INTERNATIONAL ENERGY AGENCY



Oil Supply Security

The Emergency Response Potential of IEA Countries in 2000

OECD

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The International Energy Agency (IEA) is an autonomous body which was established in November 1974 within the framework of the Organisation for Economic Co-operation and Development (OECD) to implement an international energy programme.

It carries out a comprehensive programme of energy co-operation among twenty-five* of the OECD's thirty Member countries. The basic aims of the IEA are:

- To maintain and improve systems for coping with oil supply disruptions;
- To promote rational energy policies in a global context through co-operative relations with non-member countries, industry and international organisations;
- To operate a permanent information system on the international oil market;
- To improve the world's energy supply and demand structure by developing alternative energy sources and increasing the efficiency of energy use;
- To assist in the integration of environmental and energy policies.

** IEA Member countries: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States. The European Commission also takes part in the work of the IEA.*

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- To achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
- To contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
- To contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter: Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971), New Zealand (29th May 1973), Mexico (18th May 1994), the Czech Republic (21st December 1995), Hungary (7th May 1996), Poland (22nd November 1996), the Republic of Korea (12th December 1996) and Slovakia (28th September 2000). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

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FOREWORD

Oil supply is critical to the world economy. Oil is the most important commodity in international trade and is high on the political and social agenda. The oil shock of 1973/74 underlined these facts and led directly to the creation of the International Energy Agency. Since its creation, the IEA has worked constantly to avert the disruption of world oil supply, or, if necessary, to respond quickly and effectively to an oil emergency. This task was assigned to us under the International Energy Program of 1974. It remains the IEA's core activity.

Many changes have occurred since 1974. The IEA and its Member countries have defined, developed and updated measures with which to respond to an oil emergency. We have built credible oil stocks in our Member countries. The relations between our countries and the main oil producers have improved, and some areas of common interest have been recognised. The oil consumers/producers' dialogue has become familiar. To this extent, security of supply has improved since the Agency's foundation.

But there is no room for complacency. The last decade has seen IEA countries' dependence on oil imported from non-OECD countries rise back toward the highs of the 1970s. IEA stocks as a proportion of imports have fallen steeply since the 1980s. The Agency must continue to give top priority to supply security.

So it is with great satisfaction that I introduce the present publication, "Oil Supply Security: the Emergency Response Potential of IEA Countries in 2000". The nature of possible supply disruptions has changed and will continue to change. It is only prudent, then, that IEA Member countries ensure that they are able to respond to any contingency. This book reflects the results of rigorous emergency response reviews of IEA Member and candidate countries. It describes the many ways in which they have prepared, individually and collectively, for future oil market disruptions. Should one occur, I am confident that the response of IEA countries will be well co-ordinated, timely and successful.

Robert Priddle
Executive Director

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INTRODUCTION

The International Energy Agency (IEA) was formed in 1974 to implement the International Energy Program (IEP). The Program represented the response of sixteen OECD countries to the international oil disruption of late 1973 and to the wide range of energy-sector and macro-economic problems it engendered. Twenty-five OECD countries are now members of the IEA.

Emergency response is a main element of the IEP. It includes the commitment by participating countries to hold oil stocks equivalent to 90 days of net oil imports. (In the case of European Union countries, this obligation is reinforced by an EU commitment based on consumption.) The IEP also defines an integrated set of emergency response measures – stockdraw, demand restraint, fuel-switching, surge oil production, and sharing of available supplies – for major international oil disruptions which reduce supply by 7%, the "trigger" defined in the IEP.

For disruptions below this level, the IEA has a complementary set of measures known as Co-ordinated Emergency Response Measures (CERM). These provide a rapid and flexible system of response to actual or imminent oil supply disruptions. CERM may also be used, by decision of the IEA Governing Board, in a "trigger" situation. During the Gulf Crisis of 1990/91, the IEA prepared and implemented a Contingency Plan to make available or replace the equivalent of 2.5 million barrels of oil per day. The Contingency Plan was tailored to the specific circumstances of the Gulf Crisis and consisted mainly of stockdraw. The IEA also prepared for supply disruptions resulting from possible Y2K computer problems with a Contingency Plan.

IEA policies are defined and their implementation determined by the IEA Governing Board, a body which meets at Ministerial or senior official level according to need. Under the Governing Board, standing groups carry out sectoral analysis, policy review and other operations as necessary. One of these groups is the Standing Group on Emergency Questions (SEQ), which is responsible for all aspects of emergency response. The SEQ carries out regular emergency response exercises with the international oil industry and Member governments. It is advised by an Industry Advisory Board composed of experts on supply, refining and transport from oil companies operating in IEA countries and world-wide.

To ensure the IEA's preparedness for rapid response to oil emergencies and to ensure adaptation to changes in oil market conditions, the SEQ conducts a regular cycle of emergency response reviews. Each IEA country is reviewed by the Secretariat and two or three examining countries. The review teams probe IEA countries' emergency response potential with respect to legislation, organisation, stockdraw, demand restraint, emergency sharing and other relevant factors. The present document brings together information compiled from the most recent cycle of Emergency Response Reviews. There are chapters

on the emergency response potential of each IEA Member country, as well as the candidate countries, Poland, the Republic of Korea, and the Slovak Republic. There is also an overview of IEA emergency response potential and the changing pattern of IEA emergency response requirements. Abbreviations are used for frequently occurring technical expressions. A key to these is provided at page 370.

ACKNOWLEDGEMENTS

The IEA would like to acknowledge the assistance that all Member countries provided in the preparation of this volume. The basic information resulting from a five-year cycle of reviews was updated to the situation in late 2000, with great help from their administrations.

This report reflects the work of the Emergency Planning and Preparations Division of the IEA. Under the overall guidance of the Division Head, Peter Huggins, this was carried out by the following team:

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General supervision was provided by Tatsuo Masuda, Director, Office of Oil Markets and Emergency Preparedness. Critical advice and comment was provided by others in the IEA Secretariat and by the IEA Standing Group on Emergency Questions.

CHAPTER I

THE CHANGING PATTERN OF IEA EMERGENCY RESPONSE REQUIREMENTS

Experience from the Past

There have been three distinct periods in the oil supply/demand situation of IEA and OECD Member countries since the early 1960s. The period from 1960 to the oil crisis of late 1973 was one of rapid economic growth and burgeoning oil demand. National wealth in OECD countries grew by 90% during the period, energy demand by a similar amount and oil demand by 120%. Transport demand boomed and oil cut deep into coal's markets as a furnace fuel. In the world as a whole, oil demand rose from somewhat more than 20 million barrels per day (mb/d) to approach 60 mb/d, of which OECD demand accounted for two-thirds. Many OECD countries produced little primary energy or had static or declining production. They became heavily dependent on oil imports, mostly from OPEC countries, and especially from the Middle East.

The oil price shock resulting from the 1973 crisis, reinforced by the Iran/Iraq crisis of the late 1970s, had profoundly damaging effects. It abruptly ended the period of rapid growth. OECD countries and the world were stricken by high inflation, trade and payments imbalances, high unemployment and weak business and consumer confidence. The 1973 crisis initiated a second major period of oil market development which lasted to the mid-1980s. It was characterised by vigorous efforts, especially by the countries of the IEA, to reduce dependence on oil. These efforts were underpinned by high oil prices for much of the period. In the first half of the 1980s, however, oil prices responded to the weakening market as oil supplies increased and demand continued to reflect the oil-savings measures achieved since the mid-1970s.

New oil fields came into production in Alaska and the North Sea. Nuclear energy, natural gas and coal replaced much oil in electricity generation, and energy-saving measures were widely introduced. From a high point of some 25 mb/d in the mid-1970s, OECD net oil imports dropped to 18 mb/d in the mid-1980s (Table 1).

At the same time, the supply security of IEA countries improved with the building of emergency stocks, testing and improvement of procedures for stockdraw, development of demand restraint measures and the testing of response measures, including emergency sharing. In the mid-1980s, emergency oil stocks of the IEA net importing countries reached a peak of almost 160 days of net imports.

Table 1
Annual World Oil Supply and Demand, 1975-2000
(million barrels per day)

	1975	1980	1985	1990	1995	2000[1]
OECD DEMAND						
North America	19.2	20.6	19.1	20.7	21.6	24.1
Europe	14.0	14.6	12.7	13.6	14.6	15.2
Pacific	6.1	6.3	5.7	7.2	8.7	8.8
Total	**39.3**	**41.5**	**37.5**	**41.5**	**44.8**	**48.1**
NON-OECD DEMAND						
Former Soviet Union	7.5	8.9	8.9	8.4	4.8	3.8
Europe	1.1	1.1	0.9	1.0	0.7	0.8
China	1.3	1.7	1.9	2.3	3.3	4.7
Other Asia	2.0	2.7	3.1	4.4	5.9	7.4
Latin America	2.7	3.2	3.1	4.4	5.9	4.7
Middle East	1.3	2.1	2.9	3.2	3.9	4.3
Africa	1.1	1.4	1.7	1.9	2.2	2.4
Total	**16.9**	**21.2**	**22.4**	**24.9**	**25.1**	**28.1**
Total Demand	**56.2**	**62.7**	**60.2**	**66.4**	**70.0**	**76.2**
OECD SUPPLY						
North America	12.8	14.1	15.4	13.9	14.1	14.4
Europe	0.6	2.5	4.1	4.3	6.4	6.9
Pacific	0.5	0.5	0.6	0.7	0.6	0.9
Total	**13.7**	**17.2**	**20.1**	**19.0**	**21.1**	**22.2**
NON-OECD SUPPLY						
Former Soviet Union	9.9	12.1	12.0	11.5	7.1	7.8
Europe	0.5	0.5	0.4	0.3	0.2	0.2
China	1.5	2.1	2.5	2.8	3.0	3.2
Other Asia	0.3	0.7	0.8	1.7	2.2	2.2
Latin America	1.2	2.0	2.1	2.2	3.0	3.7
Middle East	0.6	0.3	0.7	1.3	1.9	1.9
Africa	0.7	0.1	1.9	1.9	2.5	2.9
Total Non-OECD	**14.7**	**17.8**	**20.4**	**21.7**	**19.9**	**21.9**
Processing Gains	**0.5**	**0.8**	**1.1**	**1.3**	**1.5**	**1.7**
Total Non-OPEC	**28.9**	**35.8**	**41.6**	**41.9**	**42.5**	**45.9**
OPEC						
Crude Oil	27.1	26.6	16.1	23.0	25.2	28.0[2]
Natural Gas Liquids	0.5	1.0	1.5	2.0	2.4	2.9[3]
Total OPEC	**27.6**	**27.6**	**17.6**	**25.1**	**27.6**	**30.9**
Total Supply	**56.5**	**63.4**	**59.3**	**66.9**	**70.1**	**76.8**

1. Partly estimated by IEA Secretariat.
2. Actual data to third quarter.
3. This excludes OPEC supply.

The mid-1980s brought an end to the falling trend of oil imports. Since then, with low oil prices for much of the period and steady economic growth, OECD oil consumption has risen to some 48 mb/d, and net imports are now higher than they were in 1973. The bulk of additional imports continues to come from the Middle East.

While growth of demand for oil to be used in transport was somewhat slowed by high prices through much of the period, it remained on an upward trend. At the same time, dramatic savings were made by switching to alternative fuels for power generation, domestic and industry use. This was a once-for-all bonus. Oil use is now heavily concentrated in the transport sector, which is growing inexorably, with little immediate prospect for alternatives to oil in road transport, shipping and aviation. (See Figures 1 and 2.) Since there is little scope for the transport sector to switch to other fuels in a major oil disruption, and since economies are heavily dependent on the sector, this structural change has important implications for emergency response.

In the "Reference Scenario" of *The World Energy Outlook 2000*, which projects future demand and supply on the assumption of unchanged government polices, oil remains the dominant fuel in the primary energy mix, with a share of 40% in 2020, as a result of 1.9% annual growth over the projection period. This is almost identical to its share today. The volume of world oil demand is projected to be some 96 mb/d in 2010 and to reach 115 mb/d by 2020. Most of the expected incremental oil demand over the next two decades comes from the transport sector. In OECD countries, the transport sector accounts for virtually all oil demand growth. In non-OECD regions, transportation accounts for most of the growth in oil use, but the household, industry and power generation sectors also contribute. The *Outlook* forecasts that the share of the transport sector in OECD primary oil demand will exceed 60% in 2020.

Figure 1
OECD Energy Demand

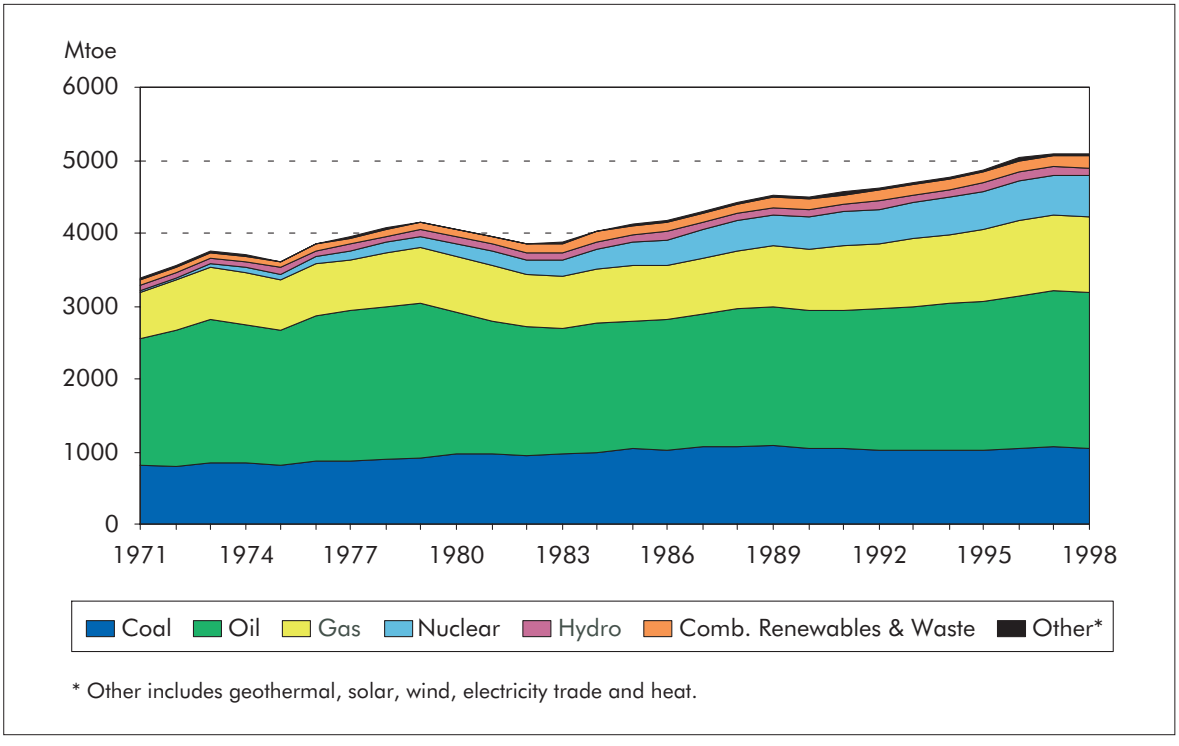
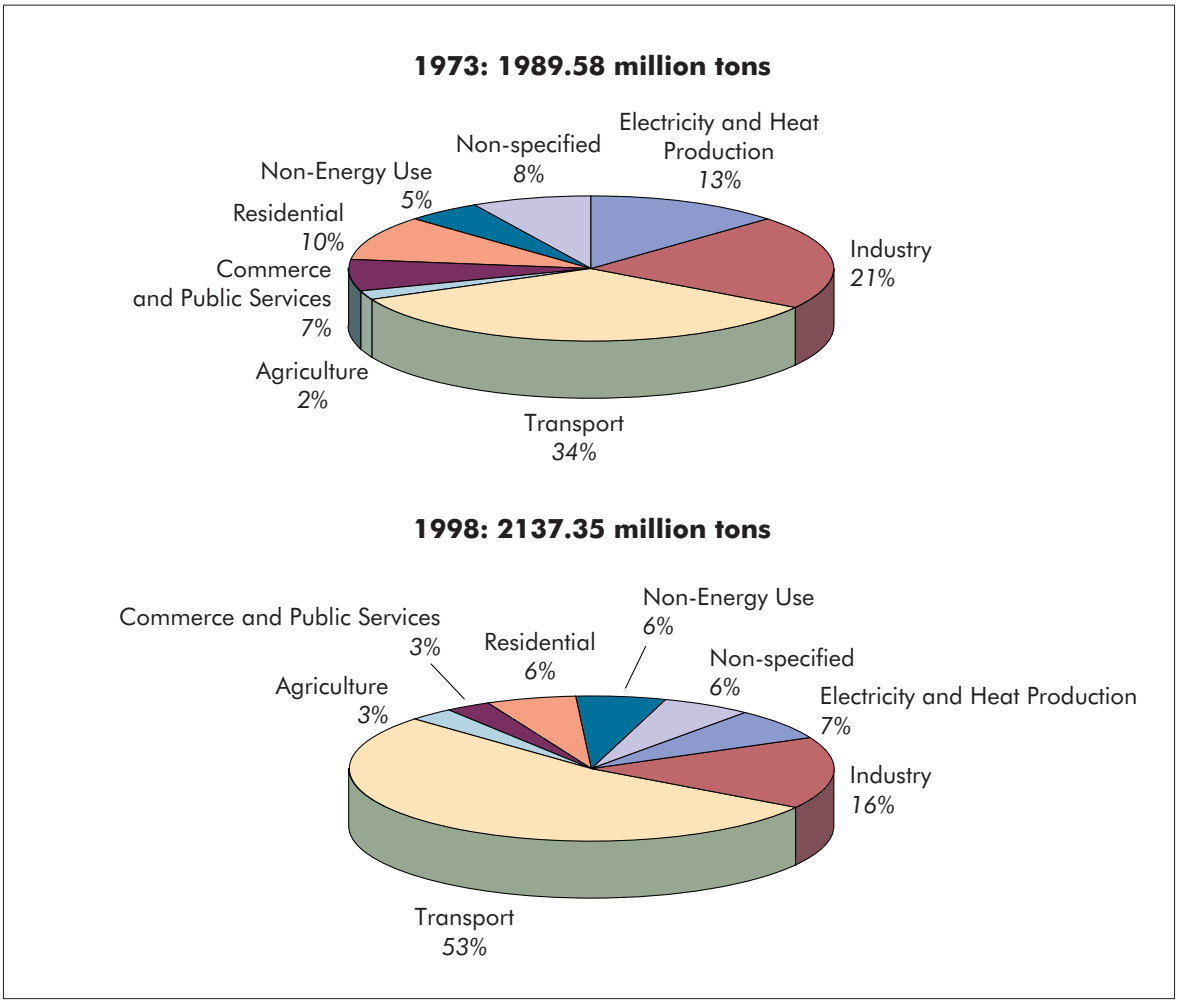


Figure 2
OECD Oil Use by Sector, 1973 and 1998



The Main Factors in Emergency Response Potential

For IEA countries, emergency response potential comprises four main elements – stockdraw, demand restraint, spare production capacity and fuel-switching capacity. The last two categories are significant only in a small number of IEA countries. The overall IEA situation for each category is reviewed below. Individual country situations are described in the country chapters of this volume.

Stockdraw

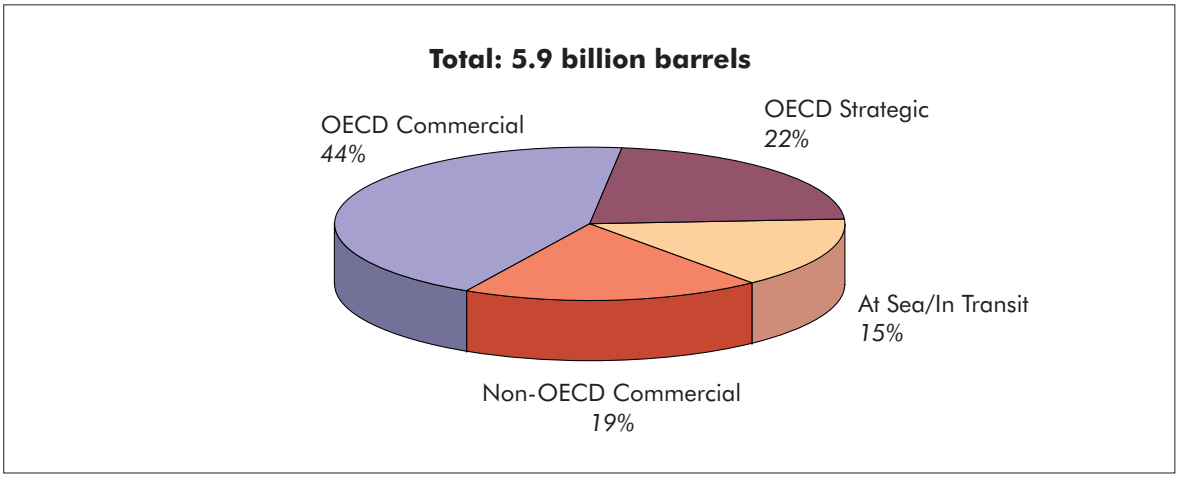
The Global Stock Situation

In mid-2000, global primary oil stocks[1] were estimated to be around 5.9 billion barrels (800 million tons), equivalent to about 90 days of world consumption. This total comprised 1.3 billion barrels of

strategic stocks (virtually all of them in OECD countries) and 4.6 billion barrels of commercial stocks. The latter category included 2.7 billion barrels in OECD countries, 1 billion barrels in the rest of the world[2] and 0.9 billion barrels of oil at sea or in transit (Figure 3). In addition to primary stocks, there are usually around 1 billion barrels of stocks held in secondary and tertiary storage,[3] bringing total stocks to almost 7 billion barrels.

Some two-thirds of primary stocks are covered by the reporting systems of OECD countries. The remaining third includes commercial stocks in non-OECD countries, in independent storage, at sea and in tanks awaiting export by producers. In the event of a major disruption, therefore, most stockdraw response by governments could only take place within the IEA. In an open world market, IEA countries would be confronted with a disruption affecting them and other countries alike. There would be a shared interest among all countries in mitigating the effects of the disruption.

Figure 3
Global Primary Oil Stocks
(Mid-2000)

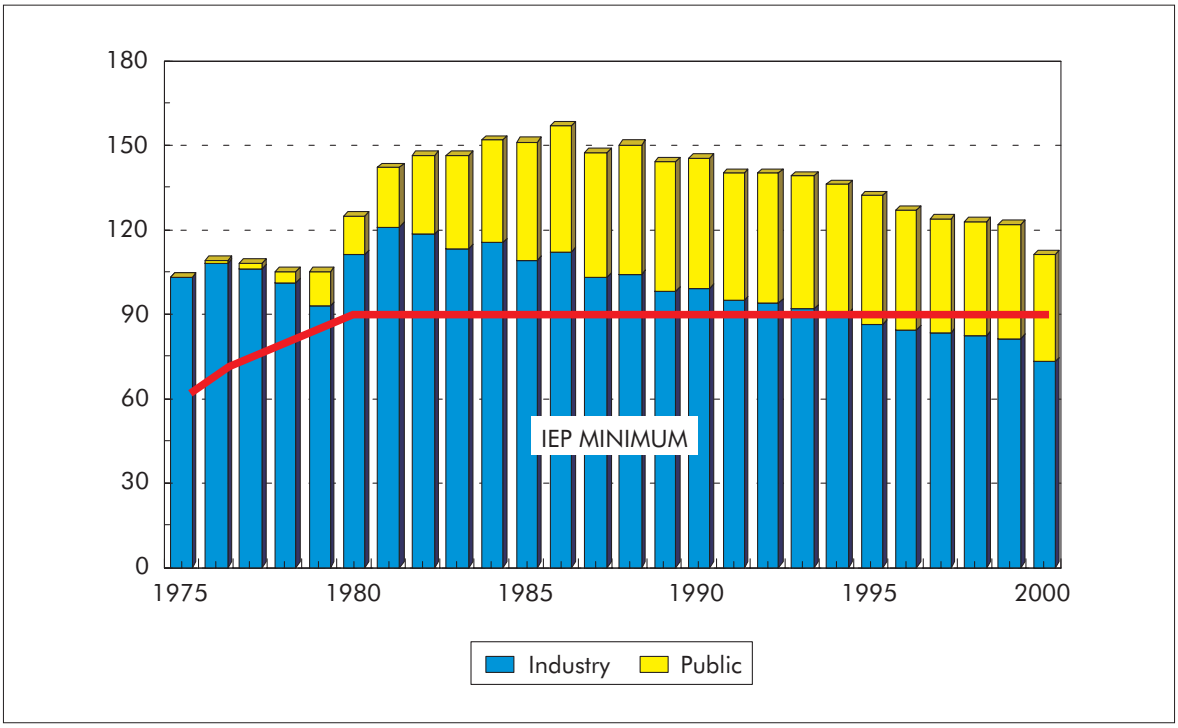


IEA Stock Levels

The IEA monitors primary oil stocks held in IEA Member countries which are not in transit.[4] By IEA definitions, stocks in IEA net importing countries mid-2000 are estimated at 370 million tons (Mt), or about 2.7 billion barrels, an amount equivalent to rather more than 110 days of net imports. Stocks are low by historical standards, particularly when compared to the 1986 peak of almost 160 days (Figure 4). The decline since the mid-1980s reflects a tendency by industry to hold lower stocks, combined with some loss of momentum in the building of public stocks, notably in the United States. The decline in

1. **Primary stocks** are held by producing, transport (e.g. tankers, pipeline, barges), and refining facilities and large distribution terminals. **Secondary stocks** are held by small distribution stations, wholesalers and retailers. **Tertiary stocks** are held by consumers.
2. Estimated on the basis of 55 days of demand cover typically assumed by industry analysts.
3. "How Much Oil Inventory Is Enough?", Energy Intelligence Group, 1997 (p. 13).
4. This excludes such categories as oil-at-sea or in floating storage or pipeline fill.

Figure 4
Stocks in Days of Net Imports: IEA Net Importers*



* Mid-year levels

industry stocks reflects efforts by oil companies to rationalise downstream operations and minimise costs through better management of stocks. Despite this declining trend, IEA oil stocks are well above the 90-days in aggregate and fully capable of responding to oil supply emergencies.

Overall, then, stocks are much lower than they were in the mid-1980s or at the time of the Gulf Crisis, when IEA countries implemented a 2.5 mb/d Contingency Plan including 2 mb/d of stockdraw. But, while volume is important, it is not the only criterion of effectiveness in an emergency. Chapter II reviews government control over stocks and other factors affecting their efficient use in an emergency.

Demand Restraint

Demand restraint refers to short-term oil savings which can be achieved during the period of a crisis. The measures to achieve demand restraint fall into three main classes – persuasion and public information, administrative and compulsory measures, and allocation and rationing schemes. Demand restraint programmes reflect local demand patterns and economic structures, legislation and emergency response policies. Especially in the early phase of a crisis, some governments may prefer to use stocks in excess of their 90-day IEA commitment rather than introduce demand restraint measures.

Most Member countries have statutory powers to implement demand restraint measures in both sub-crisis and IEP trigger situations. Actual implementation would depend on local circumstances, the nature and length of the crisis and the level of stocks.

It is generally accepted that price changes resulting from tighter markets in a supply disruption would assist in balancing oil demand and supply, although their overall effect on the level of demand might be rather limited. Especially effective in this respect would be the differentials between prices of different products, which would signal varying degrees of scarcity in a crisis and stimulate production of those products that are in short supply.

Member countries would use a variety of demand restraint measures during supply disruptions. Most countries now have measures which can be flexibly adapted to changing market conditions. The initial emphasis is likely to be on persuasion and light-handed measures to restrain end-use demand rather than on compulsory measures or allocation. In the absence of an IEP trigger situation, persuasion or selected compulsory demand restraint measures, such as reduced speed limits, are generally envisaged. The IEA emergency response reviews have shown that Member countries are continuing to assess and improve the flexibility of their emergency response measures in changing market conditions.

Other Response Measures

Capability to switch from oil to other fuels has been significantly reduced since the 1970s. In particular, growth of natural gas use has reduced the scope for fuel-switching in power generation. Oil-fired electricity generation in IEA countries now accounts for less than 7% of total electricity compared with one quarter in the mid-1970s. In individual countries, the amount of oil savings through switching will depend on the volume of oil use in dual or multi-fired installations or in power stations forming part of integrated systems.

Oil-producing countries may be able to increase indigenous production in a crisis situation. The extent of such capacity would depend on particular circumstances, and would be constrained by the need to maintain good oil field practices. The aggregated capacity of IEA countries to increase oil production is small, but some oil-producing countries have such spare capacity.

Key Recent Developments

In addition to the Emergency Response Reviews, the IEA carries out regular exercises and consultations to ensure effective emergency preparedness and to update policies and procedures to reflect the current oil market context. Key developments during the review cycle have included:

- A February 1995 IEA Governing Board Decision gave priority to the use of co-ordinated stockdraw and other measures in all disruptions, regardless of size and before activation of allocation mechanisms.
- A Conference on Long-Term Oil Security Issues in 1996 attracted wide participation from the oil industry, including CEOs of major oil companies and senior officials. One of the main conclusions of the conference was that stockdraw complemented by other measures was the most effective method to mitigate or respond to an oil crisis.
- A Global Oil Security Conference was held at the IEA in 1997. Its objective was to share experience with non-members about recent changes in the oil market and how they could affect national and global oil security. Participation included ten non-Member countries and regional energy organisations.

Non-Member country participants described their domestic oil security arrangements and were briefed on a range of IEA emergency response measures.

- An Emergency Response Exercise (ERE 98) was held in 1998. This exercise was based on the scenario of a crisis worsening over time. Its main objectives were to train oil company personnel and IEA government officials in emergency procedures and to test existing procedures. The exercise included the preparation of a three-stage IEA emergency response over a three-week period. ERE 98 was the first emergency response exercise that included a surprise market simulation element.
- As a follow-up to ERE 98, an Oil Stockholding Seminar and a "war-game"-type Disruption Simulation Exercise were held in 1999. These two conferences were attended by a wide range of participants from the IEA Member and candidate countries, by over 20 oil company representatives and by experts from the International Petroleum Exchange and the New York Mercantile Exchange. The main objective of the Stock Seminar was to assess the current IEA stock situation and contribute to a strategy for the maintenance and use of emergency stocks in the future. The purpose of the Disruption Exercise was to use hypothetical scenarios in a real-time setting to enhance understanding of the probable development of market reactions in an emergency.
- Y2K presented a unique challenge. IEA work in preparation for the possibility of supply disruption resulted in the formulation of a 2 mb/d response plan. Planning and preparations were continuous throughout the roll-over to the year 2000. A Computer Bulletin Board was introduced to monitor and share information on real-time Y2K developments. In the course of 1999, the IEA organised five regional seminars on Y2K from Caracas to Moscow to raise awareness in non-Member countries. The Disruption Simulation Exercise included Y2K scenarios. Through these intensive activities, contacts were established with industry bodies, companies, government agencies and other international organisations working on the Y2K issue. The Agency gained new expertise and extensive contacts.

Emergency Response Policy Issues for the Future

One of the major conclusions emerging from the IEA's continuing work on the *World Energy Outlook* is that OECD countries will become increasingly dependent on energy supplies from the Middle East. This dependence, however, may begin to recede by 2020, as oil products from unconventional sources (shale oil, tar sands and conversion from coal, biomass or gas) begin to play an important role. With increased reliance on Middle Eastern oil and the expected slow transition to the use of non-conventional liquid fuels, the probability of supply disruptions and price shocks may increase in the intervening period.

While IEA dependence on oil imports fell from some 70% in the mid-1970s to about 50% in the mid-1980s, it has increased steadily since then and is likely to reach and exceed 70% in the next decade. With rising IEA oil consumption and declining indigenous production, continuing growth of oil imports appears inevitable in the medium term. The OECD's oil dependence (net imports as a percentage of oil demand) is projected to rise over the outlook period, from less than 60% at present to about three quarters in 2020. In North America, oil import dependence is expected to rise to almost two-thirds in 2010, but then level off over the next decade, as much of the world's unconventional resources are situated in this region. After peaking in the next decade, OECD Europe's conventional oil production is projected to decline. With most of the oil import increase needing to come from the Middle East, issues of supply potential and vulnerability will be key concerns. Strong supply security and emergency response policies remain imperative.

The implications of increasing net oil imports for IEA stockholding requirements are significant. Should IEA countries decide to maintain the same ratio of stocks to net imports in future as in the late 1990s, they could need to increase stocks by as much as 50% by the second decade of the century. This would imply an increase from about 500 million metric tons OECD-wide to the range of 700-800 million metric tons. Apart from overall stock levels, the emergency response potential of IEA countries will depend on the degree of government control over stocks, the split between crude oil and refined products, the adequacy of stocks of individual crude oil types and the efficiency of emergency response procedures. Perhaps the biggest immediate challenge is to translate future threat into present policies on emergency reserves when many governments are confronted with competing budgetary demands.

In the area of demand restraint, government strategies face tougher challenges than in the past. The considerable diminution in fuel-switching potential in the last twenty years places a greater burden on demand restraint in reducing oil product use in an emergency. However, as noted earlier, use of oil products is increasingly concentrated in road, air and maritime transport, where demand is relatively unresponsive to price changes in the short term. This reinforces the argument for strong policies on emergency reserves. The present volume reviews the considerable current and planned efforts of IEA countries to prepare adequately for major oil supply disruptions.

CHAPTER II

IEA EMERGENCY RESPONSE POTENTIAL – AN OVERVIEW

Emergency Reserves

This chapter summarises emergency reserve issues identified during the recent cycle of IEA Emergency Response Reviews and other IEA exercises. It includes stockdraw policies of Member countries as well as recent developments and the current situation of emergency stock systems.

Stockholding Requirements of Member Countries

IEA Stockholding Requirements

Each IEA net oil importing country has a 90-day stockholding obligation, in accordance with the International Energy Program. Net exporting countries (at present, Canada, Denmark, Norway and the United Kingdom) do not have stockholding obligations under the IEP. Denmark and the United Kingdom, however, hold stocks under consumption-based EU regulations, as do other EU Member countries. Canada and Norway do not have stockholding obligations under international agreements, but Norway has its own national stockholding and emergency arrangements.

Recent Emergency Response Reviews of Member countries confirmed that all countries except Canada (which is a non-EU net oil exporter), have established national legislation or government regulations concerning emergency reserves to be held by oil companies, stockholding agencies or the government to meet the 90-day IEP stockholding requirement or other national or multilateral requirements. The legal basis for stockholding in each country is summarised in Annex 2.

Stockholding Requirements of the European Union

The current legislation of the European Union on emergency stockholding obligations results from the EEC Council Directive 68/414/EEC as amended by 98/93/EC. It requires that member states hold

emergency stocks of oil products of three major categories equivalent to 90 days of domestic consumption of the previous calendar year.

The three categories of major oil products are:

- gasolines and related feedstocks;
- middle distillates; and
- heavy fuel oil.

As noted above, the net oil exporters Denmark and the United Kingdom must hold stocks under EU regulations, as do other EU Member countries. Denmark and the United Kingdom, however, are granted a 25% reduction in their obligation, reflecting indigenous production, in accordance with the Directives (See Annex 3: Summary of European Union Legislation Concerning Crisis Measures and Oil Stocks).

The Stockholding Systems of Member Countries

Types of Stockholding Systems

Stocks to meet IEA requirements are held within three broad types of oil stockholding systems. They can generally be described as follows:

- Company stocks — Compulsory stocks and commercial stocks.
- Government stocks — Financed with central government budget and held exclusively for emergency purposes.
- Agency stocks — Maintained for emergency purposes by both public and private bodies. They are usually held under a co-operative cost-sharing arrangement allowing the industry to meet its legal requirements under the IEP Agreement.

Government stocks and agency stocks are usually referred to as public stocks.

System Diversity Among Members and its Development

There is significant policy diversity across Member countries among the three groups of stockholding systems. Member systems may be categorised in the following four groups:

1. Only company stocks

- Eleven net importing countries: Australia, Austria, Belgium, Greece, Italy, Luxembourg, New Zealand, Portugal, Sweden, Switzerland and Turkey;
- Three net oil exporters (no IEA stockholding obligation): Canada, Norway and the United Kingdom.

2. Company and government stocks

- Two net importing countries: Japan and the United States.

3. Company and agency stocks

- Six net importing countries: The Czech Republic, Finland, France, Hungary, the Netherlands and Spain;
- One net oil exporter: Denmark (no IEA stockholding obligation).

4. Company, agency and government stocks

- Two net importing countries: Germany and Ireland.

In eleven Member countries, the IEA stockholding obligation is met exclusively with industry stocks. Eleven countries hold government or government-controlled agency stocks. All these countries could draw on their government and/or agency stocks in both selective and general IEP trigger situations. In a sub-crisis situation, should a national emergency be declared or international co-ordination be required, all these countries have the statutory power to use their government and/or agency stocks.

All stockholding agencies are in EU member countries or in countries applying for EU membership (Czech Republic and Hungary). Belgium, Italy and Portugal are contemplating the establishment of such agencies. Germany and Ireland are the only Member countries that still hold all three types of stocks, although German government stocks are being replaced with increased agency stocks.

The Role of Government and Agency Stocks

In most countries in which both company and government/agency stocks are held, the circumstances of a disruption would determine the priority between company and government or agency stockdraw.

The United States would draw down the government-owned Strategic Petroleum Reserve in co-ordination with other IEA countries. In Japan, the government considers, in principle, that company stocks should be made available to the market prior to a government stockdraw, with two exceptions: (i) if international consensus requires government stockdraw; and, (ii) if the government decides to use government stocks due to the nature of a crisis. However, the trend of recent policy is toward using government stocks before industry stocks according to the nature of an emergency. In May 1999, the Petroleum Council of Japan recommended that the MITI (the Ministry of International Trade and Industry) use government stocks as the first tool to calm the market in a sub-crisis situation. The Netherlands puts emphasis on COVA (the Netherlands Stockholding Agency) stockdraw in both sub-crisis and IEP-trigger cases. Germany considers that drawdown of company stocks would be a measure of last resort.

In recent years, there has been some reduction or elimination of government-owned stocks in the United States, Germany, and Italy. There has also been a move to shift responsibility for holding compulsory industry stocks to stockholding agencies. New agencies have been established in the Czech Republic, Finland, Hungary, Ireland and Spain. This form of stockholding was recently recommended in an amendment to EU Directive 68/414/EEC as the best means to increase transparency, fairness and compliance with stock obligations.

The tables below illustrate the development of Member countries' stockholding systems and the shares of company, government and agency emergency stocks since 1980. The number of countries holding agency stocks has increased, whereas the number of countries with government stocks has decreased. The percentage of company stocks in total emergency stocks has declined.

Table 2
Development of Member Countries' Emergency Stockholding Systems
Number of Countries

Stockholding System	1980	1985	1993	2000
Company stocks only[1]	11	11	15	14
Company and government stocks	6	6	4	2
Company and agency stocks	3	3	3	7[1]
Company, government and agency Stocks	1	1	1	2
Number of the IEA countries[1]	21	21	23[2]	25[3]

1. The numbers include net oil exporters. Canada was a net oil importer in 1980. Since 1981 Norway and the UK have also been net oil exporters. Denmark has been a net exporter since 1994 and has agency stocks. These countries have no stockholding obligation under the IEP Agreement. All these countries, however, hold company stocks.
2. Finland and France formally joined the IEA in 1992.
3. Hungary joined the IEA in 1997 and Czech Republic joined the IEA in 2001.

Table 3
Development of Emergency Stocks: Share of Company, Government and Agency Stocks
(%)

	1980	1985	1993	1999
Company Stocks	89	72	69	67
Government Stocks	7	24	26	25
Agency Stocks	4	4	5	8

Compulsory Company Stocks

Statutory power to require compulsory company stocks

All IEA Member countries hold company stocks as a part of emergency oil stocks and most of them impose compulsory stockholding requirements on companies. The exceptions are:

- Canada and Norway, which are non-EU net oil exporters;
- Australia, which has a minor IEP emergency reserve commitment and small imports;
- the United States, which maintains a large volume of government-owned reserves;
- the Czech Republic, Germany, Hungary and Ireland, which have shifted stockholding obligations to established stockholding agencies; and
- New Zealand, which until recently relied on methane-to-gasoline conversion.

The governments of Australia, Ireland, New Zealand, and the United States have stand-by statutory authority to require oil companies to hold stocks, but do not at present use this statutory power. Canada, the Czech Republic, Norway and Hungary have no statutory power to impose stockholding obligations on oil companies. Table 4 summarises Member governments' statutory power over company stocks.

Compliance with the stockholding obligation

In 16 countries (Austria, Belgium, Denmark, Finland, France, Greece, Italy, Japan, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Switzerland, Turkey and the United Kingdom), the law imposes a penalty on oil companies in case of non-fulfilment of stockholding obligations.

Government authority over company stockdraw

In most Member countries, statutory government power over companies' compulsory stocks is granted (or guaranteed) by legislation. Once the IEP trigger has been activated or a state of emergency declared, governments are generally authorised to reduce compulsory stock levels. As shown in Table 4, 20 countries could reduce compulsory stock levels in an IEP trigger situation or a sub-crisis situation.

Table 4
Statutory Power over Company Stocks

Country	Mandatory stock requirement on companies	Penalty for non-fulfilment	To reduce mandatory level in a supply disruption		To control or instruct physical release in a supply disruption	
			Under 7%	Over 7%	Under 7%	Over 7%
Australia	(x)	–	(x)	(x)	(x)	(x)
Austria	x	x	x[1]	x	x[1]	x
Belgium	x	x	x	x	x	x
Canada	–	–	–	–	x[1]	x[1]
Czech Republic	–	–	–	–	x[1]	x[1]
Denmark	x	x	x	x	x	x
Finland	x	x	x[1]	x	x[1]	x
France	x	x	x	x	x	x
Germany	–	–	–	–	x	x
Greece	x	x	x	x	–	x
Hungary	–	–	–	–	–	–
Ireland	(x)	–	(x)	(x)	(x)	(x)
Italy	x	x	x	x	x	x
Japan	x	x	x	x	x	x
Luxembourg	x	x	x	x	x	x
Netherlands	x	x	x	x	x	x
New Zealand	(x)	–	(x)	(x)	(x)	(x)
Norway	–	–	–	–	–	–
Portugal	x	x	x	x	x	x
Spain	x	x	x	x	x	x
Sweden	x	x	x	x	(x)	x
Switzerland	x	x	x[1]	x	x[1]	x
Turkey	x	(x)	–	–	x	x
United Kingdom	x	x	x	x	x	x
United States	(x)	–	(x)	(x)	(x)	(x)

x Applicable
(x) Standby authority not actually used
– Not applicable
1. Depends on the national supply situation (e.g. the declaration of a national emergency).

Since most countries could invoke the state-of-emergency provisions of national legislation, they would have the authority to carry out or to require physical release of stocks in a sub-crisis situation, should a national emergency be declared or the IEP trigger be activated. Below the IEP trigger, under the Co-ordinated Emergency Response Measures, the declaration of a state of national emergency is required for company drawdown of oil stocks in four countries (Austria, Canada, Finland, and Switzerland).

While virtually all IEA governments have powers to reduce mandatory stock obligations where such obligations exist, it is less clear whether in all cases legal measures, short of requisition, exist to force oil companies to draw down their oil stocks. This issue has been examined in the current cycle of Emergency Response Reviews, and some countries have been encouraged to adopt legislation or procedures to ensure the actual drawdown of industry stocks rather than simply removing legal obstacles to such drawdown.

In four counties (Australia, Ireland, New Zealand and the United States) the legislation to require company stockdraw, both in the IEP-trigger and CERM situations, exists only as a stand-by authority. The legislative power is not in use at present and might not be available outside a national emergency broader in scope than an oil supply disruption. Hungary has no legal authority to compel drawdown or to allocate commercial stocks on national territory.

Operating versus Usable Stocks

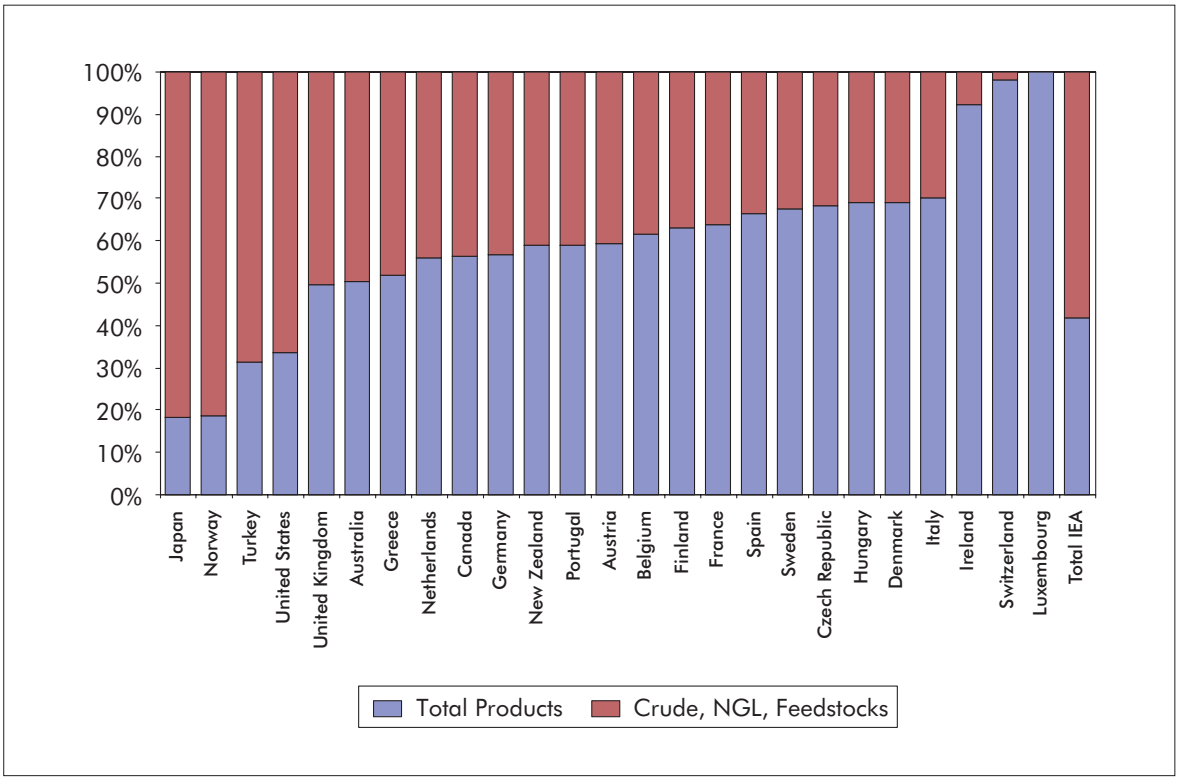
Stocks held by refineries and bulk terminals can be broken down into several subgroups. Tank bottoms, which have to be cleaned of impurities before they can be processed, typically constitute 5% or less of reported stocks. Some stocks reflect the necessity to deliver oil in batches. The optimal cycle stock is one-half the size of the average cargo received. In practice, companies augment these stocks to protect their business against tanker delays due to bad weather, shortage of tankers or problems at production sites. This additional volume of stocks is also often referred to as 'safety stocks'. Some stocks are also needed to prepare for seasonal fluctuations in product demand or to sustain shipments abroad. These types of industry stocks are accessible, but cannot really be deemed always usable, because any barrel that is consumed has to be replaced by another in order to keep pipelines, tankers and refinery units in operation. Oil company sources estimate that these operating stocks have typically made up a large portion of the primary sector inventory. The remaining portion represents the usable commercial stocks. In measuring country compliance with the IEA commitment, the IEA subtracts 10% from total stocks to reflect part of technically unavailable stocks.

Product versus Crude Oil Stocks

Total IEA emergency stocks are split more or less evenly between crude oil and petroleum products. However, there are large variations across Member countries, with the share of products ranging from as low as 15% to as high as nearly 100% (Figure 5). At the lower end of the range are Japan and the United States, which fill their government-owned storage primarily with crude oil, and Norway, which, as a major producer and exporter, needs to maintain large operational stocks of crude oil. At the higher end are Luxembourg and Switzerland, land-locked economies that depend heavily on product imports from refineries in neighbouring countries.

Industry stocks tend to include relatively high proportions of petroleum products which are used to meet seasonal fluctuations in consumer demand. In Europe, product stocks are also needed to meet the EU stockholding requirements which, unlike IEA requirements, are defined in main product groups.

Figure 5
Total Products and Crude Oil Closing Stocks, August 2000



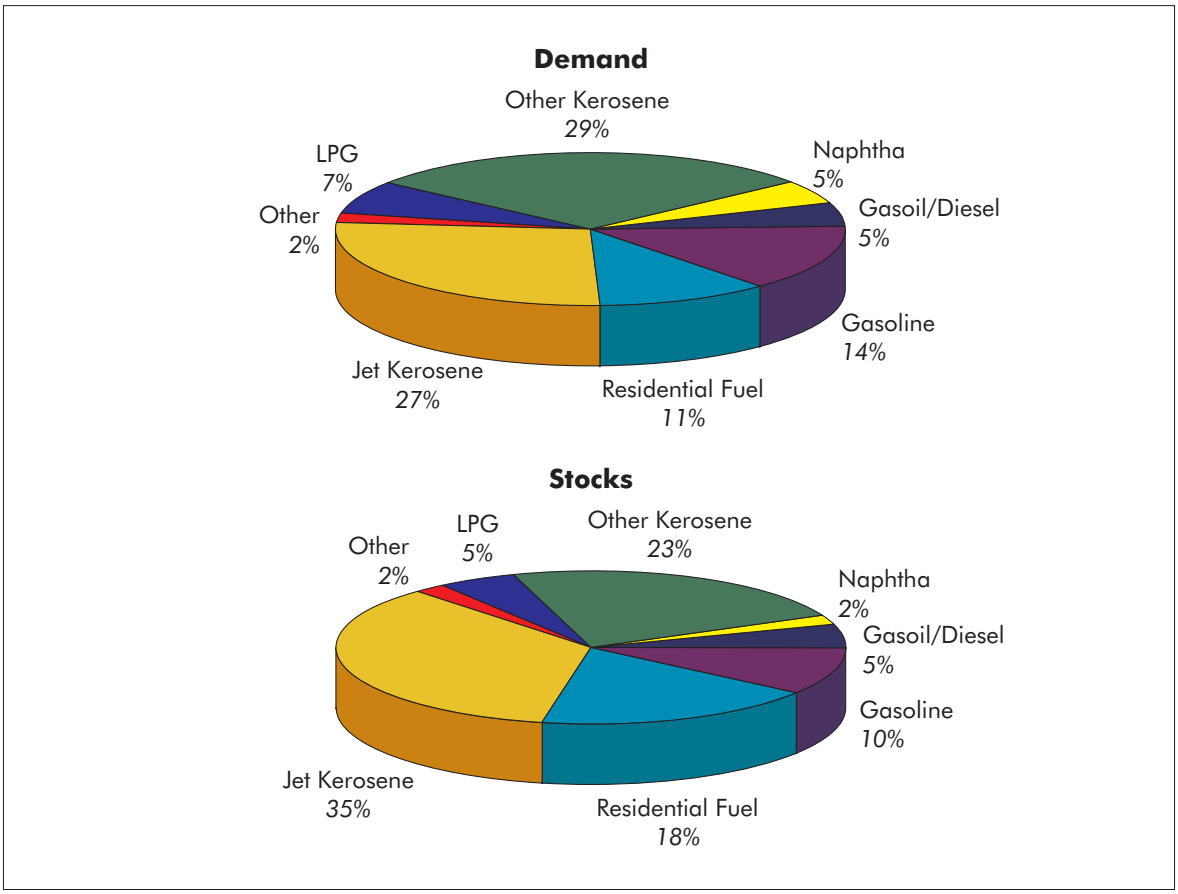
Government-owned storage is normally dominated by crude oil that is not needed for operating purposes. Crude oil is generally cheaper to store and its quality is technically easier to maintain. Crude oil stocks also provide more flexibility, in that they can be processed into products that meet the demand patterns during a supply disruption.

Product Stocks and Product Demand

The structure and quality of stocks are also important factors in the effectiveness of stockholding policies. Analysis of the structure of IEA product stocks at the end of 1999 indicates that stocks of gasoline were disproportionately low, relative to demand. The 23% share of gasoline in total IEA product stocks compared with a 29% share in total demand. Stocks of high-sulphur residual fuel oil (HSFO), on the other hand, were disproportionately high: 18% of total product stocks compared to an 11% share in demand. Smaller imbalances also apply to gasoil/diesel, the stocks of which are somewhat high, and naphtha and jet kerosene, the stocks of which are relatively low.

Gasoline stocks are proportionate to demand in Europe but not in North America and the Pacific region. Of particular concern is the situation in North America, where gasoline has a 41% share in total product demand but only a 29% share in total product stocks. As for HSFO, stocks are proportionate to demand in the Pacific region, but higher in North America and Europe. Overall, the imbalances are most marked in North America, where oil companies are not constrained by stockholding obligations.

Figure 6
Structure of IEA Product Demand and Stocks
(end-1999)



Drawdown Rates and Quality of Crude Oil in Government Storage

There are currently eleven IEA Member countries that have government or agency-owned emergency oil stocks. The three largest storage systems are in the United States, Japan and Germany, which jointly account for more than 90% of total IEA public stocks.

In the United States, SPR (Strategic Petroleum Reserve) stocks, which are exclusively crude oil, could be drawn at a maximum rate of 4.1 mb/d over the first three months and at progressively lower rates, falling to zero after seven months. This peak rate has increased significantly from a maximum rate of 3.4 mb/d in December 1995, although there has been little change in the level of SPR stocks.

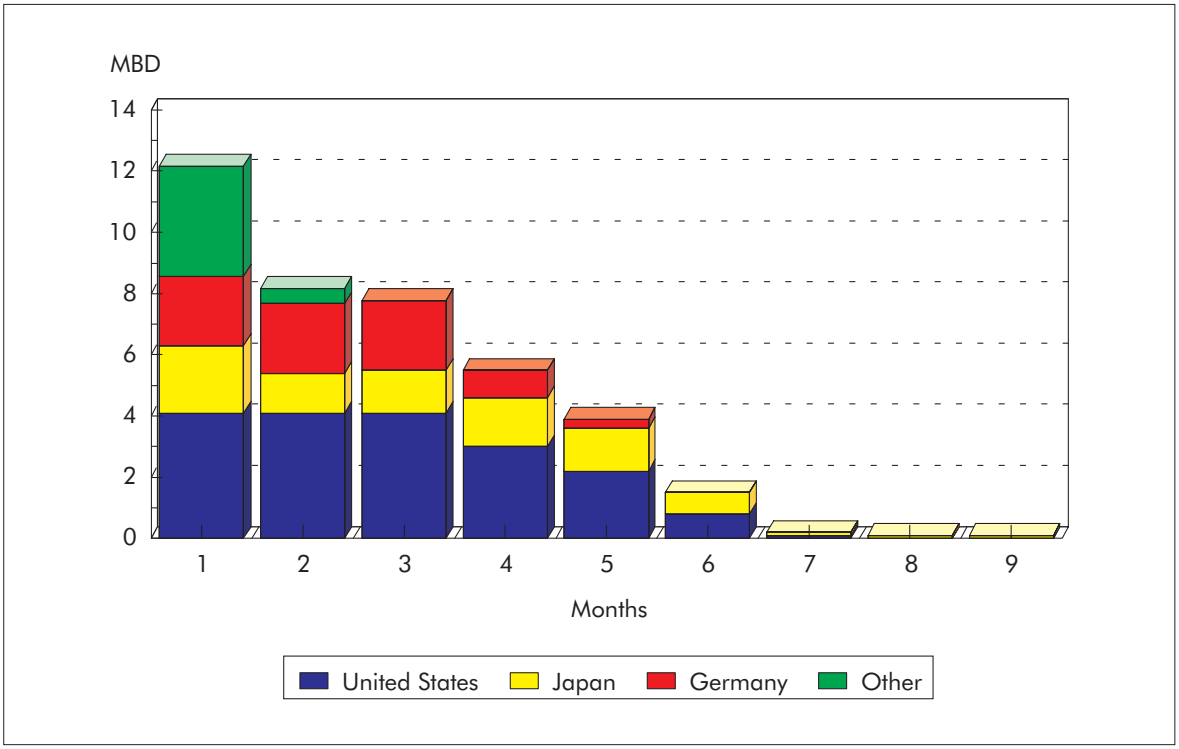
For JNOC (Japan National Oil Corporation) stocks, the drawdown profiles vary depending on the size of disruption and the time of the year, because part of the stocks is located in offshore tanks that may be more difficult to use during bad weather. The drawdown profile assumes an initial rate of 2.3 mb/d during the first month, falling steeply to negligible volumes after six months.

For EBV (the German stockholding agency, *Erdoelbevorratungsverband*) stocks, excluding crude oil reserves that the government has not yet sold, the initial drawdown rate is just below that for JNOC

stocks (2.3 mb/d), but is maintained over the first three months rather than just one month. This includes a crude oil component of 0.9 mb/d and a product component of 1.4 mb/d. At these maximum rates, all EBV stocks could be liquidated in five months.

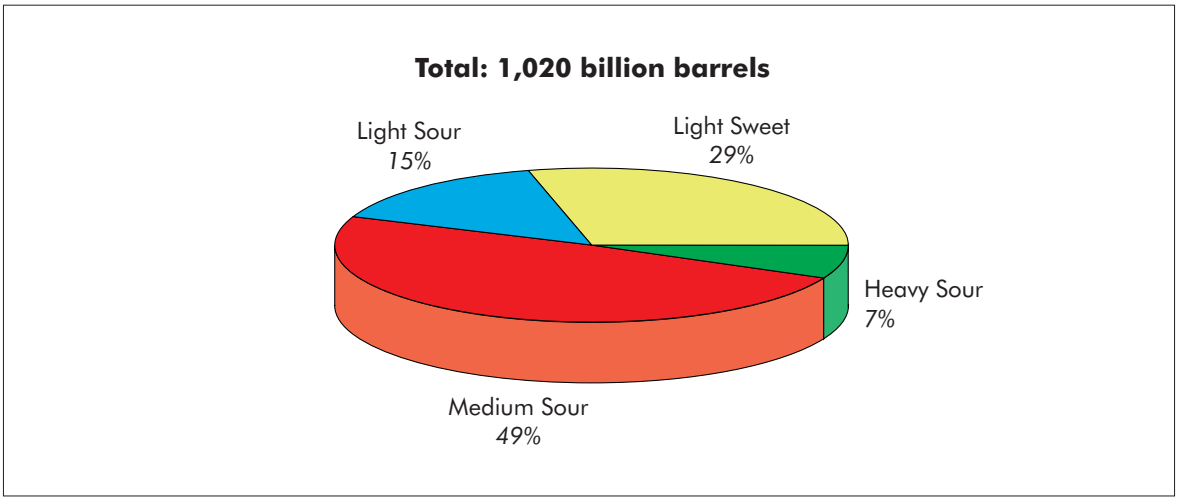
Most of the public stocks held in other IEA countries could be drawn down completely during the first 30 to 60 days, adding about 3.6 mb/d in the first month and 0.5 mb/d in the second. In some cases, these maximum rates could be reached only if there were no simultaneous drawdown of industry stocks, which would otherwise compete with public stocks for available transport capacity. The combined profile for all IEA public stocks indicates an ability to draw as much as 12 mb/d in the first month and around 8 mb/d in the following two months (Figure 7). Thereafter, the drawdown rates decline rapidly, reaching negligible volumes by the eighth month. It should be noted that a certain lead time is necessary until public stocks start flowing to the market, depending on the location of stocks and procedures for release.

Figure 7
Maximum Drawdown Profile for IEA Public Stocks



The quality of crude oil stocks would also be an important consideration during an oil crisis. Overall, IEA public stocks are dominated by light to medium crude oil (with gravity higher than 30° API) which can be processed even by simple refineries (Figure 8). Only 6% of the stocks are of the heavy type (less than 30° API) that requires the use of conversion capacity. However, desulphurisation capacity may be a more critical constraint, as nearly three-quarters of total stocks are sour grades with sulphur content in excess of 0.5%. Medium sour grades alone account for half of all public stocks, reflecting the IEA countries' dependence on oil imports from the Middle East and, to a lesser extent, from Russia.

Figure 8
Quality Characteristics of Public Crude Oil Stocks



Demand Restraint

Most Member countries have statutory powers to initiate demand restraint measures in both sub-crisis and IEP trigger situations. In a few countries the government can introduce mandatory measures subject to parliamentary confirmation at a later date. Few countries have *no* statutory authority to respond to a sub-crisis. In some cases, response depends on whether supply shortfalls are judged to cause a national energy supply emergency. Particularly in federal systems, regional governments may have significant authority to cope with local supply disruptions, with co-ordination between federal (or central) and regional governments playing a crucial role.

The use of different demand restraint measures in adjacent regions or countries could result in distortions of consumption reductions. These efforts need to be properly co-ordinated by the countries concerned. Federal governments in North America, for example, play an important part in co-ordinating the demand restraint measures of state, provincial or territorial governments. In Europe, several countries co-ordinate demand restraint measures with their neighbours.

There has been a strong trend towards oil price deregulation in IEA countries. At the same time, many countries have maintained standby price control authority for declared oil supply disruptions. In a crisis or pre-crisis situation, it is now generally accepted that price increases resulting from tighter markets would assist in balancing oil demand and supply, notably in providing refineries with an incentive to increase output of the products in shortest supply, so that price controls would need to be used sparingly.

Member countries would use a variety of demand restraint measures during supply disruptions. Most countries now have measures which can be adapted flexibly to changing market conditions. The initial emphasis is often on persuasion and light-handed measures to restrain consumer demand, rather than on compulsory measures or allocation. In the absence of an IEP trigger situation, persuasion or some selected compulsory measures, such as reduced speed limits, are generally envisaged. Member countries are continuing to assess and improve the flexibility of emergency response measures in changing market conditions.

National persuasion schemes to reduce oil demand are expected to be widely used in oil supply disruptions. The target of persuasion varies in each country, ranging from the general public to specific oil users. Lead times for these measures are very short. The effectiveness of persuasion cannot easily be determined, as it depends to a large extent on the specific circumstances of each country, such as industry-government relations, availability of standby compulsory measures and the magnitude of supply disruptions.

In many countries, compulsory and administrative consumption reduction measures are in place and available for use when IEP procedures are activated. These measures include: reduced speed limits, car-pooling, driving bans on the basis of particular days or odd and even registration plates, carless days, limited service station hours and restrictions on heating and lighting.

After activation of IEP emergency measures, many Member governments have the authority to use allocation and rationing measures. In most cases, however, these measures would be used only as a last resort.

Crude oil allocation would ensure equitable distribution of available oil from domestic sources by supplying crude oil to refiners in proportion to the amount normally used. Petroleum product allocation would control the volume of products that refiners and other major suppliers may sell to wholesale customers in proportion to normal supplies. Bulk allocation schemes are widely envisaged for specific fuel types. Special provisions usually apply for priority sectors such as health and security.

Bulk allocation and rationing programmes could control sales to retail customers. While many countries have programmes for automotive fuel rationing, these programmes generally have long lead times of two to three months or more.

Stockdraw *vs.* Demand Restraint

On the issue of stockdraw versus demand restraint measures in the early stages of a supply disruption, about one-third of Member governments consider that demand restraint measures would be the main response. Another third give priority to stockdraw. However, most countries are flexible about an early use of emergency stocks, depending on the circumstances of the crisis. Most of the larger net oil importing countries, including Germany, Japan and the United States, have a well-developed stockdraw capacity.

Australia, Austria, Belgium, France, Italy and Spain consider that, in general, demand restraint measures would be the main response in the early stage of a disruption. The government of France has indicated that stockdraw would be used in principle as a measure of last resort, and that the initial response to oil emergencies would rely strongly on demand restraint measures.

The United States, whose compulsory emergency stocks consist solely of the government-owned Strategic Petroleum Reserve, is prepared to draw down stocks in the early stages of a supply disruption in order to calm the market. Danish stocks in excess of the IEP commitment allow the government to intervene with substantial volumes in an early co-ordinated action. The United Kingdom is confident that it could restore the market balance through company stockdraw in the early stages of a supply disruption.

Japan used to rely on industry stockdraw, demand restraint and fuel-switching in the early stages of a supply disruption. Its government stocks were destined for release only in the later stages of emergency response, except under special circumstances. In the latest Emergency Response Review, a shift was

registered towards using government stockdraw as the main instrument of Japan's emergency response, rather than demand restraint and industry stocks. A similar policy shift was noted in the emergency response policy of Finland, as well as that of Switzerland.

It is the policy of Germany, Portugal and Sweden that both early stockdraw and demand restraint measures could be implemented, taking account of the circumstances of the disruptions. Australia, Austria, Belgium, Canada, Greece, Italy, Spain, New Zealand and Turkey are also flexible about an early use of stockdraw, depending on the circumstances.

Other Response Mechanisms

The ability of IEA countries to switch from oil to other fuels was significantly reduced during the latter half of the 1970s and the first half of the 1980s. While the oil price decline in the mid to late 1980s reversed this trend somewhat, the recent tendency towards increased use of natural gas has meant that the scope for fuel-switching for power generation remains limited. Oil-fired electricity generation in IEA countries now accounts for less than 7% of total electricity generated, compared with about a quarter in the mid-1970s. The recent period of high oil prices has reinforced this trend. In some IEA countries, however, the local contribution of fuel oil to electricity generation is significant. This is another example of the need for flexibility in the IEA approach to emergency response, allowing each country to choose its method of achieving its contribution to joint response.

Some oil-producing countries, especially Saudi Arabia, have some capability to increase indigenous oil production in a crisis situation, using their spare capacity. This is another important factor in considering responses to supply disruptions. During the Gulf Crisis, about 4.3 mb/d of oil was lost from the international market following the Iraqi invasion of Kuwait, but as much as 3.7 mb/d of this loss was compensated within two months or so by increased production in Saudi Arabia and other oil producers. Such capacity in IEA countries is small.

Organisation

Implementation of IEA emergency response measures requires strong emergency organisation within each national Administration to respond quickly and efficiently when the need arises. The legal basis for emergency organisation is important, since powers need to be of sufficiently wide scope, unambiguous and easy to administer. The legislation of individual IEA countries is summarised in Annex 1.

CHAPTER III

THE RESPONSE POTENTIAL OF INDIVIDUAL IEA COUNTRIES

This chapter provides emergency response profiles of individual IEA countries. Each profile is set out in the following sequence:

- **Key Oil Data**
- **Oil Import Dependence and Market Structures**
- **Emergency Response Policy and Organisation**
- **Emergency Reserves**
- **Demand Restraint Measures**
- **Other Response Measures**
- **Data Collection**
- **Refining Capacity**
- **Map of Oil Infrastructure**

Map of Australia



AUSTRALIA

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	21.3	27.7	28.5	28.0	25.7	30.4	29.4	29.3
Imports	14.5	8.8	14.3	20.8	28.3	32.9	38.9	44.8
Exports	–3.3	–8.2	–9.2	–13.0	–16.7	–22.2	–24.4	–27.7
Bunkers	–1.1	–0.7	–0.6	–0.8	–0.8	–0.9	–0.9	–0.9
Net Imports – NI	10.0	–0.1	4.5	7.0	10.8	9.8	13.6	16.2
Total Supply	31.4	27.6	32.9	35.0	36.6	40.2	43.0	45.6
Import Dependence (%)	32.0	..	13.6	20.0	29.6	24.3	31.6	35.6
Stock – Days of NI	210	..	303	365	216	..	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Australia depends on imports for some 23% of its oil requirements. Current energy supply of about 108 Mtoe comprises 35% oil, 16% natural gas, 43% solid fuels and 6% other sources. Crude oil is imported mainly from Indonesia, Vietnam, Saudi Arabia and other Asian countries, whereas significant amounts of products are imported from Singapore.

Production of crude oil and condensate grew rapidly in the early 1970s and since 1984-1985 has averaged some 530 000 b/d. Although new developments coming on stream over the next two or three years will lift production to between 585 000 b/d and 800 000 b/d, the Bureau of Resource Sciences estimates that production from identified plus undiscovered reserves will decline to anywhere between 275 000 b/d (90% probability) and 530 000 b/d (10% probability) by 2010. At the end of 1995, Australia had already produced more than half its assessed crude oil resources and around 10% of its condensate resources. It is likely that Australia will join its Asian neighbours in the IEA in becoming more import dependent, especially on oil from the Middle East, beyond 2010.

The Australian economy consumes about 34 million metric tons per year of refined oil products. Consumption is over 70% transport fuels, of which 40% is gasoline, 12% aviation fuel and 31% diesel.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	13 360	13 593	1.7
of which unleaded	9 517	10 324	8.5
Kerosene and jet fuels	3 930	3 956	0.7
Gas/diesel oil	10 599	11 024	4.0
Residual fuel oil	1 491	1 791	20.1
Other	4 138	4 073	–1.6
Total	**33 518**	**34 437**	**2.7**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Indonesia	5 951	4	0	0	0	15	5 970
Vietnam	5 294	0	0	0	0	0	5 294
Papau New Guinea	3 226	0	0	0	0	0	3 226
Saudi Arabia	2 497	129	22	0	0	202	2 850
Malaysia	1 805	0	21	0	0	3	1 829
Singapore	100	352	925	0	115	62	1 554
Other	5 204	176	232	663	27	801	7 103
Total	**24 077**	**661**	**1 200**	**663**	**142**	**1 083**	**27 826**

Source: IEA Quarterly Oil Statistics.

Australian crude oils are low in sulphur, vanadium and nickel contaminants. Due to their high quality, these crudes can often command a price premium. To reduce costs, Australian refiners generally source a large proportion of their intake from lower cost Middle Eastern and Asian producers rather than indigenous supplies.

Most production is often remote from population centres. However, shipping costs are reduced by industry product exchanges. Refinery exchanges reduce or eliminate the need for cross hauls. Under the Navigation Act (1912), any ship engaged in coastal trade must be licensed by the Australian Government; the Act does not apply to intra-state trade.

The main factor influencing increased production in cases of international shortage would be price. The Petroleum [Submerged Lands] Act of 1967 gives the government legal power to require further production increases with no delay, provided this is consistent with good oil field practice.

There have been continuous improvements to the refining sector over recent years, and these are expected to continue as Australian refiners make the investment necessary to meet new fuel specifications. These specifications are currently being developed and are expected to come into effect between 2002 and 2006. The amount of investment necessary to meet the new specifications and increased competition from Asian refineries is expected to lead to a restructuring within the Australian

refining industry which may include mergers and/or closures. The Downstream Petroleum Products Action Agenda (DPPAA) has been developed to provide a process for Government to co-ordinate its responses to these difficult issues confronting the refining industry.

There have been two significant changes to the oil supply system in Australia since the early 1990s. Van Ommeren has built a new import terminal at Port Botany, Sydney and a change of ownership of two other terminal complexes arose out of the merger of Ampol and Caltex in 1995. The merged company was required by the Australian Competition and Consumer Commission to divest itself of two of its terminals, Hastings Point in Victoria and the Brisbane terminal. Van Ommeren purchased Hastings Point and Fletcher Challenge purchased the Brisbane terminal. Currently, imports by independent operators move largely through the Van Ommeren Terminal in Sydney and small volumes through Hastings Point in Victoria. The Fletcher Challenge Terminal in Brisbane operates for oil from major international oil companies.

Emergency Response Policy and Organisation

Emergency Response Policy

Emergency measures which aim to minimise the social and economic impact of an oil supply emergency have been in place since the early 1980s. These measures were last reviewed in 1989, and the Administration undertook a comprehensive evaluation in 1997/1998 to determine their adequacy in the light of the changing world oil market situation and changing supply/demand circumstances in Australia. The final report on this evaluation was completed in September 1998.

Also, two surveys were conducted, one to determine the potential for additional local oil production and the other to determine crude oil, condensate and petroleum product stock levels and stockholding capacity.

From Australia's point of view and following its re-evaluation, the most useful and immediately available measures are market-driven demand restraint, voluntary and compulsory demand restraint and, to a lesser extent, stockdraw. Surge production can add little to supply.

Current government policies are aimed at minimising government intervention and facilitating a market approach where possible and compatible with IEA emergency response procedures. This allows the market to operate with minimal intervention.

As approximately 70% of oil is consumed as transport fuels, Australia has been encouraging the use of alternative transport fuels for many years through a range of measures, particularly through an excise concession. Under this regime, liquefied petroleum gas (LPG) from refineries, crude oil and natural gas production have increased in market share of all road transport fuels to around 8 – 9%. It currently has the highest growth rate, and this substitution could be expected to grow in an emergency.

Emergency Organisation

The Australian National Emergency Sharing Organisation (NESO) consists of the National Oil Supplies Emergency Committee (NOSEC), which comprises the Department of Industry, Science and Resources

(ISR) and State/Territory government officials and industry representatives. NOSEC meets every 12 months to discuss national/state emergency measures.

During a national fuel supply emergency, the federal, state and territory governments act in close consultation to take actions such as:

- controlling crude oil and condensate production levels;
- requiring oil companies to accumulate, hold or release oil stocks;
- transferring oil between owners and/or locations;
- prescribing the output of refineries;
- regulating oil exports; and
- controlling the distribution and sale of oil products using *ad hoc* demand restraint measures, including higher prices.

In general, State and Territory energy-related emergency responsibilities, including oil emergencies, are handled by the same agency, allowing for a close relationship with other crisis planning and management personnel.

The Liquid Fuel Emergency (LFE) Act 1984 is the principal legal basis for the management of a severe fuel shortfall at a national level, providing the Commonwealth with powers, in consultation with the State and Territory governments, to co-ordinate fuel production and distribution. It is administered by the Minister for Industry, Science and Resources. The purpose of the Act is to equip the Commonwealth with the authority needed to prepare for and handle a national oil supply emergency.

The contingency planning powers of the Act may be implemented by Ministerial direction at any time. The emergency provisions of the Act are only operational following proclamation of an emergency by the Governor-General in Council. To date, no emergency has been proclaimed since the Act was established.

During an emergency, the Commonwealth has specific powers in relation to the maintenance of reserve stocks, the physical transfer of stocks, the sale of liquid fuels to designated customers and the regulation of refinery operations.

The Commonwealth government is not obliged to use all the measures available to it, and action will only be initiated by a direction given by the Minister, his delegate or an authorised official. Many of the powers conferred by the Act to the Commonwealth Minister may be delegated by him to State and Territory Energy Ministers, to officials and authorised persons. It is expected that, in practice, the Minister will delegate extensively, although some powers may not be delegated.

The Act is based on the co-operative approach between Commonwealth, State and Territory governments. The effective management of a national oil emergency requires certain preparations to be undertaken prior to the onset of a supply shortage. This is provided for in Part II of the Act - Contingency Planning Powers. In contrast, the Emergency Powers in Part III can only be used after the formal declaration of a national oil emergency by the Governor-General.

Allocation Procedures

The Administration believes that during a disruption, higher prices for crude oil and petroleum products would reduce oil demand in Australia, thereby enabling the producing companies to export more oil.

As Australian oil attracts a premium because of its high quality, it is likely that the producing companies would sell overseas as prices rose in order to maximise their revenue. However, should it be necessary, the NESO could direct operations of companies and have legal backing to do so through legislation.

A co-operative approach with industry would be used first, with reliance on the LFE Act being available if the disruption to oil supplies were more severe.

The LFE Act and the Petroleum Submerged Lands Act ensure implementation of all types of allocation operations.

Emergency Reserves

Policy and Legal Instruments

The legal powers to enable government-initiated drawdown of stocks reside in the Act, although a co-operative approach would be used first. Legal authority through the Act provides a basis for participation in an early or sub-crisis response.

Australia more than meets its IEA obligation. Because Australia is 70% self-sufficient in oil and a net oil exporter, the Administration finds it difficult to justify government investment in stocks or to require industry to maintain minimum stocks. According to the Administration, it is difficult to attribute an historical supply pattern to spot market sales of oil. Accordingly, the Administration's position is that Australian indigenous production not contracted to overseas markets would be available for purchase by Australian refiners at prevailing world spot market rates during a crisis.

Stockholding and Maintenance

Currently, Australia easily exceeds the IEA stockholding requirement without requiring companies to hold additional stocks, and this situation is unlikely to change over at least the next few years. Australia has no plans to hold strategic stocks or to ask oil companies to hold additional stocks, as it already holds stocks well in excess of IEA requirements.

Australia does not have a policy on particular product stock levels. If problems in product stock levels were to arise during an emergency, these would be solved in co-operation with the oil industry.

Operational Aspects of Stockdraw

The Administration would rely on the oil companies drawing down stocks as required or directed by government. Stocks would be released through the normal supply and distribution system, and it is unlikely (and undesirable) that the government would control the prices of these products. The government may, however, introduce product (particularly gasoline) rationing in order to reduce demand.

The government would not immediately initiate a national emergency and activate the LFE Act. However, once the LFE Act was activated, the time from a government decision to having an effect on physical deliveries would be some days.

There has not yet been a physical test of co-ordinated stockdraw. In the event of a disruption, the success of State/Territorial demand restraint measures would depend on their timely activation, which in turn would depend to a large extent on the availability of up-to-date stocks information.

Compliance Issues

Companies report stock levels to the government on a monthly basis. Companies not complying with Ministerial direction during an emergency to hold certain levels of stocks or to draw down these stocks could be penalised. The penalties range from fines to imprisonment.

Demand Restraint Measures

Policy and Legal Instruments

As the government does not hold oil stocks and has a policy of requiring oil refinery marketers and importers to hold stocks, more emphasis is placed on demand restraint as an effective emergency response measure than in many IEA Member countries, even though demand restraint measures do affect the economy.

Legal authority for implementing demand restraint measures is provided for in the LFE Act. The measures can be enacted either before or after activation measures by the IEA after a national emergency is declared by the Governor-General. The measures are then implemented through the various State and Territory legislative controls. This is not dependent on the activation of IEP measures. In Australia, use of voluntary and compulsory demand restraint measures is largely controlled by State and Territorial governments. Past experience, notably in industrial disputes, has shown that mechanisms in place are operational.

Procedures and Monitoring

While the government would expect some consumption reduction as a result of rising prices in a supply shortfall, additional government-induced demand restraint would also be required in most situations. The main focus of demand restraint would be the transport sector. Available programmes include:

- public information and persuasion campaigns;
- full pass-through of world market increases in oil and product prices;
- reduced speed limits;
- odd/even license plate number refuelling rules and obligatory service station closures;
- a bulk allocation scheme and specified users; and
- motor fuel rationing.

The Commonwealth government has a well-prepared programme for implementing bulk allocation in co-operation with the oil industry. Oil companies maintain thorough records over the preceding twelve months of deliveries to their customers (industrial companies and other large final consumers, distributors and retailers). The government has a formal system for establishing priority users (hospitals,

municipal services, public transport, etc.) and companies would adjust their bulk allocations to take into account these government-established priorities and to compensate for shifts in the demand pattern (i.e. customers that have entered or exited the market). If necessary, in a particularly severe or prolonged disruption, the Commonwealth government has a motor fuel rationing system. This system would be based on car registration and administered by State/Territory transport authorities, acting upon Commonwealth government guidelines.

Measures would be directed largely toward the road transport sector, which accounts for over 70% of Australian oil consumption, and the prime demand target would be gasoline consumption. It has been estimated that some 15% of private motoring in Australia is discretionary, and therefore gasoline consumption could be cut considerably without causing severe economic damage. Somewhat lower levels of demand restraint would be anticipated for diesel fuel (used principally for commercial road transport), aviation fuels and marine bunker fuels, since the use of these products is more directly related to economic activities than is the use of gasoline.

Lead times for implementation of these programmes are less than one week for publicity campaigns and automotive fuel demand restraint measures, two to four weeks for the bulk allocation scheme, and less than four weeks for automotive fuel coupon rationing. In addition, States and Territories have individual emergency response plans and procedures manuals. Quantitative effects of these campaigns would be measured at monthly intervals.

Decision Processes

The NESO was activated and the decision processes were effectively engaged during the Gulf Crisis. Based on the results from the Gulf Crisis, when gasoline prices rose by 50%, gasoline demand decreased by 10%. Similar price rises for diesel led to a decrease in demand of around 4%.

Other Response Measures

Australia's current capacity to increase production of crude oil and condensate during an emergency is limited to the more recent fields off the northwest coast of Western Australia.

A survey was undertaken in late 1997 of the main producing companies in Australia to determine potential surge production. Survey results indicated that, provided environmental regulations for flaring etc. were relaxed, there is potential for increased production of 50 - 60 000 b/d, around 10% of Australia's total crude oil and condensate production. It is anticipated that higher prices for crude oil would stimulate increased production. Although the government does have the power through the Petroleum Submerged Lands Act to prescribe production levels, these levels could be constrained by technical limits such as reservoir damage or production capacity constraints. Increased crude oil and condensate production could be obtained from the producing areas off the coast of northwest Australia. However, this would have significant environmental costs, as well as representing an opportunity cost to the companies concerned.

At present, natural gas produced in Australia is little used as a transport fuel. Most crude oil and natural gas liquids are used to produce transport fuels and there is little opportunity for large-scale fuel-switching in the short to medium term.

The industry sector accounts for only 21% of Australian oil use. Those industrial users still using residual fuel oil have little potential for short-term fuel-switching or for otherwise restraining demand without reducing output. Within this sector, the mining industry is an important user of diesel fuel, and nickel and alumina smelters are large fuel oil consumers. However, deregulation of Australia's electricity and gas supply industries will lead to greater flexibility in fuel supply, particularly for power generation.

Data Collection

A comprehensive system of questionnaires is used to collect data on indigenous production, stock levels, refinery operations and product demand. The data is processed through sophisticated computerised checking procedures before being compiled into IEA questionnaires. Overseas trade data is obtained from the Australian Bureau of Statistics and included in a similar process. Every two years, a survey of end-use is carried out to provide information for IEA Annual Oil Statistics.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Ampol (Caltex)	Lytton	4.5	90.0			1.5	29.7	1.5	29.7						
BP Australia	Kwinana	6.2	124.7	1.0	18.0	1.6	30.2	1.6	30.2						
BP Australia	Bulwer Island	3.3	66.2	0.8	14.0	1.0	18.5	1.0	18.5						
Ampol (Caltex)	Kurnell	5.2	104.4	0.9	17.1	2.1	41.0	2.1	41.0						
Mobil	Altona	6.0	121.5	1.8	34.2	1.3	25.2	1.3	25.2						
Mobil	Port Stanvac	3.5	70.2	1.3	23.1	0.0	0.0								
Shell	Geelong	5.3	107.1	0.6	10.2	2.1	40.5	2.1	40.5						
Shell	Clyde	3.8	77.4	1.0	18.9	1.6	31.5	1.6	31.5						
Total		**37.7**	**761.4**	**7.3**	**135.6**	**11.3**	**216.5**	**11.3**	**216.5**						

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Ampol (Caltex)	Lytton			1.0	23.4	0.4	8.3	0.1	3.0	0.1	1.4	7.4			
BP Australia	Kwinana			0.9	20.3	2.3	47.7	0.1	3.0	0.1	1.9	13.5			
BP Australia	Bulwer Island			0.5	11.9	1.0	20.4	0.1	2.2						
Ampol (Caltex)	Kurnell			1.2	27.2	0.7	14.4	0.1	3.2	0.1	2.3	7.2			
Mobil	Altona			1.5	34.2	2.3	47.7	0.1	2.6						
Mobil	Port Stanvac (Adelaide)			1.0	23.4	2.7	54.9					9.0			
Shell	Geelong			1.4	31.5	3.4	70.2	0.2	4.1	0.1	2.4	11.1			
Shell	Clyde			0.8	18.0	2.2	44.1	0.1	2.7	0.0	1.1				
Total				**8.2**	**189.9**	**15.0**	**307.7**	**0.9**	**20.7**	**0.4**	**9.1**	**48.2**			

Map of Austria



AUSTRIA

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	1.5	1.2	1.2	1.1	1.0	0.7	0.6
Imports	11.6	9.6	10.4	11.2	13.1	11.4	11.6
Exports	–0.2	–0.8	–0.4	–1.3	–1.6	–0.9	–0.9
Bunkers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Imports - NI	11.4	8.7	10.0	9.9	11.4	10.5	10.7
Total Supply	12.9	9.9	11.3	11.0	12.5	11.1	11.2
Import Dependence (%)	88.2	88.0	89.2	89.9	91.8	94.0	95.1
Stock - Days of NI	90	115	89	103	102	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structure

Austria depends on imports for 90% of its oil requirements. Current energy supply of 28 Mtoe comprises 44% oil, 23% natural gas, 11% solid fuels and 22% other sources. Oil is imported mainly from Germany, the countries of the former Soviet Union, Iraq, Libya, the Czech Republic and Algeria.

The country's dependence on coal and natural gas imports is also very high. Overall, about two-thirds of domestic energy requirements are met through imports. The long-term energy projections were updated in 1996 by the Austrian Institute for Economic Research in a report titled "*Energy Projections until the Year 2010*". The salient features of these projections are: (a) a 23% decline in gasoline consumption by 2010, due largely to the increased use of diesel oil; (b) a 37% drop in heating oil consumption, and (c) a 44% increase in natural gas consumption, mainly at the expense of hard coal.

A large proportion of Austria's oil product demand is met by the OMV refinery in Schwechat, near Vienna. This complex and sophisticated refinery has a distillation capacity of 10 million tons per year, numerous upgrading and conversion units, blending plants, shipping facilities and tank farms with capacity to store 1.4 million tons of crude oil and products. The refinery currently processes mainly light crude oil from Algeria, Nigeria and Libya and produces around 8.8 million tons of refined products a year.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	2 130	2 047	–3.9
of which unleaded	2 130	2 047	–3.9
Kerosene and jet fuels	551	541	–1.8
Gas/diesel oil	5 436	5 752	5.8
Residual fuel oil	1 816	1 592	–12.3
Other	1 451	1 508	3.9
Total	**11 387**	**11 440**	**0.5**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Germany	204	359	1 113	196	31	232	2 135
Former Soviet Union	1 774	0	3	0	0	19	1 796
Iraq	1 701	0	0	0	0	0	1 701
Libya	1 235	0	0	0	0	0	1 235
Czech Republic	184	84	525	244	0	46	1 083
Algeria	928	0	0	0	0	0	928
Other	2 409	320	851	27	3	253	3 863
Total	**8 435**	**763**	**2 492**	**467**	**34**	**550**	**12 741**

Source: IEA Quarterly Oil Statistics.

OMV and four international oil companies operating in Austria jointly account for some 80% of total oil product supply. The remaining 20% is supplied by 114 smaller local companies involved in product imports. Since there are no price controls or restrictions on imports of finished products, OMV is faced with intense international competition which comes mainly from Germany and Italy, whose oil products tend to meet Austrian specifications better than those from neighbouring refineries in Slovakia and Hungary. In particular, the western and southern parts of Austria are supplied with products from Bavarian and Italian refineries. Despite this competition, OMV's market share has been stable in recent years. OMV has been partially privatised and is now owned by a consortium comprising the State (35%), International Petroleum Investment Company (IPIC) of Abu Dhabi (19.6%) and a number of smaller national and international investors (45.4%).

Crude oil is shipped to Austria through the Trans-Alpine-Line (TAL), which connects Triest (Italy) with Ingolstadt (Germany). At Würmlach (Austria), TAL links with the Adria-Vienna-Pipeline (AWP), which extends to the Schwechat refinery. In 1999, total throughput of the TAL pipeline reached 33 million tons, of which 7.9 million tons were shipped through the AWP pipeline to Schwechat. AWP is jointly owned by OMV and four major oil companies, which are the only shippers on the line. Access for other companies is limited, as the line operates close to capacity. There are no other pipeline connections with neighbouring countries. River barges and rail transport are also used to distribute petroleum products across the country.

In recent years there have been proposals to link the Schwechat refinery by pipeline with the nearby refinery in Bratislava, which is supplied by the Druzhba pipeline. Such a connection would allow Austrian oil companies to access Russian and Slovak oil supplies and, eventually, Slovak companies to access oil imports from Triest. OMV's negotiations with Slovnaft have so far failed to produce an agreement, mainly for economic reasons. One of the key obstacles is the small spare capacity on the AWP pipeline (1 to 2 million tons), which would limit the scope for Slovak shipments from Triest to Slovakia.

Emergency Response Policy and Organisation

Emergency Response Policy

Austria has a well balanced mix of primary energy consumption, comprising coal (12%), oil (40%), gas (23%), hydropower (14%), and other energy sources (11%). The main objectives of Austrian energy policy are: security of energy supply, reduced dependence on energy imports, rational use of energy, and environmental and social acceptability. The dependence on energy imports is being reduced through efforts to increase the use of indigenous renewable energy sources (mainly hydro and biomass). Some of these sources, such as biomass, receive special tax incentives and subsidies. Projected increases in consumption of natural gas will contribute to achieving the environmental objectives.

Oil security is an important element in Austria's overall energy policy. The share of oil in primary energy consumption has been reduced from almost 50% in 1980 to some 40% at present. The scope for further reductions is limited, as only about 4% of power generation is based on oil. However, there is some scope for reduction in industrial use.

Austria has a strict legal framework to deal with oil supply crises. The Administration considers that demand restraint would be the main response to a supply crisis. Demand restraint and other response measures would be prepared in close co-operation with the oil industry and implemented flexibly in response to the given situation.

Emergency Organisation

The Austrian NESO includes industry experts and is embedded on a standby basis in the Energy Department of the Federal Ministry for Economic Affairs. In times of supply difficulties, the Energy Steering Council (*Energielenkungsbeirat)*, which consists of representatives from various ministries, energy industry and social partners, would act as an advisory body to the Minister for Economic Affairs and within the Austrian emergency organisation. The four social partners are: the Chamber of Commerce, the Chamber of Employment, trade unions and the Conference of the Chambers of Agriculture. These chambers have fairly centralised structures and are represented in many important institutions influencing economic activity. Obligatory membership in the chambers ensures that most participants in economic activity participate in the work of the chambers.

The legal framework for Austrian emergency management consists of the Energy Steering Law (*Energielenkungsgesetz* 1982) and the Stockholding and Reporting Law (*Erdöl-Bevorratungs-und Meldegesetz* 1982). These laws clearly define all tasks, measures and responsibilities of the relevant national and regional emergency organisations. In addition, there are also regulations and plans within

the "Comprehensive Country Defence System" (*Umfassende Landesverteidigung*). This system is enshrined in the Austrian Constitution (Article 9a) and is under the responsibility of the Federal Chancellor. It includes, *inter alia,* the military, civil and economic defence of the country. Within the framework of economic defence, crisis measures are foreseen for all kinds of commodities, including energy. Exercises are periodically carried out.

Allocation Procedures

Austria prefers to rely on voluntary participation of oil companies in the allocation process. Hence, any allocation measures would be discussed between the Austrian NESO, oil companies and the Federal Chambers of Commerce. Nevertheless, the Energy Steering Law of 1982 enables the Minister for Economic Affairs to enforce transactions concerning the fulfilment of Austria's potential international obligations. No other legal authority is needed to implement measures for meeting Austria's allocation obligations.

Emergency Reserves

Policy and Legal Instruments

The government would have strong statutory powers to draw stocks once the Energy Steering Law is activated. In January 1995, the law was amended in order to provide a basis for Austria's participation in CERM-type responses. The amendment stipulates that any steering measures can be activated by the government if there is a need to comply with international legal obligations based on decisions of executive bodies of international organisations. In the absence of conditions for the activation of the Energy Steering Law, voluntary actions from the industry can be expected as a result of discussions within the framework of the Austrian Social Partnership.

Stockholding and Maintenance

The Stockholding and Reporting Law of 1982 guarantees at all times the availability of emergency reserves covering 90 days of net imports. All importers are obliged to hold emergency stocks equivalent to 25% of their previous year's net imports, plus 10% for unavailable stocks (thermal power plants must hold stocks sufficient to maintain electricity supplies for 30 days). There is no legislation or plan for holding stocks in excess of the IEP commitment. However, industry stocks typically exceed the 90-day commitment by 10 to 15 days of net imports.

Most emergency stocks are commingled with operational stocks, which ensures low storage costs, physical integrity of stocks, high system flexibility and immediate availability of oil to the market. These stocks are continuously recycled to maintain adequate quality of products. Total storage capacity is currently about 1.2 million tons for crude oil and 4.5 million tons for oil products. OMV's main product tank farm outside the refinery is located in St. Valentin (near Linz) at the end of the product pipeline (1.5 million tons per year) from Schwechat. It has a capacity of 520 000 tons of oil products. Erdöl-Lagergesellschaft (ELG) owns a crude oil storage facility (surface tanks) in Graz with total capacity of 520 000 tons. The current utilisation rates are 60-70% for crude oil storage and 50-60% for product storage.

ELG is a private non-profit company owned by OMV and four majors, and offering stockholding services to oil importers. It operates under the Stockholding and Reporting Law of 1982 and the Stockholding Promotion Law of 1977, and reports monthly to the Ministry of Economic Affairs. Importers can choose to hold emergency stocks by themselves or to transfer their stockholding obligation to ELG, which is obliged by law to accept contracts with any oil company. ELG's current stocks of 320 000 tons of crude oil contribute only about 12% to Austria's 90-day obligation, because many importers choose to hold their mandatory product stocks in their own tanks. ELG does not hold any product stocks except for 6 000 tons of diesel used for cleaning crude oil tanks.

Maximum storage tariffs are set per ton of oil products by the Federal Minister for Economic Affairs and are currently equivalent to 0.09 Austrian schillings per litre of motor gasoline and gas oil and 0.07 Austrian schillings per litre of fuel oils. This implies an average storage cost of around US$ 0.83 per barrel of oil equivalent. There is no financial support for industry stockholding obligations, except for the federal loan guarantees for ELG operations. Storage costs are included in the retail price and are, therefore, borne directly by consumers.

Austria has no bilateral stockholding arrangements or other security agreements with other countries. Reflecting its supply structure, such arrangements are not planned in the near future. OMV has a co-operation agreement with Hungarian oil company MOL concerning mutual technical support in supply matters. The agreement provides for "first aid" delivery of small volumes of oil products in case of an operating problem on either side, but contains no provisions for storage or sharing of emergency stocks.

Operational Aspects of Stockdraw

All Austrian stocks are governed by the Energy Steering Law, whenever activated. Since the law provides sufficient legal flexibility, no specific drawdown procedures have been established. During a stockdraw, first priority would be given to emergency stocks held under the Stockholding and Reporting Law. No physical drawdown tests have recently been carried out. The latest stockdraw took place during the 1990/91 Gulf Crisis and was implemented on the basis of voluntary actions negotiated between the Energy Department, the Austrian Oil Industry Association and the Association of Traders. At that time, Austria drew stocks in excess of its 90-day stock obligation. This measure was complemented by public appeals for energy conservation and the price monitoring system.

The minimum operating requirement for industry stocks is estimated at 10 to 15 days of consumption, depending on the type and duration of a crisis. Stocks in excess of this minimum requirement could be released to the market in accordance with the regulations of the Energy Steering Law. Prices would reflect prevailing oil market conditions at the time of a crisis. The type of information released would depend on the results of negotiations within the framework of Austrian Social Partnership. The Federal Minister for Economic Affairs could act very quickly in implementing decrees based on the Energy Steering Law. Since emergency stocks are generally stored together with operational stocks, drawdown could be implemented within five days. (ELG could deliver crude oil to the Schwechat refinery within 24 hours.)

Compliance Issues

The legislation requires that emergency stocks must be maintained at the required levels at all times. The stockholding obligations can be fulfilled through: (a) creation and management of stocks by the oil

operator himself; (b) joint stockholding by two or more oil operators; (c) a civil law contract between oil operator and a stockholder; and (d) a transfer of the stockholding obligations to a licensed stockholder (i.e. ELG). Monitoring of compulsory stocks through monthly reporting, physical inspections and accounting audits is based on the Stockholding and Reporting Law. Companies are obliged to report their actual mandatory stock positions on a monthly basis. The Federal Ministry for Economic Affairs makes random physical inspections of the levels and quality of stocks and of storage sites. Fines and even imprisonment may be imposed in cases of non-compliance with storage regulations. These have not been used in practice, as oil companies, including small independents, generally have had no difficulty with meeting their stockholding obligations.

Jet fuel used by international aviation is included in national consumption statistics, as required by the IEA. However, companies are allowed to deduct jet fuel volumes for the purpose of calculating their stockholding obligations, which results in some overstatement of the stock coverage. On the other hand, stocks held in Triest are still not included in the figures reported to the IEA. This is mainly because there is no bilateral agreement for these stocks and because the Administration's approach is to exclude stocks held outside of the national territory as less reliable.

Demand Restraint Measures

Policy and Legal Instruments

The Administration considers that demand restraint measures would be the main response in a severe supply crisis. The legal basis for these measures is provided by the Energy Steering Law. The law can be activated if the federal government declares by ordinance the existence of a supply shortfall, or if there is a need to fulfil international legal obligations. This means that the Administration could comply with future CERM actions, including, in particular, compulsory demand restraint measures, if the relevant decisions of the IEA Governing Board were based on Articles 19.3 or 22 of the IEP.

Procedures and Monitoring

Austrian demand restraint measures range from light-handed to heavy-handed, and would be phased in at three stages, depending on the nature and severity of a crisis. In the initial stage, priority would be given to light-handed measures in the form of public information campaigns and public appeals for voluntary energy-saving. Specific measures would include: speed reductions; car pooling; control of tire pressure; avoidance of short distance driving; increased use of public transport facilities; and reduction of room temperature in households and public buildings. These measures could be implemented within one to two days.

In the second stage, medium-handed measures based on the Energy Steering Law would also be considered. These include: speed restrictions; introduction of driving bans (one day per week and/or weekend driving); prohibition of motor sport events; and restrictions for oil product deliveries. The lead time for implementation of these measures would be one to two weeks. In the final stage, the Administration could resort to heavy-handed measures defined in the Energy Steering Law. A wide range of such measures can be summarised as follows:

Fuel Oils

- Large consumers:

  After consideration in the Energy Steering Council, the Federal Chamber of Commerce would receive contingents which would be made available to various industry sectors through individual allocations.

- Small consumers:

  Delivery restrictions and contingents for retail traders would be implemented. Private tanks, which can typically hold about 5000 litres, would be refilled only up to a maximum of 50% of capacity.

Automotive Fuels

- Private Sector: Rationing through coupons issued by the Federal Ministry for Economic Affairs.
- Public Sector: Distribution of coupons by local authorities on the basis of allocation.
- Commercial Sector: Distribution of coupons by the Federal Chamber of Commerce.

The lead time for the above measures until the first measurable volumetric effects is estimated to be two to three months. Coupons would be distributed by mail on behalf of the Federal Minister for Economic Affairs. These coupons would not be tradable and would be limited to defined periods. Potential problems with self-service stations or unmanned retail sites would be solved according to the actual situation. The coupons would be valid only in connection with the registration numbers and differentiated according to the types of cars. To meet the needs of people travelling to work, public transport would be encouraged. Coupon rationing would be a measure of last resort and priority would be given to medium-handed measures. Demand restraint measures would be co-ordinated with the neighbouring countries in order to avoid cross-border distortions.

Decision Processes

The decision process necessary for programme activation was engaged during the 1973/74 and 1990/91 oil crises. It has also been examined during the IEA's emergency response tests and during periodical national training tests in the framework of the Comprehensive Country Defence System.

Evaluation of Measures

No estimates are available for the costs of implementing individual demand restraint measures. On the basis of national and international experience from the past crises, volumetric savings from these measures can be roughly estimated at 5-6% from lower speed limits, 8-9% from daily alternating driving bans, 5% from alternating bans on weekend driving, and 20-25% from delivery restrictions for fuel oil.

Other Response Measures

An increase in indigenous production is not likely for geological and technical reasons.

Some Austrian product specifications, which are among the toughest in EU, could be relaxed in a crisis, as the supply aspects would gain priority over environmental considerations. The Energy Steering Law

allows the Minister for Economic Affairs to implement such measures for a limited time period, subject to approvals by the Ministry of Environment. The most likely modifications could involve, *inter alia*, a higher benzene content in gasolines and higher sulphur content in heating oil and gas oils. No precise estimates are available for the potential impact of relaxation of product specification on total product supply.

In addition, the use of oil could be reduced in the power generation sector, as the majority of power plants are capable of switching from oil to natural gas. However, most of the dual-fired plants already use natural gas, which limits the switching potential to only about 0.3 to 0.4 Mt of heavy fuel oil per year. Appropriate switching measures would be developed and co-ordinated with the representatives of the energy industries at Energy Steering Council. Fuel-switching could also be enforced, if necessary, on the basis of provisions of the Energy Steering Law.

Natural gas is expected to replace coal and, to a lesser extent, heavy fuel oil in combined heat-power generation, residential heating and industry use. Incremental gas will initially come from Norway. The Administration is aware that an oil disruption might be aggravated by a simultaneous disruption of natural gas supply. To counter this impact, the Austrian gas industry has developed a detailed emergency plan for all categories of the supply network. In addition, underground storage capacity for natural gas was increased in the mid-1990s by 650 million m^3 to reach 2 300 million m^3. This corresponds to about 150 days of natural gas consumption, which is the highest level among the IEA countries. Current stocks of natural gas cover around 120 days of consumption.

Data Collection

Collection, evaluation, transmission and monitoring of all IEA-related data are the responsibility of the Austrian NESO. This ensures consistency between the different reporting systems. Monthly and annual data are collected through company reporting forms that are based on the national reporting system and the official Foreign Trade Statistics.

In 1997, the Central Statistics Office – the sole supplier of the energy trade data – undertook an overhaul of data reporting procedures to meet EU requirements. During this overhaul, the Ministry of Economic Affairs responded to temporary data supply problems by building its own independent system for primary energy data.

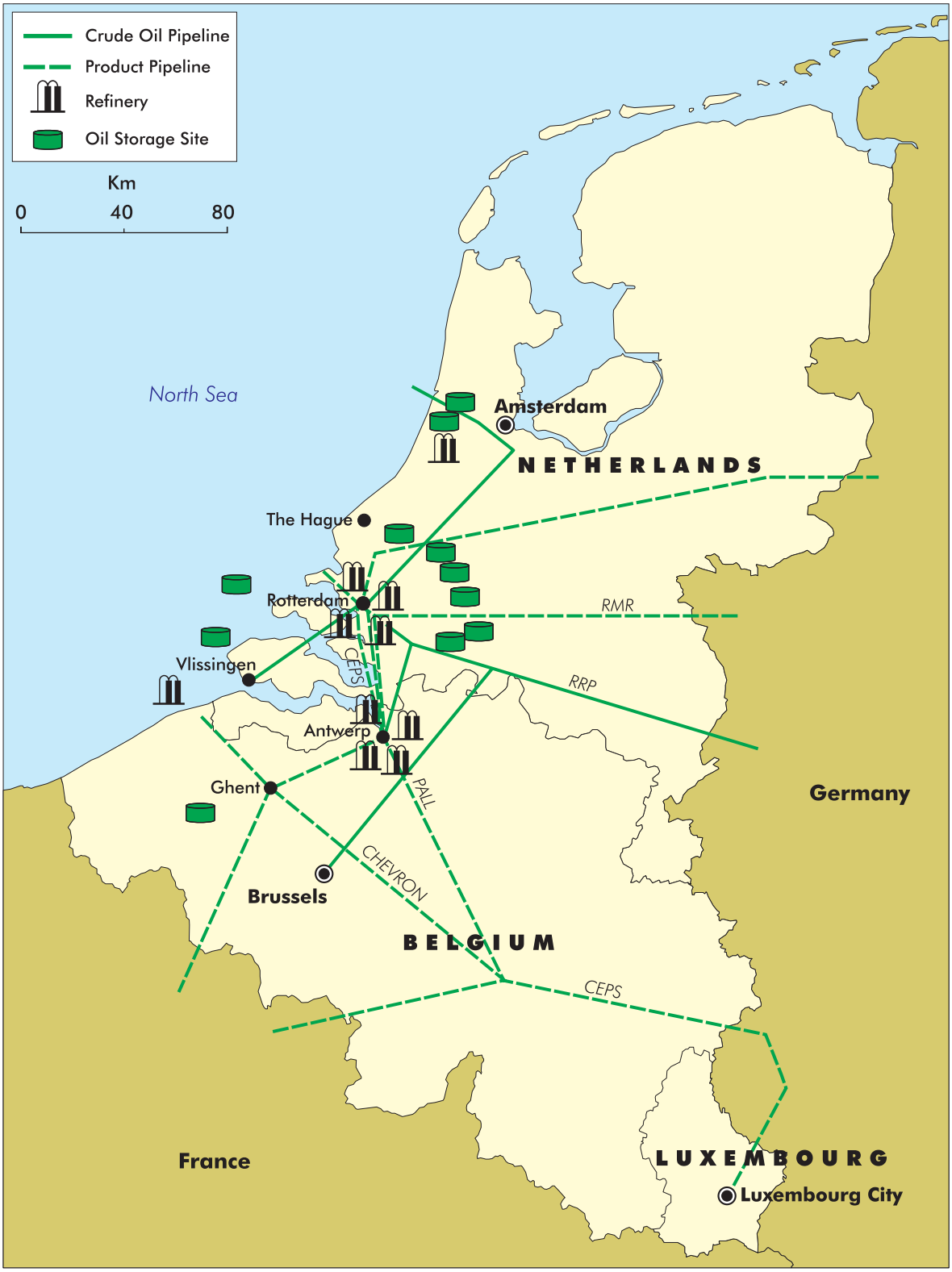
Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
OMV	Schwechat	10.00	202.0	3.57	66.0	1.9	37.4	1.31	25.2	0.56	10.8			0.88	15.0
Total		**10**	**202**	**3.57**	**66.0**	**1.9**	**37.4**	**1.31**	**25.2**	**0.56**	**10.8**			**0.88**	**15.0**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
OMV	Schwechat			1.37	31.9	3.88	79.5					0.54	13.0	0.07	1.7
Total				**1.37**	**31.9**	**3.88**	**79.5**					**0.54**	**13.0**	**0.07**	**1.7**

Map of the Benelux



BELGIUM

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	0	0	0	0	0	0	0
Imports	44.3	32.6	41.7	43.2	50.2	41.8	42.9
Exports	–18.1	–13.2	–19.2	–18.4	–22.5	–16.0	–16.4
Bunkers	–2.4	–2.3	–4.1	–3.9	–4.4	–4.0	–4.0
Net Imports - NI	23.9	17.1	18.4	20.9	23.2	21.8	22.5
Total Supply	23.9	17.1	18.4	20.9	23.2	21.8	22.5
Import Dependence (%)	100	100	100	100	100	100	100
Stock – Days of NI	108	111	101	92	90	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Belgium imports all of its primary energy requirements. Current energy supply of 53 Mtoe comprises 40% oil, 22% natural gas, 18% solid fuels, 12% nuclear energy and 8% other sources. The share of oil in total energy use has declined from a peak of 54.4% in 1975 to the current level of around 40%. Oil is imported mainly from the Netherlands, Norway, the United Kingdom, the countries of the former Soviet Union, Saudi Arabia and Iran. According to the latest long-term oil projections, consumption and imports of oil to 2010 are not expected to change significantly from the present levels.

Belgium has two large refineries owned by Fina and Esso, and two smaller independent refineries owned by Nynas/Universal Refining and BRC. These refineries – all located near Antwerp – have total primary distillation capacity of about 38 Mt/year and produce around 25 Mt/year of petroleum products. Of this amount, about 20.5 Mt/year is consumed domestically and the remainder is exported. The Fina and Esso refineries are linked with the port and refineries in Rotterdam by a pipeline owned jointly by the two companies. No significant changes in Belgium's refining industry are foreseen in the near future.

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	2 512	2 396	–4.6
of which unleaded	0	0	0
Kerosene and jet fuels	1 755	1 670	–4.8
Gas/diesel oil	11 007	10 750	–2.3
Residual fuel oil	1 953	1 937	–0.8
Other	4 868	5 007	2.9
Total	**22 095**	**21 760**	**–1.5**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999
(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Netherlands	1 285	1 329	4 973	1 835	451	837	10 710
Norway	9 597	0	78	0	0	372	10 047
United Kingdom	6 478	142	226	90	0	660	7 596
Former Soviet Union	5 558	13	908	134	0	0	6 613
Saudi Arabia	5 676	0	0	0	0	0	5 676
Iran	2 036	0	0	0	0	0	2 036
Other	4 642	88	127	169	190	1 214	6 430
Total	**35 272**	**1 572**	**6 312**	**2 228**	**641**	**3 083**	**49 108**

Source: IEA Quarterly Oil Statistics.

Belgium's oil supply system has changed little in recent years. There are several NATO pipelines on Belgian territory owned by the Belgian army. These pipelines have for many years been leased for civilian use. The contracts signed between the army and the oil companies are based on market prices and supervised by the Ministry of the Economy.

Emergency Response Policy and Organisation

Emergency Response Policy

The main objectives of Belgium's energy policy are security of supply through geographic and fuel diversification, rational use of energy, competitive prices, and environmental protection. Security of oil supply is an important element of the energy policy. Since Belgium has no indigenous oil production, oil disruptions would fully translate into supply shortfalls. Nonetheless, the refining sector is flexible enough to adapt to different types of available crude oil supplies. Many companies operating in Belgium are affiliates of large multinational oil companies which could reallocate oil to meet the country's needs.

Natural gas has largely replaced fuel oil in power generation and is gradually replacing it in residential heating for economic and environmental reasons. Natural gas is imported by Distrigaz from the Netherlands (36%), Algeria (30%), Norway (29%), and Germany (5%) under long-term contracts. No crisis policy has been developed for disruptions in natural gas supply. The contract with the Netherlands allows for increased purchases of its gas in case of supply disruptions in Algeria. Russian gas could also be obtained through the German pipeline network. In addition, some stocks of natural gas are held in storage facilities at Loenhout (900 million m^3), Anderlues (164 million m^3) and Dudzele (66 million m^3). There are plans to increase the capacity at Loenhout to 1 000 million m^3.

Emergency Organisation

There have been no major changes in recent years concerning the structure or operations of Belgium's emergency organisation. The overall aim of the emergency management is to restrict demand and to share available supplies in co-operation with the industry using traditional distribution channels. The National Oil Board (NOB) is the only body responsible for oil crisis management. It was created by the Royal Decree of 11th October 1984 to oversee the supply and the distribution of crude oil and products in a crisis. The NOB's main tasks are to:

- monitor market developments and update information required for the implementation of crisis measures;
- propose measures to the Council of Minister and monitor their implementation during a crisis; and
- communicate with other international bodies (i.e. Benelux, EU, IEA, and NATO).

The permanent unit of the NOB is situated within the framework of the Administration of Energy and can be expanded in a crisis to include experts from the Department of Economic Affairs, other Ministerial Departments and the oil industry. All proposed measures would have to be reviewed and approved by the Inter-Ministerial Economic Commission (CEI), which represents various government departments. The proposals would then be submitted by the Minister of Economy to the Council of Ministers for final approval.

Allocation Procedures

In the event that the country's available supply were not identical to its supply right under IEA rules, in an extreme crisis, oil companies would be encouraged and expected to participate voluntarily in the international reallocation process. At the same time, one sub-group of the NOB would calculate, on the basis of available statistics, the "national fair-sharing" for possible reallocation among national companies. Another sub-group representing all oil importers would be responsible for international sharing.

The Law of 22nd January 1945 on Economic Regulation and Prices and the Law of 13th July 1976 concerning the Approval of the IEP Agreement give the Minister of Economy legal powers to use requisition in order to fulfil Belgium's IEP obligations and, in particular, to ensure implementation of compulsory allocation. However, the Administration does not expect that the Minister would in practice be forced to resort to such a drastic measure.

Emergency Reserves

Policy and Legal Instruments

In addition to the legislation regulating oil stocks, the NOB and national oil statistics, Belgium has legislation which allows the Minister of Economic Affairs to issue decrees during oil emergencies. The Royal Decree of 11th October 1971, which was amended in 1976, provides the legal basis for mandatory stocks. Importing companies are obliged to keep stocks of three categories of products (gasolines, middle distillates and residual fuel oil) corresponding to 25% of their sales on the national market during the previous calendar year. This is consistent with the EU directive on mandatory stocks.

In contrast to IEA rules, Belgian legislation does not require a 10% deduction for stocks deemed unavailable. There is no explicit legal basis for Belgian participation in IEA emergency response as Belgian legislation makes no reference to commitments stemming from an integrated set of emergency measures contained in the IEP, or a complementary set of co-ordinated measures (CERM) established by a 1984 Governing Board decision.

The Administration is now in the process of revising its stockholding legislation. No specific link with the IEP or CERM is foreseen in the new legislation, but there may be a general reference to the IEP. The legislation will give the Minister broad powers to use emergency stocks in a crisis. The new law may include a deduction for unavailable stocks of up to 10%.

Until 1997, Belgian stock legislation imposed a minimum storage capacity of 10 000 m^3 per category of imported product, a minimum physical storage requirement of 7 000 metric tons, and a minimum 3-year term for storage facility rental contracts (Article 4 of the Royal Order of October 1971). These thresholds have been strongly criticised by the industry and the European Commission as barriers to the establishment of a small importer on the Belgian territory and thus contrary to the rules for the single market. The Royal Order of October 1997 abrogated the minimum thresholds for stocks and storage capacities that are independent of sales volumes. Subsequently, the European Commission has notified the Belgian authorities that their regulations comply with EU stock directives.

Stockholding and Maintenance

All Belgian emergency stocks are held by oil companies. Compulsory stocks and commercial stocks are commingled; there is no possibility under present legislation to differentiate them. Stocks in excess of the reported compulsory stocks are considered commercial stocks. Stocks held abroad under bilateral agreements are permitted within a limit of 30% of total stocks. A Royal Decree of February 1995 has been updated to allow for on-the-spot checks of the quality of oil products on the Belgian market.

Until recently, jet fuel in transit used by international aviation was excluded from Belgian consumption data because the definitions contained in domestic legislation were inconsistent with the IEP definitions. In the course of the drafting of directive 98/93/EC, it was agreed that all supplies of jet fuel should be included in the calculation of domestic consumption of Member States, and that deliveries to international air transport carriers would no longer be treated as exports. In April 1998, the Administration notified Belgian airline company Sabena and other oil operators that deliveries to international air transport carriers would no longer be treated as exports. A grace period of one year was granted to the operators to allow them to increase stocks gradually to the required higher level.

By April 1999, the targeted oil companies had increased their stock levels accordingly in order to meet their new and higher storage requirements for kerosene deliveries. However, Sabena found itself faced with an obligation to constitute additional stocks that were seven times higher than its operating stocks. The company wishes to comply with these new regulations, but has yet to determine the most economic means of reaching the required stock levels.

All product imports by smaller importers are now included in Belgian statistics. The Administration has tightened the monitoring of activities by small importers and drafted a new Royal Decree on Statistics that requires each operator to have a customs/excise registration number. This should link statistical requirements with customs and excise status and, consequently, allow for closer scrutiny of oil imports by some thirty new companies.

There are no plans for holding stocks in excess of the IEP commitment. The Administration views the 90-day requirement as sufficient to guarantee the security of supplies. Since mandatory stocks are directly linked to consumption, emergency reserves increase every year in line with consumption. Storage capacity is not a constraint, as there is a large surplus capacity on the national territory and in the contiguous Rotterdam area. In mid-1999, only about 30-40% of existing Belgian storage capacity was utilised.

The cost of mandatory stocks is calculated in the *Contrat de Programme*, the Belgian system of official maximum prices for oil products. The total includes the cost of renting tanks, product rotating and financing. In 1997 this amounted to 0.20 Belgian francs (BEF) per litre (0.006 US$/L) or 237 BEF per ton. The cost of mandatory stocks is included in the product prices, and is thus paid for by the consumers. A recent study by the Administration of Energy indicated that the cost of renting a tank ranges between 20 and 45 BEF/m^3/month. The budget for mandatory stocks foreseen in the *Contrat de Programme* is sufficient to finance the 90-day obligation, including contemplated agency stocks. The current storage fee of 20 centimes per litre may be converted into a mandatory contribution to finance agency stocks.

Stocks must be held in proportion to domestic product deliveries during the previous year. The stock legislation of 1971 allows the refiners to hold crude oil or refinery feedstock instead of finished products in proportion to volumes refined in each product category. In practice, emergency reserves comprise around 35% of crude oil and feedstocks and 65% of oil products.

Belgium has bilateral agreements with France, Germany, Ireland, Luxembourg, the Netherlands and the United Kingdom. As much as 20% of Belgian stocks is held in the Rotterdam area by Petrofina and Esso Belgium. The agreement with the United Kingdom is yet to be officially approved, even though it has existed for several years. Stock reports are exchanged with other administrations on a monthly, or sometimes quarterly, basis. Belgium is a member of two standing groups outside the IEA: Oil Crisis Policy of the Benelux and Oil Supply Group of the European Commission. Co-ordination is well established with the Netherlands, Luxembourg and France.

Operational Aspects of Stockdraw

Belgian legislation does not have a direct link with either the IEP or a Governing Board decision for activating crisis measures. The Minister of Economy has broad legal powers based on existing laws and directives that are now rather dated and need to be amended. The procedure is flexible, but any measures taken would be in line with the decisions taken at the European level (Oil Supply Group) and

at the Benelux Inter-ministerial level. Given that all stocks are held by the industry, they would be sold at market prices and delivered to the market through normal commercial transactions.

Most industry stocks are immediately available. The time lapse between a decision and the physical delivery would be 15 to 30 days. Stocks held abroad would be repatriated or compensated with stocks physically held on the national territory. A large part of Belgian stocks abroad are located in Rotterdam at the sea terminal connected to the Rotterdam-Antwerp Pipe Line (RAPL), which supplies the Fina and Esso refineries in Antwerp. Minimum operating stocks are estimated at 30 to 50 days for the refiners and 5 to 15 days for the distributors. They form part of the compulsory stocks reported to the IEA and the EU. A complex refinery can operate with less than 30 days of stocks, but this could impair operating flexibility and efficiency.

Compliance Issues

Monthly reports from oil companies and refiners allow the Administration to assess the overall stock situation and to monitor deliveries to the final consumer in a crisis. The physical stock levels can be verified at any time by agents from the Administration of Economic Inspection or from the Administration of Energy. With minor exceptions, the stock volumes confirmed through physical controls are consistent with reported quantities. Reports on bilateral stocks are exchanged monthly with the administrations of neighbouring countries.

Penalties for non-compliance with the minimum stock obligations are defined in the general laws on commercial practices. These laws include a maximum penalty of one-year imprisonment for non-compliance. However, since the procedure required to obtain an order from the judge is rather complex and lengthy, there has been reluctance in the past to use the existing penalties. The Administration recognises this as a shortcoming and intends to propose in the new decree a system of administrative penalties that could be imposed directly by the Administration.

In a crisis, the Administration would try to persuade companies to draw their stocks by reducing the stockholding obligation for importing companies. The Minister of Economy also has the power, after consultation with the Council of Ministers, to requisition compulsory stocks owned by oil companies. There is no other legal authority to force oil companies to release stocks in a crisis. Although the companies could be encouraged to refrain from speculation or hoarding, it would be difficult to detect or prevent their purchases on the international market during a crisis. A proposed creation of a stockholding agency would give the government more effective control over this portion of emergency stocks. If companies refuse to co-operate in the implementation of mandatory allocation, the government has the powers to requisition required product supplies. No other measures are foreseen or deemed necessary.

Demand Restraint Measures

Policy and Legal Instruments

Belgian response to a crisis would be likely to comprise a mix of stockdraw and demand restraint. In the absence of a stockholding agency, the initial response would probably be in the form of light-handed demand restraint measures. These could be implemented prior to the activation of the IEA or EU

programmes. More severe measures would require a longer preparation period and consultation with partners and industry, and would probably be taken after IEA and EU decisions.

The list of contemplated demand restraint measures would range from reduced speed limits and driving bans to rationing. The demand impact would now be larger than in the past due to the complete price pass-through. While some measures are relatively easy to legislate, they are very difficult to implement and monitor (i.e. bans on gasoline jerry cans), particularly given the limited number of personnel responsible for this area.

Procedures and Monitoring

All crisis measures were studied and implemented during the Gulf Crisis. Demand restraint measures would be proposed by the NOB after consultation with other national or international bodies. Since the abolition of border controls, it is becoming increasingly difficult to implement demand restraint measures by any country without co-ordination with neighbouring countries.

Decision Processes

Decision processes have not been tested since the Gulf Crisis. There are no estimates of the costs of implementing the demand restraint measures, and no estimates of the volumetric effects of these measures. Given changes in the demand pattern, measures related to the transport sectors would become more prominent, but would also be more difficult to implement without social and economic consequences.

Other Response Measures

In Belgium, fuel-switching is principally driven by market prices and is not subject to any legal obligations. Moreover, the use of oil in power generation has been declining. It currently accounts for only 1.4% of power supply and is expected to cease completely in the near future. There is virtually no scope for further reductions in oil use in residential heating, but some fuel oil could be replaced by coal in the steel and cement industries. The latest estimate of total capacity to switch from oil to natural gas is around 50 000 tons per month. Some of this potential would not be available in the winter, due to the limited supply of natural gas. A simultaneous disruption in natural gas supply would not greatly affect the oil situation. However, it would create problems for the power sector, where spare capacity is rather low.

The Administration indicated that most of the existing product specifications could be altered, subject to approval of the Health Ministry and the European Commission. The most likely measures would be increases in maximum lead and sulphur contents. Such measures are not expected to have a large impact on product supply, but could facilitate finding product suppliers on the international market.

Data Collection

With progressive European integration, which eliminated customs borders and physical inspections, and with a growing number of operators, it is becoming increasingly difficult to verify international trade

data. The Administration has responded by strengthening procedures for oil reporting and by drafting a new Royal Decree on Statistics that introduced mandatory excise numbers linked to the statistical requirements.

Monthly oil reports are prepared by the Administration of Energy using monthly data collected from importers and refiners. The same staff collects and processes all IEA and EU oil statistics. Monthly emergency oil supply data are processed in the same way, but with fewer companies directly involved. Resulting reports by the NESO cover oil operations of individual companies reporting directly to the IEA and in aggregate for twenty companies not reporting to the IEA (the latter account for about 90% of the Belgian oil market).

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
BRC	Antwerpen	6.50	131.30	3.98	73.63	0.00	0.81	0.00	0.00					1.61	27.37
Esso Belgium	Antwerpen	12.00	242.40	6.70	123.95	1.77	33.98	1.77	33.98						
Universal/Nynas	Antwerpen	4.05	81.81	0.90	16.65	0.00	0.00	0.00	0.00						
Fina	Antwerpen	15.00	303.00	5.30	98.05	5.85	109.35	4.50	86.40						
Total		**37.55**	**758.51**	**16.88**	**312.28**	**8.43**	**157.02**	**6.27**	**120.38**					**2.7**	**45.9**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
BRC	Antwerpen			0.68	15.84	2.39	49.00								
Esso Belgium	Antwerpen			1.70	39.61	11.90	243.95	0.28	6.72						
Universal/Nynas	Antwerpen			0.35	8.16	0.45	9.23		0.00						
Fina	Antwerpen			2.25	52.43	11.81	242.11	0.27	6.48					0.20	4.80
Total				**4.98**	**116.0**	**26.55**	**544.3**	**0.55**	**13.2**					**0.2**	**4.8**

Map of Canada



CANADA

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	83.6	86.3	94.7	113.2	117.5	163.1	170.9	191.7
Imports	30.2	18.8	34.2	36.7	51.6	51.7	54.3	57.1
Exports	–21.8	–36.7	–49.7	–72.9	–83.3	–123.6	–128.2	–144.9
Bunkers	–1.5	–0.4	–0.6	–0.6	–1.0	–0.7	–0.7	–0.8
Net Imports - NI	6.9	–18.3	–16.2	–36.8	–32.7	–72.6	–74.6	–88.5
Total Supply	90.5	68.1	78.6	76.4	84.9	90.6	96.3	103.2
Import Dependence (%)	7.6	0	0	0	0	0	0	0
Stock – Days of NI	1 002	0	0	0	0	..	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structure

Canada produces sufficient amounts of oil for all of its requirements. Current energy supply of 234 Mtoe comprises 35% oil, 29% natural gas, 12% solid fuels, 8% nuclear energy and 16% other sources.

Canadian production of crude oil and equivalent hydrocarbons reached around 2105 thousand barrels per day (kb/d) in 1999. More than half of the volume produced (1255 kb/d) was exported to the United States (mainly to the Midwest). Around 817 mb/d of oil was imported into eastern Canada (mainly Quebec and Atlantic provinces), resulting in net exports of 438 kb/d, or 21% of production. Oil is imported mainly from Norway, United Kingdom, United States, Venezuela, Saudi Arabia and Algeria.

Virtually all Canadian oil is produced in western Canada and is subsequently shipped to domestic and US markets through three main pipeline systems:

- **Enbridge Pipeline** (formerly Interprovincial Pipe Line), which delivers 1 700 kb/d of oil from Edmonton into the US Great Lakes region and Ontario;
- **Express Pipeline**, which delivers crude from Alberta into Wyoming and onward via its Platte Pipeline connection into Illinois; and

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	27 881	28 545	2.4
of which unleaded	*27 464*	*28 198*	*2.7*
Kerosene and jet fuels	4 813	5 069	5.3
Gas/diesel oil	22 351	23 171	3.7
Residual fuel oil	7 318	6 179	–15.6
Other	17 704	18 239	3.0
Total	**80 067**	**81 203**	**1.4**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999
(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Norway	12 714	128	0	60	0	21	12 923
United Kingdom	8 246	354	0	0	0	49	8 649
United States	3 050	201	751	1 286	467	2 246	8 001
Venezuela	5 379	0	0	771	106	32	6 288
Saudi Arabia	3 089	0	0	0	0	0	3 089
Algeria	3 075	0	0	0	11	0	3 086
Other	5 408	884	120	563	202	577	7 754
Total	**40 961**	**1 567**	**871**	**2 680**	**786**	**2 925**	**49 790**

Source: IEA Quarterly Oil Statistics.

- **Trans Mountain Pipe Line** (TMPL), which delivers oil mainly from Alberta west to Vancouver and the Puget Sound region of the United States.

According to the latest forecasts by Natural Resources Canada, production of crude oil and equivalent will increase to 2 355 kb/d in 2010. This increase will be driven mainly by technological progress, which is expected to reduce production costs by up to 30% over the projection period. Net oil exports are projected to increase by 60% from the current level to 735 kb/d in 2010. Although no low oil price scenario has explicitly been considered, Canada would be likely to remain a net exporter even if prices were to remain at the depressed levels experienced in 1998 and early 1999.

These projections were prepared before the recent announcements of approximately C$30 billion-worth of new investments in extraction, mining and upgrading of bituminous sands. If all of the projects announced to-date were to come on stream, they could add over 800 kb/d to crude oil production by 2010. Most of the additional bituminous sands production would come on stream in the 2001–2006 period, assuming that oil prices stay in the US$18 to 20/bbl range. As a result, total oil production could reach as much as 3 250 kb/d by 2010.

Total crude oil refining capacity was 1 870 kb/d at the end of 1998, down from 2 050 kb/d in 1989. Most future changes to refinery capacity or additions of conversion units will be in response to

environmental regulations pertaining to fuel quality. The Administration expects that these changes would provide the refiners with more flexibility with respect to crude oil slates, and are not expected to have a major impact on oil security.

Pipeline Developments

From 1994 to 1999, there has been significant expansion of Canada's crude oil pipeline system. The expansion plans have been driven by a need to accommodate rising crude oil production in western Canada, a gradual increase in the density of crude oil (which tends to lower a pipeline's throughput capacity), changing supply/demand patterns in the US oil market, and the reversal of the Sarnia-Montreal pipeline (Line 9).

Several projects have been completed since 1994, adding a combined 770 kb/d of export capacity to Canada's crude oil pipeline infrastructure. The projects are summarised below.

- In late 1994, Interprovincial Pipeline completed work to expand its capacity by 170 kb/d.
- In late 1994, Trans Mountain Pipe Line completed a 38 kb/d expansion of its system to 260 kb/d.
- The Express Pipeline from Hardisty, Alberta, to Casper, Wyoming was built by TransCanada PipeLines Ltd. (TCPL) and Alberta Energy Co. Ltd. (AEC). In service since April 1997, the C$585 million pipeline has been shipping below its full capacity of 172 kb/d, due mainly to the need to refurbish the 180 kb/d Platte Pipeline linking Wyoming with Illinois. However, a now refurbished Platte Pipeline has boosted volumes on the Express system in 1999 by 17% over 1998, for an average of 119 kb/d.
- In early 1999, Enbridge Pipelines (formerly Interprovincial Pipeline) completed Phase II of its System Expansion Program, adding pumping capacity to its existing lines. This expansion increased capacity on Enbridge's main system by 100 kb/d.
- Enbridge's Terrace Phase I Expansion project has increased throughput capacity on the existing system by approximately 170 kb/d. The new line entered into service in January, 1999, while all pumping facilities were in service in September, 1999. This expansion is expected to eliminate apportionment on the Enbridge system from September 1999 until at least late 2002.
- In December 1999, Enbridge Pipeline's reversed Line 9 went into full service, allowing Ontario refiners access to 240 kb/d of imported crude oil. This imported oil is expected to displace some Canadian crude out of the Ontario market, and could put some pressure on western Canadian producers to discount the price of their crude in order to penetrate new US markets. Line 9, which runs from Montreal to Sarnia, picks up imported crude from the Montreal-Portland pipeline.

Rapid technological progress and the creation of a favourable, profit-based, royalty regime have encouraged plans for a large number of heavy oil and oil sands projects. Production of bitumen and synthetic crude oil is expected to double, or even triple, by 2010. To accommodate this increase, two major expansions of existing pipeline systems and five new oil pipelines have been proposed.

Emergency Response Policy and Organisation

Emergency Response Policy

Canada's energy policy derives in part from the constitutional division of powers between the federal and provincial governments. The constitution provides both levels of government with a major role in energy policy. Within their geographic boundaries, the provinces own natural resources and are responsible for the conservation, development and management of those resources. The federal government is responsible for matters relating to inter-provincial and international trade, programmes and policies in the national interest (including national economic development and energy security) and resource management on federal lands.

The current Canadian energy policy is based upon the concept of sustainable development. It seeks an appropriate balance in terms of economic, environmental and social objectives. The policy places primary reliance upon the use of market instruments to achieve energy objectives, but the government is prepared to take direct action where barriers to the operation of efficient markets exist, or where there are important non-economic objectives.

Energy security remains one of the key objectives of Canadian energy policy. The federal government's general approach to energy security is to rely upon market forces to enhance the growth, flexibility and diversity of the energy supply system, and to engage collectively with other IEA countries in emergency planning to reduce the risks and potential impacts of oil supply and price disruptions.

Most crude oil is produced in western provinces and shipped to the east, west and south via pipelines to major domestic and export markets. Serious disruptions to any of these pipelines could negatively affect the implementation of the allocation programme and could cause environmental damage. In addition, since Canada's eastern provinces are dependent on oil imports, a significant disruption of these imports could cause an emergency supply situation. The Energy Supplies Emergency (ESE) Act and the Emergencies Act are in place to deal with contingency oil allocation and potential environmental damage.

Under the IEP, Canada must maintain, on a contingency basis, emergency response mechanisms required for oil allocation, including the related data collection and market monitoring activities. The ESE Act provides the legal instruments to satisfy these obligations. Since Canada is a net oil exporter, and is likely to remain so for the foreseeable future, there is no requirement to maintain emergency oil stocks. Under CERM, Canada stands ready, in a pre-crisis situation, to encourage the use of any available spare oil production capability and to promote voluntary oil demand reductions.

The reversal of the Sarnia-Montreal crude oil pipeline will increase the use of imported oil feedstock in the major refining centres in Ontario, and will end the use of domestic feedstock by the two refineries in Montreal. As a result, about 220-240 kb/d of mainly light crude oil from western Canada will be displaced in these markets within one year. The line may also be used to ship oil from the Hibernia offshore oil project. Enbridge Pipelines, the owner of the Sarnia-Montreal line, has installed facilities that will permit reversal of the line during an emergency. Such an operation could take about one week.

The Administration has recently undertaken a review of energy security issues. It is not likely to recommend the establishment of strategic stocks in eastern Canada as the region has a well developed infrastructure for oil imports and will soon have access to production from new east coast offshore projects. Moreover, the Administration and the domestic oil industry are optimistic about the Canadian oil supply outlook, and are confident that Canada will remain a net oil exporter for the foreseeable future.

Operating stocks in eastern Canada already reflect the possibility of logistical problems and delays in deliveries. They have stabilised in the past few years after experiencing a decline in previous years. After the reversal of the Sarnia-Montreal pipeline, oil importers plan to increase operating stocks to cover the risks of disruptions in imports through the line. Petro-Canada and Shell Canada estimate that they will have around 20 days of storage in Montreal after the reversal.

Natural gas is an important alternative to crude oil in Canada's oil security policy. The federal government welcomes the development of natural gas resources and the construction of natural gas transmission and distribution systems in areas dependent on oil supplies. The recent start-up of the Sable Offshore Energy Project in Nova Scotia will allow the development and transmission of natural gas to markets in Nova Scotia and New Brunswick. This development is projected to displace about 30 kb/d of imported oil (mainly in power generation) when it is in full operation in late 2000. This amount could be increased somewhat with additional lateral pipeline links.

Emergency Organisation

The Federal Government has two stand-by organisations to deal with energy emergencies: the Energy Supplies Allocation Board (ESAB) and the National Emergency Agency for Energy (NEAE). ESAB would operate under the Energy Supplies Emergencies Act, which gives it the authority to prepare, develop and maintain in a state of readiness, the programmes to restrain demand for petroleum products, allocate crude oil and petroleum products, and ration gasoline and diesel in a declared emergency. NEAE would operate under the Emergencies Act, which gives it the authority to control and regulate the production, distribution and transmission of oil, natural gas, electric power and coal supplies during an international or war emergency. ESAB is the oil component of NEAE and constitutes the Canadian NESO. Following the declaration of an international or war emergency, the Mandatory Allocation Program (MAP) would be administered by ESAB until it was deemed more practical to activate the NEAE. The ESAB staff would then form the oil division of the NEAE.

The Canadian NESO is composed of the ESAB and its staff. The ESAB comprises a Chairman and up to six members. The Chairman is appointed by the Governor in Council and reports to the Minister of Natural Resources. The Board is supported by the Oil Division of the Ministry. In an emergency situation, when enabling legislation is activated, a much larger emergency organisation could be mobilised. This group includes personnel from oil companies, transport organisations, other federal government departments and the provinces.

ESAB has the mandate to deal with energy emergency issues and to ensure that Canada fulfils its oil-sharing commitments as a member of the IEA. Non-energy emergencies which are national in scope would be co-ordinated by Emergency Preparedness Canada, a federal government organisation within the Department of National Defence that plays a key role in the development and maintenance of an appropriate level of civil emergency preparedness. Provincial, regional and local emergencies would be handled by emergency organisations at each respective level.

Allocation Procedures

The legal authority to implement programmes for meeting Canada's allocation obligation exists under the Energy Supplies Emergency Act. The Act also provides the legal authority to enforce mandatory

allocation through the Mandatory Allocation Program (MAP). Canada's approach to meeting its allocation obligation is to impose demand restraint sufficiently high to redistribute supplies equitably within Canada and to free supplies for exports to satisfy the country's allocation obligation. The allocation system could be triggered by a national emergency (no supply loss trigger is specified) or by an IEA obligation. If Canadian oil supply were not affected in a crisis, refinery intake could still be curtailed to allow Canada to meet its IEA obligation. Allocation of crude oil would be fairly simple, as there are only ten companies involved in refining operations.

During the 1991 Gulf War, a process change was implemented in the MAP, so that crisis regulations do not have to be reviewed and adopted each time they are to be activated in a crisis. Moreover, the Administration is reluctant to resort to rationing and instead favours greater reliance on market mechanisms and the complementary set of co-ordinated response measures established by a July 1984 IEA Governing Board decision. The industry is kept aware of Canada's allocation obligation and domestic tests include allocation obligation as a major feature. The Administration has enjoyed very good co-operation from the petroleum industry in the development of its programmes and during tests, and expects this co-operation to continue in the future.

Emergency Reserves

Policy and Legal Instruments

Under the ESE Act, Sec. 25 (d), the Board has the authority to regulate building, storage and disposal of stocks, including industry stocks, during a declared national emergency. The threshold level would be decided by the government in consultation with the oil industry at the time of an emergency. The mechanism requires monthly reports to the ESAB by each company on its stock situation.

Stockholding and Maintenance

As a net oil exporter, Canada does not have an IEA emergency reserve commitment. All stocks currently held in Canada are commercially owned and used for operating purposes.

Operational Aspects of Stockdraw

The drawdown of commercial stocks would be carried out by oil companies during the mandatory allocation programme. Initial data submissions would be received by the NESO, an assessment of the situation and a decision by ESAB would be taken, the information communicated to companies and stock drawdown initiated. Stocks would be released into the market by companies meeting their crude oil entitlement and the product entitlements of their customers. The Board has the power to establish parameters for prices as well as set prices at the time of emergency, if necessary. This sequence of events would require about 2-3 weeks. The procedure has been tested on several occasions on paper, but not through physical tests.

Compliance Issues

In normal times, oil companies are not required to hold emergency stocks. However, in an emergency, the Board would have the authority to regulate company stocks and to penalise companies for contravention of its orders under Section 41 of the Energy Supplies Emergency Act. There are monitoring mechanisms through the submission of data from industry, as well as the possibility of audit.

Demand Restraint Measures

Policy and Legal Instruments

In a crisis, demand would be restrained at the federal level through implementation of the Crude Oil and Products Allocation Programme. The ESAB would strive to ensure that limited supplies of crude oil and petroleum products would be distributed fairly and equitably to all citizens. Further demand restraint measures would be implemented by the provinces and territories to complement actions imposed by the federal government.

Legal authorities are required at the federal and provincial levels. The Energy Supplies Emergency Act would have to be invoked for implementing the federal authority. Some provinces already have legislative authority and other provinces are studying their legislation requirements. Those provinces that do not have demand restraint programmes would rely on energy efficiency programmes instead. These programmes will be reviewed in conjunction with the forthcoming review of the energy security issues.

Beyond the allocation programme there is no specific federal legislation regarding other demand restraint measures for a crisis of shorter duration or lower intensity. Such authority rests entirely with the provinces. At the federal level, such activities would be handled on a voluntary basis, and would include media campaigns to encourage voluntary consumption reductions and prevention of hoarding. The Administration is confident that this voluntary approach would be adequate to deal with a crisis and cited several examples where the provinces have collaborated successfully during other types of emergencies (e.g. extreme weather conditions in Quebec in 1998).

Procedures and Monitoring

During a disruption of energy supply, the ESAB could activate the following allocation plans to ensure that crude oil and products are distributed fairly and equitably to all citizens:

- the Crude Oil Allocation Program, which allocates available crude oil from offshore and domestic sources to refineries throughout Canada;
- the Petroleum Products Allocation Program, which controls the volume of products that refiners and other major suppliers may sell to wholesale customers; and
- the Rationing Program, the last resort programme of mandatory rationing by coupon for gasoline and diesel fuel.

Allocation of petroleum products would be based on historical consumption patterns and on the use of oil products. The allocation factors would be issued for three basic priorities of use: (a) health, welfare and security of Canadians (e.g. hospital services, fire and police protection, national defence or public transit); (b) economic stability (e.g. most industrial and commercial activities, including public utilities, postal services, taxis and road maintenance); and (c) discretionary activities related to maintenance of the standard of living (e.g. supplies of gasoline at service stations and of fuels for heating commercial buildings). Users in the first two categories would receive their supplies directly from the wholesalers. Since the definition of the second category is quite general in the legislation, the NESO has developed a detailed list of users in this category.

In addition to restraining sales of products, crude oil intake in refineries would be reduced to complement and match permissible product requirements. This can be implemented within days of a declared emergency and a data submission from industry. Rationing falls under federal jurisdiction. It is considered to be a measure of last resort as it would take up to six months to fully activate and implement.

Decision Processes

The decision process for activating the programme is described in the ESE Act and would involve recommendations from the Board to the Governor in Council (the Cabinet of the federal government). This area has not been tested. It would take up to 60 days after the declaration of an emergency to fully implement mandatory products allocation and issue product entitlements. The effects of mandatory allocation would be immediate and equal to the demand restraint imposed each month. Progress would be monitored on a monthly basis. A public information programme has been developed to communicate relevant information to the public through the media.

Cross border distortions could arise during the implementation of demand restraint measures because gasoline costs less in the United States and because the United States prefers to rely on SPR drawdown rather than demand restraint.

Evaluation of Measures

No recent studies have been conducted to estimate volumetric savings from demand restraint measures. Since the allocation programme restricts the amount of crude oil processed by refineries and the product sales at the wholesale level, volumetric savings would be known once a decision on demand restraint is made by the ESAB.

Other Response Measures

Canadian surge production capacity fluctuates seasonally due to such factors as refinery turnarounds, inclement weather or operating problems. It is typically equivalent to at least 5% of production and in late 1999 was estimated at 100 to 200 kb/d. This does not include production shut-in due to market and pipeline constraints which at times could reach up to 1% of total production.

This measure would only be used under very severe emergency conditions as it could increase the risk of damaging wells and reservoirs if maintained for more than a few weeks or months. Moreover, the federal

government has little control over surge production as most oil resources are under provincial jurisdiction. In a crisis, provincial regulatory boards could relax the best production practices (including the gas-to-oil ratios), but could not force oil companies to take advantage of this in order to increase production. Under extreme emergencies, the Federal Emergencies Act gives the federal government the authority to control oil production. The Administration estimated that this intervention process would take a minimum of two weeks.

Spare pipeline capacity would be needed to transport surge production volumes to the markets. In the past few years, the most important constraint on crude oil production has not been conservation and environmental regulation, but the pipeline capacity from Western Canada. Since January 1994, the National Energy Board has approved the construction of over 700 kb/d of new pipeline capacity to export markets. Recently approved expansions are expected to eliminate pipeline apportionment until 2002, when further pipeline expansions may be necessary to keep up with rising oil production.

The ESAB's 1991 study on fuel-switching estimated that the capability to switch from heavy fuel oil to alternative fuels was around 42 kb/d, or 25% of heavy fuel oil demand. However, this also included switching to other oil products such as light fuel oil and diesel oil. When these fuels were removed as alternatives, the off-oil switching capability to other non-oil fuels was reduced to about 16 kb/d, including 11 kb/d potentially switchable to natural gas. This represented 9% of Canadian heavy fuel oil demand and less than 1% of total product demand. On a sectoral basis, off-oil switching capability was concentrated in the pulp and paper, smelting and refining industries. The study implies that fuel-switching would not significantly reduce demand for petroleum products in an oil crisis.

No recent data is available on the use of dual-fired (i.e. natural gas/oil) boilers for industrial and utility purposes. However, given Canada's limited remaining capacity to switch from oil to gas, it is unlikely that there would be a significant impact on oil demand if an interruption in natural gas supply were also experienced.

Product specifications are generally under the provincial jurisdictions. However, the Canadian Environmental Protection Act (CEPA) and the ESE Act include the authority to relax product specifications under certain circumstances. Whether these authorities would be exercised in an emergency would depend on the extent of the crisis and the types of problems created by the existing specifications.

There are only two current product specifications in Canada which could restrict access to product imports in a crisis: the summer Reid Vapour Pressure (RVP) and the benzene level. Relaxing the RVP requirement could result in additional product output. The benzene regulation only has impact on the availability of imports. In a crisis, the relaxation of the benzene requirement could increase the flexibility of importers. New standards for sulphur levels in gasoline currently under development could also constitute a barrier to imports. However, modifications to refining capacity, which will be required to meet the new standards, could also provide refiners with some increased flexibility on crude slates.

Data Collection

Most of the data reported to the IEA are collected as part of the national statistics collection processes. Statistics Canada, which has the legal authority to collect data, processes and verifies the data internally before transmitting it to Natural Resources Canada for inclusion in the IEA reports. Similar methodologies are used for the monthly and annual oil statistics to minimise discrepancies. Annual oil reports are based on more current and more detailed information than monthly reports and, therefore, reflect revisions and updates. As a result of recent improvements in data handling processes, annual oil reports and most other annual questionnaires are now fully automated.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

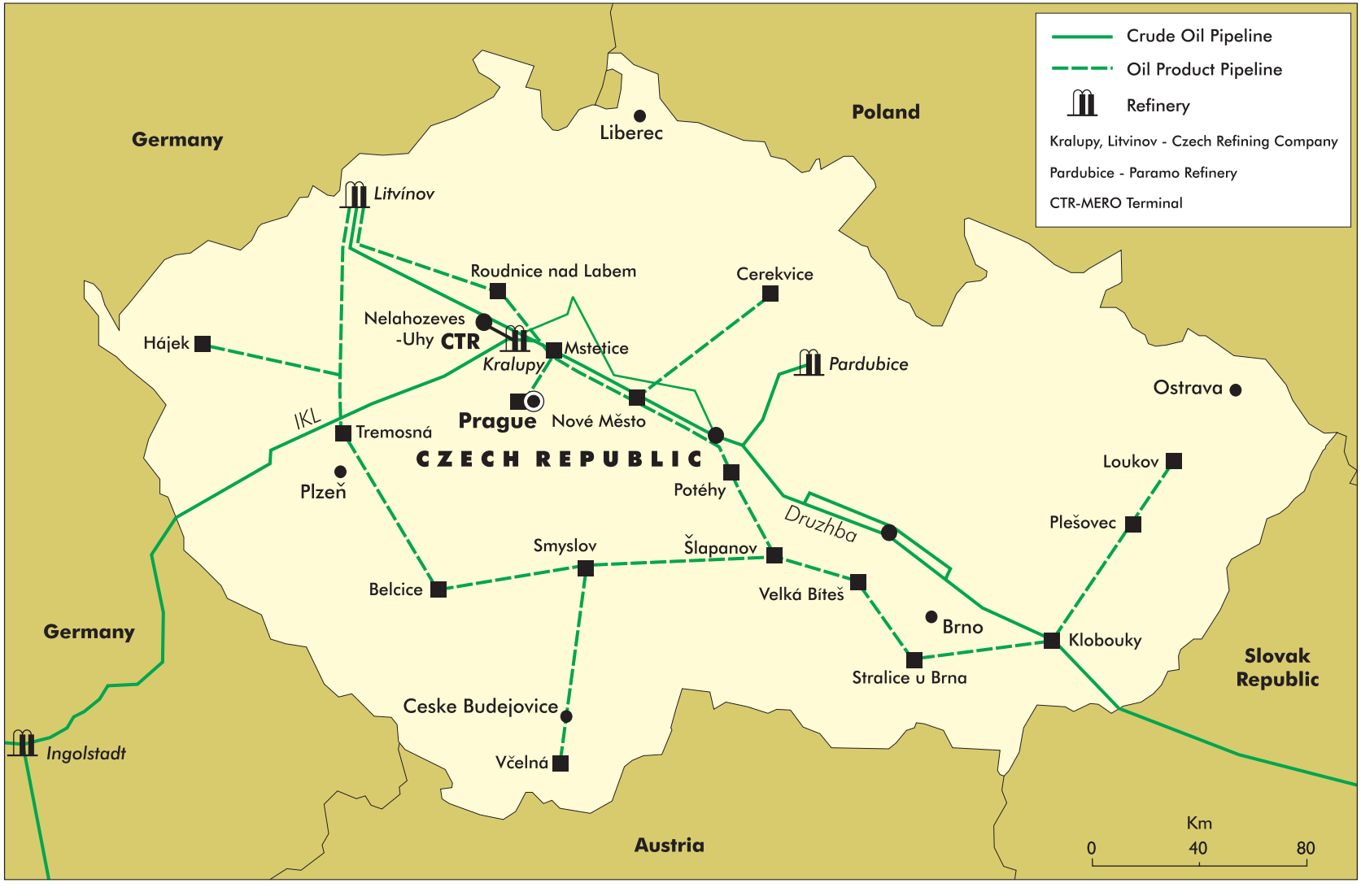
Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Atlantic															
NFLD Refining	Come-By-Chance	4.94	99.69	2.82	52.22	2.28	42.72	0		1.64	31.48			0.95	16.19
Esso Petroleum	Dartmouth	4.16	83.96	2.16	39.98	1.52	29.18	1.52	29.18						
Ultramar	Halifax														
Irving Oil	Saint-John	11.75	237.37	3.34	61.72	3.48	65.63	1.25	23.99	1.55	29.68			1.06	17.99
Quebec															
Petro-Canada	Montreal	5.20	104.95	2.29	42.27	3.32	62.90	1.55	29.68	1.27	24.39			0.75	12.79
Shell Canada	Montreal	6.43	129.83	2.67	49.48	2.27	42.85	1.25	23.99	0.61	11.69			0.71	11.99
Ultramar	Saint-Romnald	7.67	154.92	2.43	44.98	2.81	53.97	2.81	53.97						
Ontario															
Esso Petroleum	Nanticoke	5.54	111.94	1.82	33.68	2.13	40.83	2.13	40.83						
Esso Petroleum	Sarnia	6.04	121.93	1.66	30.78	5.38	96.03	1.34	25.63	0.69	13.19				
Petro-Canada	Clarkson					0	0								
Petro-Canada	Oakville	4.11	82.96	2.06	38.08	1.32	25.39	1.32	25.39						
Polysar	Sarnia	3.96	79.96	1.78	32.98	0	0								
Shell Canada	Sarnia	3.53	71.36	1.33	24.69	1.26	23.84	0.75	14.39	0.35	6.75			0.24	4.05
Suncor	Sarnia	4.08	82.35	1.08	19.99	2.44	46.33	0.86	16.49	1.25	24.08			0.39	6.70
Prairie															
CO-OP/Newgrade	Regina	2.57	51.97	1.35	24.99	2.26	40.58	0.99	18.99						
SASK Asphalt	Moose Jaw	0.59	11.99	0.38	6.99	0	0								
Esso Petroleum	Edmonton	8.71	175.90	3.57	66.04	2.72	52.27	2.72	52.27						
Petro-Canada	Edmonton	5.94	119.93	1.46	26.98	3.91	72.83	1.79	34.28	0.97	18.69				
Husky	Lloydminster	1.16	23.49	0.81	14.99	0	0								
Parkland	Bowden	0.30	5.99			0	0								
Shell Canada	Scotford	4.67	94.30	2.32	44.52					2.11	40.47				
Turbo resources	Balzac					0	0								
Esso Petroleum	Norman Wells	0		0	0	0	0								
Br. Columb															
Chevron	Burnaby	2.48	50.03	0.59	10.99	0.94	17.99	0.94	17.99						
Esso Petroleum	IOCO														
Petro-Canada	Port Moody														
Petro-Canada	Taylor														
Husky	Prince George	0.51	10.25			0.17	3.30	0.17	3.30						
Shell Canada	Burnaby														
Total		**94.31**	**1 905.06**	**33.61**	**621.9**	**40.52**	**761.2**	**21.37**	**410.37**	**10.44**	**200.42**			**4.10**	**69.72**

Refining Capacity *(continued)*

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Atlantic															
NFLD Refining	Come-By-Chance	1.00	23.39	0.79	16.19										
Esso Petroleum	Dartmouth	0	0	0.51	10.49	0.34	8.09								
Ultramar	Halifax	0		0											
Irving Oil	Saint John	1.49	34.63	1.40	28.78	0.21	5.00			0.40	9.50				
Quebec															
Petro-Canada	Montreal	1.30	30.39	0.51	10.40	0.11	2.70	0.03	0.80						
Shell Canada	Montreal	0.89	20.69	1.32	26.98	0.10	2.50			0.28	6.80				
Ultramar	St Romnald	0.84	19.49	2.00	40.98	0.21	4.97			0.57	13.79				
Ontario															
Esso Petroleum	Nanticoke	1.18	27.39	0.46	9.50	0.49	11.87								
Esso Petroleum	Sarnia	1.40	32.73	1.73	35.48	0	0								
Petro-Canada	Clarkson	0.39	8.99	0	0										
Petro-Canada	Oakville	0.57	13.39	0.32	6.50	0.14	3.30			0.30	7.09				
Polysar	Sarnia			0.83	16.99										
Shell Canada	Sarnia	0.90	20.99	0.31	6.30			0.07	1.60						
Suncor	Sarnia	1.13	26.29	0.27	5.50	0.24	5.80								
Prairie															
CO-OP/Newgrade	Regina	0.41	9.50	0.62	12.79			0.09	2.20	0.17	4.00				
SASK Asphalt	Moose Jaw			0											
Esso Petroleum	Edmonton	0.90	20.89	1.11	22.79	0.65	15.69			0.27	6.60				
Petro-Canada	Edmonton	0.66	15.29	1.93	39.48	0.52	12.59			0.63	15.09				
Husky	Lloydminster														
Parkland	Bowden	0.12	2.80							0.12	2.80				
Shell Canada	Scotford	0.92	21.49	1.02	20.99										
Turbo resources	Balzac														
Esso Petroleum	Norman Wells														
Br. Columb															
Chevron	Burnaby	0.43	9.99	0.68	13.99	0.13	3.00	0.08	2.00	0.42	9.99				
Esso Petroleum	IOCO														
Petro-Canada	Port Moody														
Petro-Canada	Taylor														
Husky	Prince George	0.07	1.60	0.39	7.99					0.04	0.90				
Shell Canada	Burnaby														
Total		**14.59**	**339.91**	**16.20**	**332.12**	**2.60**	**62.45**	**0.82**	**19.66**	**3.19**	**76.57**				

Map of Czech Republic



CZECH REPUBLIC

Key Oil Data

(million metric tons oil equivalent)

	1980[3]	1985[3]	1990[3]	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	0.2	0.3	0.2	0.2	0.4	0.2	0.2	0.2
Imports	21.5	18.8	15.2	8.9	9.2	7.4	8.0	8.2
Exports	–10.6	–8.7	–6.6	–1.0	–1.3	–0.1	–0.4	–0.4
Bunkers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	..
Net Imports – NI	10.9	10.1	8.6	7.9	7.9	7.3	7.6	7.8
Total Supply	11.1	10.3	8.8	8.2	8.3	7.5	7.8	8.0
Import Dependence (%)	97.9	97.4	97.7	96.9	95.3	97.3	97.4	97.5
Stock – Days of NI	..	0	0	0	101	..	..	..

1. Estimated data.
2. Latest available forecast.
3. Czechoslovakia.

Oil Import Dependence and Market Structures

The Czech Republic depends on imports for 95% of its oil requirements. Current energy supply of 41 Mtoe comprises 20% oil, 19% natural gas, 51% solid fuels, 9% nuclear energy and 1% other sources. Oil is imported mainly from the countries of the former Soviet Union, Germany, Austria, Algeria, Poland and Libya.

Until 1996, the Czech Republic was almost completely dependent for its oil imports on supplies from Russia via the Druzhba ("Friendship") Pipeline, which has an annual capacity of 10 million tons. In January 1996, a 340 km pipeline link between Litvinov/Kralupy and Ingolstadt (IKL) became operational. This pipeline allows for imports of up to 7 million tons of crude oil a year from Trieste via the Trans-Alpine Line (TAL pipeline). Only part of this capacity is used at present for economic reasons, but the existence of the pipeline gives the Czech oil industry considerable flexibility to choose between supplies from different sources. Imports from Russia account for about 80% of supplies. The remaining 20% is imported via Ingolstadt, and comes mainly from Algeria, Libya and the North Sea.

Local oil production is relatively small (400 000 tons/year). Only one small refinery (Pardubice) is able to process domestically produced crude oil, as it is transported only in railway tankcars. As for other

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	1 800	1 927	7.1
of which unleaded	1 125	1 341	19.2
Kerosene and jet fuels	186	181	–2.7
Gas/diesel oil	2 695	2 649	–1.7
Residual fuel oil	1 251	1 166	–6.8
Other	1 727	2 108	22.1
Total	**7 659**	**8 031**	**4.9**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999
(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Former Soviet Union	5 302	5	10	0	0	93	5 410
Germany	1	259	256	28	1	210	755
Austria	0	505	183	12	4	14	718
Algeria	391	0	0	0	0	0	391
Poland	0	0	0	158	0	86	244
Libya	217	0	0	0	0	0	217
Other	134	280	616	97	52	179	1 358
Total	**6 045**	**1 049**	**1 065**	**295**	**57**	**582**	**9 093**

Source: IEA Quarterly Oil Statistics.

important energy projects, a new fluid catalytic cracking unit (capacity 1.5 Mt of feedstock per year) will be built at Kralupy, to be commissioned in July 2001. In addition, the Temelin nuclear plant project will be completed no later than 2001/2002.

Products are transported to consumers from Czech refineries (and partly from Slovak Slovnaft) via product pipelines (with adjacent facilities for rail and road tankcars), or directly by rail and road from the local and neighbouring foreign refineries. The Czech Republic imported more than one million tons of products in 1999, the bulk coming from Austria, Germany and Slovakia.

Emergency Response Policy and Organisation

Emergency Response Policy

A draft document on energy policy was approved by the government on January 12th 2000. It was subsequently discussed and passed by the Parliament. The longer-term objectives are as follows:

- reliable, safe and environmentally acceptable energy supplies;
- environmentally and economically acceptable level of domestic coal production;
- phasing out of the remaining energy price subsidies;
- privatisation of the remaining state-owned energy companies (in some strategic cases, preserving a state-owned stake);
- creation of a competitive market for electricity and gas (the crude oil and products market being fully competitive);
- preparation of the energy sector for the accession to the European Union.

The Administration of the State Material Reserves (ASMR) is responsible for:

- stockholding and supply security;
- monitoring of strategic and company stocks;
- management of supply crises.

With respect to all these responsibilities, the role of the ASMR is strengthened by the Emergency Oil Stocks Act (Nº 189/99), which came into force on November 1st 1999. As foreseen in this Act, the ASMR has issued a decree stipulating the principles of stockholding and procedures for calculating daily net imports in accordance with IEA rules and a daily average consumption to comply with EU Directives. The ASMR had prepared the above decree, which was to come into force during 2000.

All these facts are reflected in stock levels (including industry stocks), which have risen from about 60 days of consumption and net imports in 1997 to about 90 days in early 1998. The principal laws, i.e. Act Nº 189/99, Act Nº 272/1996 on the Authority of the State Material Reserves Administration and Act Nº 256/92 on Statistics, ensure that the required information is available for implementation of IEP and CERM measures, including demand restraint and allocation.

During the process of accession to the IEA, the Administration demonstrated that the provisions of the legislation described above work well in practice, and that the emergency response commitments have been fully implemented.

Trade and refining in emergencies will be managed in accordance with the above-mentioned laws. The Chairman of the ASMR will propose to the government the limits on consumption and volumes to be drawn down from emergency stocks in times of crises. The ASMR will manage sales of stocks, loans or distribution. Article Nº 5 of the Act on the Emergency Strategic Stocks stipulates in detail the emergency measures, both in private and state sectors, up to the implementation of the rationing system.

As for IEA allocation commitments, the government will be authorised to order exports in the case of an allocation obligation for the Czech Republic.

Most power plants are fuelled by coal. Natural gas is 99% imported – 80% from Russia, and 19% from OECD countries. The Czech Republic is a transit country for Russian gas to the West, a positive factor in the security of gas supplies.

Primary Energy Supply consists of brown coal, 38%, gas, 22%, oil, 20.5%, hard coal, 16%, nuclear, 3%, and hydro, 0.5%. The Czech Republic is a net exporter of both hard and brown coal.

Emergency Organisation

The NESO comprises representatives of the following organisations:

- the Administration of State Material Reserves, which provides political and operational heads of the NESO;
- representatives of the Ministries of Industry and Trade, Transport and Communications, Interior, Defence, Finance and the Czech Statistical Office;
- eleven representatives of the oil industry: seven from the Association of the Czech Petroleum Industry; the Secretary General and four from the Reporting Companies.

The NESO is a co-ordinating committee of the relevant government offices and representatives of the main oil industry players represented either directly or by the Association of the Czech Petroleum Industry. Each member is responsible for his own sphere, the Administration of the State Material Reserves having the chief responsibility and thus a leading role in organisation, administrative support and decision-making.

Emergency Reserves

Policy and Legal Instruments

On 20 July 1999 the Czech Parliament, acting on proposals of the Administration, enacted the Emergency Oil Stocks Act, which makes long-term arrangements to meet IEA and European Union stockholding requirements and provides broad legal authority to deal with emergencies involving an actual or foreseen reduction in oil imports. The enacted legislation, which came into force on 1 November 1999, accommodates suggestions made by an IEA Secretariat team during a visit in March 1999, while the legislation was pending in the Parliament.

The Emergency Oil Stocks Act reflects European Union requirements, including minimum levels of products in total stocks and EU arrangements for bilateral stockholding, as well as IEA requirements, such as the exclusion of certain categories of stocks defined in the Annex to the IEP Agreement and deductions for unavailable stocks. The legislation specifies the facilities that may be used for crude oil and product storage, stipulates that construction of new facilities for storage of emergency stocks should be considered construction for the public benefit, and makes provision for storage abroad in EU countries.

The Act stipulates that the Head of the Administration of State Material Reserves shall submit proposals for declaring or terminating a state of oil emergency, and specifies the role of that Administration in the creation, maintenance and monitoring of stocks and in the formulation of proposals to the government for the use of stocks in emergencies.

As concerns demand restraint and related measures, the Act empowers the government during a declared emergency to limit motor vehicle speed, limit motor vehicle use on certain days or for specific kinds of transportation, impose usage restrictions based on odd/even car plates, limit the use of railway and aviation facilities, regulate filling station operations, introduce rationing, and limit or prohibit oil exports. It also gives the government the power to order private companies to draw down their stocks in an emergency. The legislation assigns responsibility for assuring compliance with these different measures to various components of the government.

The key arrangements for stockdraw are:

- the government will decide and declare a state of emergency on the basis of a proposal made by the Chairman of the ASMR;
- the ASMR shall manage the crisis situation (Law) and release the state-owned stocks up to some explicit limits approved in advance by the Government and the NESO will supervise the drawdown of company stocks;
- as for state-owned stocks, stockholding companies will act as normal business partners on the orders of the ASMR; and
- stocks held by companies are to be drawn in case of emergency according to the NESO instructions.

Participation in an early co-ordinated response (CERM) is ensured because notification of IEA membership by the Czech Parliament included commitment to this and all other obligations of membership.

Stockholding and Maintenance

In non-emergency periods, the Czech Republic will have powers to ensure that sufficient oil stocks are available to meet the IEA emergency reserve commitments.

Act Nº 189/99 on Emergency Strategic Oil Stocks abroad provides the necessary basis for meeting IEA and EU stockholding requirements in full.

The policy of the Czech Republic is to have some stocks in excess of the IEP commitment. This was reflected in actual performance in 1998 and 1999.

Any increase in net imports would result in an automatic increase in the stockholding obligations for the ASMR. The ASMR is currently studying domestic stockholding capacity enlargement and checking availability of stockholding capacity in neighbouring EU countries.

Company stocks are financed by the companies themselves. Stockholding by industry in normal times is not obligatory by law.

State-owned stocks include the main groups of oil products, and thus the Czech Republic will meet EU, as well as IEA, requirements.

Operational Aspects of Stockdraw

After an assessment of the situation has been made by the NESO and after the government has declared the state of emergency on the recommendation of the Chairman of the ASMR, the drawdown of company and government stocks will be carried out by oil companies depending on the logistics under the supervision and auspices of ASMR (e.g. state crude oil stored in the companies' facilities shall be processed by those companies).

Physical tests of stockdraw were provided by floods in 1997 and occasional disruptions of Russian crude oil deliveries which occur at the end of December or in early January. No formal exercise has been held to-date.

Release of stocks and subsequent drawdown would depend on the circumstances: The ASMR has the right to release a certain volume, while other phases are dependent on Government Orders given on the recommendation of the ASMR Chairman. This may be done at any time, providing that the 90-day obligation is met.

The present system prefers lending oil stocks to oil companies rather than selling them. If sales are needed, then the price would reflect market conditions. However, the process of pricing will take place under the auspices of the Ministry of Finance and it cannot be excluded that some tranches will be sold at prices slightly below market price so as to calm the domestic oil market.

The time required from a government stockdraw decision until physical deliveries is determined by:

- approval by the Chairman of the ASMR (limited quantity) – no delay;
- governmental decision (several days needed).

The time required depends on the speed of the response of the oil industry and the time the government needs to decide on a regular or an extraordinary session, should it have to give its approval.

Compliance Issues

Company stocks are not compulsory, but commercial, at the discretion of the respective companies. They do, however, come under ASMR control at the times of emergency. Penalties for non-compliance are included in the legislation.

Demand Restraint Measures

The demand restraint programme has been designed to comply with Article 5 of the IEP. Measures will vary according to the severity of a crisis. A publicity campaign will be followed by the implementation of measures, including some or all of the following:

- reductions of speed limits;
- limits or bans on the use of some classes of vehicles during specific days or for specific kinds of transport;
- limits or bans on vehicles with even/odd final car plate number alternately;
- limits or bans on use of railways, motor cars, civil aviation;
- limits on opening hours of filling stations; a ban on the sales of oil products into canisters;
- regulation of the use of the stocks other than state-owned;
- rationing;
- limits or bans on exports of crude oil and petroleum products (outside IEA countries).

In accordance with Act Nº 189/99 on Emergency Strategic Oil Stocks, the government would declare the state of emergency on the recommendation of the Chairman of the ASMR. The enforcement of the implemented measure would be under the scrutiny of the Ministry of Interior and the Czech Trade Inspectorate.

Emergency response would involve the mix of stockdraw and demand restraint considered optimal. As a first step, a publicity campaign would be launched to persuade the population to restrain demand, particularly for transport fuels.

Procedures and Monitoring

The key elements in demand restraint comprise: (i) procedures for activation and implementation of demand restraint: (ii) enforcement mechanisms; (iii) expected effectiveness by product, and (iv) mechanisms for monitoring the reduction in consumption and avoiding cross border distortions. Each demand restraint measure may be implemented immediately after publication by the media. Rationing may take time before becoming effective, as the coupons would have to be printed and distributed. Also, the ban on exports must take into account the obligations of contracting parties. After the law has been passed and becomes effective, a regulation stipulating procedures shall be issued.

Data Collection

Data reported to the IEA are collected by the Czech Statistical Bureau within the standard data collection process conducted by the State.

The data collected by the Czech Statistical Bureau are scrutinised by the Ministry of Industry and Trade and cross-checked with the statistics of the Czech Association of the Petroleum Industry. If there are differences, the Customs statistics are consulted.

Under Law Nº 189/99 the ASMR would be able to collect data in emergencies to meet IEA requirements.

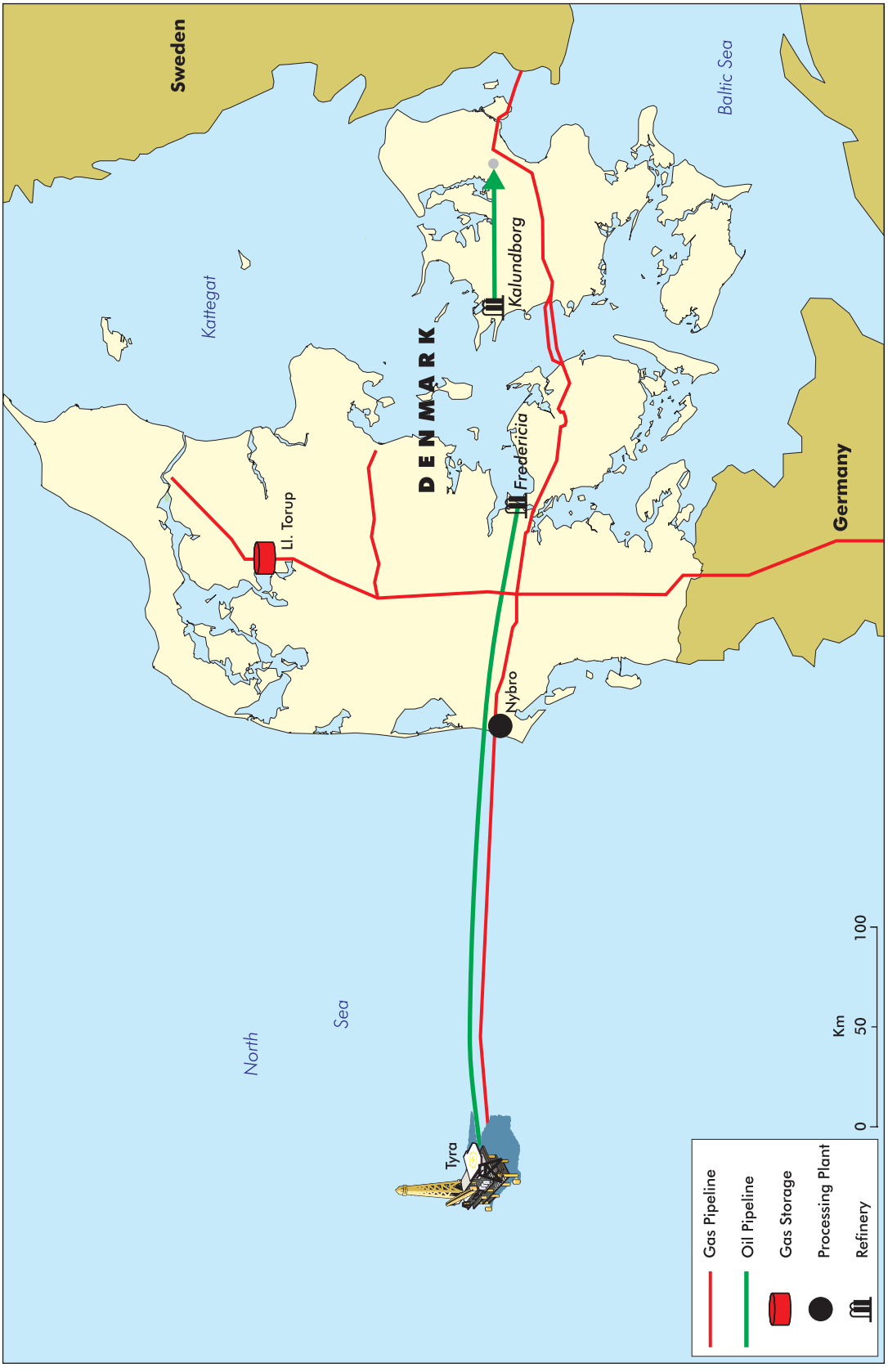
Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Kaucuk a.s.	Kralupy	3.60	72.7			0.0	0.0								
Chemopetrol a.s.	Litvinov	5.50	111.1	2.6	48.1	1.1	21.1			1.0	19.2				
Paramo a.s.	Pardubice	1.00	20.2	0.6	11.1	0.0	0.0								
Total		**10.10**	**204.0**	**3.2**	**59.2**	**1.1**	**21.1**			**1.0**	**19.2**				

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Kaucuk a.s.	Kralupy	0.4	9.3	2.0	41.0							0.2	4.8	0.1	2.4
Chemopetrol a.s.	Litvinov	1.0	23.3	3.3	67.7							0.1	2.4		
Paramo a.s.	Pardubice		0.0	0.3	6.2										
Total				**1.4**	**32.6**	**5.6**	**114.8**					**0.3**	**7.2**	**0.1**	**2.4**

Map of Denmark



DENMARK

Key Oil Data
(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	0.3	2.9	6.1	9.4	14.7	11.7	5.5
Imports	15.0	11.7	8.7	10.8	10.6	..	..
Exports	–1.6	–3.2	–5.5	–9.2	–15.2	–1.0	5.5
Bunkers	–0.4	–0.4	–1.0	–1.6	–1.3	–1.5	–1.5
Net Imports – NI	12.9	8.1	2.3	0.0	–6.0	–2.5	4.0
Total Supply	13.2	11.0	8.4	9.3	8.7	9.2	9.5
Import Dependence (%)	97.7	73.2	27.0	–0.1	–68.5	–26.8	42.1
Stock – Days of NI	151	221	512	0	0	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Current energy supply of 20 Mtoe comprises 46% oil, 22% natural gas, 24% solid fuels and 8% other sources. Due to North Sea oil production, Denmark became a net exporter of oil in the early 1990s. While it exports oil mainly to neighbouring countries, imports are made from Norway, Sweden, Venezuela, the countries of the former Soviet Union and the United Kingdom. Crude oil is imported primarily from Norway and all crude oil import from Venezuela is orimulsion.

A 1998 study made by the Ministry of Environment and Energy indicates that Danish North Sea crude production will continue to rise, whereas annual oil consumption will remain static. However, it is expected that production will decline in the next decade, and that Denmark will return to the status of being a net importer.

The bulk of the Danish product requirement is met by direct supplies from the two refineries at Fredericia and Kalundborg and from the ports of Aalborg, Stigsnæs and Copenhagen. About 40% of Danish refinery production is exported and a similar quantity of products is imported.

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	2 031	2 016	–0.7
of which unleaded	2 031	2 016	–0.7
Kerosene and jet fuels	807	863	6.9
Gas/diesel oil	3 972	3 959	–0.3
Residual fuel oil	718	557	–22.4
Other	1 821	1 955	7.4
Total	**9 349**	**9 350**	**0**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999
(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Norway	4 538	291	359	0	74	18	5 280
Sweden	3	483	748	112	0	157	1 503
Venezuela	1 199	0	0	0	126	0	1 325
Former Soviet Union	55	0	776	174	19	0	1 024
United Kingdom	56	86	31	0	60	0	233
United States	0	0	0	0	0	219	219
Other	125	88	189	367	330	148	1 247
Total	**5 976**	**948**	**2 103**	**653**	**609**	**542**	**10 831**

Source: IEA Quarterly Oil Statistics.

Shell and Statoil have extensive operations, including refining, in Denmark. Kuwait Petroleum acquired the former Gulf interests, including the 3 Mt/yr refinery at Stigsnæs in 1983 (now closed) and the bulk of the BP marketing assets in 1987. Hydro Texaco, which resulted from the merger of the Danish marketing affiliates of Norsk Hydro and Texaco is also counted as a major company.

Emergency Response Policy and Organisation

Emergency Response Policy

The Danish overall energy policy emphasises energy savings in order to reduce CO_2 emissions by 20% from the 1988 level by 2005, which would contribute to reduction of Denmark's oil dependence, thereby rendering the nation less vulnerable to oil crises.

The Danish emergency response policy centres on the price mechanism. Market price rises can be expected to have their effect and, if necessary, could be supplemented by an increase in taxation. The

Danish Administration believes that there is ample evidence of substantial price elasticity of demand in the gasoline and heating oil markets.

The legal framework of Denmark's emergency response measures consists of:

- The Supply Measures Act 1986;
- The Reporting and Selling Obligations Act 1975;
- The Minimum Mineral Oil and Oil Products Stocks Act (revised in 1992); and
- The Civil Emergency Preparedness Act.

Emergency Organisation

The Danish emergency organisation has three full-time staff. Although there are no specific staffing plans, the emergency organisation can flexibly and quickly be expanded in co-operation with personnel who have previous experience and experts from the industry. The Minister has the powers to organise and establish the NESO without the need for specific legislation.

Allocation Procedure

The Reporting and Selling Obligations Act and the Supply Measures Act empower the Minister to fulfil Denmark's obligations to the IEA as to participation in the crisis allocation system.

Emergency Reserves

Policies and Legal Instruments

In the case of an emergency, the Supply Measures Act empowers the Minister, in conjunction with the Standing Committee on Energy, to determine the use and distribution among users of stocks, supplies of energy and the location and price equalisation of the available energy products.

Net oil exporting countries, including Denmark, have no IEA stockholding obligation, but Denmark holds stocks under EU regulations and has maintained a high level of emergency stocks to enable itself to participate in IEA Co-ordinated Emergency Response Measures (CERM) with stockdraw. The major part of the oil stocks is held by the FDO (the Association of Danish Oil Reserve Stocks). In addition, some part of commercial stocks would be available in the case of a supply disruption. The stock obligation for oil companies has been lowered from 90 to 81 days of consumption as of 1 July 1999. This decision was taken in accordance with the EU Directive 98/93/EC of December 1998, which raised the derogation from the stockholding obligation for the oil-producing member countries from 15% to 25%. The government is assured that Denmark retains a reserve of compulsory stocks of 13$^{1}/_{2}$ days of consumption in excess of the effective EU obligation, and this reserve allows the Danish government to participate in a CERM stockdraw without being in breach of the EU commitments.

Stockholding and Maintenance

The Minimum Mineral Oil and Oil Products Stocks Act empowers the Minister to order compulsory oil stocks. It came into effect in 1993.

The previous FDO stocks policy of long-term storage of products had to be revised in the face of changing refining practices which led to the unavailability of products with a long-term storage potential. Therefore, the FDO has entered into agreements with two refineries connected by pipeline to the major FDO facilities. The agreement between the FDO and two refineries has contributed to integration of the FDO operations with the refiners, which ensures that FDO stocks reflect current consumption patterns except for Jet A-1 fuel.

Some 4% of FDO stocks are held as crude oil for flexibility. Apart from crude oil stocks, the composition of FDO stocks reflects the market product mix.

Operational Aspects of Stockdraw

Danish stockdraw procedures are as follows:

Company held stocks

The procedure will simply be to lower the percentage figures in terms of sales and consumption in the latest available calendar year which the companies are required to observe.

FDO stocks

The FDO will offer the released quantities to the members in proportion to their shares in the organisation. The price to be paid is the average of Platts Rotterdam quotations for the day of the purchase and the working days on either side necessary for the transaction. The Administration considers that this procedure worked well when it was activated during the Gulf War.

Compliance Issues

Companies which have a stockholding commitment are required to report all movements of products on a monthly basis, in terms of production, imports, exports, sales to other stockholding companies and to consumers, bunker deliveries, blending out and ingoings, as well as opening and closing stocks. Failures to report and to fulfil stockholding commitments are reprimanded and prosecuted, if necessary.

In addition, during a crisis, stockholding companies and the FDO should report their stockholding situation on a more frequent basis, which would ensure that the NESO can monitor stockdraw performance accurately.

Demand Restraint Measures

Policy and Legal Instruments

The Supply Measures Act contains the necessary powers for the Minister, in conjunction with the Folketing Standing Committee on Energy, to impose various demand restraint measures, from light-

handed measures to increases of taxation. The Administration is sceptical about whether the administrative burden necessitated by some compulsory demand restraint measures is justified by the likely effects. Among the heavy-handed measures, the government considers that increased taxation would be the most practicable measure, whereas rationing is considered to be a last resort.

Procedures and Monitoring

The introduction of demand restraint measures will be decided at cabinet level and must be endorsed by the Standing Committee on Energy before the Minister takes any actions.

Light handed measures include:

- exhortation to the public on saving oil and other energy — Minister's message through TV;
- speed limits and ban on weekend driving in co-operation with Ministry of Justice and the police.

Heavy-handed measures include:

- increased taxation; the potential for energy savings is substantial. The Danish authorities estimate that doubling of the price paid by the consumers would reduce consumption of gasoline and heating gas oil by more than 30%;
- a ban on deliveries of heating oil to domestic consumers with more than 25% fill in their tanks; and
- rationing as a last resort; coupons are likely to be allocated on an equal basis in order not to favour owners of uneconomical vehicles.

Other Response Measures

Since Danish North Sea fields normally operate at full capacity, there is little potential for increasing indigenous production in an emergency. However, were the potential to arise, the legal powers exist under the Underground Act for the Minister to order maximum production during an emergency.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Shell	Fredericia	3.65	73.73			0.88	16.21					1.46	27.01		
Statoil	Kalundborg	5.50	111.10	1.60	29.60	1.37	23.97			0.29	5.57		0	2.10	35.70
Total		**9.15**	**184.83**	**1.60**	**29.60**	**2.25**	**40.18**			**0.29**	**5.57**	**1.46**	**27.01**	**2.10**	**35.70**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Shell	Fredericia	0.64	14.91	2.30	47.15							0.24	5.69		
Statoil	Kalundborg	1.10	25.63	1.70	34.85							0.49	11.76		
Total		**1.74**	**40.54**	**4.00**	**82.00**							**0.73**	**17.45**		

Map of Finland



FINLAND

Key Oil Data
(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	0	0	0	0	0.1	0	0
Imports	16.5	13.5	12.5	12.9	15.6	14.2	14.2
Exports	–2.1	–2.3	–1.7	–4.2	–4.7	–4.5	–4.5
Bunkers	–0.6	–0.5	–0.6	–0.3	–0.5	–0.4	–0.4
Net Imports – NI	13.8	10.8	10.2	8.4	10.4	9.3	9.3
Total Supply	13.8	10.8	10.2	8.4	10.4	9.3	9.3
Import Dependence (%)	100	100	100	99.8	99.2	100	100
Stock – Days of NI	178	222	139	111	110	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Finland has no domestic oil production, and is entirely dependent on imported oil. Current energy supply of 33 Mtoe comprises 32% oil, 10% natural gas, 16% solid fuels, 17% nuclear energy and 25% other sources. Oil is imported mainly from the countries of the former Soviet Union, Norway, Denmark, the United Kingdom, Sweden and the United States.

Finland has made considerable effort to enhance its energy supply security by diversifying its sources of primary energy supply. It uses coal, oil, natural gas, hydro-power, peat and nuclear power in a balanced manner, complementing them with new and renewable energy sources. But Finland is also heavily dependent on imported energy because its indigenous sources of energy are limited to hydro-power, nuclear and bioenergy.

Although Russia still occupies a dominant position in the oil imports of Finland, the current situation is far from the almost complete dependence on Russia in the 1980s. Total crude oil imports in 1999 were about 11.1 million tons, of which 47% was imported from Russia, 24% from Norway, 22% from Denmark, and 7% from the United Kingdom. Russia was also the largest source of other feedstocks, including gas condensates. Crude oil imports from Russia were 5.3 million tons, of which 58% was

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	1 857	1 852	–0.3
of which unleaded	1 857	1 850	–0.4
Kerosene and jet fuels	145	418	188.3
Gas/diesel oil	4 144	4 185	1.0
Residual fuel oil	1 620	1 627	0.4
Other	1 359	1 174	–13.6
Total	**9 125**	**9 256**	**1.4**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Former Soviet Union	5 267	11	860	364	473	382	7 357
Norway	2 682	267	18	58	0	96	3 121
Denmark	2 436	0	0	64	0	8	2 508
United Kingdom	717	0	76	8	0	18	819
Sweden	0	29	123	492	0	119	763
United States	0	0	84	0	0	37	121
Other	0	0	56	3	2	95	156
Total	**11 102**	**307**	**1 217**	**989**	**475**	**755**	**14 845**

Source: IEA Quarterly Oil Statistics.

transported by rail and the rest by tankers. Railway wagons are discharged in Hamina, South-East Finland and at the discharge terminal of Porvoo refinery. Road deliveries are handled mainly by private haulage contractors. Tanker ports are in Porvoo and Naantali. Total consumption was about 9.3 million tons in 1999.

About 1 million tons of middle distillates and heavy fuel oil was imported from Russia. Gasoline was mainly imported from Sweden and Norway. Petroleum products are mainly exported to neighbouring countries around the Baltic Sea. Gasoline is the important exported fuel; around half of its domestic production is exported. The important export markets are Sweden, the Netherlands, Latvia, Estonia and the United States.

Oil refining capacity (Porvoo, Naantali) is approximately 13 Mt/yr. In addition to crude oil, Finnish refineries use other feedstocks, such as gas condensate, and these account for approximately 25% of total input.

The Ministry of Trade and Industry has drawn up energy scenarios to the year 2025. Consumption of oil products and total primary energy for the years 2010 and 2025 is presented in the Table below.

Consumption of gasoline and diesel fuel will increase greatly according to the energy market scenario (EMS) from the mid-90s up to the year 2025. CO_2 emissions will increase 1.5-fold by the year 2025. The energy policy scenarios (EPO) contain several factors with restraining effects on the demand for energy — not only the rise in world market prices, but also a more stringent energy taxation, an accelerating penetration of new energy technologies, and so on. By means of energy taxation, choices between different types of fuel will be steered into a direction leading to reduced CO_2 emissions. In EPO scenarios, only consumption of diesel fuel will increase.

It is predicted that the fleet of motor cars and light trucks will increase steadily by the year 2003 up to 10%, and the fleet of vans will increase 18%. The great increase of vans is based on the positive economic growth assumption. The number of diesel-powered cars will increase 0.5% per year and by the year 2003, about 11% of all cars will be diesel-powered.

Consumption of Oil Products and Primary Energy

(million tons oil equivalent)

	1998	2010			2025		
		EMS*	EPO1**	EPO2	EMS	EPO1	EPO2
Gasoline	1.9	2.4	2.0	2.0	2.5	1.6	1.6
Diesel fuel	1.7	2.2	1.9	1.9	2.6	2.1	2.1
Other products	5.0	4.7	4.4	4.3	4.4	3.7	3.7
Primary energy	33.5	39.0	37.0	37.0	44.0	37.0	37.0

* EMS = Energy market scenario.
** EPO = Energy policy scenario. In the EPO1 scenario, natural gas and biofuels increase (leading to CO_2 emission reduction). In the EPO2 scenario, nuclear power also increases.

Although the fleet of motor cars is projected to increase 10% by the year 2003, consumption of gasoline will remain at about 2.5 million cubic metres. This is because the fuel efficiency of cars will be improved when the fleet of cars is renewed. Consumption of diesel fuel will increase about 10% by the year 2003. Consumption of heavy fuel oil will decrease about 11% by the year 2003, mainly due to the transition to competing sources of energy and increases in the efficiency of the consumption of energy.

Emergency Response Policy and Organisation

Emergency Response Policy

Energy and oil emergency response policy is a part of the general energy policy of Finland. The Security of Supply Act (enacted in 1992) is the legal basis for ensuring supplies of various basic materials, including oil, in the case of emergency situations. General goals for security of supply regarding specific materials are determined by the government. According to the decision of the government in 1996, the target for stocks of imported fuels corresponds to 7 months' average consumption. Under the Act, the government is responsible for securing a control system for energy

supply and demand. As the State has its own stockpiles, the 7-month stockholding target can always be reached.

Based on the Act 1992, the National Emergency Supply Agency (NESA: in Finnish, *Huoltovarmuuskeskus* or HVK), a subordinate agency to the Ministry of Trade and Industry, was formally founded in 1993 for the development and maintenance of security of supply. The NESA is the national stockholding agency of Finland.

The IEP Agreement was adopted in Finnish legislation by the Act on Adoption of Certain Provisions in the Agreement on an International Energy Program and the Application of the Agreement (enacted in 1991). Finland maintains its stock level well above the 90-day level, and these extra stocks can be drawn down by a government decision, including an oil supply shortage under 7%. The Emergency Act (enacted in 1991) gives the right to the Government to control widely different activities in case of a severe crisis.

Finnish oil refineries are installed and adjusted to produce high quality oil products from different kinds of crude oils, gas condensates and other refinery intakes. The refined oil products and those stored in commercial storage, as well as all products stored in the state-owned stockpiles, meet the standards required by Finnish environmental authorities. Changes in product quality specifications are needed only in case of massive changes in refinery intake and operational shortcuts between diesel and gasoil. The commercial quality standards in the domestic market and major export market, Sweden, are much tighter than those set by authorities. However, in a crisis situation, it is possible to adjust to new standards set by the authorities.

Finland's natural gas consumption was about 3.9 billion m^3 in 1999. All natural gas is imported from Russia. Finland has adopted a compulsory stockholding system of back-up fuels for municipal natural gas users (consumption over 15 million m^3/yr) and for natural gas importers. Stockholding obligation corresponds to 3 months' consumption. Because there is no large-scale underground gas storage in Finland, compulsory natural gas stocks are stored in the form of substitute fuels. One part of these substitute fuels is light and heavy fuel oil. These oil stocks are not included in stocks reported with respect to the IEA stockholding obligation.

Emergency Organisation

The Department of Energy in the Ministry of Trade and Industry is responsible for general energy issues and issues related to security of supply both in normal times and in a crisis situation. The Department is the core of the NESO of Finland. The NESO would also include personnel from the NESA and the National Board of Economic Defence. Industry experts in the Finnish Petroleum Federation are nominated on a stand-by basis to join the NESO in case of emergency.

The main principle in NESO activities is that the same experts deal with general energy issues and issues related to security of supply during normal times as in a crisis situation. There is a small unit co-ordinating issues related to security of supply within the Department of Energy. The NESA monitors compulsory stockpiles and takes care of state-owned security stocks of oil. The Board for Economic Defense has prepared rationing schemes for transport fuels, light fuel oil, heavy fuel oil, electricity and district heat.

The powers of the NESO organisation are based on the Act on Adoption of Certain Provisions in the Agreement on an International Energy Program and the Application of the Agreement.

The main contents of this Act are:

Section 2

The Council of State may be authorised by decree to exercise powers defined in Sections 6-8, if the allocation obligation prescribed in Articles 13-15 or Article 17 or the demand restraint obligation prescribed in Articles 13-15 adopted in accordance with Article 19 or 20 of the Agreement so requires.

Section 6

The Council of State may control and regulate imports and exports of crude oil and oil products if the allocation obligation or the demand restraint obligation so requires and without prejudice to Finland's international commitments bearing on trade.

Section 7

To fulfill an allocation obligation or a demand restraint obligation provided for by the Agreement, the Council of State may control and regulate the imports and exports of crude oil. The Agreement provides that:

1. Those responsible for production and distribution of oil products shall perform certain duties and provide for production and distribution to a certain extent;

2. Crude oil and oil products may be produced, manufactured or processed only subject to compliance with the conditions and restrictions set by the Council of State; and that

3. Crude oil and oil products may not be offered for sale, offered against remuneration, convoyed or acquired, stored or received, or that they may be transported or used only in those ways and those conditions prescribed by the Council of State.

Section 8

The Council of State may oblige the importer of crude oil or oil products or a stockholder referred to in the Act of Compulsory Stockholding of Imported Fuels to allocate, under penalty of fine, crude oil or oil products to the State if the allocation obligation of State provided for by the Agreement so requires.

Allocation Procedures

If Finland's available supply were to exceed the supply right, then the government would have several options. First, companies which have excess supplies are requested to make voluntary offers and in this way give up part of their supply. If this is not the case, authorities can influence companies by releasing or not releasing compulsory stocks and in this way direct oil supply to meet the allocation obligation. There is also the possibility that oil could be released from state stockpiles to the market or exported.

The legal rights are based on the Act on the Application of IEP Agreement. On the basis of this Act, the Government has the necessary powers to fulfil the obligations to the allocation system.

The Emergency Act gives the right to the Government to control widely different activities in case of a severe crisis.

Emergency Reserves

Policy and Legal Instruments

Drawdown of Compulsory Stocks

According to the Act on the Compulsory Stockholding of Imported Fuels, the Ministry of Trade and Industry may give permission to the owner of compulsory stocks to use his stocks.

Drawdown of State-owned Stockpiles

State stockholding is based on the Security of Supply Act. According to this Act, stockpiles are held also to meet Finland's international contractual obligations (i.e. both to the IEA and to the EU) relating to energy supply during a time of crisis. The decision for drawdown of these stocks is made by the Government.

As long as stocks of Finland exceed its own and IEA commitments, the Government is able to participate in a CERM stock drawdown.

There is an agreement between Finland and Sweden on bilateral holding of strategic oil stocks. However, Finland has at present no strategic oil stocks in Sweden.

Stockholding and Maintenance

Finnish legislation to ensure sufficient oil stocks to meet the IEA emergency reserve commitment includes the following:

1. The Act on Compulsory Stockholding of Imported Fuels

The stockholding obligation applies to crude oil, other refinery feedstocks (i.e. gas condensates) and oil products. The obligation to hold stocks lies with importers. The obligation is based on the actual net imports of each product and crude oil. The Act was revised in 1997 and the stockholding obligation for imported oil products and crude oil was decreased to correspond to 2 months' average imports of the previous calendar year.

2. The Security Supply Act

Government-owned stocks are held by the National Emergency Supply Agency (NESA). A part of these stocks is held exclusively to meet the IEA stockholding obligation.

The overall target for the security of supply corresponds to 7 months' consumption, which far exceeds the IEA emergency reserve commitment. The amount of oil held in state stockpiles is confidential

information. Compulsory stockholding is based on actual net imports. If net imports increase, it automatically increases the stockholding obligation.

Compulsory stockholding costs vary from product to product, with the cost for crude oil being the lowest and motor gasoline the highest. This is generally the case for both products and storage facilities. The total annual storage costs vary from 50 to 150 FIM/ton.[5] When the rotation of these stocks is about 7 to 10 times/year, the cost of stockholding included in the consumer price is about 5 to 20 FIM/ton. The actual cost for the companies is lower because the minimum operating storage level needed is at present about 2/3 of the total compulsory stockholding obligation. So the excess annual costs vary from 20 FIM/ton (crude) to 100 FIM/ton (motor gasoline). The present environmental regulations concerning both products and storage facilities increase the costs of storage, especially motor gasoline.

For state-owned stockpiles, the costs are within the above-mentioned limits. State-owned stockpiles are usually larger, so the unit cost per ton is lower. Stockholding costs are financed by the security storage levy. Detailed information on costs of state-owned stockpiles is not available because of its confidential character.

Operational Aspects of Stockdraw

Compulsory Stocks

Subject to Finland's international contractual obligations relating to strategic energy supply, the NESA may, upon request, authorise a compulsory stockpiler to undercut the prescribed threshold when its production or business would be endangered if the compulsory stock were not drawn down. Decisions on how compulsory stocks are released are made on a company-to-company basis so as to satisfy the overall security targets set by the government. Compulsory stocks are stored in the same facilities where companies have their operational stocks, so no special arrangements for the drawdown are needed.

State Stocks

Drawdown of state-owned stocks will be decided by the Council of State, based on oil supply calculations, estimates of imports, exports and estimated consumption. Because compulsory stocks held by importers are released first and state stocks are generally not available until industry stocks and compulsory stocks are used, the decision to use state stockpiles is strongly affected by the actual crisis situation.

Companies holding compulsory stocks will receive permission from the government for drawdown of these stocks. This measure can be taken together with the IEA drawdown order. It is also possible for the government to draw down state stockpiles to meet the IEA allocation obligation. This is carried out by the NESA, using normal commercial offers to oil companies and to major consumers. The price level will follow world market prices.

In the beginning of a crisis, when commercial operations are undertaken only between the NESA and oil companies and if the price level follows the world market level, physical delivery can be carried out

5. 50 Finnish Markka = US$ 7.42.

rapidly in a few days. If the price-setting requires government decisions and if heavy-handed demand restraint measures are simultaneously in force, the government's oil allocation policy is to offer and deliver oil products to important customers. The activation of the rationing measures, together with the domestic oil allocation system, would take 1 to 3 months.

Compliance Issues

The NESA is responsible for supervising compulsory stocks and their use. The stockholder and anyone maintaining a compulsory stock for another's account shall provide the NESA any information needed to ensure compliance with this Act and any regulations and orders issued under it. Persons designated by the NESA will have access to the premises and grounds where the compulsory stocks are located in order to monitor volumes of oil.

Companies with a chartered stockholding commitment are required to send the verified written report to the NESA. The report includes total quantities of each product (stockholding position) concerning compulsory stocks.

Whoever does not to meet the stockholding obligation or does not supply information under the Act, or draws on stockpile in contravention of the Act, will be sentenced for infringement of a stockholding obligation to fines, unless a more severe punishment should apply to the Act or omission under some other law. There have been no infringements of the stockholding obligation since 1983, when the Act entered into force.

Compulsory stocks held by companies are not segregated from commercial stocks and can be used for operational purposes provided that the total level of stock equals or exceeds the company obligations in each category. A compulsory stock may be located on or outside the stockpiler's premises if it can be identified for purposes of accounting.

Demand Restraint Measures

Policy and Legal Instruments

Because the current stockholding target corresponds to seven months' average consumption and because the Finnish economy is energy intensive, the current policy naturally favours the drawdown of stocks to demand restraint measures. Despite this, the government maintains preparedness to implement both "light- and heavy-handed" restraint measures.

The Emergency Act and the Act on Adoption of Certain Provisions of the IEP specify the conditions and measures for demand restraint and identify the authorities in charge of the decision.

Procedures and Monitoring

Since the stockholding position of Finland is very good, there is enough time to prepare, decide upon and implement demand restraint measures required by the situation. Some examples of demand restraint measures to be implemented after stockdraw are:

- reducing speed limits; decision to be made by Ministry of Transport. (This decision can be made immediately.);
- lowering of room temperatures in space heating and limitations in ventilation (recommendations; compulsory orders can be given only in a severe crisis);
- limitations in use of cars (only in a severe crisis);
- rationing of light fuel oil;
- rationing of heavy fuel oil;
- rationing of transport fuels;
- rationing of electricity and district heat.

Decision Processes

The decision process was put into practice during the Gulf Crisis. The NESA also arranges exercises regularly so that the validity of different kinds of action plans can be verified.

Evaluation of Measures

A study was made recently on savings of oil products resulting from the price effect, lowering of room temperature, introducing lower speed-limits and certain restrictions for the use of cars. A computer model has recently been developed to produce information on stock levels of imported fuels in different imports situations combined with various demand restraint measures.

For the implementation of light-handed measures there are no significant costs over normal administrative costs. Rationing costs per year in a crisis would be approximately:

motor gasoline and diesel rationing	50 million FIM (US$ 7.4 million)
gasoil rationing	20 million FIM (US$ 3.0 million)
fuel oil rationing	less than 1 million FIM (US$ 153 500)
jet fuel rationing	less than 1 million FIM (US$ 153 500)

Other Response Measures

Natural Gas

Consumption of natural gas in Finland was 3.9 billion cubic metres in 1999. Finland is entirely dependent on Russia for its natural gas supply and has only one pipeline connection. Major natural gas users can switch to oil as a back-up fuel. In the compulsory stockholding system the stockpiler shall maintain stockpiles equalling three months' average natural gas consumption at his own cost. The stockholding obligation concerns natural gas plant owners as well as importers. The obligation is

fulfilled by stockholding oil, coal or other back-up fuel. The stockholding obligation does not concern industrial users of gas.

In the event of a supply disruption, over 90% of natural gas consumption can be replaced immediately by light or heavy fuel oil, with additional replacement with propane. There is neither natural gas storage capacity nor an LNG terminal in Finland.

Fuel-switching Capability

The share of oil in power generation is only 2%, and Finland has enough reserve power capacity based on other fuels to produce electricity, if needed. Power plants using oil as a fuel are not able to switch to other fuels except natural gas. However, the natural gas network in Finland is limited to the southern part of Finland and gas is not available in other parts of Finland. The share of oil in space heating is 30%, and oil boilers in private houses usually are able to switch to electricity.

Data Collection

At present, Statistics Finland is responsible for collection and transmission of data. Statistics Finland collects the data from the Finnish Petroleum and Gas Federation and the oil company Fortum. Most oil companies (market share 98%) are members of the Federation. Annual Oil Statistics (AOS) and Monthly Oil Statistics (MOS) use the same database in principle, but AOS is based on more current and more detailed information than MOS. Data for emergency response is collected by the NESO using information collected from the oil companies Fortum Oil and Gas and Teboil/Suomen Petrooli.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Fortum Oil and Gas Oy	Nantali	2.80	56.56	1.66	30.71	0.80	15.60	0.80	15.36					0.48	8.16
Fortum Oil and Gas Oy	Porvoo	9.70	195.94	4.10	75.85	3.42	66.42	2.20	42.24	1.11	21.31			1.48	25.20
Total		**12.50**	**252.50**	**5.76**	**106.56**	**5.20**	**97.70**	**3.00**	**57.60**	**1.11**	**21.31**			**1.96**	**33.36**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Fortum Oil and Gas Oy	Nantali	0.34	7.92	1.48	30.34		0	0.01	0.19		0				
Fortum Oil and Gas Oy	Porvoo	1.83	42.64			0.31	7.51			0	0	0.12	2.93		
Total		**2.17**	**50.56**	**1.48**	**30.34**	**0.31**	**7.51**	**0.01**	**0.19**	**0**	**0**	**0.12**	**2.93**		

Map of France



FRANCE

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	2.4	3.3	3.6	3.0	1.8	..	0
Imports	128.4	94.2	102.4	102.5	111.2	..	121.3
Exports	–13.8	–12.1	–14.8	–16.0	–18.7	..	–6.3
Bunkers	–4.0	–2.4	–2.5	–2.5	–2.9	..	–2.7
Net Imports - NI	110.6	79.8	85.1	84.0	89.6	..	112.3
Total Supply	113.0	83.1	88.7	87.0	91.5	..	112.3
Import Dependence (%)	97.9	96.0	96.0	96.6	98.0	..	100
Stock - Days of NI	99	88	83	103	96	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structure

Current energy supply of 257 Mtoe comprises 36% oil, 13% natural gas, 6% solid fuels, 40% nuclear and 5% other sources. Crude oil is imported mainly from the United Kingdom, Norway, Saudi Arabia, the countries of the former Soviet Union, Iraq and Iran.

France depends on imports for some 98% of its hydrocarbon supplies, but overall energy import dependence is only 50% of total needs, thanks to a large contribution by nuclear power.

Crude oil imports are received at the following ports: Fos and Lavéra, close to Marseille, (51% of the total), Le Havre-Antifer (33%), Nantes/St. Nazaire (9%) and Dunkerque (7%). Petroleum product imports are received at several other maritime ports. The pipeline systems are used mainly to supply oil products to French refining and distribution centres. One exception is a major pipeline used for the shipping of crude oil and products from the south of France to northeast France, Germany and Switzerland. Stockholding facilities are located primarily at the refineries and close to the main oil ports.

The French Administration has recently developed three alternative scenarios for energy supply and demand to 2020: Market Society, Industrial State and Environmental Protection. The scenarios share

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	13 985	14 023	0.3
of which unleaded	9 529	10 215	7.2
Kerosene and jet fuels	5 234	5 634	7.6
Gas/diesel oil	41 873	42 931	2.5
Residual fuel oil	6 715	4 265	–36.5
Other	21 002	22 732	8.2
Total	**88 809**	**89 585**	**0.9**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
United Kingdom	12 973	564	2 014	141	57	831	16 580
Norway	15 008	58	198	0	0	135	15 399
Saudi Arabia	15 069	0	17	0	0	64	15 150
Former Soviet Union	7 822	18	2 586	480	57	92	11 055
Iraq	7 282	0	0	0	0	0	7 282
Iran	6 829	0	0	0	0	0	6 829
Other	17 245	1 389	7 072	2 713	802	7 392	36 613
Total	**82 228**	**2 029**	**11 887**	**3 334**	**916**	**8 514**	**108 908**

Source: IEA Quarterly Oil Statistics.

the same assumptions on economic growth and oil and gas prices, but assume different policies. They project oil demand to grow to between 89 Mt and 106 Mt in 2010, and to between 91 Mt and 122 Mt in 2020. The upper end of the range corresponds with the Market Society Scenario, whereas the lower end corresponds with the Environmental Protection Scenario.

There are currently 14 refineries operating in France, with total atmospheric distillation capacity of 96 Mt and output of 89 Mt in 1998. In general, French refineries are sophisticated and able to upgrade heavy fuel oil to lighter products. A 15-25% reduction in refining capacity appears inevitable in the context of strategies for rationalisation adopted by oil companies for their overall European operations. The refineries that are the least competitive, or the least suitable to market conditions are most likely to be closed. A small refinery at Reichstett,[6] near Strasburg, is currently examining its options and may close after 2002.

The capacity reductions will be accompanied by investment necessary to implement stricter gasoline specifications (e.g. on benzene and aromatics contents) and to respond to changes in demand structure. Oil companies are studying possible solutions to meet future specifications. In response to EU Directive

6. The refinery is owned by *Compagnie Rhénane de Raffinage* (CRR).

Nº 98/70/CE of December 1998 concerning the quality of gasoline and diesel fuels and work in progress on the Auto Programme Nº 2, refining profiles will be modified through the addition of hydro-cracking and coking units, as well as hydro-desulphurisation and de-asphalting units.

French regulations require that oil companies notify the government of any plans to acquire, build or close refineries in France. The government can veto plans deemed to threaten oil supply security or market stability. The Administration intends to examine the security implications of contemplated refinery closures when the refineries make such decisions.

One consequence of closures may be that net oil imports of certain products will increase. This will be the case particularly with diesel oil, consumption of which has been increasing at 4% per annum and is soon expected to overtake gasoline demand. Incremental imports of diesel oil are likely to come from traditional suppliers in Russia, the United Kingdom and the Middle East. Another likely effect will be a reduction or elimination of exports of other products. For instance, French jet fuel exports may disappear by around 2005 as a result of expected strong growth in domestic demand. The impact of refinery closures may also be mitigated somewhat by a capacity creep at the remaining refineries, and by more product exchanges among the refineries in search of greater synergies at the European level.

Emergency Response Policy and Organisation

Emergency Response Policy

The Minister of Economics, Finance and Industry delegates his responsibility with respect to energy and raw materials to the Secretary of State for Industry. The Directorate-General for Industry and Raw Materials (DGEMP) has the task of formulating and executing government policy in the sector of energy and raw materials. Within the DGEMP, the Directorate for Raw Materials and Hydrocarbons (DIMAH) has particular responsibility for security of hydrocarbon supply, monitoring of strategic stocks, and management of supply crises.

Security of oil supply is regulated by Law Nº 92-1443 of 31st December 1992 that entered into force on 1st January 1993. The law liberalised the movement of oil products and most other oil operations, but retained some controls on exploration and production. In particular, the law abolished the previous requirement of prior authorisation of imports. The new oil regime takes account of the development of world oil markets and the liberalisation of trade within the internal EU market.

However, the law does maintain a modified set of fundamental provisions intended to ensure the security of supply. In particular, these concern:

- the obligation to build and maintain strategic stocks (Article 2);
- the obligation to maintain a maritime transport capacity called “flag obligation” (Article 6);
- the obligation to provide information (Article 7);
- monitoring of refining capacity (Article 8); and
- monitoring of international trade in crude oil and products in a crisis (Article 11).

Companies owning refineries in France must have access to French-flag oil tankers through ownership or long-term charter. The obligation is required to ensure that the government has the

right of requisition of French-flag vessels in a crisis. However, this does not impede the use of foreign flags, which currently transport most French oil imports. French-flag vessels account for only 2% of French crude oil imports, but under Article 6, this share could be increased to 8%, if necessary.

The government's power to restrict oil imports and exports in a crisis is limited to only four rather exceptional cases: a war, a threat of war, international tensions affecting France and measures taken by the European Union. The restrictions are regarded as a last resort (they were not used during the Gulf Crisis), and they would likely be taken in co-operation with the international community.

Law nº 74-908 (amended) of 29th October 1974 defines government powers to restrain energy consumption in certain conditions on an automatic basis. Energy conservation also allows for the mitigation of the effects of possible crises. In 1999 the government devoted an annual budget of 500 million francs for this purpose. These funds were used, *inter alia,* to support the development of vehicles using alternative fuel.

Law nº 96-1236 of 30th December 1996 on air quality and the rational use of energy allows the Administration to limit consumption through ministerial decrees and supporting publicity measures. A notable provision is that new buildings must be equipped to allow for the replacement and choice of any type of energy at any moment. These provisions aim at mitigating the consequences of an oil supply crisis.

Emergency Organisation

In the 1920s, France developed an administrative structure for oil issues in order to cope with increasing motorization and the needs of national defence. The DIMAH is the heir to that structure and is responsible for the whole range of oil issues. Its main mission is to ensure optimum supply of crude oil, petroleum products and natural gas, and to prepare and update crisis plans in the civilian sector. In a crisis, the DIMAH would play the role of a NESO as foreseen in the IEP Agreement. It has a permanent organisation that could be strengthened by the incorporation of personnel from other ministries and the industry. To ensure the reinforcement of the DIMAH in personnel and equipment, the government would rapidly put in place special funds.

The organisation maintains close links with other relevant government departments and with the professional organisations that would be involved in the updating and implementation of crisis measures. In particular, it would set up special task forces to implement plans for allocation of oil products in liaison with departmental prefects. The inter-ministerial task forces are based on the principle of continuity and flexibility. They would provide political guidance on oil crisis management. At the technical level, the DIMAH would co-ordinate emergency response involving a network of senior officials concerned with defence and crisis response.

The legal and administrative powers of the DIMAH in a crisis are based on several legal acts. The Law of 1974 on energy conservation gives the Energy Minister wide powers in the fields of monitoring and allocation of oil and other energy resources, but for a limited period. The Governmental Order of 1959 on the organisation of national defence confers on the Energy Minister the same powers as the law of 1974, but in the context of an armed conflict or a threat to the vital interests of the nation. In addition, the decrees of the Council of Ministers permit an activation of compulsory measures to reduce consumption and introduce allocation plans.

No specific legislation is necessary for the setting up of the NESO in a crisis, as the DIMAH provides the necessary structure even in normal times. Moreover, in case of the execution of IEP emergency response measures, the government has all necessary powers, including those to ensure demand restraint and allocation.

Allocation Procedures

The existing legislation allows for the implementation of all measures with respect to the allocation rights and obligations within the IEA framework. It also provides the legal authority to ensure implementation of mandatory allocation.

Emergency Reserves

Policy and Legal Instruments

The 1974 Law on energy savings, the 1959 Law on general defence planning and the 1992 Law on the oil regime, together with implementing decrees and orders, give the Energy Minister legal and regulatory authority to release emergency stocks in any circumstances, whether related to economic factors or an armed conflict. The stock release would be decided in accordance with relevant articles of the IEP. The Law of 1992 allows for a reduction of the stockholding obligation even without the activation of crisis procedures, and authorises the DIMAH to issue instructions to the stockholding agency to make available, under certain conditions, a specified quantity of emergency stocks. This provides a sufficient legal basis for the country's participation in an early co-ordinated response, including a drawdown of stocks under CERM procedures.

Stockholding and Maintenance

Articles 2 to 4 of the 1992 Law define the obligation to hold emergency stocks for all operators. Ministerial Decree nº 93-131 of 29 January 1993 (revised) requires that each operator must build and maintain stocks equivalent to 26% of the previous year's consumption of crude oil and products (based on a 12-month moving average), which is equal to 95 days of consumption. As a result, French emergency stocks have been consistently above the IEA's minimum requirement of 90 days of imports.

French regulations require that finished products must cover at least 58% of the stockholding obligations for gasoline, gas/diesel oil and jet fuel, and 48% of the obligation for heavy fuel oil. The remaining portions of the obligations can comprise crude oil or semi-finished products. Since the stockholding obligation is proportionate to volumes marketed, any future increase in net imports will involve an automatic increase in the stockholding obligation for operators with sales in France.

The Administration strives to ensure an appropriate product balance and geographical spread for strategic stocks. In particular, it requires that each region has gasoline stocks covering at least 10 days of consumption, and encourages operators to hold stocks of all finished products at depots close to the main consuming centres. Nevertheless, operators are given the flexibility of meeting a part of the obligation with crude oil in order to:

- make optimum use of the existing stockholding capacity and limit the financial burden resulting from the building or upgrading of depots to meet environmental standards; and
- allow adjustments in the quality of stocks in case of changes in product specifications.

The Administration regards jet fuel as a product of great strategic importance. France is the only EU member that has a national stockholding obligation for this product. French stockholding legislation requires that jet fuel stocks cover at least 55 days of consumption. Slightly more than half of these stocks are held by *Société Anonyme de Gestion des Stocks de Sécurité* (SAGESS) and the remainder by refineries. The stocks are recycled at least every six months to ensure adequate quality, although long-term stocking of up to two years is possible without the need for additives to improve thermal stability.

The Administration expects this obligation to be maintained despite the latest EU Directive, which does not impose any specific stockholding obligation for this product. This implies a certain cost disadvantage for the French aviation industry, particularly compared to European Union countries with indigenous oil production, which now have a higher EU exemption from the stockholding commitment.[7]

The law of 1992 introduced a new structure for the stockholding agency by creating the Professional Committee for Strategic Petroleum Stocks (CPSSP), which assumed all powers in strategic stock operations. CPSSP defines the policy for building collective stocks under the supervision of the Minister. It has a mandate to build and manage strategic stocks directly, or through other bodies such as SAGESS, which in the new structure became a service provider to CPSSP. SAGESS retains an important technical and industrial role, in particular in the organisation of depots and in case of an actual use of stocks.

Ministerial Decree nº 93-131 of 29th January 1993 specifies the proportion of strategic stocks which each operator has to hold directly and the proportion which may be delegated to CPSSP. At present, CPSSP holds 54% to 80% of the stockholding obligation for registered operators (the remaining portion is held directly by these operators), and 100% of the obligation for operators defined by EC regulations as "unregistered".[8]

Ministerial Decree nº 93-132 of 29th January 1993 concerning the creation of CPSSP defines the role of the administrative board of CPSSP and sets the fees which the operators have to pay to CPSSP for the building and maintenance of its part of strategic stocks. In return, CPSSP rents the products to operators under a system called "*mise en disposition*". The fee charged by CPSSP is revised at least every quarter by the administrative board, taking account of market conditions and with a view to cover all storage costs.[9] For example, on 1st January 1998, CPSSP was managing 9.5 Mt of strategic stocks, or 58% of the national stockholding obligation, at the total cost of some 1 billion francs.

Approximately half of these stocks are held by SAGESS, which invoices CPSSP for the corresponding storage costs. About 95% of SAGESS stocks are held at the refineries and in large depots. SAGESS has recently leased five military depots from the Central European Pipeline System (CEPS), which had opened its storage and pipeline facilities to civilian use in order to improve its budget situation. For the same reason, CEPS had also eliminated the option of drawing stocks by rail and car by removing from operation the depots not connected to pipelines. This has resulted in some reduction of storage capacity.

7. The latest EU Directive on stocks has increased the exemption for indigenous production from 15% to 25% (Annex 3).
8. Unregistered operators must reimburse CPSSP for the cost of holding their entire obligations.
9. No financial support is offered to oil companies for building strategic stocks.

The dual structure of the stockholding agency since 1993 is mainly due to the fact that, as a limited company, SAGESS is not well suited to fulfil a public mandate. More specifically, it would not be possible from a legal point of view to force oil operators, particularly foreign ones, to become shareholders of a limited company under existing EU legislation. The two bodies complement each other, with SAGESS offering operational expertise and CPSSP providing policy guidance.

French legislation stipulates that up to 10% of company stocks can be held in other EU countries, provided that such stocks are subject to intergovernmental agreements. This approach is dictated mainly by the belief that stocks held on the national territory can be monitored more rigorously than those held abroad. However, there is an open policy concerning foreign stocks held in France.

At present, France has bilateral stock arrangements with Belgium, Germany, Luxembourg, the Netherlands and the United Kingdom. Intergovernmental agreements exist with Germany and the United Kingdom, and another is in preparation with Spain. Within the framework of these agreements, the holding country provides a guarantee not to interfere with the transfer of stocks to the beneficiary country in case of a crisis. The stocks are subject to reciprocal declarations at the European Commission. They are identified according to product and are held in clearly marked tanks.

Operational Aspects of Stockdraw

The Administration has legal authority to ensure physical drawdown of strategic stocks, including those held directly by oil companies. As a normal course of action, the drawdown would be accomplished by relaxing the stockholding obligation placed on companies. During the Gulf War in 1991, a ministerial order authorised a temporary 3% reduction of the stockholding obligation for gas/diesel oil. This resulted in an actual reduction of the corresponding stocks from 91 to 88.5 days.

Another step could be to order SAGESS to release stocks to operators who, in turn, could make them available to the market. Although neither of the two steps would necessarily guarantee that the stocks were actually made available to the consumers, operators did not show any tendency to hoard stocks during the recent social disturbances. Moreover, they have a legal obligation to sell products to consumers if inventory is available, and would be discouraged from hoarding by the government's reserve power to control oil product prices in a crisis. Furthermore, some demand restraint measures would be likely at the same time, thereby reducing the shortages of oil products and their corresponding impact on prices.

Finally, in a serious crisis, the Minister could impose stockdraw through the power of injunction (based on the laws of 1974 and 1959), although this power would be used only as a last resort. The measure could be accompanied by the system of national sharing, resulting in mandatory release and distribution of stocks. The Administration emphasised that companies generally accept the need to co-operate with government actions in case of emergencies.

In case of a reduction of the stockholding obligation, stocks could be immediately available to the market. In case of instructions from CPSSP specifying the volume of stocks to be released, time required would depend on the speed of response of the industry to proposals for sale made by the committee. The market would determine transfer prices. Nevertheless, the prices for SAGESS-owned stocks should not be below their purchase cost. If they were, CPSSP would have to indemnify SAGESS for the difference, and subsequently increase the level of fees charged to operators.

The Administration indicated that, in principle, stockdraw would be used as a measure of last resort. Initial response to oil emergencies would rely strongly on demand restraint measures.

Compliance Issues

Compliance of operators with the stockholding obligation is monitored monthly by DIMAH. There is a provision for on-site physical inspection at any time, with the participation of the customs service. Monitoring concerns only the stocks held at depots with capacity of more than 400 m^3 which have been duly declared and approved by the Administration.

Failure to meet the stock obligations is sanctioned by the Energy Minister after consultation with the inter-ministerial commission on hydrocarbon depots. Fines can be as high as 50 times the level of storage cost avoided. They are determined based on the principles of consistency, proportionality and dissuasion that are prescribed in the latest EU directive on stocks. In the past, those operators who failed to meet the stockholding obligation were asked to provide explanation, and some were ordered to pay fines of up to 2 million francs. The fines were particularly heavy in cases of false stock declarations and repeated infractions. This has resulted in significantly improved compliance in most recent years.

Demand Restraint Measures

Policy and Legal Instruments

The 1974 Law on energy savings provides the main legal basis for the issuance of ministerial orders regarding demand restraint measures. France has a long list of such measures ranked according to the speed of implementation and expected results. Some measures are compulsory and some rely on persuasion, and their effects may be short or medium-term. The list has been updated to reflect the evolution of the oil market and the experience of recent social disturbances.

Immediate measures would include campaigns to raise public awareness of potential savings in oil product consumption, and strict enforcement of existing regulations (e.g. speed limits or temperatures of buildings). Subsequent measures would involve stiffening these regulations, prohibiting certain activities (e.g. mechanical sports, Sunday traffic), limiting the distribution of certain products (e.g. shorter opening hours of service stations) or replacing oil products with alternative energy sources such as gas, electricity or waste. This could be complemented by measures of persuasion having immediate effect, such as encouraging the use of public transport, checks on the tuning of vehicles, and rationalisation of transport systems. As a last resort, the rationing and allocation of road fuels to priority consumers could be envisaged.

Procedures and Monitoring

The DIMAH has prepared a catalogue of demand restraint measures. These are classified in eight fields of application and have a numbered code. Descriptive notes for each measure define, *inter alia*, the responsibility for and the persons involved in its implementation, the content of the measure, as well as the duration and geographical scope of its application.

Most measures require only the ministerial orders for their implementation. They would be decided by the government on the proposal of the Minister of Industry, introduced at local government levels

(prefectures and departments), and co-ordinated by the Interior Ministry and the Ministry of Economy. The DIMAH provides a permanent organisational structure to oversee the implementation of the measures.

Decision Processes

Recent social disturbances affecting national distribution have provided an occasion for developing the decision-making process and testing the implementation of measures. These measures are based on the same regulatory mechanism as those taken at the national level within the IEA framework.

Evaluation of Measures

No estimates are available for the costs of implementing the demand restraint measures, and there are no plans to carry out studies to estimate the potential impact of these measures on oil demand. However, detailed relevant data developed by DGEMP are considered adequate to allow realistic and rapid estimation prior to the implementation of demand restraint measures.

During recent social disturbances, close co-operation was achieved with senior personnel of major oil companies. The Administration was also generally satisfied with public response to its efforts to encourage the use of public transport and car-pooling during the 1995 strike by the French rail system SNCF, as well as to reduced speed limits at times of stricter pollution controls.

Other Response Measures

Around 200 oil wells are currently shut in for economic or technical reasons. In general, economic shut-in applies to daily production of less than 0.5 cubic metres (m^3). The maximum potential for increasing indigenous production is estimated at 100 m^3 per day (1% of indigenous crude oil production), without taking account of possible technical difficulties.

Given the small scale of upstream operations in France, there is no state control of hydrocarbon production. The only regulatory factor that could allow an increase in national production is taxation (e.g. upstream taxes and departmental and communal mining levies). No reductions in taxes are presently under consideration, but the time necessary for a government decision to result in an actual increase in production would be at least two years.

According to the latest projections, indigenous oil production will decline sharply and cease by around 2010 due to the lack of new discoveries. The Administration is considering financial incentives to encourage greater exploration efforts. If successful, these efforts could result in continued small oil production after 2010. Natural gas fields are also in a steep decline. They currently produce at maximum capacity, with an exception of the Lacq fields, where production could possibly be increased temporarily by about 1%.

Natural gas would play a very limited role in an oil crisis. In the power sector it could replace heavy fuel oil (HFO), but the latter accounts for only less than 1% of French electricity production. In the

petrochemical sector, substitution of naphtha by natural gas is possible, but requires modifications of certain equipment (e.g. ovens and burners). In other sectors, economic incentives for switching from oil to gas are limited by an indexation of gas prices on oil prices.

There is some scope for the relaxation of product specifications. In case of an oil crisis, the DIMAH has regulatory powers to:

- widen certain specifications which would permit refiners to produce higher proportions of some products or to maximise the yields from available crude oil feedstock;
- allow minor exceptions in quality specifications of products actually distributed; and
- postpone shutdowns of production units necessary for controls of pressure vessels, but on condition that correct functioning of these units remains guaranteed.

Data Collection

When required in times of emergency, Questionnaire B is sent to operators by all existing means at the Administration's disposal. The replies containing monthly oil supply data are subsequently aggregated and transmitted electronically by the NESO to the IEA. Consistency of data is checked manually and its accuracy is challenged with the operators as necessary.

Frequent revisions to French trade data do not get reported to the IEA automatically. Trade companies co-operate well in the supply of trade data, but there have been some delays in processing of these data. Improvements in this area are expected in the near future.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
BP	Dunkerque			1.23	22.70	0.00	0.00								
BP	Lavera	10.47	211.6	4.05	74.90	3.30	61.30	1.61	30.90	0.93	17.86				
Total	Gonfreville	15.87	320.6	3.91	72.30	2.90	54.40	2.30	44.10					1.27	21.56
Total	La Mède	6.83	137.9	2.85	52.70	2.40	45.00	1.86	35.80					1.22	20.76
Total	Mardyck	7.25	146.3	2.01	37.20	2.00	38.50	2.01	38.50					1.09	18.50
CRR	Reichstett	4.00	80.8	2.09	38.70	1.20	22.80	0.78	15.00						
Elf	Donges	11.83	238.9	5.56	102.90	3.40	62.80	2.47	47.50					0.92	15.66
Elf	Feyzin	5.75	116.0	1.94	35.80	1.70	30.90	1.26	24.10					1.80	30.57
Elf	Grandpuits	4.56	92.2	2.71	50.10	1.90	35.30	1.50	28.90					0.80	13.60
Esso	Fos-sur-Mer	5.56	112.3	1.96	36.30	1.40	27.60	1.44	27.60					0.76	12.89
Esso	Port-Jérôme	7.60	153.42	3.74	69.13	1.65	31.74	1.65	31.74						
Mobil	Gravenchon	3.20	64.72	1.45	26.84	0.00	0.00								
Shell	Berre	6.30	127.26	2.94	54.39	0.98	18.82	0.98	18.82						
Shell	Petit Couronne	7.04	142.11	4.45	82.23	1.56	29.13	1.23	23.52						
Total		**96.23**	**1944.02**	**40.88**	**756.21**	**24.36**	**458.27**	**19.08**	**366.26**	**0.93**	**17.86**			**8.51**	**144.7**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
BP	Dunkerque														
BP	Lavera	0.50	11.63	2.50	51.31					0.64	15.38				
Total	Gonfreville	1.92	44.62	5.25	107.56					0.69	16.56	0.64	15.38		
Total	La Mède	1.10	25.72	3.85	78.99	0.16	3.91			0.37	8.98	0.69	16.56		
Total	Mardyck	1.03	23.98	1.58	32.47					0.41	9.91	0.37	8.98		
CRR	Reichstett	0.61	14.26	1.07	21.96							0.41	9.91		
Elf	Donges	1.33	31.01	3.19	65.35	0.20	4.80			0.18	4.22				
Elf	Feyzin	0.41	9.62	1.78	36.47	0.16	3.84					0.18	4.22		
Elf	Grandpuits	0.55	12.91	1.47	30.20	0.14	3.26								
Esso	Fos-sur-Mer	0.82	19.01	2.38	48.79										
Esso	Port-Jérôme	0.74	17.17	2.28	46.70	0.26	6.31								
Mobil	Gravenchon	0.48	11.25	1.16	23.70					0.34	8.04				
Shell	Berre	0.83	19.29	1.97	40.32							0.34	8.04		
Shell	Petit Couronne	1.19	27.73	1.84	37.78										
Total		**11.51**	**268.20**	**30.32**	**621.60**	**0.92**	**22.13**			**2.63**	**63.10**	**0.20**	**4.82**		

Map of Germany



GERMANY

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	5.7	5.9	4.9	3.6	3.5	2.0	1.6	1.3
Imports	160.6	132.2	132.9	147.8	148.2	155.4	154.7	152.1
Exports	–11.2	–11.4	–10.2	–15.2	–18.7	–14.8	–14.6	–14.3
Bunkers	–3.5	–3.5	–2.5	–2.1	–2.1	–1.9	–1.8	–1.8
Net Imports – NI	145.8	117.4	120.2	130.5	127.3	138.7	138.4	136.1
Total Supply	151.5	123.3	125.1	134.1	130.8	140.7	140.0	137.4
Import Dependence (%)	96.2	95.2	96.1	97.3	97.3	98.6	98.8	99.0
Stock – Days of NI	96	109	133	125	123	..	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Germany depends on imports for 98% of its oil requirements and will become more dependent in the future. Crude oil, which is mainly produced in the old *Länder* and, in particular, Lower Saxony, is about 3.5 Mtoe or just 2.2% of total oil supply. Current energy supply comprises 40.1% oil, 21.3% natural gas, 23.5% solid fuels, 13.1% nuclear energy and 2% other sources. Oil is imported mainly from the countries of the former Soviet Union, Norway, the United Kingdom, Libya, Syria, Saudi Arabia and Algeria.

Projections of oil demand have been made by the German Oil Industry Federation – *Mineralölwirtschaftsverband* (MWV). They forecast that the share of oil in total energy demand will decrease from about 40% at present to 38% in 2010. Annual oil consumption may decrease from 132 million tons this year to 124 million tons in 2010.

With regard to the oil product demand pattern, the MWV forecasts a decrease in heating oil and gasoline imports up to the year 2010 and an increase in naphtha, diesel oil and jet fuel.

The German oil industry is privately owned. Privatisation of the refining and distribution sectors in the new *Länder* was completed in 1992. Since then, the oil industry of the new *Länder* has been completely modernised, with major investments particularly in the refining sector.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	30 352	30 276	–0.3
of which unleaded	–	–	–
Kerosene and jet fuels	6 444	6 833	6.0
Gas/diesel oil	61 907	58 409	–5.7
Residual fuel oil	5 809	4 983	–14.2
Other	27 747	27 675	–0.3
Total	**132 259**	**128 176**	**–3.1**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Former Soviet Union	31 928	36	2 098	389	4	509	34 964
Netherlands	0	4 258	10 035	766	2 276	6 006	23 341
Norway	20 784	51	145	27	0	224	21 231
United Kingdom	13 905	328	457	304	7	391	15 392
Libya	14 273	0	0	0	0	89	14 362
Syria	6 034	0	0	0	0	0	6 034
Other	17 009	2 736	4 431	958	598	3 402	29 134
Total	**103 933**	**7 409**	**17 166**	**2 444**	**2 885**	**10 621**	**144 458**

Source: IEA Quarterly Oil Statistics.

In Germany, refining capacity is below oil products demand. As a result of earlier restructuring, the utilisation rate reached its maximum about 1995-1996 and has remained high since. At the same time, conversion capacity increased to adapt to the evolution in consumption (increased demand for lighter products). As planned in the Table below, some small changes have taken place in 2000, with no further change within the next few years.

Refining and Conversion Capacities

(million tons per annum)

	1999	2000	2003
Refining capacity	111.5	111.5	111.5
Conversion capacity	46.4	47.3	47.5
hydrocracking	7.2	8.0	8.0
catalytic cracking	18.2	17.8	17.8

Source: Mineraloelwintschaftsverband.

There are about 3 850 km of crude oil pipelines and about 800 km for refined products. Inland waterways and railways are also used for oil product transport. Rhine barge traffic is of particular importance. The German system of national crude oil supply depends largely on three ports (Wilhelmshaven, Brunsbüttel and Rostock), and the following pipeline system:

No changes in capacity are planned. The main stockholding capacity is situated close to the oil ports and refineries. Total capacity amounts to 72 Mm^3.

German Pipelines and Throughput

Pipeline	throughput in 1999 [Mt]
Triest – Bayern – Oberrhein (TAL)	24.4
Russia – Schwedt – Leuna (Druzhba)	19.4
Rotterdam – Rhein (RRP)	15.9
Wilhelmshaven – Rhein (NWO)	13.6
Marseille – Karlsruhe (SPSE)	8.2
Wilhelmshaven – Hamburg (NDO)	4.0
Brunsbüttel – Heide	3.9
Rostock – Schwedt – Leuna	
Ingolstadt – Litvinov	1.2
Total	**90.6**

See also the infrastructure map.
Source: Mineraloelwintschaftsverband.

Emergency Response Policy and Organisation

Emergency Response Policy

With Germany's high import dependence not only on oil, but also – to a lesser extent – on natural gas, security has a high priority for the German government and is an important part of its overall energy policy. Limiting supply dependence by saving energy, higher energy efficiency, promotion of renewables and new technologies are all energy policy elements which, together with diversification of import sources and dialogue with producer countries, work towards the goal of improved energy supply security.

International co-operation in the field of energy security within the IEA and EU is of paramount importance to the German government. To cope with a sudden oil supply disruption, the German administration has created instruments to implement its international commitments. Stocks and demand restraint are two principal tools.

With oil stocks covering more than 110 days of net imports at present, Germany has a relatively high level of emergency stock cover.

Germany's second important asset for coping with a supply disruption is demand restraint. The country has a contingent demand restraint programme designed to comply fully with Article 5 of the IEP. The

extent to which demand restraint will be used in an emergency will be decided in the light of circumstances at the time.

The policies of Germany concerning emergency measures follow closely the commitments under the IEP and CERM, including the IEA Governing Board Decision of 22nd February 1995.

In an emergency, trade will be pursued without limitation as far as possible. National fair sharing will be introduced in line with international sharing activated under IEP rules. Refineries will adapt their refinery runs to the emergency situation, e.g. to meet an eventual new demand pattern following demand restraint or to cope with whatever qualities of crude oil are available. The situation would be monitored and suitable action taken as recommended by the NESO.

If any market intervention is needed in an oil crisis, the Energy Security Law of 28th December 1974 gives the government the needed legal authority for decrees on production, transport, stockholding, trading and allocation of crude oil and oil products.

Concerning the quality of gasoline and diesel fuel, Directive 98/70/EC of the European Parliament and of the Council of 13th October 1998 gives each member country the right to inform the Commission of sudden change in the supply of crude oil or petroleum products which would make it difficult for the refineries to respect the fuel specification requirements. The Commission may authorise higher limit values for one or more fuel components for a period not exceeding six months.

Emergency Organisation

Oil crisis planning and management in Germany is organised in co-operation with industry, reflecting a market-oriented approach. Correspondingly, the German NESO is set up as a body where government, the *Erdölbevorratungsverband* (stockholding agency) and industry representatives work together. Responsibilities are distributed among NESO members as follows:

- *Bundesministerium für Wirtschaft* (Federal Office for Trade and Commerce) (BMWi): Political head;
- *Bundesamt für Wirtschaft*: Data collection; data processing; administrative decisions in the international allocation and national fair sharing;
- *Erdölbevorratungsverband* (EBV): Stock release following a decision by the BMWi.

The oil industry is represented in the NESO by:

- *Koordinierungsgruppe Versorgung* (KGV): KGV is a group of oil industry experts in supply, refining and distribution who give practical advice on these matters to the BMWi, thus preparing its decision on e.g. demand restraint and stockdraw. These experts convey decisions to and co-ordinate measures of industry and act as mediators in the voluntary offer and fair sharing process. They provide the operational head of the NESO.
- *Krisenversorgungsrat* (KVR): The KVR is a policy-oriented body which is formed by the chairman of the KGV and the heads of the supply committees of industry and traders. Members advise the BMWi and settle problems that KGV cannot solve.
- *NESO-Sekretariat*: Co-ordinating function within the NESO.

The co-operative structure of the German NESO, bringing together government and industry, is based on voluntary agreement between the parties concerned. Legal reference to this co-operative approach in crisis management is made in the Energy Security Law of 28th December 1974 (BGBL[10] I 1974, p. 3681) which in Article 8 states that government authorities can, for specific tasks, rely on associations (e.g. of industry) if they agree. Necessary antitrust clearance for industry activities, including their co-operation within the NESO, can be given on the basis of Article 13 of the Energy Security Law, which authorises the BMWi to issue such clearance.

The KGV, with its tasks as a mediator and adviser in the national fair sharing process, is explicitly mentioned in Article 10 of the Decree of 13th December 1984 (BGBL 1985 I, p. 2267) on fair sharing (*Mineralölausgleichsverordnung*).

Allocation Procedures

Should Germany have an allocation obligation, the NESO will solicit voluntary offers for meeting an allocation obligation. Voluntary participation of oil companies is encouraged by the fact that national fair sharing takes place and no company giving up oil for international allocation need expect a disadvantage by participating.

If voluntary action fails, the *Mineralölausgleichsverordnung* (BGBL 1985 I, p. 2267) gives the legal authority for meeting allocation obligations. Article 9 of the *Mineralölausgleichsverordnung* gives the legal authority for mandatory action if voluntary action fails. Voluntary action is, however, to be given preference.

Training

The German NESO is trained on a periodic basis in connection with IEA training sessions. The most recent training of the German NESO, including industry participants (KGV), on Germany's emergency response system and also IEA emergency procedures took place in March 1999. In spite of the move to Berlin, about 80% of the staff in the NESO were involved in that training session.

Emergency Reserves

Policy and Legal Instruments

The EBV holds a dominant proportion of German emergency reserve stocks, and their release is decided by government decree on the basis of the Oil Stockholding Law. Conditions for the stock release decision under the Oil Stockholding Law are laid down in Article 30, paragraph 1. Stock release is authorised to counter imminent or existing problems in securing energy supplies and/or when a stock release is required under the IEP agreement or EU regulations. The decree on stock release can limit the release to certain products or to certain regions if this would meet the emergency requirements.

10. BGBL = *Bundesgesetzblatt*, the official record of additions and changes to German law.

The government-owned federal crude oil reserve can be released by government decision. These stocks were for many years around 7.3 million tons. Sale of these stocks began in 1997 and they are now in the final stage of being sold. Their loss has been compensated by an increase in EBV stocks.

Company stock drawdown can, if needed, be ordered by decree on the basis of the Energy Security Law. However, this would be a measure of last resort.

Participation in an early co-ordinated response (CERM) is possible with the existing legal authority. Under this, an "energy supply problem" which allows a stock release decision does not require a specific shortfall of oil supplies. The *Erdölbevorratungsgesetz* (Oil Stockholding Law) of 1978, amended in 1987 and 1998 (BGBL 1998 I, p. 679), also gives the government legal powers over the drawdown of stocks under CERM procedures.

The legal authority for stockdraw requiring "imminent or existing problems in securing energy supplies" leaves the government some discretion for its decision. Without being bound to a precise threshold, the government will certainly make use of this authority only in situations involving a significant net loss in oil supplies. This follows from the fact that the oil stockholding law is part of Germany's emergency legislation and explicitly does not allow for market intervention without an underlying emergency situation.

Stockholding Obligations

Germany's emergency reserve policy is designed to comply fully with Article 2 of the IEP Agreement. Germany's Oil Stockholding Law requires the EBV to hold stocks equivalent to 90 days of supplies of major oil products (gasolines, middle distillates, heavy fuel oils). All companies and individuals which import and/or refine petroleum products are compulsory members of the EBV. The EBV is financed exclusively through membership fees assumed to be passed on in retail prices to consumers.

The EBV is currently obliged to hold stocks for each of the three product categories equivalent to 90 days of the quantities of refinery output and net imports calculated on the average of three preceding calendar years, or on last year's imports, if higher.

The compulsory stock reference basis as defined above excludes exports of the relevant petroleum products, (except for the contents of aircraft and vehicle fuel tanks), bunker sales for seagoing vessels, supplies to foreign armed forces and products used as refinery fuel. Thus, sales of international aviation fuel are not counted as exports and are included in the volume reference calculation. Supplies to the national armed forces (*Bundeswehr*) are included in the calculation of stock obligations if they are delivered from local refineries or depots, but supplies through NATO pipelines from abroad are excluded.

The calculation of refinery output takes into account backflows to refineries, volumes produced from semi-finished products and any products recycled from the petrochemical industry.

In principle, stocks subject to the obligations must be held on national territory in above/underground or cavern storage, but not in transport, production, or manufacturing facilities. However, it is possible to include stocks which are on board ships in port ready for discharge. Stocks may also be held in other member states of the European Union under bilateral agreement, and such agreements exist historically with Belgium, France, Italy and the Netherlands. Failure to provide the required information concerning refinery production or import can result in the imposition of fines.

Stock of crude oil and semi-finished products may be counted towards the stock obligations according to the refinery yields of the relevant product categories during the preceding calendar year on the basis of the national average for EBV.

Stockholding and Maintenance: The EBV

The Oil Stockholding Law of 1978, which was first amended in 1988 and again in 1998, established an entity of public law, the EBV, for the specific purpose of holding a 65-day supply of stocks (today amended to 90) of the three above-defined product categories. All companies refining or importing the relevant products are compulsory members of EBV.

Since 1978, EBV has taken over the ownership of some of the storage facilities – mainly cavern sites and three bulk plants – required to meet its obligations, the remainder being rented. Most of the stocks are owned by EBV, but up to 10% of EBV stocks may be delegated by oil companies to EBV under leasing contracts. Today, EBV holds about 60% of its stocks as products and 40% as crude oil. In the next few years it is planned to move to a 60/40 crude oil/product ratio because crude oil provides more flexibility in a crisis and is cheaper to stock.

The Board of Directors of EBV is appointed by a supervisory board (*Beirat*) of nine delegates. The three government delegates are representatives from the Ministry of Economics, the Ministry of Finance and the *Bundesrat.* The refining companies and importing/trading companies each delegate three representatives. The supervisory board is elected for three years at an annual meeting of the members. Two executive directors, supported by a number of staff, are responsible for law-bound EBV operations.

The founding of EBV was suggested following disagreement over the government's stock obligation rules, which had imposed different obligations on refiners and importers. The Oil Stockholding Law of 1978 provided that all companies refining and importing oil which were subject to the previously applicable compulsory storage laws could offer to sell or lease their compulsory stocks, including storage capacity, to EBV. The law required that EBV accept these stocks if there was proof that they were held in compliance with the previous laws.

Composition of EBV Stocks

As stated earlier, EBV currently maintains product stocks in each of the three relevant product categories to meet its stock obligations, specifically:

- gasolines (all grades);
- middle distillates (diesel, light heating oil, kerosene, jet fuel); and
- heavy fuel oils (only under delegation).

EBV also maintains stocks of crude oil which can be counted towards the stock obligations, although only about three quarters of the crude oil (mainly products) can be included (in line with the average previous year's refinery yield of the relevant product categories). In principle, EBV can choose to hold stocks in either crude oil or products, but a minimum of 40% in gasolines and middle distillates has to be kept in finished products. Heavy fuel oil may be kept 100% in crude.

Fifteen days' minimum of the previous year's consumption should be kept as products in five geographical regions of the federation.

EBV is allowed to sell stocks in excess of 105% of its requirements, but must ensure that its sales do not disturb the oil market; e.g. during a sharp fall in oil consumption at the beginning of the 1980s, EBV sold off part of its excess stocks. Speculative purchases/sales activity are not allowed.

During the period 1986 to 1988, EBV purchased over 6 million tons, two-thirds of which were required build-up under the new legislation of 1988, which raised the stock level to 80 days, and the remaining one-third to replace company delegations by EBV-owned stocks.

Further major build-up was required after unification with the former East German territories over the period 1990/91 and was necessary in 1998 due to increase of the stockholding obligation to 90 days.

A substantial part of overall stocks is stored in salt caverns in Northern Germany, which allows low cost, high flexibility and safe, long-term storage. However, no region holds less than 15 days' supply of finished products, and emergency transport arrangements between regions exist. Most of the EBV crude oil is kept in salt caverns linked to pipelines. EBV has ready-made processing agreements signed with every German refiner to place the crude oil wherever spare capacity develops. Crude oil can be tailor-made to refinery yield requirements using synthetic crude oils (blends of natural crude, naphtha and distillates). Products are permanently controlled for quality and exchanged, whenever deterioration is detected. A sophisticated quality prediction system (EQPS) based on mathematical Expert-System technology is used for monitoring.

Financing

The Oil Stockholding Law stipulates that neither public funds nor direct state guarantees may be made available to EBV, nor may oil companies invest directly by becoming stockholders of EBV. However, in case of liquidation of EBV, the federal government would underwrite the debts.

The operating costs of EBV are met by membership fees established under the Oil Stockholding Law, which requires that all refiners and importers of the relevant products be compulsory members of EBV. Membership fees are established according to product categories and calculated per metric ton of the product. The actual membership fees per ton in 1999 are 11.87 DM[11] for gasoline; 8.88 DM for middle distillates and 7.90 DM for fuel oils. The fees are reflected in prices to consumers.

Fees are adjusted at irregular intervals to balance EBV's operating expenses and interest payments.

The fee contributions give EBV a cash flow of about 1000 million DM[12] per year. Fees are payable monthly for the preceding month by the end of the following month. Failing payment by that date, an interest of 3% above the Lombard rate will be charged.

Companies pass on the fee to their customers and eventually to the end-consumer by adding the EBV fee to the retail price. On commercial level, the fee is shown separately on the receipt.

The stockholding law requires that EBV stocks be distributed in a regionally balanced way. German authorities considered in the past that product stocks best meet this requirement.

11. 10 DM = US$ 4.5.
12. 1000 million DM = approx. $US 450 million.

Operational Aspects of Stockdraw

Drawdown of stocks would be carried out by procedures of which the reliability has been demonstrated.

EBV stocks can be drawn down in close co-operation with industry, since industry itself exercises responsibility in the committees of the EBV and EBV stocks are linked closely to industry logistics and operations. In addition, product stocks are well-distributed over the country so that a stock release could start immediately in all regions. EBV has established and tested the necessary drawdown and distribution procedures. A physical drawdown took place successfully during the Gulf Crisis.

Stocks of refiners are fully integrated into their operations. No special drawdown procedures are needed.

Criteria and procedures for the distribution of EBV stocks are set out in the Oil Stockholding Law. Article 30 of the Law states that if stocks are released, they shall be offered with priority to member companies taking into account their share in covering the costs of EBV stockholding. The calculation is made in terms of products, since crude oil is not subject to the stockholding obligation. Crude oil will be delivered to refineries for processing, thus making it available for further distribution. The stocks will be released at market prices which are to be determined by the EBV supervisory board on the basis of market quotations.

The allocation right for each release period is notified to the member firms by EBV. The distribution is, in principle, arranged in the following way:

- delegated stocks will be allocated according to the terms of delegation;
- members who have rented storage facilities to the EBV will be supplied with oil stored there;
- small member firms will be supplied with oil located in their neighbourhood;
- supplies for companies operating all over Germany will be delivered to them following consultation.

A government decision on stockdraw can be reached within a week. In parallel, EBV can already prepare drawdown so that the sales process for products could start immediately after the decision. Processing of crude oil can start within a week or up to a month, depending on the storage modalities (whether close to a refinery or underground in caverns). Since EBV product stocks would normally be drawn down first, there would be sufficient time for releasing and processing of the crude oil to assure a continuous stock release as needed. EBV has negotiated processing contracts with all German refiners.

EBV is obliged to hold stocks of 90 days, but, in general, supplies are substantially higher. Substantial stocks are held voluntarily by private consumers (especially in the large home-heating oil sector), averaging often more than one whole winter requirement. In addition, refiners hold operating stocks to support their processing activities.

EBV's stocks do not cover the substantial oil consumption of the chemical industry, which is not required by law to join the EBV. The chemical industry has made its own arrangements to ride out an oil supply crisis. Stocks are being held as feed stocks, intermediate unfinished bulk products and end-consumer products.

The Federal Republic of Germany does not hold special emergency stocks of minor products from crude oil refining, such as LPG, raw naphtha not for gasoline use, lubes, asphalt, etc., even though industrial users of such products hold stocks voluntarily to master shortage situations. Stocks of this kind rarely exceed 30 days. Crude oil stocks contain amounts of these products proportionate to their importance in refinery output.

Compliance Issues

The drawdown of stocks by companies can be monitored by the *Bundesamt für Wirtschaft* through the data on stock levels contained in the comprehensive statistical report (*Integrierter Mineralölbericht*) companies are required to submit monthly.

Demand Restraint Measures

In Germany, the demand restraint programme is designed to comply fully with Article 5 of the IEP. Demand restraint is regarded as a valuable alternative option to stockdraw to cope with an oil supply disruption.

The extent to which demand restraint will be used in an emergency will be decided in the light of the specific circumstances of the emergency. The government decision between stockdraw and demand restraint has to take into account that Germany is a large net importer, with 98% of its oil being imported. If stocks were released too early, it would be necessary to introduce very severe demand restraint at a later stage. If such risk is not foreseen, Germany might well rely to a large extent on stockdraw at an early stage of a crisis.

A decision is likely to include both demand restraint and stockdraw. The market impact of stockdraw can be optimised when combining it with some type of demand restraint. The announcement of stockdraw could prove to be insufficient to calm the markets. Consumers may nevertheless start panic-buying and thus even increase demand. To avoid such reaction, any stockdraw, even if intended to be the primary counter-measure, should be accompanied by some back-up measures restraining demand.

This policy approach to demand restraint is market-oriented. This is reflected in the Energy Security Law of 28th December 1974 (BGB1 I p. 36 81) which gives the government the legal authority to intervene in the market in an oil supply emergency, if necessary. It states explicitly that administrative demand restraint measures:

- shall be implemented only if solving the problem by market-oriented means either is not possible at all or cannot be achieved in time or by adequate means;
- shall not be disproportionate to the scale of the problem.

Following these principles, two sets of measures have been established. The first set of light-handed measures includes, among others:

- persuasion, public appeals to reduce consumption;
- reduced speed limits;
- Sunday or alternate weekend driving bans;
- recommendation to the oil industry to refill heating oil tanks only when they fall below a defined level of fill.

The second set includes rationing schemes. Only in case of a severe disruption would rationing of heating oil, gasoline or diesel fuel be considered. Rationing systems have been elaborated and the basic principles have been set out in already existing regulations (decree on rationing of gasoline/diesel fuel

dated 26th April 1982 - BGB1 I p. 520; decree on rationing of heating oil dated 26th April 1982 - BGB1 I p. 536).

All necessary legal authorities for demand restraint measures are available. They are contained in the Energy Security Law. Prior to activation of the IEP trigger, only the light-handed measures would be considered for implementation.

Procedures and Monitoring

Light-handed measures are prepared administratively. Decision-making can be done at short notice. For implementation, no additional time is required.

Rationing of heating oil does not require much more time until full operation because no coupon rationing is needed.

Rationing of gasoline/diesel fuel would require a lead time of 4 weeks before becoming fully operational because administrative preparations for the delivery of coupons are necessary. This rationing system would only be the ultimate option in a very severe crisis. The preparation time could be bridged by stockdraw.

First measurable effects of all measures can be expected from the beginning of full operation. Monitoring will be carried out by the monthly statistical reports of the oil industry and by *ad hoc* reviews, if necessary.

Information campaigns through the mass media would be undertaken from the beginning of a crisis. They would deal with the situation as well as with the measures taken. An appeal from the Federal Chancellor to consumers to restrain demand will be prepared as necessary.

No special costs will arise from the implementation of light-handed demand restraint measures and heating oil rationing. Some administrative costs will arise from gasoline/diesel fuel rationing (for coupons etc.). Since administrative work will be done with the available manpower in administrations, no significant additional expenses are expected.

A study on "The Efficiency of Measures to Reduce Petroleum Consumption in the Context of Supply Constraints" was conducted by the *Deutsches Institut für Wirtschaftsforschung* (German Institute for Economic Research), Berlin in 1996. The main results are that Germany could cut its demand with light-handed measures alone by some 10% and that by rationing heating oil and automotive fuel consumption, reductions exceeding 20% are possible.

Other Response Measures

There is no potential for increased indigenous crude oil production.

To a limited extent, an oil disruption could be aggravated or complicated by a simultaneous disruption of natural gas supply. Of course, the overall economic impact of a simultaneous shortfall will be higher.

There is only a small fuel-switching capability to other energy sources. The input of heavy fuel oil for electricity generation is only about 0.5 million tons per year.

Data Collection

Oil statistics in Germany are prepared by *Bundesamt für Wirtschaft* (BAW) according to the "*Mineralöldatengesetz*". According to this law, all producers, importers and exporters of crude oil and oil products are obliged to provide a monthly report of their activities on the oil market. These data are mainly collected with Reporting System ("*Integrierter Mineralölbericht*"), with information on production, foreign trade, deliveries and stocks for crude oil and oil products. Smaller companies with an aggregated market share of about 5% report only figures on their foreign trade. Reports of refineries are transmitted via the German Oil Industry Association (*Mineralölwirtschaftsverband*) to BAW. Data are verified by procedures checking the internal consistency of data, time series analyses, comparisons with tariff declarations, comparisons with reports to the stockholding entity (*Erdölbevorratungsverband*) and by audit of companies. Close co-operation between industry and administration ensures the good quality of German oil statistics. IEA questionnaires QuB, AOS amd MOS are derived from the same database. This ensures consistency between the reports.

International Co-operation on Oil Security Issues

Consistent with Directive 98/93/EG of the EU Council of 14th December 1998, stocks may be held in other member states of the EU under bilateral agreement. Such agreements have existed historically with Belgium, France, Italy and the Netherlands. The EBV uses these agreements only marginally. The German government monitors bilateral stockholding arrangements in consultation with the other governments concerned. Germany holds some crude oil for the Netherlands.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Beta Raffinerie	Wilhelmshaven	10.3	208.1												
Mobil Schmierstoff	Neuhof			0.70	13.0										
Bayernoel	Vohburg	12.0	242.4	4.41	81.6	4.30	75.0	3.2	61.4			1.22	22.57	0.73	
DEA	Heide	4.0	80.8	1.60	29.6	0.81	14.6	0.4	8.3					0.75	12.75
DEA	Wesseling	7.0	141.4	3.40	62.9	3.26	60.3			2.0	39.40			2.00	34.00
OMV	Burghausen	3.4	68.7			3.36	57.1								
Elf Bitumen	Brunsbuttel	0.0		0.95	17.6										
Esso	Ingolstadt	5.0	101.0	2.16	40.0	1.50	28.8	1.5	28.8						
Miro	Karlsruhe	14.0	282.8	7.20	133.2	8.80	159.5	4.5	86.4					1.40	23.80
Holborn	Hamburg	4.7	93.9	1.03	19.1	1.20	22.1	1.2	22.1						
Mider	Spergau	10.3	207.9	4.58	84.7	3.20	59.3	2.4	46.8					1.48	25.09
Paraffinwerke	Webau				0.7										
PCK Schwedt	Schwedt	10.5	212.1	5.50	101.8	3.50	65.1	2.7	51.5					1.60	27.20
Ruhr OEL	Gelsenkirchen	12.3	248.5	5.20	96.2	8.00	143.1	1.4	26.9	1.8	34.56			1.04	17.68
Shell	Godorf	9.0	181.8	4.00	74.0	3.30	62.4			2.2	43.58	1.00	1.90	0.40	6.80
Shell	Harburg	5.1	103.0	2.50	46.3	1.30	24.1	0.9	17.3					0.80	13.60
Wintershall	Lingen	4.0	80.8	1.90	35.2	3.90	68.1			1.1	21.12				
SRS	Salzbergen			0.31	5.7										
Total		**111.5**	**2253.1**	**45.44**	**841.34**	**46.25**	**839.51**	**18.2**	**349.3**	**7.2**	**138.62**	**2.22**	**24.42**	**10.20**	**160.92**
Memo	**East Germany**	**20.8**	**419.9**	**10.12**	**187.18**	**6.65**	**124.37**	**5.1**	**98.2**					**3.1**	**52.29**

Refining Capacity *(continued)*

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Beta Raffinerie	Wilhelmshaven			1.50	34.95	5.21	106.81								
Mobil Schmierstoff	Neuhof					0.25	5.13								
Bayernoel	Vohburg			2.32	54.06	4.87	99.84					0.34	8.16	0.02	0.48
DEA	Heide			0.78	18.17	2.51	51.46							0.01	0.29
DEA	Wesseling			0.89	20.74	0.68	13.94							0.07	1.56
OMV	Burghausen	1.40	23.80			0.88	18.04								
Elf Bitumen	Brunsbuttel														
Esso	Ingolstadt			0.79	18.41	3.21	65.81					0.26	6.24		
Miro	Karlsruhe	1.50	25.50	2.40	55.92	4.00	82.00	0.45	10.8	0.45	10.80	0.57		0.15	3.60
Holborn	Hamburg			0.80	18.64	3.41	69.91								
Mider	Spergau			0.97	22.51	1.40	28.70	0.25	6.05	0.25	6.05				
Paraffinwerke	Webau														
PCK Schwedt	Schwedt			1.53	35.65	6.64	136.12	0.24	5.76	0.24	5.76	0.58		0.08	2.02
Ruhr OEL	Gelsenkirchen	1.70	28.90	1.20	27.96	5.38	110.29							0.10	2.40
Shell	Godorf			1.86	43.34	5.90	120.95					0.50	12.00		
Shell	Harburg			0.76	17.71	2.51	51.46					0.09	2.16		
Wintershall	Lingen	1.10	18.70	1.20	27.96	1.80	36.90								
SRS	Salzbergen					0.13	2.67								
Total	**5.70**	**96.90**	**0.00**	**17.00**	**396.01**	**48.78**	**999.99**	**0.94**	**22.61**	**0.94**	**22.61**	**2.34**	**28.56**	**0.43**	**10.34**
Memo	**East Germany**			**2.50**	**58.16**	**8.82**	**180.81**	**0.24**	**5.76**			**0.57**	**13.80**	**0.08**	**2.02**

Map of Greece



GREECE

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	0.0	1.4	0.9	0.5	0.0	0.0	0.0	..
Imports	24.3	15.3	22.2	21.6	21.9	32.3	37.5	..
Exports	–10.8	–4.6	–7.6	–4.2	–3.8	–6.0	–6.0	..
Bunkers	–0.8	–1.1	–2.5	–3.6	–3.1	–3.5	–3.5	..
Net Imports – NI	12.6	9.6	12.0	13.9	14.9	22.8	28.0	..
Total Supply	12.6	11.0	12.9	14.4	15.0	22.8	28.0	..
Import Dependence (%)	100	100	87.7	93.4	100	100	100	..
Stocks – Days of NI	103	107	111	78	100	..	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Greece depends on imports for all of its oil requirements. Current energy supply of 27 Mtoe comprises about 58% oil, 4% natural gas, 32% solid fuels and 6% other sources. Oil is imported mainly from Iran, Saudi Arabia, the countries of the former Soviet Union, Libya, Iraq and Italy. Greece is a net importer of gasoil and diesel oil and a net exporter of heavy fuel oil.

While partly within continental Europe, Greece is characterised by many small islands and no direct network interconnections to other OECD countries. At the same time, oil represents 58% of its total primary energy supply in 1999, which is considerably higher than the 41% average for OECD countries. Greece is also an important export refining centre. Oil supply security is, therefore, a major concern for the Greek Administration.

The Greek economy consumes about 13 Mtoe per year of petroleum products. The product mix is relatively heavy, as many power plants burn residual fuel oil; until 1996, moreover, natural gas was unavailable. Transport fuels represent 46% of demand (of which 46% is gasoline, 19% aviation fuel and 32% diesel oil). Geographically, demand is spread over quite a large area, with a long logistics chain which has a strong influence on distribution costs. This results in significant movement of petroleum products by sea.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	3 176	3 222	1.4
of which unleaded	1 516	1 737	14.6
Kerosene and jet fuels	1 161	1 256	8.2
Gas/diesel oil	6 225	6 168	–0.9
Residual fuel oil	3 009	2 997	–0.4
Other	1 369	1 336	–2.4
Total	**14 940**	**14 979**	**0.3**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Iran	6 994	0	0	0	0	0	6 994
Saudi Arabia	5 384	40	0	0	0	0	5 424
Former Soviet Union	1 739	0	1 465	43	91	0	3 338
Libya	1 252	0	183	0	68	21	1 524
Iraq	1 446	0	0	0	0	0	1 446
Italy	25	58	450	86	57	28	704
Other	447	379	640	169	90	340	2 065
Total	**17 287**	**477**	**2 738**	**298**	**306**	**389**	**21 495**

Source: IEA Quarterly Oil Statistics.

The Greek, Bulgarian and Russian governments signed a protocol in 1994 and reconfirmed their commitment in a Memorandum of Understanding (signed December 1997) to co-operate on the construction and operation of a pipeline that could potentially provide an alternative route for export of Caspian Sea oil.

The Transbalkan Oil Pipeline Company, a multi-national company consisting of Greek, Bulgarian, Russian and international oil companies, which will construct and operate the 280 km long, 35 Mt per annum transit pipeline connecting the Bulgarian port of Burgas with the Greek port of Alexandroupolis, is expected to be established over the next few years.

Another crude oil pipeline, 230 km long, connecting the Greek port of Thessaloniki with Hellenic Petroleum's recently acquired OKTA Refinery at Skopje, capitol of the former Yugoslav Republic of Macedonia, is already under construction.

Indigenous production is limited to one field representing less than 3% of demand and is on the decline. However, new exploration efforts in western Greece are underway which could result in an eventual increase in oil production.

A reorganisation of the state-owned DEP (Public Petroleum Corporation of Greece) has recently been undertaken for its partial privatisation. The company has been renamed Hellenic Petroleum Corporation, with marketing, refining, exploration and chemical activities under Hellenic Petroleum and retail market activities under a single combined ELDA-EKO company. The maximum privatisation share allowed by the law is 25%. A 23% share was successfully sold on the Athens and London stock markets in June 1998.

Refining

Greece has four refineries: two are mainly state-owned and two are privately operated. The refinery yield at present is relatively heavy; heavy fuel oil accounts for 35% of Greek refinery output compared to 13% on average in the OECD. At the same time, the refinery output is still slightly in deficit for fuel oil supplies and in surplus in aviation fuel for internal consumption. About 35% of domestically produced fuel oil, together with imported fuel oil, was sold as international marine bunkers throughout the 1990s, whereas the OECD averaged roughly 20%, reflecting the importance of the shipping industry in Greece.

Oil refineries cannot sell directly to the market, except to the Public Power Corporation, Olympic Airways, the military forces and the Aluminium Company of Greece. Products are sold under license by 25 distributing/marketing companies, which are free to import products.

Investments are planned which will effect Greece's refinery capacity. Within the next few years, conversion units will be installed or replaced as follows:

- Motor Oil: 100 000 tons/year for Naphtha Reforming + 720 000 t/yr for desulphurisation of cracked naphtha.
- Hellenic Petroleum S.A.:
  - Aspropirgos Refinery (HAR): 2 400 000 t/yr for Atmospheric Distillation (Replacement) + 500 000 t/yr for Vacuum Distillation (Replacement) + 500 000 t/yr for Hydro-Cracking + 180 000 t/yr for Polymerisation.
  - Thessaloniki Refinery (EKO): 295 000 t/yr for Isomerisation of Naphtha.
- Petrola: 1 050 000 t/yr for Hydro-Cracking + 750 000 t/yr for Thermal Cracking + 400 000 t/yr for Visbreaking.

Storage Facilities

Refineries: 9 066 100 cubic metres.

Trading Companies: 1 266 600 cubic metres.

Prices

Petroleum product prices were liberalised in 1992. At the same time, the government has maintained the right to introduce price ceilings on oil products for a maximum period of two months in areas in which it believes monopolistic conditions prevail, in accordance with Law 1571/85.

Emergency Response Policy and Organisation

Emergency Response Policy

Greece has a policy of increasing the use of local energy resources, encouraging use of natural gas and diversifying sources of oil supplies. The Civil Emergency Planning Law 17/74, which deals with civil emergency situations of any kind, as well as the legal framework of oil law 1571/1985 as subsequently amended, provide the legal framework for participation in IEA emergency response measures.

While the recent introduction of natural gas into the country's energy supply scheme is anticipated to play an important role in contributing to energy diversification, the substitution of gas for oil is not anticipated in an emergency. Natural gas will be primarily used for industrial and domestic generation of electricity, thus reducing some fuel and diesel oil consumption in those sectors.

Emergency Organisation

The core of the Greek National Emergency Sharing Organisation (NESO) resides in the Directorate of Petroleum Policy within the Ministry of Development and is a permanent structure. Other participants include directorates within the same Ministry, and oil industry experts.

The principal activities of the NESO are:

- to maintain contacts by attending relevant meetings and working groups of international organisations: IEA, EU, NATO;
- to collect, aggregate, check and estimate data and compile questionnaires;
- to formulate contingency plans and activities in the area of emergency response; and,
- to provide training to all people involved in oil emergency preparedness.

Allocation Procedures

The Minister of Development has the authority to implement an allocation obligation. The Law provides for oil company compliance with government emergency actions.

Greece does not have specific guidelines on national fair sharing. This would be handled in consultation with the major operators in the oil market. The government is confident it could meet its IEA obligations through a consultative process.

Emergency Reserves

Policy and Legal Instruments

Law 2289/95 and Ministerial Decision D1/FA33/11264/367/1995 oblige oil companies to maintain the three categories of product stocks in accordance with EU regulations corresponding to 90 days of their sales in the internal market during the previous calendar year. The Civil Emergency Planning Law provides the

government with statutory power to direct oil companies to release stocks, following an IEA Governing Board decision, by reducing the level of the stockholding obligation. The released stocks would be allocated to consumers according to the contractual agreements between refineries and distribution companies.

There is no legal framework for participation in CERM or sub-crisis activities, as the Administration would rely on the voluntary co-operation of the oil industry and, in particular, the refining industry, to release stocks to the distribution companies. Unlike most IEA Member countries, the Greek Administration has no authority to draw down or to allocate privately held domestic oil stocks.

Stockholding and Maintenance

Oil traders/distributors are obliged to comply with EU stockholding regulations. New companies entering the market will be obliged to keep stocks according to their sales prospects for the next three months. However, in practice, most oil marketers meet the requirement by holding stocks at refineries. The stock obligation is transferred from the trader/distributor to a refinery under a provision of a supply contract.

Stocks essentially meet the EU obligation of 90 days of consumption. Domestic legislation makes no reference to the IEP obligation and, in particular, does not require a 10% deduction for unavailable stocks.

No financial support is given to the companies in building stocks. Stockholding is compulsory for operators in the internal market.

In the case of an emergency, the Greek government believes stocks held at the refinery facilitate operations such as product mix and specifications implementation. The Administration does not expect to face particular problems, as the refineries have the flexibility to meet a variety of circumstances.

Operational Aspects of Stockdraw

The drawdown of stocks would be performed according to the general allocation scheme for all companies, as instructed by the Greek NESO. As stocks are held commercially, their release to the market would occur smoothly, in a manner similar to daily commercial operations.

Compliance Issues

Companies provide stock reports on a monthly basis or at shorter intervals, if it is required. The level of stocks is also reported to the customs authorities. In case companies do not fulfil their obligations, penalties may be applied, according to the Law 2289/95.

Demand Restraint Measures

Policy and Legal Instruments

Demand restraint would be mainly applied to those sectors which would not have a large influence on the country's economy. The Ministry of Development provides the main tools for application of

demand restraint measures. Starting in 1999, the Administration undertook a comprehensive review of oil and emergency policies, including a sector-by-sector study of demand restraint measures.

Procedures and Monitoring

Depending on the estimated length and the severity of the crisis, the demand restraint measures to be applied are:

Persuasive Measures

- Saving campaigns, organised as information campaigns through mass media, requesting voluntary energy savings, together with proposals on how to obtain these savings.

Compulsory Measures

- fiscal measures;
- lower speed limits;
- ban on using private cars on the basis of their licence plate number (odd/even) during weekends;
- lower thermostats in buildings (18° C. maximum);
- reduction of electricity consumption for unnecessary lighting, such as shop windows, advertising, etc.;
- reduction of energy consumption in public buildings (reduction of heating during the winter and cooling during the summer).

Evaluation of Measures

While there have been no recent studies, the Ministry of Development is planning to conduct a study on the measures to be taken in case of emergency.

Other Response Measures

At present, the scope for increasing indigenous oil production is limited. However, legislation is in force to improve the commercial conditions for exploration and development of hydrocarbon deposits by encouraging the development of small fields and by improving the economics of fields located in deep waters.

Substitution of oil is not anticipated to offer significant savings. The oil industry in Greece is flexible enough to satisfy imbalances of product categories during a crisis, but a change of product specifications would be unlikely.

Data Collection

Data is sent from sources in specific forms that have been established by legislation. It is collected by e-mail, mail and fax. There are several sources (refineries, trading companies, customs, major consumers) to compare and verify collected data.

Data is processed electronically. For data transmission, the Administration uses electronic mail, floppy disks, fax and mail. For ensuring consistency, monthly questionnaires are consolidated and the results are compared with the annual data.

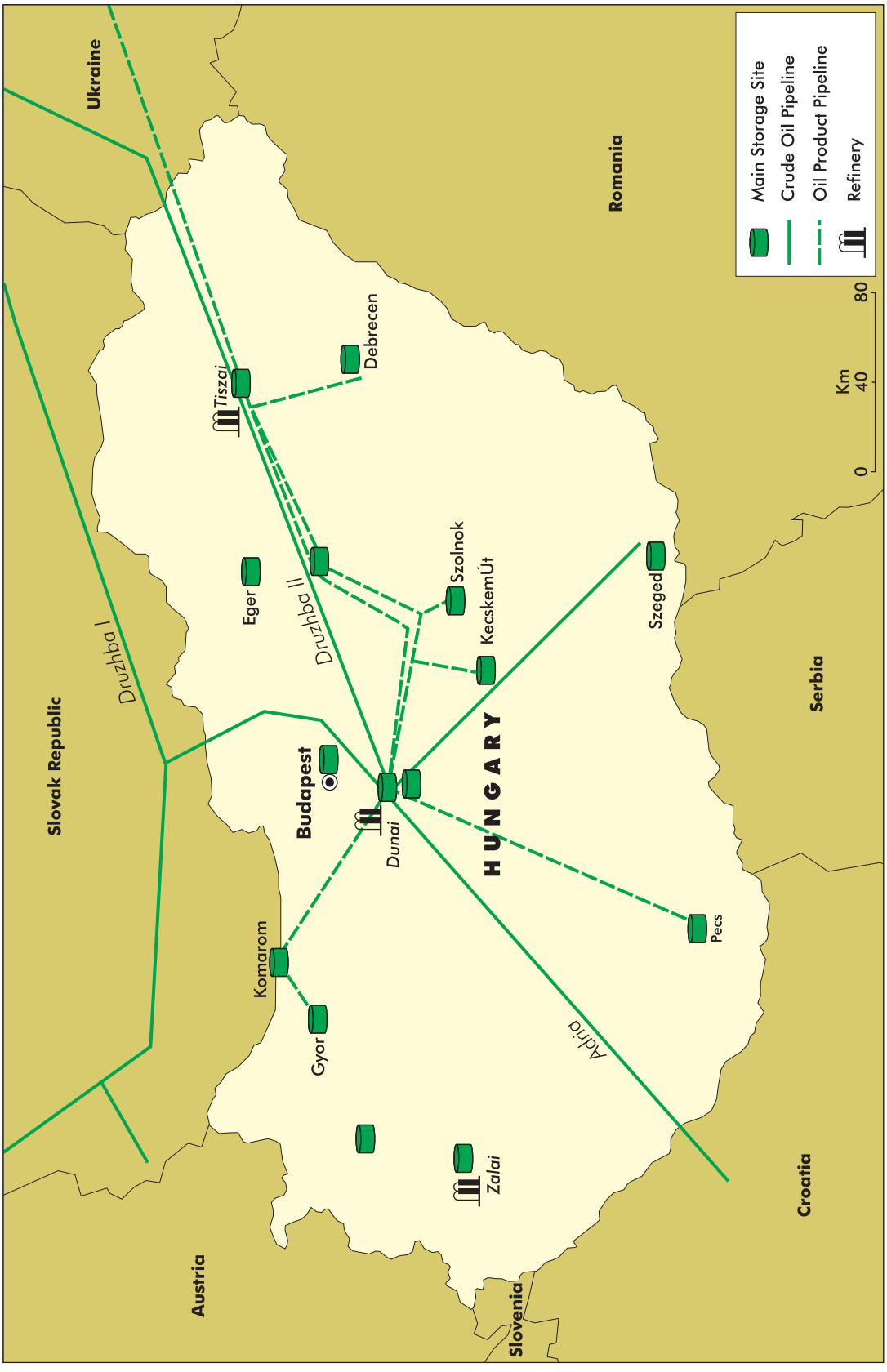
Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Har (Dep)	Aspropyrgos	6.70	135.34	4.12	76.22	5.48	92.44	2.38	45.70	2.18	41.86			1.41	23.97
Motor oil hellas	Aghio Theodori	4.99	100.80			2.28	30.12	1.53	29.38					1.49	25.33
Petrola	Eleusis	5.00	101.00												
Eko (Dep)	Thessaloniki	3.45	69.69	0.48	8.88										
Total		**20.14**	**406.82**	**4.60**	**85.10**	**7.76**	**145.76**	**3.91**	**75.07**	**2.18**	**41.86**			**2.90**	**49.30**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Har (Dep)	Aspropyrgos	1.37	31.92	3.94	80.77					0.28	6.72	0.05	1.20		
Motor oil hellas	Aghio Theodori	0.53	12.35	1.49	30.55					0.20	4.80	0.04	0.96		
Petrola	Eleusis			0.86	17.63										
Eko (Dep)	Thessaloniki	0.43	10.02	2.32	47.56					0.31					
Total		**2.33**	**54.29**	**8.61**	**176.51**					**0.79**	**11.52**	**0.09**	**2.16**		

Map of Hungary



HUNGARY

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	2.5	2.5	2.3	2.3	2.0	1.5	1.1
Imports	10.1	8.5	8.0	7.5	7.0	7.7	8.3
Exports	–1.8	–1.4	–1.5	–2.1	–1.9	–1.8	–1.8
Bunkers	0	0	0	0	0	0	0
Net Imports – NI	8.3	7.1	6.4	5.4	5.0	5.9	6.5
Total Supply	10.9	9.6	8.7	7.7	7.0	7.3	7.6
Import Dependence (%)	79.2	76.6	73.5	73.8	71.7	80.0	85.9
Stock – Days of NI	0	0	90	93	208	..	..

1. Estimated data.
2. Latest available forecast.

Import Dependence and Market Structures

Hungary depends on imports for 71% of its oil requirements. Current energy supply of about 25 Mtoe comprises 27% oil, 39% natural gas, 17% solid fuels, 15% nuclear and 2% other sources. Oil is imported mainly from the countries of the former Soviet Union.

Hungary traditionally had the Soviet Union as a single supply source for oil and gas which covered the bulk of its requirements. With the disintegration of the Soviet Union, one of the first tasks of Hungary was to formulate a new energy policy which stressed energy diversity, security of supply, conservation and environment. The high priority given to preparation for oil emergencies reflects the continental geographical situation of the country, as well as the fact that the country depends on oil imports for three quarters of its supplies, a proportion expected to rise further in the next decade.

The Hungarian energy sector, like other sectors of the economy, has been significantly affected by the transition process. The total primary energy supply (TPES) declined from 31 million tons oil equivalent (Mtoe) in 1987 to 25 Mtoe in 1992 and was still around that level in 1999.

In 1999, oil consumption was almost 6.9 Mtoe, with 100% oil dependence in the transport sector and in the operation of agricultural machinery. However, oil consumption is fairly low at 29% of TPES, as

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	1 432	1 410	–1.5
of which unleaded	1 039	1 358	30.7
Kerosene and jet fuels	198	214	8.1
Gas/diesel oil	1 870	1 894	1.3
Residual fuel oil	1 792	1 783	–0.5
Other	1 812	1 642	–9.4
Total	**7 110**	**6 943**	**–2.3**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Former Soviet Union	5 915	2	27	54	5	82	6 085
Czech Republic	0	60	134	491	0	1	686
Austria	0	107	117	64	0	8	296
Former Yugoslavia	15	9	0	5	0	84	113
Germany	0	0	7	2	0	8	17
Australia	0	12	0	0	0	0	12
Other	0	7	0	1	0	11	19
Total	**5 930**	**197**	**285**	**617**	**5**	**194**	**7 228**

Source: IEA Quarterly Oil Statistics.

compared to some 41% for the IEA. This difference reflects two main factors: (a) transport plays a smaller role in Hungary than in Western European countries, and (b) the use of heating oil is very low in the residential sector. The share of oil in TPES is expected to increase at a very slow rate due to the strong penetration of natural gas in energy supply through natural gas-fired power stations scheduled to be built in the next five or six years.

Domestic oil production (with gas condensates) was 1.75 Mt in 1998 and 1.9 Mt in 1999. This covered about 20% of national consumption. Production is expected to decrease to 1.5 Mt in 2005. Currently *Magyar Olaj és Gázipari Részvénytáraság* (MOL) is the only domestic producer of crude oil. However, five foreign companies have exploration and production concessions and are at the stage of exploration. Crude oil imports were around 5.9 Mt in 1999.

Hungary has one large and two smaller oil refineries owned by the wholly state-owned, integrated oil and gas company MOL Rt., which have a total capacity of 11.5 Mt. The Dunai (Danube) Refinery at Százhalombatta has a capacity of 8.5 Mt, the Tiszai Refinery situated in North-Eastern Hungary has a capacity of 3.0 Mt and the Zalai Refinery, a specialised bitumen refinery close to the Austrian border, has a capacity of 0.5 Mt.

The Dunai and Tiszai refineries can be supplied via the company's crude oil pipelines with domestically produced crude oil and crude oil supplied from Russia through the Druzhba Nº 1 and Druzhba Nº 2

pipelines. Crude oil can also be supplied to the Dunai refinery through the Adria pipeline via Croatia from the Adriatic, which has a maximum capacity of 10 Mt per annum. This pipeline, which was closed for four years because of civil war in former Yugoslavia, but was reopened in 1995, can be used either to import supplies from the Mediterranean or export oil in transit from Russia. Moreover, a relatively small investment would be required to connect the Tisza refinery to the Adria pipeline.

The government decided in 1995 to offer shares of the wholly state-owned, integrated oil and gas company, MOL, to institutional investors. As a result of this offer, the share-holding of the state privatisation agency decreased to 59% by the end of 1995, while the shares of foreign investors rose to 29%. A further sale held in May 1997 reduced the state share to 38%. The State may eventually reduce its shareholding to 25%.

MOL has considerable spare processing, pipeline and storage capacity which is made available to market competitors under market conditions. About one-fifth of crude oil processed in MOL's three refineries is from domestic production, with the bulk of the remainder imported from Russia and a small amount through the Adria pipeline. Much of the petroleum products produced in the refineries is transported from the refineries through product pipelines to a network of distribution depots located throughout Hungary.

Prior to the break-up of the former Yugoslavia, about one million tons of products were transported on the Danube. This was reduced as a result of armed conflict in early 1999 and is expected to recover gradually.

There is currently an oversupply of refinery capacity in Central and Eastern Europe and MOL's refineries compete with products refined in Austria, the Slovak Republic, the Czech Republic, Romania and Croatia. With capacity operating at about 70%, upgrading to permit quality improvements (isomerization, cracking, residue processing) is more likely than the extension of the primary processing capacities.

There is also considerable spare capacity in the supply system. In the interest of better capacity utilisation, MOL refineries export considerable quantities of products to EU countries. More than one-fourth of refinery output (approximately 2 Mt) is exported annually, mainly to Austria, Germany, Italy and Switzerland.

Some 1400 filling stations operate in Hungary. There is keen competition in retail sales between international oil companies and MOL. MOL also owns filling stations in Slovak Republic and Romania and plans operations in other neighbouring countries.

While the bulk of Hungarian crude oil and product imports (approx. 95%) comes from countries outside the OECD, namely, the Russian Federation, the Slovak Republic, Croatia, Romania, and the Ukraine. Non-OECD oil companies have no role in production, refining, transport, storage and distribution.

With the liberalisation of the oil markets, there continues to be some violation of excise tax regulations by small companies importing oil. Therefore, the government has tightened controls, and the system of taxation of oil products became stricter from 1998 onwards.

Emergency Response Policy and Organisation

Emergency Response Policy

During the Socialist era, the Soviet Union accounted for all oil supplies to Hungary, so it was not seen as appropriate to keep a high level of stocks. For short-term disruptions in supplies, a few weeks of stocks were held by OKGT, the predecessor of MOL.

In the post-Soviet environment, stockholding emerged as an urgent issue. During the transition, importers held stocks on the basis of a government decree. Then in 1993, following one and a half years of preparation, the Act on Security Stockholding of Imported Oil and Oil Products was adopted (49/1993). Relevant German legislation was used as a model. The objective of this law was to introduce conditions and provisions to meet the obligations of the IEA and the European Union. This Act was amended in 1997 to meet IEP obligations.

Emergency response policy is an integral part of Hungarian energy policy. For this reason, the Parliament has taken measures in two main areas:

- the diversification of energy sources and the routes of procurement, and
- strategic stockholding for oil and natural gas.

Oil security, its elaboration, maintenance and co-ordination with the IEA is the responsibility of the Ministry of Economic Affairs. Priorities are elaborated primarily at the level of the Division of Energy Policy, and approved by the Minister.

The Oil Stockholding Act ensures most of the necessary legal authority. As part of the process of joining the IEA, the Ministry undertook a survey of domestic procedures and modified them wherever necessary.

Since 1995, total stocks have been continuously above 90 days on the basis of the IEA method of calculation. In accordance with the law, the Crude Oil Stockholding Association alone has held stocks of at least 90 days since 1st January, 1999.

Natural gas plays an important role in Hungary, supplying about one-third of energy requirements. The country has considerable underground natural gas storage capacity (re-injection into mature fields), which is being increased, and about half of the country's demand is met from domestic production. Most gas is consumed by households, which explains its strong seasonal fluctuation. In case an oil emergency occurs in a period of low natural gas demand, natural gas could play a significant role as an alternative fuel, mainly in power stations. The situation would be more difficult during the winter peak on gas demand.

Emergency Organisation

As energy is the specific responsibility of the Minister of Economic Affairs, the National Emergency Sharing Organisation (NESO) operates under the supervision of the Minister, primarily within the Department of Energy Policy. The Political Head of the NESO is the Head of the Department of Energy Policy, and the Operational Head is the Head of the Department of Energy Supply. Statistical support is also ensured by this Division in close co-operation with the Energy Information Agency.

In a declared oil supply emergency, the NESO, under the direction of the Minister, would include appointed experts of certain partner ministries (e.g. Ministry of Defence, Ministry of the Interior, Ministry of Transport, Telecommunications and Water Management, etc.), the Stockholding Association (KKKSZ) and the former national oil company, MOL, as well as the Hungarian Oil Association as the representative of the multinational companies.

In an emergency, the Minister has wide authority. Strategic stocks are owned by the Stockholding Association, and the Director of the Board of the Association is the Political Head of the NESO (Head

of the Department of Energy Policy). There are close relations between this Department and the oil industry outside of emergency situations, including daily information contacts with the former national oil company and frequent contacts with other oil companies, either directly or through the Hungarian Oil Association.

Moreover, oil importing companies are represented in the Board of Directors and General Meetings of the Stockholding Association, so a permanent consulting, information and decision-making forum is ensured in this area.

Allocation Procedures

The Oil Stockholding Act gives the Minister of Economic Affairs wide powers, including the authority to take measures to comply with IEA procedures. The present legal regulation conforms with the allocation mechanism of the IEA.

The Articles of Association of the Crude Oil Stockholding Association take into account Hungary's membership in the IEA and permit the use of stocks in international allocation.

Emergency Reserves

Policy and Legal Instruments

Emergency reserves in Hungary are held by the Crude Oil and Oil Product Stockholding Association (KKKSZ) established on the basis of the Act of 1993 on the Emergency Stockholding of Imported Crude Oil and Oil Products. This was modified in 1997 to meet the obligations of the IEP.

All crude oil and oil product importers are obliged to become members of the Association. There are no other compulsory stock requirements for companies, with the exception of power stations. The drawdown of stocks of KKKSZ may be ordered by the Minister of Economic Affairs in accordance with Section 8 of the Act.

Stockholding and Maintenance

The Act of 1993 regulates stockholding. The effect of the legislation was to raise KKKSZ's stocks progressively to 90 days of net imports from 1996 to 1999.

The Association stores crude oil, gasoline and gas oil. While the Association only buys crude oil, approximately one-third of the total stocks is crude oil and two-thirds is products. Crude oil is purchased and then processed into products under a special contract with MOL. In this way, products are not bought on the market and therefore are not subject to tax. The location of gasoline and gasoil stocks is decentralised, so distribution can be realised quickly. Crude oil stocks are stored for the Association at the refineries, so they can be processed rapidly. Keeping a part of the stock in crude oil enables the refinery to produce those products that are most needed. This also avoids the problem of specifications of stored products becoming outdated. Furthermore, the Association has set up five joint

venture projects to build a total of 1 million cubic metres of storage (above-ground tanks with floating roofs) for crude oil and products.

The Association has not received any government loans and does not intend to do so. However, it has government loan guarantees for its crude oil purchases. The interest on loans and the storage costs are financed through obligatory fees paid by members in proportion to the volumes imported. The amount of a member's contribution is calculated on a scale reflecting metric tons imported and is approved at the General Meeting of the Association.

The General Meeting is the supreme organ of the Association. Its authority covers the adoption of the statutes, the approval of the annual budget and the regulations of the Association, as well as the election of six out of the nine members on the Board of Directors. Of the remaining three members, two are delegated by the Minister for Industry, Trade and Tourism and one by the Minister of Finance. The Board of Directors is in charge of similar tasks as the board of directors of a joint stock company. The adoption of the Association budget is subject to approval by Ministry representatives.

The Minister of Economic Affairs has special competencies regarding the supervision of the Association. The Minister may check the activity of the Association, declare its resolutions violating legal rules as null and void, place the Association operation under his direct control, if necessary, and give orders to draw down stocks.

Operational Aspects of Stockdraw

Drawdown of stocks is ordered by the Minister of Economic Affairs. Based on the law, the members of KKKSZ have the right of pre-emption in the case of a drawdown of stocks. If the Minister orders drawdown, the Board of Directors of KKKSZ notifies the members. Within 48 hours following the drawdown, the members are obliged to declare whether or not they wish to exercise their right of pre-emption to acquire the stocks. If not, KKKSZ will act in accordance with the instruction of the Minister. In the case of the stockpiled crude oil, the Minister may request the refinery to process the oil.

The Association has already carried out some test sales of products through open tender process. This process took about one month, but it would take less time in a crisis. Physical deliveries are possible within 48 hours following a stockdraw decision.

Demand Restraint Measures

Policy and Legal Instruments

Hungary has long-standing rules and legislation (since 1979) which give the Minister of Economic Affairs wide powers. If necessary, a decision at the level of the Parliament can also be prepared on the part of the NESO.

Procedures and Monitoring

There are three stages of demand restraint: light, medium and heavy-handed measures. Light-handed measures include:

- publicity to encourage fuel savings;
- information on links between motor vehicle speed and fuel consumption;
- regular checking of tire pressures;
- avoiding the use of cars for short distances;
- encouraging the use of mass transport;
- checking the adjustment of heating equipment;
- reducing the temperature of public buildings; and
- encouraging the reduction of the temperature in dwellings.

These measures can be executed within a few days and can result in a 2 to 4% reduction in consumption. The medium-handed measures include:

- introducing driving and speed restrictions;
- prohibition of driving for one day a week and/or at the weekends;
- restriction of the use of passenger cars based on registration numbers;
- reducing the quantity of fuel that can be purchased at filling stations;
- restricting the opening hours of filling stations; and
- restricting the deliveries of oil products.

One to two weeks are necessary for implementing these measures. They should result in a 4 - 8% reduction of consumption.

In the case of heavy-handed measures, the following rules will come into force:

- Fuel Oils:
  - for large consumers, a crisis committee determines quotas based on a reconciliation of interests with the Chamber of Commerce, which the various industrial branches will share on the basis of distribution patterns;
  - for small consumers, the problems are handled by restrictions of delivery and by determining retail quotas.
- Engine Fuels:
  - restricting use by the chemical industry;
  - introducing rationing tickets in the private sector with the collaboration of the municipal organisations;
  - for the public sector the local authorities would distribute tickets based on allocated quotas; and
  - the Chamber of Commerce would allocate the quotas for the trading and services sector.

It would take two or three months after the introduction of these measures for the first effects to be perceived. Heavy-handed demand restraint measures would have economic implications and further research is required to estimate their impact.

Crude oil is processed by the MOL refineries and the products distributed to retailers and supplying companies through the MOL distribution network. When the need for introducing the restraint measures is determined and before the various types of measures are introduced, MOL would elaborate a detailed plan of action. Compensation for the eventual losses to the company would have to be taken into consideration in the process.

Other Response Measures

As Hungary's oil fields produce at full capacity in normal times, domestic production can be increased in an emergency to a very small extent and only temporarily. Permits from the mining authority must be obtained in order to initiate increased domestic production.

Domestic gas production conforms with its maximum contribution to the seasonal peak output. There is no possibility to increase production above that level. Increasing domestic gas production in an emergency is possible to the extent of the current peak output, which, unfortunately, is declining.

Fuel-switching in dual-fired power stations can take place within one day. Fuel-switching does not require use of any legal powers.

Data Collection

Data for the IEA are compiled by the Energy Information Agency (EIA). The monthly data are collected from the companies, custom statistics, the Stockholding Association and the Hungarian Power Company (MVM).

Annual energy data are collected, reviewed, processed and distributed by the EIA, which is responsible for operating the Hungarian energy statistics system. The Agency is totally administered by the Ministry of Economic Affairs and acts as a public limited company. The Hungarian energy statistics system has been restructured since 1989 in order to meet the new requirements of national and international demands.

Data are collected from major oil companies. Moreover, the Ministry receives the data on oil imports and exports from customs statistics, the Stockholding Association and the Hungarian Power Companies. This ensures full data coverage for imports, exports and production, and a 60-70% coverage for stocks and deliveries, except for stocks in the tertiary sector.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Duna Refinery	Szazhalombatta	8.13	164.25	4.00	73.98	1.46	28.45	1.46	28.05					0.80	13.60
Tisza Refinery	Tiszaujvaros	3.08	62.24	1.70	31.51	0.00	0.00								
Zala Refinery ATM. 1	Zalaegerszeg					0.00	0.00								
Zala Refinery ATM. 2	Zalaegerszeg	0.51	10.20	0.31	5.74	0.00	0.00								
Total		**11.72**	**236.68**	**6.01**	**111.22**	**1.86**	**34.85**	**1.46**	**28.05**					**0.80**	**13.60**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Duna Refinery	Szazhalombatta	1.36	31.73	1.69	34.65	0.13	3.19			0.11	2.64	0.05	1.30		
Tisza Refinery	Tiszaujvaros											0.03	0.74		
Zala Refinery ATM. 1	Zalaegerszeg														
Zala Refinery ATM. 2	Zalaegerszeg														
Total		**1.36**	**31.73**	**1.69**	**34.65**	**0.13**	**3.19**			**0.11**	**2.64**	**0.09**	**2.04**		

Map of Ireland



Note: This map shows the location of a number of key energy facilities: the coal-fired power sation at Moneypoint, the new peat-fired station at Clobulloge, the Whitegate refinery, and the Whiddy oil terminal in Bantry Bay.

IRELAND

Key Oil Data

(million metric tons oil equivalent)

	1985	1990	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	0	0	0	0	0	0	0
Imports	4.7	5.8	6.8	8.8	9.6	9.3	11.1
Exports	–0.6	–0.7	–1.0	–1.3	–1.1	–1.3	–1.3
Bunkers	0.0	0.0	–0.1	–0.2	–0.2	0.0	0.0
Net Imports – NI	4.1	5.1	5.7	7.4	8.3	7.9	9.7
Total Supply	4.1	5.1	5.7	7.4	8.3	7.9	9.7
Import Dependence (%)	100	100	100	100	100	100	100
Stock – Days of NI	81	72	81	94	..	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Ireland imports all of its oil requirements. Current energy supply of 14 Mtoe comprises 58% oil, 21% natural gas, 19% solid fuels and 2% other sources. Oil is imported mainly from the United Kingdom and Norway. According to latest long-term oil projections, consumption and imports of oil to 2015 are expected to increase by 26% from 1999 levels.

The Irish National Petroleum Corporation (INPC), a government-owned company founded in 1979, is responsible for the purchase and shipping of crude oil, oil trading, and marketing and product sales. Irish Refining plc (IRC), Bantry Terminals Ltd. (BTL), and the National Oil Reserve Agency (NORA) are three subsidiaries of the INPC. IRC operates the Whitegate refinery, Ireland's only oil refinery, in Cork Harbour. BTL operates a deep-sea oil terminal on Whiddy Island, Bantry Bay. NORA is the national stockholding agency of Ireland.

In July 2000, the Irish government authorised the INPC to sign non-binding Heads of Agreement with the US corporation Tosco for the sale of the Whitegate refinery and the Whiddy Island terminal. If the proposed sale is completed, the Irish authorities will be free to concentrate fully on their responsibilities in relation to strategic stockholding. In this regard, the NORA is specifically excluded from the proposed disposal of INPC assets and its stockholding function will continue to be discharged without interruption.

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	1 306	1409	7.9
of which unleaded	1 105	1 297	17.4
Kerosene and jet fuels	947	1 156	22.0
Gas/diesel oil	2 592	2 851	10.0
of which diesel oil	*1 427*	*1 612*	*13.0*
Residual fuel oil	1 762	2 049	16.3
Other	128	132	3.1
Total	**6 735**	**7 597**	**12.8**

Source: IEA Quarterly Statistics 2000.

Origin of Oil Imports, 1999
(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
United Kingdom	89	989	1 948	2 207	932	106	6 271
Norway	2 707	0	0	0	0	0	2 707
Denmark	36	0	0	0	0	0	36
France	10	0	0	0	0	0	10
Netherlands	6	0	0	0	0	0	6
Total	**2 848**	**989**	**1 948**	**2 207**	**932**	**106**	**9 030**

Source: IEA Quarterly Statistics 2000.

In order to ensure security of energy supplies, the government plans to take the following measures to reduce dependence on imported oil and build stocks:

- promotion of the development of indigenous energy sources;
- a number of initiatives to improve the efficiency of energy use under the Energy Efficiency Programme;
- possible expansion of spare storage capacity available in the medium term, especially additional crude oil tankage at the Whiddy Island oil Terminal and product tankage at the Whitegate refinery.

Emergency Response Policy and Organisation

Emergency Response Policy

Ireland's overall energy policy is centred on the supply of fuels to consumers as efficiently as possible, at internationally competitive prices, taking into account supply security, socio-economic and environment considerations. Emergency response measures are based on a mixture of stockdraw and demand restraint.

Emergency Organisation

The Department of Public Enterprise is responsible for oil crisis planning and management. The relevant legislation comprises the Fuels Acts 1971 and 1982 and the "European Communities (Minimum Stocks of Petroleum Oils) Regulations", 1995.

In the event of an oil supply shortfall, industry experts would be consulted by the NESO and additional staffing would be provided to implement the National Emergency Plan. This plan will provide for the establishment of a Unit within the Department to supervise the demand restraint and allocation procedures which are central to NESO operations. The Department would prepare necessary Ministerial Orders to introduce these measures and to give specific powers at the appropriate time.

Allocation Procedures

The allocation procedures of Ireland for the IEA Emergency Sharing System are as follows:

- The NESO would be placed on an emergency footing for the purpose of liaison with the EU and the IEA;
- The Government will make an Order under the Fuels Act, which would empower the Minister for Public Enterprise to regulate and control the acquisition, supply, distribution and marketing of oils;
- The co-operation of oil companies, particularly that of IEA Reporting Company Affiliates, is anticipated within the context of a general supply emergency;
- A meeting of the NESO and the oil industry would be convened without delay to appraise the situation and to make arrangements for continuous monitoring and control;
- Demand restraint measures would be introduced at the appropriate level.

Training programmes for the staff would include briefing on emergency procedures, the simulation of a supply disruption and review of actions taken by the NESO and industry personnel as well, if necessary.

Emergency Reserves

Policy and Legal Instruments

The legal framework of the emergency response measures consists of Fuels (Control of Supplies) Acts, 1971 and 1982 and the "European Communities (Minimum Stocks of Petroleum Oils) Regulations", 1995.

The legislation:

- permits the safeguarding of the supply and distribution of oil in case of an emergency;
- provides a framework for meeting IEA and EU stockholding obligations, and
- permits the gathering of required data regarding consumption, trade and stocks of oil products.

The stocks policy, which has applied in its present form on a statutory basis since 1995, is designed to ensure that Ireland has adequate supplies in the case of an oil shortage. Its basic principle is that the State retains a strategic stockholding function and levies the cost on a fair and equitable basis from the oil companies, which in turn recover it through retail prices.

The policy involves the National Oil Reserves Agency (NORA), which is responsible for ensuring that sufficient stocks are in place to meet IEA and EU obligations and maximising stocks held in Ireland to ensure speedy mobilisation. In order to carry out this responsibility, the Agency may:

- hold stocks which it owns in its own facilities;
- hold stocks which it owns in commercial facilities leased for this purpose;
- arrange for a commercial undertaking to hold a specific quantity of oil not owned by the NORA in its facilities;
- arrange for oil to be held by a commercial undertaking in non-segregated tankage; and
- arrange stockcover abroad under arrangements agreed bilaterally on a government to government basis.

The NORA's function is restricted to maintaining stocks. It does not have a role in stockdraw or allocation other than to make available to the Minister stocks which it controls. Oil importers and large consumers are not obliged to hold strategic stocks but are expected to hold reasonable levels of operating stocks. The expenses of the Agency's administration, stockholding and any necessary capital works are funded by levy on the oil industry.

The Minister may set any specified level of oil stocks exceeding 90 days. For now, the Irish government has made provision to meet the 90-day commitment and it has no plans to increase this level. Should the government decide in the future to increase stock levels, NORA would execute the decision.

Stockholding and Maintenance

The oil stocks of Ireland in October, 1999 consisted of:

industry operational stocks	all products
refinery stocks	crude oil 53%; products 47%
strategic stocks	crude oil 55%; products 45%
bilateral stocks	all products

In October 1999, bilateral stocks represented some 21 days of net imports, whereas crude oil stocks owned by the INPC and working stocks in the refinery represented 15 days and 11 days of net imports, respectively.

In addition to formal treaties on bilateral stockholding with the United Kingdom, Belgium, France and Denmark, there are informal arrangements with the Netherlands and Sweden which are in the process of being formalised into treaties. Stocks are held in the United Kingdom, Denmark, the Netherlands and Sweden. Consultation takes place on a quarterly basis regarding the location and quantity of stocks.

Operational Aspects of Stockdraw

Agency and company stocks would be drawn down in accordance with the provisions of the relevant legislation and following discussions between the NESO and the oil industry under both CERM and IEP conditions.

The new stockholding procedures have been in place since 1995 and drawdown procedures were developed in 1999.

The release of stock information to the public will be a matter for bilateral agreement between the NESO and the companies. The allocation of stocks onto the market will be supervised by the NESO, which will resolve any pricing disputes which may arise in this procedure.

Agency stocks at Whitegate refinery will be transferred into the market via distribution companies' existing channels. Crude oil stored at Whiddy will be available to the INPC. Company stocks, available at depots throughout the country, will be distributed into the market by the companies.

Demand Restraint Measures

Policy and Legal Instruments

The emergency response programme of Ireland centres initially on stockdraw, consistent with IEA and EU requirements, and demand restraint measures. Ireland's demand restraint measures are multi-faceted and correspond to different degrees of disruption. Orders under Fuels Acts may be made independently of IEP measures. Legal authorities to implement demand restraint measures would be prepared by the Department of Public Enterprise. It would assess through consultation with the oil industry, and measure effectiveness on a continuous basis.

Minimum sales, restriction of opening hours for garages, and banning of illegal storage and distribution could be introduced by Ministerial Orders. The National Police Force would enforce of the maximum speed limit. Publicity measures could be introduced to encourage the more efficient use of petroleum products.

Although a computerised rationing system has been drawn up, the Administration places more emphasis on demand restraint measures, which would achieve the effects of rationing but without heavy front-end costs. It considers that rationing would only be used as a last resort.

Data Collection

Forms used to collect and process data from importing oil companies are completed in accordance with EU and IEA procedures covering the submission by Member countries of data relating to petroleum products.

Data provided by major oil companies and the national refinery regarding imports and exports are verified against import and export data assembled by the Office of the Revenue Commissioners and published by the Central Statistics Office in the form of Trade Statistics. Monthly and annual returns are compared with the data, and if further verification is required, confirmation is obtained from the companies in question.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Irish Nat. Ref.	Whitegate	3.70	74.74												

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Irish Nat. Ref.	Whitegate			0.53	12.35	0.60	12.30								

Map of Italy


Austria
Hungary
Switzerland
Slovenia
Croatia
Collombey
Trieste
France
Biella
Venice
Aosta
Milan
Rovigo
Bosnia-
Herzegovina
Serbia
Cremona
Turin
Busalla
Genova
Carrara
Ancona
Florence
Leghorn
ITALY
Adriatic Sea
Albania
Corsica
(France)
Rome
Bari
Spain
Naples
Greece
Mediterranean Sea
Tyrrhenian Sea
Sardinia
Messina
Palermo
Sicily
Augusta
Syracuse
Avola
Licata
Ionian Sea
Crude Oil Pipeline
Refinery
Km
0
100
200

ITALY

Key Oil Data
(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[1, 2]	2010[2]
Production	1.9	2.5	4.8	5.5	4.6	5.8	5.5
Imports	111.8	96.0	111.1	108.3	107.5	85.3	83
Exports	–12.4	–12.4	–20.1	–17.4	–20.5	..	..
Bunkers	–4.2	–3.4	–2.7	–2.4	–2.6	–2.4	–2.4
Net Imports – NI	95.2	80.2	88.3	88.4	84.4	82.9	80.6
Total Supply	97.1	82.7	93.1	93.9	89.0	88.6	86.1
Import Dependence (%)	98.1	97.0	94.8	94.1	94.8	93.5	93.6
Stock – Days of NI	84	105	102	93	88	..	..

1. Estimated data.
2. Latest available forecast.

Oil Dependence and Market Structure

Italy depends on imports for 95% of its oil requirements. Current energy supply of 168 Mtoe comprises 56% oil, 30% natural gas, 7% solid fuels, and 7% other sources. The share of oil in total primary energy supply has declined from 69% in 1980. Italy imports about 94% of its primary energy requirements.

Italy is one of the largest importers of oil in the IEA. Oil supply sources are well diversified, as they include about 30 countries. Nonetheless, Italy relies heavily on North African and Middle Eastern sources, which account for 35% and 23% of total oil imports, respectively. Oil imports from Russia are also significant, representing around 10% of the total. Indigenous production of crude oil is around 5.0 Mt per year. The Villafortuna field in the Po Valley accounts for nearly 46% of overall production. Recent discoveries in the Val d'Agri in the Basilicata Region in the extreme south of Italy show good prospects for production, as the reservoir is the largest in western continental Europe.

The former state oil company, *Ente Nazionale Idrocarburi* (ENI), accounts for around 80% of Italian crude oil production, nearly 40% of total output of petroleum products and 40-45% of wholesale and retail sales. The company also has oil exploration and production interests in several countries. The rest of the market is made up of Italian and foreign companies, all of which are members of the industry

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	17 507	16 171	–7.6
of which unleaded	9 621	9 231	–4.1
Kerosene and jet fuels	3 641	3 924	7.8
Gas/diesel oil	24 776	25 384	2.5
Residual fuel oil	24 188	20 560	–15.0
Other	16 011	16 750	4.6
Total	**86 123**	**82 789**	**–3.9**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Libya	21 514	0	73	2 955	156	666	25 364
Former Soviet Union	18 202	0	325	1 289	0	99	19 915
Iran	13 427	0	0	0	0	0	13 427
Saudi Arabia	8 347	0	0	0	0	88	8 435
Iraq	6 388	0	0	0	0	0	6 388
Norway	4 410	28	23	301	0	33	4 795
Other	15 603	611	605	6 324	54	4 709	27 906
Total	**87 891**	**639**	**1 026**	**10 869**	**210**	**5 595**	**106 230**

Source: IEA Quarterly Oil Statistics.

association *Unione Petrolifera*. Generation and distribution of electricity is mostly in the hands of the former state company *Ente Nazionale Electricite per L'Energia Elettica* (ENEL), which co-ordinates power generation and transmission throughout the country.

In 1994, Italy began the process of privatisation of energy companies. ENI is now a full-fledged joint stock company, with the government stake reduced to only 38%. Further sales of the government's share in ENI are possible in the near future. In 1998, two ENI companies - Agip Petroli and Italiana Petroli (IP) – merged, boosting their share in the gasoline market to 43.6% (Agip's 28.7% plus IP's 14.9%) and in the automotive diesel market to 43.1% (Agip's 28.4% plus IP's 14.7%). Privatisation of ENEL is proceeding more slowly; in November 1999 a first tranche of 34% of the equity was issued. The process has been accompanied by streamlining and restructuring and a general gradual opening of the energy sector to greater competition.

There are 16 major refineries operating in Italy, of which 13 are located along the coast and are supplied by sea. The other three are situated in the Po Valley in northern Italy and are supplied by pipelines from Genoa, Venice and Vado Ligure. Until 1998, there were also two pipelines – Central Europe Line (CEL) from Genoa and Trans Alpine Line (TAL) from Trieste – which supply Germany and Austria. CEL was closed in 1998 and oil shipments through the line were re-routed to TAL. There are about

500 commercial and 300 industrial depots across the country with a capacity of at least 3 000 cubic metres.

Despite the recent reduction in Italian refining capacity, only about 80% of the total installed capacity of 105 Mt is currently being utilised. However, there is no surplus of upgrading capacity. Much capacity is relatively simple, reflecting the large quantities of high gravity, low sulphur, North African crude oils processed. An agreement signed in November 1999 between Agip Petroli and Esso will lead to a 10 Mt reduction in primary capacity by 2001. The planned de-commissioning concerns two refineries in Sicily and is aimed at improving the profitability of the facilities. Some new conversion capacities (de-bottlenecking) needed to meet new product specifications are planned as follows:

- ERG Priolo: a 2.0 Mt de-asphalting plant;
- Raffineria di Roma: a 0.175 Mt gasoil desulphurisation;
- ESSO Trecate: a 0.2 Mt FCC;
- AGIP Gela: a 0.7 Mt gofiner revamping.

There are also plans for three tar gasification projects: an ERG plant of 512 Megawatts for 0.9 Mt/year of tar, a Saras plant of 550 MW for 0.9 Mt/year of tar, and an API plant of 276 MW for 0.5 Mt/year of tar.

In July 1997, an agreement was reached between oil companies, retailers and the Ministry of Industry to reduce the number of filling stations. Oil companies and retailers agreed voluntarily to close down the less profitable and poorly located service stations. This is expected to reduce the number of stations by 4 500 – 5 000 by end of 2000, and the number of independent retailers (*convenzionati*) by 2 000. Decentralisation has brought more regional planning power to the municipalities regarding the opening and closing of filling stations. Until June 2001, authorisation to open a new filling station will only be granted if three existing stations are shut down in the region.

In February 1998, a decree on the "Rationalisation of Fuel Distribution" was published. The new regulatory system was put in place by end-1999. Its main provisions are as follows:

- For the opening of filling stations, Italy has moved from authorisations to a system of concessions granted by the municipalities on an automatic basis, provided that obligations related to environment and security are fulfilled. For stations situated along motorways, concessions will no longer be granted by the State, but by the municipalities.
- Regulations related to the sale of goods other than oil products in filling stations have been simplified, and stations will now be allowed to carry out minor mechanical repairs.
- When the number of filling stations falls to 20 000, opening hours will increase by 50% from the current limit of 52 hours per week.
- A special tax on oil products has been introduced to establish a fund for the restructuring of the filling station network.
- Third-party access to unused oil product and crude oil storage facilities will be provided.

ENI and Unione Petrolifera have developed long-term forecasts for Italy's energy balances. In the forecast of Unione Petrolifera, the share of oil in total final energy demand is predicted to decrease from 53.2% in 1997 to 49.9% in 2010. The decline reflects the projected increase in the use of natural gas in power generation, which is expected to boost the share of gas in total energy consumption from 27.9% in 1997 to 34.7% in 2010.

Emergency Response Policy and Organisation

Emergency Response Policy

The National Energy Plan of 1988 encouraged the exploitation of domestic energy sources, diversification of supply sources, increasing the contribution of renewable sources to meet climate change challenges, energy efficiency and sustainable development. The plan defined the security of energy supply in terms of a choice of the fuels mix according to their cost, flexibility, origin and application of energy saving technologies.

During the 1990s, the government fostered a policy of reducing the dependence on imported oil by encouraging exploration and production of indigenous crude oil and by diversifying energy sources. As a part of the diversification effort, thermo-electrical power plants increased their utilisation of coal in the early 1990s. Subsequent strong environmental concerns have led to the suspension of the construction of additional plants and the conversion of existing ones. Unable to rely on the nuclear power programme, which had been abandoned for environmental reasons after a 1987 referendum, the government has decided to give priority to the increased use of natural gas in power generation and in other sectors. The current medium-term forecast indicates the doubling of current gas consumption over the next decade. This will require substantial investment in new infrastructure. There will also be greater emphasis on clean-coal technologies.

In November 1998, the government held a National Conference on Environment and Energy, after which it set out a series of energy policy goals. The Conference focused on the environmental, social and economic aspects of the energy sector, with the aim of achieving agreements among the government, energy companies and unions on energy requirements, environmental protection and national objectives. In the concluding document, the government set the following energy policy objectives:

- to increase the role of competition and to favour voluntary actions over command and control;
- to promote sustainable development and to account for environmental concerns in energy policy;
- to extend the decentralisation process and to improve the balance between the north and south of Italy in terms of infrastructure and quality of energy services;
- to simplify legislation and procedures; and
- to support the internationalisation of energy companies.

The government plans to devote at least 5000 billion lira from 1999 to 2004 to support the following specific actions agreed at the Conference:

- to ensure energy security of supply through domestic production, diversity of supply and hydrocarbon storage;
- to issue the Legislative Decree on the reorganisation of the electricity sector (which was issued in February 1999) and to introduce competition in the gas sector as soon as possible;
- to increase efficiency in final energy use, especially in the transport sector;
- to double energy production from renewables from 12.7 Mtoe in 1996 to 24 Mtoe in 2010;
- to increase the degree of internalisation of the external cost of using energy and to promote a common approach in this respect consistent with European Union objectives; and

- to start a programme to reduce greenhouse gas emissions and to increase energy R&D funding, particularly in the fields of development and demonstration.

Emergency Organisation

The basis of the Italian NESO is provided by the Decree of the President of the Council of the Ministers (DPCM) of May 1985, amended by Law 608 of May 1994. Under this legislation, the responsibility for co-ordinating and implementing emergency policies and procedures now lies with the Executive Board, headed by the Director General of the Department of Energy and Mineral Resources in the Ministry of Industry. The Executive Board is a standing body comprising officials from the Department of Energy in the Ministry and industry experts, if necessary. Some regional structures headed by the local prefects would also participate in emergency response. The decision to centralise powers in the Ministry of Industry has been made on the basis of past experience, including successful issue of operational directives for fuel-switching and stockdraw during the Gulf Crisis, and is not expected to affect the implementation of IEP/CERM measures.

Allocation Procedures

The Minister of Industry has all necessary powers to ensure that Italy meets its allocation obligations. In a crisis, the Italian NESO will re-allocate crude oil supplies among Italian refineries, using a fair sharing mechanism which shares the burden of eventual allocation obligation among them. Although the government has no legal authority to ensure implementation of mandatory allocation, it would make every effort to encourage companies to participate in that process.

Should Italy be in a position of allocation obligation, the NESO and operators who are oversupplied would work together to find the most suitable offers. It is the NESO's duty to prepare the calculation for each company according to the IEA procedures. After determining the obligations for individual non-reporting companies, the NESO would prepare voluntary offers following the same procedure as for reporting companies.

Emergency Reserves

Policy and Legal Instruments

Consistent with EU regulations, Italian stocks must exceed 90 days of inland consumption for three oil product categories (gasoline, middle distillates and heavy fuel oil) reduced by an adjustment for domestic oil production in the previous year. This formula ensures that the levels of compulsory stocks adjust automatically to the variations in consumption and imports.

Law 61 of March 1986, amended by Law 427/1993 and Law 30/1997, gives the Minister of Industry the authority to activate by decree the use of compulsory stocks. This applies also to participation in an early co-ordinated response. Although there is no specific legislation regarding CERM situations, general laws such as Law 61 of March 1986 and DPCM of May 31, 1985 amended by Law 608/1994

give the government all necessary powers to act in a crisis, including a CERM response in accordance with the Governing Board decisions. This was demonstrated during the Gulf Crisis when Italy was able to comply fully with the IEA Contingency Plan even in the absence of a specific law defining the modalities of stockdraw operations.

Stockholding and Maintenance

Law 22 of February 10, 1981 assigned the then state-owned ENI the duty to set up and manage (on behalf of the government) the strategic oil stocks to be used in emergencies. Budget Law 30 of February 28, 1997 abolished government-owned oil stocks. The decision was related to government efforts to reduce its expenditures in order to meet the Maastricht criteria for the monetary union. Subsequently, the Italian Treasury approved tenders for the sale of the stocks during 1997. The sale of 750 kt of crude oil and products[13] held in government storage was conducted by the ENI affiliate Sogesco between June and November of 1997. The obligation to hold the equivalent amount of stocks was transferred to oil operators, who now must hold stock covering 90 days of consumption instead of the previous obligation of 87 days.

All Italian emergency stocks are now held by oil companies. Compulsory and commercial stocks are commingled. No financial support is given to oil companies for holding stocks. There are about 150 operators in Italy who have a stockholding obligation. In case of severe operational problems, oil companies may be permitted to temporarily lower their compulsory stocks below 90 days of consumption. In recent years, the Administration has issued several authorisations for temporary stock reductions for periods lasting from several days to several months, in response to requests from companies experiencing financial or logistical problems. These authorisations have had a negligible impact on the overall level of industry stocks.

The maximum ceiling for the amount of oil stocks held abroad is 10% for individual oil companies. There is no ceiling for bilateral stocks at the national level. At present, Italy has a bilateral agreement with Germany. In addition, a new agreement with the Netherlands is awaiting approval by the Dutch authorities.

Italian stock legislation is based on the EU requirements and makes no reference to the IEP. The Administration intends to make amendments to existing legislation that would make a clear reference to stockholding obligations arising from the IEP and CERM, and change the method of calculating the stock obligation to conform with IEA practices. It is also considering a proposal to establish a stockholding agency.

Until 1998, jet fuel used for international aviation was not included in domestic oil consumption, as it should be under IEA rules. Of the total annual jet fuel consumption, only a quarter or so used domestically was included in the basis for the calculation of compulsory stock obligation. The remaining part used by international aviation was treated as exports and, as such, was not subject to any stock obligation. The Administration has implemented corrective measures which should result in full consistency with IEA rules.

13. This included 370 kt of crude oil, 160 kt of gasoline and 220 kt of middle distillates. Earlier, in October 1996, some 130 kt of residual fuel oil was also sold from the government stocks.

Operational Aspects of Stockdraw

The government has the power to increase or reduce the minimum stock obligation and to enforce the release of industry stocks to the market. The government can also use powers implicit in the system of administrative licences for refining and storage activities to obtain stockdraw by refiners and traders. This worked out well in January 1991, when 74 kb/d of oil stocks were released over one month, with negligible time lag between the Ministry of Industry directive and the actual release of oil products to the market.

The Administration expects that oil companies will voluntarily participate in stockdraw, following advice from the Ministry of Industry. Since oil stocks are held only by companies, they are delivered through normal market channels and no tests of stock drawdown are considered necessary. If the system of sharing of oil supplies were to be activated, the NESO would make calculations of necessary reserve drawdown and transmit them to each company. The time required from a government stockdraw decision until physical deliveries is estimated to be less than 24 hours.

Compliance Issues

Companies with a stock obligation must inform the Ministry of Industry of their stock positions on a monthly basis. In a crisis, the Ministry may require more frequent reports to allow better monitoring of the situation. The financial police (*Guardia di Finanze*) can at any time perform spot inspections independently or on advice of the Ministry. Companies can be fined if they do not meet the obligation. Law 61 of March 1986 establishes automatic penalties for non-compliance reaching up to five times the value of missing products. Companies not complying with their obligations can also have their operating concessions revoked. The system of penalties has been used only a few times since 1986, as most companies typically meet their compulsory stock obligations.

Demand Restraint Measures

Policy and Legal Instruments

The Italian government regards demand restraint as the first line of response to an oil crisis and would adopt measures to safeguard the country's industrial sector, concentrating the restrictions primarily on the civil sector. The legal basis for demand restraint measures is provided by Law 608/1994, which transferred all relevant authority from the abolished Inter-Ministerial Committee on Energy Emergencies to the Ministry of Industry. The Executive Board within the Ministry is now responsible for the development and implementation of all necessary demand restraint measures in an emergency, subject to approval by the Council of Ministers.

Actions taken in a pre-crisis situation or at the beginning of an emergency would have an immediate effect by containing demand and providing alternative forms of supplies. The specific measures considered include limitations in the private transport sector and domestic heating, graded according to the severity of the crisis and the time of the year. The time necessary for the implementation of these restraint measures would vary from four to seven days.

Procedures and Monitoring

Once activated, the Executive Board has the legal authority to take all necessary demand restraint measures and to implement them through its operational structures. Should the crisis become more severe, the restraint measures would be tightened, which might require introduction of specific legislative procedures or approval by the government. The decision-making process for such measures as fuel-switching was successfully put into practice during the Gulf Crisis.

Evaluation of Measures

There have been no recent studies on volumetric savings from demand restraint measures. However, historical estimates of such savings are as follows:

- in private transport: 4.0% from driving bans, 1.0% from speed limits, 0.3% from car pooling (LPG, gasoline, diesel);
- in domestic heating: 2.5% from shorter operating time, 2.0% from lower room temperatures (LPG, kerosene, gas oil); and
- in the thermo-electric sector: 6.0% from fuel-switching (heavy fuel oil).

Other Response Measures

The scope for increasing indigenous production of crude oil is very limited, as fields operate at or close to optimum capacity.

Italy has no plans to relax product specifications in a crisis in order to increase output of petroleum products. This would create problems of segregation and exports to other countries that have not implemented similar measures. Changing product specifications is considered as a last resort which would require general consensus among all Member countries.

There is some scope for switching from fuel oil to natural gas in dual/triple fuel power stations. ENEL has the capacity to replace 9 Mt/year of heavy fuel oil (around 30% of Italian HFO consumption) with natural gas. This is a significant increase from the 1990 estimate of 2.5 Mt per year. (The latter was equivalent to 12% of ENEL's normal fuel oil use.) The actual switching potential may vary at different times of the year, depending on the market situation and economic factors. During the Gulf Crisis, Italy used about half of its fuel-switching capacity (4 000 t/d) by replacing fuel oil with natural gas.

There are 20 multi-fuel stations in Italy with combined capacity of 80 000 gigawatts/hour, or about a quarter of total Italian power generation capacity. Some of these stations use heavy fuel oil instead of natural gas in order to prevent excessive dependence of the power sector on natural gas. Available import pipeline capacity is another factor limiting the use of natural gas. No new dual-fired power plants are being planned in the near future.

Natural gas can play an important role during an oil crisis. Indigenous production of natural gas was 17.6 billion cubic metres (bm^3) in 1999. Imports reached 49.5 bm^3 and came mainly from Algeria (54%), countries of the former Soviet Union (39%) and the Netherlands (6%). Imports from Norway

have begun under a new contract. Gas companies are interested in diversifying their supply sources. New contracts have recently been signed to import 6 bm^3 of gas from Norway starting in 2000 and 10 bm^3 (up from 6 bm^3 currently) from the Netherlands, starting in 1999. The project to import LNG from Nigeria has been abandoned due to public opposition to the construction of a new import terminal. In the longer term, ENI is studying the possibility of importing oil and gas from the Caspian region.

Italian companies have no legal obligation to hold stocks of natural gas. Nonetheless, the country has gas stocks of about 90 days of normal consumption which provide operating flexibility in planning interruptible contracts. Dry gas fields in the Po Valley are used as the main storage facilities. They are operated by Agip and have a combined capacity of around 25 bm^3, of which 15 bm^3 is currently utilised.

Data Collection

The Administration's capacity to collect and transmit data has improved with the installation of a local PC network with access to Internet. Monthly oil statistics are collected using an internal oil questionnaire that is updated when necessary. Oil processing by foreign companies is creating some data reporting problems.

The annual oil data are sometimes inconsistent with the sums of monthly figures because companies submit year-end corrections (the so-called thirteenth month data) without attributing them to specific months and because the annual data reflect information from other fuel balances. This discrepancy implies under-reporting of oil demand on a monthly basis of around 4%. The Administration is making efforts to eliminate these discrepancies and to improve the data system in general. It has reorganised the Ministry and delegated some functions to regional authorities, and in 1998 introduced a new monthly reporting system designed to reduce the discrepancies.

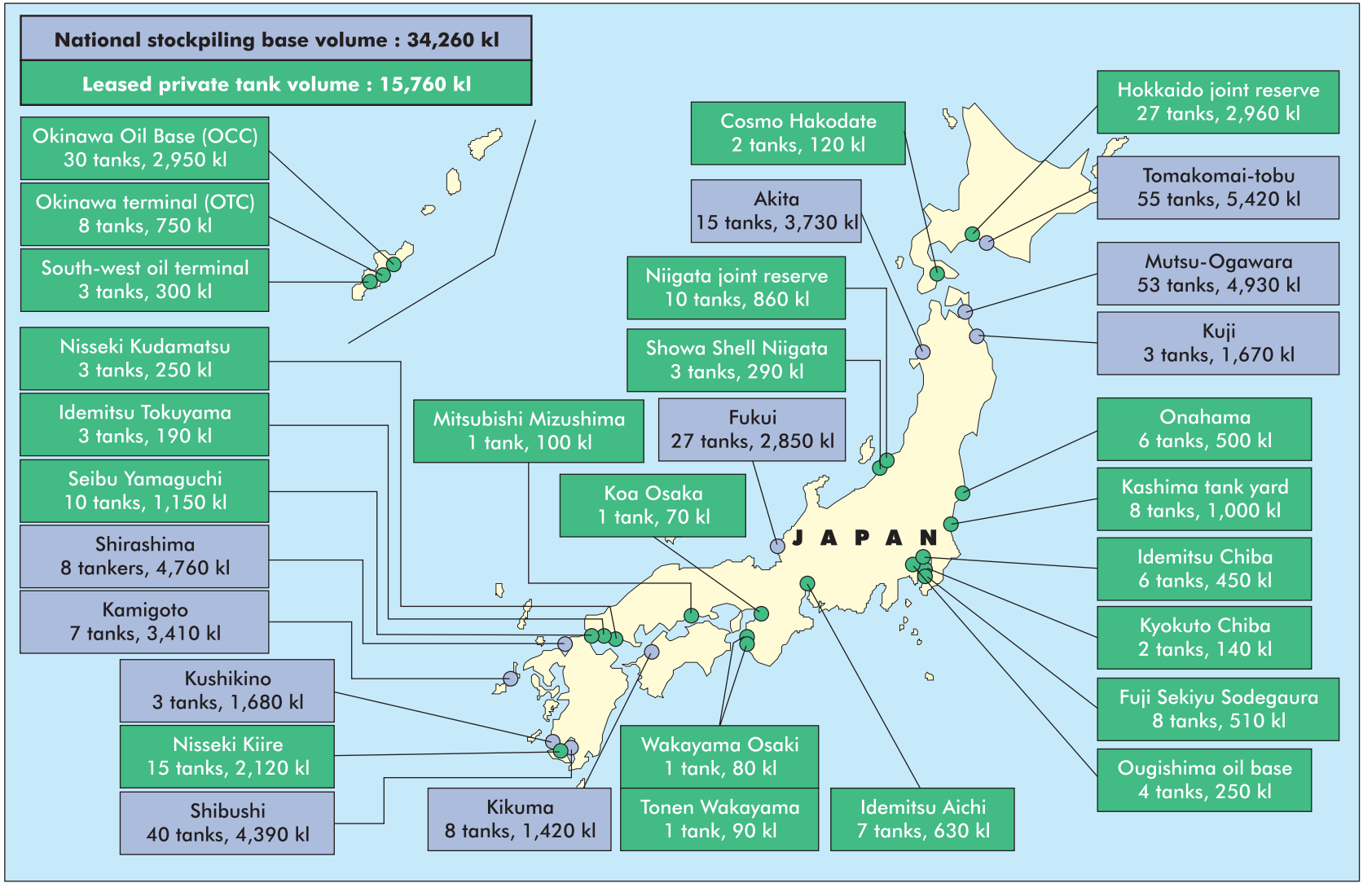
Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Ravena	0.40	8.08			0.00	0.00								
Falconara	3.90	78.78	2.19	40.53	1.58	26.78						0	3.15	53.55
La Spezia	0.80	16.16			0	0								
Livorno	4.20	84.84	1.95	36.00	0	0								
Porto Marghera	4.50	90.90	2.05	38.00	0.55	9.35							1.10	18.70
Sannazzaro. Pavia	10.00	202.00	4.57	84.50	4.20	78.88	1.75	33.60	1.50	28.80			1.60	27.20
Taranto	4.50	90.90	0.73	13.50	2.06	37.28			0.96	18.43		0	2.00	34.00
Gela	5.00	101.00	2.84	52.50	3.74	71.71	1.70	32.64	1.85	35.52				
Priolo	11.00	222.20	2.70	50.00	2.40	44.54	1.70	32.64	0	0			1.40	23.80
Augusta. Saracusa	8.50	171.70	4.88	90.20	2.28	43.78	2.28	43.78						
Mantova	2.60	52.52	1.09	20.10	0.87	15.20					0.45	8.33	1.20	20.40
Busalla	1.80	36.36	0.95	17.50	0.69	12.70		0	0.40	7.68			0.50	8.50
Priolo Gargallo/Melilli	12.00	242.40	5.55	102.70	6.02	112.07		0	3.36	64.51	1.72	31.82	2.59	44.03
Pantano	4.30	86.86	0.62	11.50	0.85	14.45							1.70	28.90
Milazzo	10.00	202.00	3.75	69.30	4.88	93.70	1.80	34.56	2.80	53.76		0		
Sarroch	18.00	363.60	5.81	107.50	8.57	161.90	4.40	84.48	2.70	51.84			2.40	40.80
Martino di Trecate	9.00	181.80	1.48	27.40	1.60	30.72	1.60	30.72		0.00				
Cremona	5.00	101.00			1.31	22.91			0.30	5.76			1.95	33.15
Total	**115.50**	**2333.10**	**41.15**	**761.23**	**47.82**	**882.03**	**15.23**	**292.42**	**13.87**	**266.30**	**2.17**	**40.15**	**19.59**	**333.0**

Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Ravena														
Falconara			0.56	13.05	2.20	45.10					0.26	6.24		
La Spezia														
Livorno			0.59	13.75	2.77	56.79					0.20	4.80		
Porto Marghera			1.20	27.96	2.02	41.41					0.20	4.80		
Sannazzaro. Pavia			2.70	62.91	3.76	77.08	0.19	4.56			0.45	10.80	0.05	1.20
Taranto			0.70	16.31	2.78	56.99					0.20	4.80		
Gela	2.60	44.20	0.58	13.51	3.09	63.35	0.37	8.88				0	0.06	1.44
Priolo			0.36	8.39	1.27	26.04	0.17	4.08			0.00	0	0.05	1.20
Augusta. Saracusa			0.95	22.14	1.71	34.99	0.32	7.68				0		
Mantova			0.33	7.69	1.38	28.29					0.10	2.40		
Busalla														
Priolo Gargallo/Melilli			1.50	34.95	9.43	193.32					0.35	8.40		
Pantano			0.60	13.98	2.18	44.69					0.23	5.52		
Milazzo			0.50	11.65	1.33	27.27	0.16	3.84					0.06	1.44
Sarroch			1.20	27.96	6.13	125.67	0.30	7.20						
Martino di Trecate			1.13	26.33	2.01	41.29			0.05	2.00	0.39	9.36		
Cremona			1.05	24.47	1.34	27.47					0.42	10.08		
Total	**2.60**	**44.20**	**13.95**	**325.04**	**43.40**	**889.72**	**1.51**	**36.24**	**0.05**	**2.00**	**2.80**	**67.20**	**0.22**	**5.28**

Map of Japan


National stockpiling base volume : 34,260 kl
Leased private tank volume : 15,760 kl
Okinawa Oil Base (OCC)
30 tanks, 2,950 kl
Okinawa terminal (OTC)
8 tanks, 750 kl
South-west oil terminal
3 tanks, 300 kl
Nisseki Kudamatsu
3 tanks, 250 kl
Idemitsu Tokuyama
3 tanks, 190 kl
Seibu Yamaguchi
10 tanks, 1,150 kl
Shirashima
8 tankers, 4,760 kl
Kamigoto
7 tanks, 3,410 kl
Kushikino
3 tanks, 1,680 kl
Nisseki Kiire
15 tanks, 2,120 kl
Shibushi
40 tanks, 4,390 kl
Cosmo Hakodate
2 tanks, 120 kl
Akita
15 tanks, 3,730 kl
Niigata joint reserve
10 tanks, 860 kl
Showa Shell Niigata
3 tanks, 290 kl
Mitsubishi Mizushima
1 tank, 100 kl
Fukui
27 tanks, 2,850 kl
Koa Osaka
1 tank, 70 kl
Kikuma
8 tanks, 1,420 kl
Wakayama Osaki
1 tank, 80 kl
Tonen Wakayama
1 tank, 90 kl
Idemitsu Aichi
7 tanks, 630 kl
J A P A N
Hokkaido joint reserve
27 tanks, 2,960 kl
Tomakomai-tobu
55 tanks, 5,420 kl
Mutsu-Ogawara
53 tanks, 4,930 kl
Kuji
3 tanks, 1,670 kl
Onahama
6 tanks, 500 kl
Kashima tank yard
8 tanks, 1,000 kl
Idemitsu Chiba
6 tanks, 450 kl
Kyokuto Chiba
2 tanks, 140 kl
Fuji Sekiyu Sodegaura
8 tanks, 510 kl
Ougishima oil base
4 tanks, 250 kl

JAPAN

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2010[2]
Production	0.7	0.5	0.6	0.6	0.7	0.7
Imports	249.4	252.2	212.7	262.5	271.2	255.0
Exports	–1.2	–0.5	–0.6	–3.8	–5.3	–14.5
Bunkers	–19.0	–11.6	–7.1	–5.1	–5.2	–5.0
Net Imports – NI	229.1	240.2	204.9	253.6	260.6	235.5
Total Supply	229.8	240.7	205.5	254.2	261.3	236.2
Import Dependence (%)	99.7	99.8	99.7	99.8	99.7	99.7
Stocks – Days of NI	90	105	116	111	121	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Japan depends on imports for 99.7% of its oil requirements. Current energy supply of 510 Mtoe comprises 51% oil, 12% natural gas, 17% solid fuels, 17% nuclear and 3% other sources. Oil is imported mainly from United Arab Emirates, Saudi Arabia, Iran, Qatar, Kuwait and Indonesia.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	35 597	36 057	1.3
of which unleaded	35 597	36 057	1.3
Kerosene and jet fuels	33 029	33 486	1.4
Gas/diesel oil	60 654	61 020	0.6
Residual fuel oil	31 337	30 681	–2.1
Other	81 926	84 367	3.0
Total	**242 543**	**245 611**	**1.3**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
United Arab Emirates	53 622	0	0	0	269	5 335	59 226
Saudi Arabia	40 163	0	0	0	327	9 692	50 182
Iran	24 893	0	0	56	0	53	25 002
Qatar	19 832	0	0	0	44	1 155	21 031
Kuwait	12 856	0	0	0	180	5 464	18 500
Indonesia	12 326	0	0	1 145	0	1 791	15 262
Other	49 449	1 019	2 036	453	4 190	17 268	74 415
Total	**213 141**	**1 019**	**2 036**	**1 654**	**5 010**	**40 758**	**263 618**

Source: IEA Quarterly Oil Statistics.

Domestic demand for oil products has been relatively stable in recent years. After FY 2000, the steady increase in the demand for gasoline, kerosene and A fuel oil is expected to continue, but demand for gas oil, naphtha and C fuel oil is expected to decrease. Domestic demand for major oil products is expected to increase gradually after 2001.

Demand Growth by Product

	Major Factor	1998/2003 average
Gasoline	Increase in number of vehicles	1.1%
Naphtha	Decrease in export of ethylene to South-East Asia	–0.3%
Aviation fuels	Increase in number of flights in Haneda, Itami and Narita airports and others	1.1%
Kerosene	Increase in industrial production, number of households	0.7%
Gas diesel oil	Decrease in number of vehicles using diesel oil	–0.7%
A fuel oil	Increase in industrial production and private consumption	0.6%
C fuel oil	Increase in start of operation of nuclear/coal/gas power plant	–1.6%
Total demand growth		0%

Source: MITI.
As of June 1999.

Import of oil products is expected to increase after 2001, responding to the increase in domestic demand, but the rate of increase is not expected to be rapid, reflecting the domestic price situation.

The Provisional Measures Law on the Importation of Specified Petroleum Refined Products was repealed in 1996.

Current profits of the refinery and wholesale sector decreased from 60.2 billion yen in FY1997 to 12.8 billion yen[14] in 1998. The current profit margin on sales decreased significantly from 0.40% to 0.10%. The distribution sector was also faced with a tough situation, which resulted in continuous

14. 108.53 Yen = US$ 1.00.

decrease in the number of gas stations since FY1994, and the number of redundancies in gasoline retail companies amounted to 1 800 in FY1997. Under such circumstances, the Japanese oil industry has been restructuring to achieve drastic cost reductions, including reducing the existing work force, limiting the number of new recruits and streamlining logistically in order to make operations more efficient. The process of mergers and strategic alliances has been accelerated since 1998.

Emergency Response Policy and Organisation

Emergency Response Policy

The basic legal framework to secure adequate oil supply in an emergency consists of:

- the Petroleum Stockholding Law;
- the Japan National Oil Corporation (JNOC) Law; and
- the Petroleum Supply and Demand Optimisation Law.

The government maintains its own emergency reserves under the JNOC Law and imposes stockholding obligations on the industry in accordance with the Petroleum Stockholding Law.

The Petroleum Supply and Demand Optimisation Law provides for the following actions to secure adequate supply, subject to a Cabinet decision and proclamation to implement an emergency measure under the law:

- The MITI (Ministry of International Trade and Industry)[15] prescribes and issues the target for oil supply;
- Each oil refiner, oil importer or oil marketer prepares and reports its plan for oil production, oil import and oil sale to the MITI;
- The MITI, when necessary to achieve the oil supply target, will instruct any reporting oil refiner or marketer to revise its plan for oil production or sale.

In order to prepare for an expansion of the number of oil product importers, the Petroleum Stockholding Law was revised in 1995 so that stockholding obligations would be shared among refiners, marketers and importers in such a way as to respond appropriately to an emergency. More specifically,

- Every petroleum importer should assume a stockholding obligation irrespective of the amount of import products;
- In principle, importers should stock the same types of products that they import;
- Each importer's required amounts of stocks each month should be based on the scale of its activities in the previous twelve months;
- The government should simplify reporting procedures and arrange requirements for smooth fulfilment of stockholding obligations.

15. The MITI was reorganised into the Ministry of Economy, Trade and Industry (METI) in January 2001.

In addition, a new quality control system was established under the revised Law on the Quality Control of Gasoline and Other Fuels which ensures an appropriate quality standard for specifications beyond the control of market mechanisms.

Emergency Organisation

Japan's NESO is organised within the Agency of Natural Resources and Energy (ANRE) of the MITI. In the case of oil supply disruption, ANRE of MITI, including the following divisions, would also be responsible for the implementation and co-ordination of the domestic emergency response measures:

- the International Affairs Division, the Energy Policy Planning Division of the Director-General's Secretariat,
- the Planning Division, the Refining Division and the Petroleum Reserve Division of the Petroleum Department, and
- the Energy Efficiency Division of Coal and the New Energy Department.

Allocation Procedures

In the event that Japan has to meet IEP allocation obligations, each company will offer the volume required by the government's response measures (including demand restraint and stockdraw) under the Petroleum Industry Law, the Petroleum Supply and Demand Optimisation Law, the Petroleum Stockholding Law and the JNOC Law.

Emergency Reserves

Policy and Legal Instruments

In order to meet IEP stockholding commitments, the government maintains its own emergency reserves in accordance with the JNOC Law and imposes stockholding obligations on oil companies under the Petroleum Stockholding Law (Article 8).

Since these laws allow stockpiles to be drawn irrespective of the volume of supply disruption, Japan is able to participate in an early co-ordinated response measure (CERM) in a flexible manner under the existing laws.

Stockholding and Maintenance

Oil stock-building started in 1974 with a stock level of 60 days, which corresponded to pre-IEA/OECD requirements. In addition to industry stocks, the government began to build its own stocks in 1978. In November 1987, the Petroleum Council's Sub-Committee for Stockholding submitted a report on future oil stockholding policy in Japan to the government. Based on the recommendations of the report, the government has implemented the following stockholding policy:

- Private stocks are being reduced to 70 days.
- Government stocks are being increased to 50 million kl, equivalent of 90 days imports.

The government provides companies with low-interest loans. With regard to the funding of purchases of oil except LPG for stockholding, out of the mandatory stockpile for 70 days, 25 days of the volume in excess of the running stocks (45 days) are covered by low-interest loans. As for LPG, out of the required stockpile for 40 days, 90% of the volume in excess of the operating stocks (10 days) is financed by low interest loans.

The government also supports the establishment and maintenance of company storage facilities.

Stockholding Facilities for National Stocks

Storage Bases	Began Operation	Storage System	Capacity M.KL	Actual Stocks M.KL
Mutsu-Ogawara	1985	Conventional steel tanks	5.7	4.9
Tomakomai-Tobu	1990	Conventional steel tanks	6.4	5.3
Fukui	1986	Conventional steel tanks	3.4	2.9
Kamigoto	1988	Sea–floating steel barges	4.4	3.4
Akita	1995	In–ground tanks	4.5	3.7
Shibushi	1993	Conventional steel tanks	5.0	4.5
Kuji	1993	Underground caverns	1.75	1.7
Kikuma	1994	Underground caverns	1.5	1.4
Kushikino	1994	Underground caverns	1.8	1.7
Shirashima	1996	Sea–floating steel barges	5.6	4.76
Total			**40.0**	**34.2**

Source: MITI.

Operational Aspects of Stockdraw

Regarding the drawdown of industry stocks, the MITI reduces stockholding obligations in accordance with the Petroleum Stockholding Law, taking into account individual companies' oil availability as well as the general oil supply situation. During the Gulf War, the government lowered stockholding obligations for industry stocks held by companies by four days of consumption to meet Japan's commitment to the IEA Contingency Plan.

Government stocks can be drawn down on the basis of instruction by the MITI in accordance with the JNOC Law.

The lead time required from the decision by the MITI to release of government stocks held in rented company storage tanks will be only a few days, because the tanks are located in the refining sites. As for the stocks in national stockholding bases, the lead time varies from base to base in a range of two weeks to two months, because conditions are different. The bases which require the longest lead time to release oil are the Kuji and Kushikino bases, which account for 7% of total government stocks.

Compliance Issues

Companies maintaining compulsory stocks are required to record stock levels and the related issues twice a month and report them to the MITI so that it can monitor the levels of stocks every month. The MITI also has legal authority to conduct on-the-spot inspections.

Under the Petroleum Stockholding Law, the MITI is authorised to instruct and order companies failing to meet stockholding obligations to increase their stocks to the required level. Failure to obey this order would be subject to a penalty.

Demand Restraint Measures

Policy and Legal Instruments

The Petroleum Supply and Demand Optimisation Law and Electricity Utilities Industry Law provide the government with legal authority to implement compulsory demand restraint measures. Activation of these laws in a severe crisis is likely, following energy conservation measures and moderate demand restraint measures.

The government and local government organisations will take initiatives to introduce demand restraint measures by persuading the public and industry to make greater efforts to conserve energy and provide them with necessary information on the emergency situation. The measures to be taken will be decided on an *ad hoc* basis and reflect the specific nature of any crisis.

Procedures and Monitoring

Based on past experience of oil crises, the government believes that the general public and industries should co-operate in oil consumption reduction measures in an emergency.

Other Response Measures

Fuel-switching

In the case of an emergency, the MITI has authority to make a recommendation to modify the supply plan or issue a supply order to electric power companies in accordance with the Electric Utilities Industry Law, in order to secure an adequate capacity for electric power supply and to shift the energy source to non-oil energy sources such as coal, natural gas and nuclear power.

Data Collection

The Agency of Natural Resources and Energy of the MITI collects IEA Emergency Questionnaire data from the companies concerned, and the Research and Statistics Department of the MITI collects Annual Oil Statistics and Monthly Oil Statistics data under the Statistics Law from business establishments concerned by a questionnaire method.

The Information Network System for Possible Oil Crises (INSPOC) is responsible for gathering, analysing, and providing the following information depending on the conditions of the emergency:

- imports, production and distribution data necessary for preparing oil supply forecasts, releasing stocks, providing the guidelines for production planning and preventing purchase of oil products at abnormally high prices, and
- information on the international and domestic structure of oil supply and demand.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Idemitsu Kosan	Tokuyama	5.3	108.0	2.7	49.5	1.2	22.5	1.2	22.5						
	Chiba	10.7	216.0	3.2	59.4	2.1	40.5	2.1	40.5						
	Hyogo	6.2	126.0												
	Hokkaido	6.2	126.0	1.2	21.6	2.2	41.9	1.4	27.0	0.7	13.5				
	Aichi	7.1	144.0	2.1	39.6	2.1	39.6								
Nihonkai Oil	Tonyama	2.7	54.0	0.5	9.0										
Japan Energy	Mizushima	8.9	180.2	5.3	98.1	2.0	38.7	2.0	38.7						
	Chita	4.5	90.0	1.9	36.0	0.8	15.3	0.8	15.3						
Kygnus Sekiyu Seise	Kawasaki	3.6	72.0												
Nippon Petr. Ref.	Muroran	8.7	176.4	3.0	54.9	3.2	62.1	1.2	22.5	1.9	36.0				
	Yokohama Negishi	17.2	346.5	6.3	117.0	3.9	72.9	3.3	63.9					1.1	18.0
Tohoku Ol	Sendai	6.5	130.5	2.9	54.0	1.6	30.6	1.6	30.6						
Tonen	Wakayama	7.4	149.4	3.4	62.1	1.8	34.2	1.8	34.2						
	Kawasaki	11.4	229.5	6.0	110.7	5.7	108.7	4.2	81.0	1.3	25.2				
Toa Oil	Kawasaki	2.9	58.5	2.8	52.2	1.5	29.7	1.5	29.7						
Kashima Oil	Kashima	8.0	162.0	2.0	37.8	1.5	29.7	1.5	29.7						
Taiyo Oil	Shikoku	4.5	91.8	1.3	24.3	0.9	17.8	0.8	16.2						
Fuji Oil	Sodegaura	8.6	172.8	2.7	49.5	0.8	15.3	0.8	15.3						
Koa Oil	Marifu	5.7	114.3	3.1	57.6	1.1	21.6	1.1	21.6						
	Osaka	5.6	112.5	2.9	54.0	1.3	24.3	1.3	24.3						
Cosmo Oil	Yokkaichi	6.9	139.5	3.6	66.6	1.2	22.5	1.2	22.5						
	Chiba	10.7	216.0	2.9	54.0	1.6	31.5	1.6	31.5						
	Sakai	4.9	99.0	1.7	30.6	1.0	19.8	1.0	19.8						
	Sakaide	6.2	126.0	2.0	37.4	0.9	17.1	0.9	17.1						
Kyokuto Petr. Ind.	Chiba	7.1	144.0	4.0	74.7	3.6	68.7	1.6	30.6	1.8	34.7				
Kyushu Oil	Oita	6.9	139.5	4.4	81.9	1.6	29.8	1.0	18.9	0.5	9.9				
Mitsubishi Oil	Kawasaki														
	Mizushima	11.6	234.0	3.3	60.3	2.4	46.9	1.9	36.0	0.5	9.9				
Showa Yokkaishi Sekiyu	Yokkaishi	11.6	234.0	5.1	94.5	2.9	54.9	2.9	54.9						
Showa Shell Sekiyu	Kawasaki	5.3	108.0	1.5	27.0										
Seibu Oil	Yamaguchi	5.3	108.0	2.1	39.6	1.2	22.5	1.2	22.5						
Genereal Sekiyu	Sakai	7.0	140.4	3.4	63.0	1.9	36.0	1.9	36.0						
Teiseki Topping Plant	Kubiki	0.2	4.0												
Toho Oil	Owase	1.6	31.5												
Wakayanan Petr. Ref.	Kainan	2.2	45.0	1.5	27.0										
Nanasei Sekiyu	Nishihara	4.5	90.0												
Okinawa Sekiyu Seisei	Okinawa	4.9	99.0												
Total		**238.5**	**4818.2**	**86.7**	**1604.2**	**63.7**	**1196.0**	**43.0**	**826.2**	**7.5**	**145.4**			**1.1**	**18.0**

Refining Capacity *(continued)*

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Idemitsu Kosan	Tokuyama			0.8	18.0	5.3	108.0								
	Chiba			0.7	15.3	10.9	224.1							0.1	2.3
	Hyogo			0.7	15.3	5.6	115.2								
	Hokkaido			0.7	16.2	5.3	108.0								
	Aichi			0.7	16.2	7.0	144.0	0.4	9.0						
Nihonkai Oil	Tonyama			0.3	6.3	1.4	27.9								
Japan Energy	Mizushima	1.4	23.4	1.7	39.6	11.3	231.8	0.3	8.1						
	Chita			0.9	21.2	6.2	127.8								
Kygnus Sekiyu Seise	Kawasaki			1.3	26.1										
Nippon Petr. Ref.	Muroran			1.2	27.0	7.1	145.8								
	Yokohama			0.2	3.6	0.5	10.4								
	Negishi			1.9	45.0	14.1	288.9	0.3	8.1					0.1	2.0
Tohoku Oil	Sendai			0.6	13.5	5.4	111.5	0.3	8.1						
Tonen	Wakayama			0.8	18.0	5.1	105.3	0.1	3.0						
	Kawasaki			1.9	45.0	10.0	204.3	0.4	9.0						
Toa Oil	Kawasaki			1.3	21.6	0.3	7.2	4.4	90.9			0.1	2.3		
Kashima Oil	Kashima			0.8	19.8	7.4	151.2							0.1	1.6
Taiyo Oil	Shikoku			1.3	29.7	2.8	56.9								
Fuji Oil	Sodegaura	1.3	21.6	1.2	26.9	7.4	151.7	0.2	3.6						
Koa Oil	Marifu	1.0	17.1	0.9	21.6	4.8	99.0								
	Osaka			0.5	12.6	3.7	76.5	0.3	7.2						
Cosmo Oil	Yokkaichi			0.8	17.6	6.0	122.4								
	Chiba			1.4	32.9	12.2	251.1								
	Sakai			0.3	7.2	3.7	76.5	0.3	7.2					0.1	1.9
	Sakaide			0.5	12.6	5.5	112.7								
Kyokuto Petr. Ind.	Chiba			1.0	22.5	4.3	88.7								
Kyushu Oil	Oita			1.0	24.3	6.1	126.0								
Mitsubishi Oil	Kawasaki			0.4	9.0	2.1	42.3								
	Mizushima			0.8	18.0	9.1	186.3	0.3	6.8						
Showa Yokkaishi Sekiyu	Yokkaishi			2.3	54.7	11.7	240.8	0.6	15.3			0.4	9.0		
Showa Shell Sekiyu	Kawasaki			0.8	19.4	4.0	82.8					0.2	5.4		
Seibu Oil	Yamaguchi			0.7	15.3	8.4	173.0					0.2	5.1		
Genereal Sekiyu	Sakai			1.3	30.6	6.9	140.8								
Teiseki Topping Plant	Kubiki														
Toho Oil	Owase														
Wakayanan Petr. Ref.	Kainan					0.9	18.0								
Nanasei Sekiyu	Nishihara			0.5	10.8	1.9	39.6								
Okinawa Sekiyu Seisei	Okinawa			0.7	15.3	4.6	93.6								
Total				**4.9**	**83.7**	**30.0**	**699.0**	**212.5**	**4357.3**	**0**	**0**	**0.9**	**21.8**	**0.3**	**7.7**

LUXEMBOURG[16]

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	0	0	0	0	0	0	0
Imports	1.2	1.1	1.7	1.8	2.1	1.8	1.7
Exports	0	0	0	0	0	0	0
Bunkers	0	0	0	0	0	0	0
Net Imports – NI	1.1	1.1	1.7	1.8	2.1	1.8	1.7
Total Supply	1.1	1.1	1.7	1.8	2.1	1.8	1.7
Import Dependence (%)	100	100	100	100	100	100	100
Stocks of Days NI	95	87	68	79	90	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structure

Luxembourg depends on imports for all of its oil requirements. Current energy supply of 3 Mtoe comprises 62% oil, 19% natural gas, 3% solid fuels and 16% other sources.

Since Luxembourg is totally dependent on oil imports, with 70% of stocks held abroad, it is particularly vulnerable to international oil supply disruption.

Excise taxes on gasoline in Luxembourg are relatively low. Accordingly, pump prices are lower than in neighbouring countries, such as Belgium, France, Germany and the Netherlands, which has led to inflated transport fuel sales. One-third of all automotive fuel is sold to non-residents.

In order to ensure security of supply and improvement of the security of aviation kerosene supply, in particular, the government rents storage facilities connected with the Central Europe Pipeline System (CEPS).

In addition, in accordance with IEA rules, sales of jet fuel are no longer considered as exports, so that deliveries of the product automatically entail a stockholding liability.

16. A map of the Benelux countries is on page 192.

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	545	565	3.7
of which unleaded	492	556	13.0
Kerosene and jet fuels	275	330	20.0
Gas/diesel oil	1 090	1 163	6.7
Residual fuel oil	7	3	–57.1
Other	37	46	24.3
Total	**1 954**	**2 107**	**7.8**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999
(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Belgium	0	505	1 036	3	235	35	1 814
Netherlands	0	36	70	0	31	6	143
France	0	0	0	0	59	13	72
Germany	0	14	27	0	0	0	41
Total	**0**	**555**	**1 133**	**3**	**325**	**54**	**2 070**

Source: IEA Quarterly Oil Statistics.

Current government assumptions indicate that oil imports and consumption will decline in coming years due to the substitution of natural gas in the industrial sector and tax harmonisation in the European Union.

Emergency Response Policy and Organisation

Emergency Response Policy

The basic framework of legislation of Luxembourg's emergency measures consists of:

- the Decree of 31st October 1973;
- ratification of IEP Agreement on 16th April 1975;
- the Law of 8th December, 1981 (amended 22nd January, 1991);
- the Law of 22nd September, 1982;
- a Protocol between Belgium and Luxembourg related to supply in case of an emergency on 18th December 1974;

- a Recommendation of the Benelux Ministers Committee related to a common policy in case of a possible or real supply crisis.

In order to ensure sufficient stocks to meet the IEA commitment, the government plans to amend the relevant legal framework, notably with respect to increasing storage capacity of oil products, generally, and stocking of aviation fuel, in particular.

Emergency Organisation

The NESO is established on an informal basis under the authority of the Minister of Economic Affairs. The Ministry of Economics is in charge of the administrative co-ordination, legal regulation and control of stocks, as well as data collection and its transmission to the IEA.

Reflecting the size of the country and pricing system for oil products, there exists a permanent relationship between the Administration and the association of oil importing companies. This relationship can be easily strengthened in emergency situations and industry experts would also be involved in the NESO activities.

Allocation Procedures

Allocation procedures for the IEA emergency sharing system are as follows:

- The NESO will contact companies individually and ask them to provide it with the necessary information;
- Since important stocks are stored at the refineries of their parent companies, it is necessary to arrange joint cargoes with the authorisation of the relevant NESO (Belgium, Germany and the Netherlands);
- Every company participates in allocation procedures in proportion to its market share at the national level.

Emergency Reserves

Policy and Legal Instruments

Under the Laws of 8th December 1981 and 22nd September 1982, legal authority for drawdown of stocks resides with the government. For the moment, there only exist company-held stocks. In the case of co-ordinated stockdraw, a decree would forbid imports of oil products, except for stocks held abroad under bilateral agreements.

Luxembourg has bilateral stockholding agreements with Belgium, France, Germany and the Netherlands. Stocks held in these countries on behalf of Luxembourg companies must be certified by the national authorities or other ministries responsible for emergency reserves at the beginning of each quarter. Notifications are sent to the Ministries of Economic Affairs. On request of the Minister, the authorities of the host country verify the existence and accurate reporting of these stocks.

Stockholding and Maintenance

The Decree of 31st October 1973 defines a compulsory stock level for Luxembourg of 90 days of the previous year's consumption. As a result of tightening up regulations for aviation fuel suppliers, the level of gasoil and kerosene stocks with respect to IEP obligations has improved.

Pump prices include an amount destined to cover the stockholding costs. If companies do not fulfil their obligations, this amount will, in proportion to non-compliance, be demanded back by the Administration.

Operational Aspects of Stockdraw

Drawdown would be organised by means of Ministerial Decrees as a general measure, or by individual notification to the stockholding companies. Deliveries to the consumers would be regulated in co-ordination with the stockholders.

The pricing and releasing of the stocks into the market will be implemented by an *ad hoc* Emergency Committee consisting of government officials, oil company executives and consumer representatives.

Although the government does not have formal drawdown procedures, close consultations with industry representatives (*Groupement Pétrolier Luxembourgeois*) would take place, which would ensure flexible response measures to emergency situations. The Administration does not plan physical tests of drawdown.

Compliance Issues

Importing companies must report their stocks, imports and deliveries every month. The physical stock level can be checked at any time on request of the Minister of Economic Affairs. Since the application of penalties of the relevant laws is too harsh to be accepted, the current legislation is not effective. The government, therefore, plans to amend the existing legislation to be more effective in this regard. Stocks on foreign territory must be certified by the Administration of the respective country concerned.

There is no physical difference between compulsory stocks and commercial stocks. Stocks in excess of the reported compulsory stocks are considered as commercial stocks.

Demand Restraint Measures

Policy and Legal Instruments

The relevant legislation neither fixes a threshold for activating emergency measures nor stipulates a rigid scheme of the different steps. But there are common guidelines at the Benelux level for the implementation of demand restraint measures. The Minister of Economic Affairs can take decisions deemed necessary even prior to activation of the IEA measures.

An information campaign could be started immediately after an *ad hoc* decision. Other light-handed measures such as speed limitation on roads and reduced house heating could be implemented within two days after consultation with Benelux partners.

More severe measures, such as driving bans and reduced deliveries, would have to be co-ordinated within the Benelux, and eventually with the other neighbouring countries as well. In this case, administrative preparations and decisions would take about a week. The timetable from implementation of decisions to full operation would be rather brief and the first volumetric effects would be measurable after two weeks.

The Administration considers that cross-border traffic is still a problem, and that a rationing system might be one way of preventing this problem in a crisis.

There are concrete plans to co-ordinate measures within the Benelux. The Standing Benelux-Commission (*Pétrole-politique de crise*) intends to strengthen co-operation with France and Germany in order to avoid major cross-border problems.

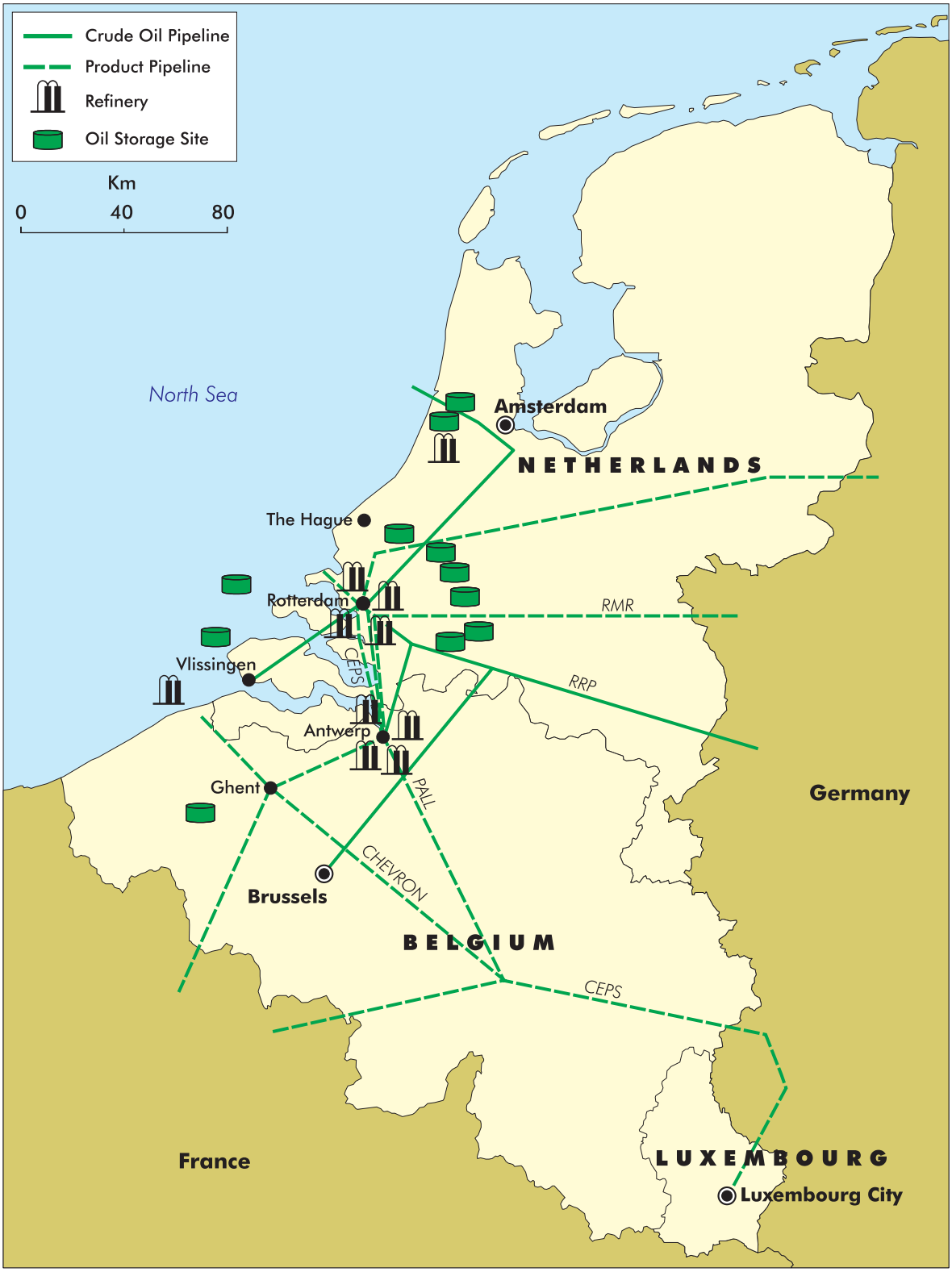
Decision Processes

Although no decision process necessary for programme activation has been tested since the Gulf Crisis, this issue could be discussed in periodic meetings of the Benelux oil emergency question group.

Data Collection

The Supply Office is in charge of collecting and transmitting data in Luxembourg. All 22 oil importers are obliged by the Decree of 31 October 1973 to report all necessary data.

Map of the Benelux



THE NETHERLANDS

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	1.6	4.2	4.1	3.6	2.6	1.7	1.1	0.8
Imports	80.2	78.9	91.1	92.5	99.0	87.0	95.2	100.5
Exports	–42.3	–54.0	–59.8	–59.5	–62.2	–40.8	–43.9	–43.7
Bunkers	–9.3	–8.8	–10.9	–11.3	–12.7	–15.5	–17.7	–20.0
Net Imports – NI	28.6	16.1	20.4	21.7	24.1	30.7	33.7	36.8
Total Supply	30.2	20.3	24.5	25.3	26.7	32.4	34.7	37.6
Import Dependence (%)	94.6	79.5	83.3	85.8	90.1	94.8	97.0	97.8
Stocks – Days of NI	177	303	219	284	187	..	..	..

1. Estimated data.
2. Forecast data for the Netherlands based on scenario assumptions.

Oil Import Dependence and Market Structures

The Netherlands depends on imports for 90% of its oil requirements. Current energy supply of about 74 Mtoe comprises 38% oil, 46% natural gas, 10% solid fuels, 1% nuclear and 5% other sources. Oil is imported mainly from the countries of the former Soviet Union, the United Kingdom, Saudi Arabia, Norway, Iraq and Kuwait, but the Netherlands' large and diverse refining sector imports crude oil from many other sources as well.

Oil accounted for 38% of total primary energy supply (TPES) of the Netherlands in 1999, which is slightly lower than the IEA average, while natural gas met close to half of the Netherlands' energy requirements. This results from the Netherlands' well-established position as a major gas producer. In 1999, supplies to international marine bunkers were 12.7 Mtoe, nearly equivalent to its inland consumption, reflecting the country's major role in maritime transport.

Relative to other countries, LPG fuels a significant part of the Dutch car fleet. The historical factors leading to this development were environmental concerns combined with a relatively abundant supply of LPG from the refining sector. Market penetration was realised by introducing a tax advantage, especially for vehicles with high yearly kilometres travelled.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	4 116	4 148	0.8
of which unleaded	4 102	4 136	0.8
Kerosene and jet fuels	3 302	3 386	2.5
Gas/diesel oil	6 424	6 736	4.9
Residual fuel oil	95	86	–9.5
Other	8 323	9 175	10.2
Total	**22 260**	**23 513**	**5.6**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Former Soviet Union	3 237	191	3 120	5 247	252	375	12 422
United Kingdom	8 412	909	559	382	81	2 057	12 400
Saudi Arabia	11 559	0	0	12	8	64	11 643
Norway	10 633	37	123	41	0	563	11 397
Iraq	8 358	0	0	0	0	0	8 358
Kuwait	5 579	0	0	0	105	1 197	6 881
Other	11 324	4 256	3 530	3 774	916	9 559	33 359
Total	**59 102**	**5 393**	**7 332**	**9 456**	**1 362**	**13 815**	**96 460**

Source: IEA Quarterly Oil Statistics.

The general objective of Dutch energy policy is to provide the Netherlands with adequate supplies of reliable, affordable and clean energy. Policies set by Parliament in the mid-1990s and progressively implemented since aim to achieve a sustainable energy economy by improving energy efficiency by one-third in the next 25 years, and by increasing the share of renewables in primary energy supply, from 1% in 1990 to 10% by 2020. Reflecting these policies, the oil share in TPES is expected to decline from almost 40% at present to one-third in 2010.

At present, Dutch institutes such as CPB (Economics), ECN (Energy), RIVM (Environment), RPD (Physical Planning), and AVV (Transport) are collaborating in a process of making a new set of long-term scenarios as a follow-up to the 'Scanning the Future' scenarios. This new long-term study shows weak growth of oil demand to the year 2010, as compared with the forecasts of the Ministry for Economic Affairs, which show a small decline in oil demand, primarily due to the Ministry's assumption in the growth of renewables.

Dutch oil refineries play an important role in balancing oil product supply/demand in western Europe. The major part of the refinery production is exported. Dutch refineries are among the most modern and technologically advanced in the world, forming the largest refining center in Europe.

The largest export refinery in Europe, Shell at Pernis, was upgraded in the late 1990s. 'Per +' now comprises three large complexes: a hydro cracker, an oil gasification installation and two co-generation power stations, as well as supporting plants. This upgrade gives the Netherlands and Europe as a whole, added flexibility, while being able to meet stringent environmental specifications.

There is a strong trend in the oil industry to improve efficiency in operations. This is reflected in lower industry stocks and a decrease in demand for stockholding capacity. Independent storage companies confronted with this situation are looking for replacement business to avoid the situation of idle capacity.

Emergency Response Policy and Organisation

Emergency Response Policy

In formulating energy policies, the establishment of free and open markets is a fundamental point of departure, though energy security and environmental protection need to be given particular emphasis. Taking account of these issues and the IEA's evaluation of emergency response policies following the Gulf Crisis, the Dutch Administration is in the process of changing its demand restraint measures, making them less subject to complicated national control systems and reflecting the trend towards greater conformity with market principles.

Consistent with the IEA Governing Board Decision of 22nd February, 1995, if an oil crisis were to arise, the Netherlands would expect stockdraw, demand restraint and complementary measures to form the first stage of any international action, with more radical measures to be introduced as and when appropriate.

The specific policy during a crisis or sub-crisis would depend on the extent to which market mechanisms were effective in terms of incremental production, fuel-switching, stocks and demand. The precise mix of the set of measures (stockdraw, demand restraint and complementary measures) would be determined in the light of the circumstances at the time, taking into account the nature and likely duration of the crisis. Also, maintenance of desirable stock levels throughout a disruption by the Central Organisation for Oil Stockolding (COVA) and the industry and limitations on the economic and social effects of a reduction in consumption (induced by market/price effects or by government measures) would play a role in decision-making.

The Netherlands is self-sufficient in natural gas, and is one of the largest net natural gas exporters in the European market. In a crisis, the potential for switching from oil into gas would be one of the potential responses, which would be significant. However, dual-firing capacity in the power sector has diminished in recent years, and households are almost completely connected to the gas grid, so fuel-switching is limited.

Emergency Organisation

Since February, 2000, the Emergency Preparedness Unit of the Division of Energy Markets in the Directorate General for Energy (The Ministry of Economic Affairs) is responsible for the Dutch emergency response preparedness. The Unit of Emergency Preparedness works in close co-operation with the other Units of the Division of Energy Markets and with the management of COVA.

The Minister of Economic Affairs may, according to current policy, establish a State Bureau of Oil Products through a regulation based on the Rationing Act of 1939. The Netherlands' NESO consists of the Unit of Emergency Preparedness augmented by the State Bureau of Oil Products in emergency situations. In tmes of energy crisis, civil servants and industry experts will staff the State Bureau of Oil Products. Industry experts will be seconded to the State Bureau. (These arrangements have been the subject of practical tests.)

In case of an oil crisis, the Minister of Economic Affairs can convene the ICA (*Inter-departementale Commissie Aardolieproblematiek*), which is the Interdepartmental Committee for Oil Crises. Policy co-ordination between the departments will be carried out by this body. Membership would include:

- the Secretary-General of the Ministry of Economic Affairs as Chairman of the ICA;
- the Director-General of Public Order and Safety of the Department of Home Affairs;
- the Head of the National Co-ordination Centre (NCC) for crisis situations;
- the Chairman of the NVC (*Nationaal Voorlichtings Centrum*), the national public information centre; and
- representatives of all the other departments.

Any measure directly related to an oil crisis can be a point of the agenda in the ICA. The ICA advises the Minister of Economic Affairs. The Minister then reports to the Cabinet. After deliberation and agreement in the Cabinet, the Minister of Economic Affairs decides on the set of detailed measures to be implemented.

The most direct relations to other parts of the crisis organisations in the Netherlands are within the department with the Project Team Crisis Management of the Directorate General for Industry and Services. In particular, this project team would co-ordinate the Rationing System. The so-called Contingency Managers Group (*Contingent-beheerders*) links with other departments.

The Netherlands is looking at possibilities to make more use of the crisis management infrastructure existing in the Department of Home Affairs, especially in the area of public relations.

No particular legal authority is required to establish the Netherlands' National Emergency Sharing Organisation (NESO) during an oil emergency. The Emergency Preparedness Unit of the Division of Energy Markets of the Directorate General for Energy will form the core of the NESO. The NESO prepares oil emergency measures for the decision-making of the Minister of Economic Affairs or the Cabinet.

Allocation Procedures

In principle, national fair sharing would only be considered in a crisis situation under the definition in the IEP, but not under sub-crisis conditions. The starting point for national fair sharing is the responsibility of each importing company to ensure sufficient supplies. The Administration considers that fair sharing could only be a supplementary measure to oil industry operations.

The purpose of fair sharing is to ensure that delivery patterns and export flows can be maintained as much as possible. Fair sharing is intended to assist in achieving this by reducing differences in relative company supply positions.

The means to achieve fair sharing are primarily to be found (1) in (re)directing the (expected) national allocation right to companies requiring extra supplies, and (2) in the NESO inducing direct sales between companies in very different supply positions. Finally, and only as a last resort, the Minister would initiate enforced deliveries between companies. Pricing would be left to the market. But, as already mentioned, in the first instance, the Netherlands would seek to allow market mechanisms to resolve temporary disruptions wherever possible.

In case the Netherlands had an allocation obligation, the NESO would use its continuous analysis of the supply positions of the individual companies to assess which companies are relatively over-supplied. Direct discussions between the NESO and these companies are expected to lead to adequate action in the current or next months.

The Dutch IEP Implementation Act enables the Minister to instruct a company to make certain deliveries, either within the Netherlands or abroad. The IEP Implementation Act and the Rationing Act give the Minister of Economic Affairs full powers to enforce allocation transactions.

Emergency Reserves

Policy and Legal Instruments

The Oil Stockholding Act of 21 October 1976, as revised on 1 January 1987 pertains to the maintenance of mandatory stocks of petroleum products. Under the Oil Stockholding Act, the national stockholding obligation is defined as the entire Netherlands obligation to hold stocks, resulting from the Directive of the Council of the European Communities of 20 December 1968 and the Agreement on an International Energy Program. Refiners and importers are required to hold specific minimum levels of stocks related to the amount of oil products they brought into the Dutch market in the foregoing year.

The following are subject to a stockholding obligation:

- Refiners (50 days of their inland sales of the three EU product groups);
- Importers (16 2/3 days of their inland sales of the three EU product groups);
- COVA, which meets the difference between the national stockholding obligation and the aggregate of industry obligations.

The Oil Stockholding Act stipulates the stockholding obligation for refiners and independent importers for three categories of products: motor gasoline and aviation fuel; gas oil, diesel oil, kerosene and jet fuel of the kerosene type (middle distillates); and fuel oil. As a result, nearly all of the petrochemical feedstocks (e.g. LPG, naphtha and most of the gas oil type feedstock) are not covered by the stockholding obligation. This is particularly pertinent in the case of the large automotive LPG consumption, which is not covered by emergency stocks in the same way as other automotive fuels such as gasoline and diesel, and in the case of maritime bunker fuel. The latter is of considerable importance because of the disproportionately high share of the Netherlands in the bunker market. Therefore, the Netherlands might have to cope with some complications in meeting demand in these sectors, especially in the early stages of a disruption.

As a result of the change in the reporting rules and definitions with respect to the intra-European Union movements and exports to third countries, there would be some shift of stockholding obligations from

COVA to companies. Therefore, the Administration has put some interim procedures in place with the relevant companies. While in the past, deliveries to international traders were considered exports; as deliveries from refineries to the customs warehouses, under the Internal Market Rules, these deliveries would be considered to take place in the inland market, which would lead to an added stockholding obligation for the refineries. Furthermore, under the new statistical rules for deliveries between trading companies, the stockholding obligation is at the refinery. Therefore, the Administration is now working on an update of the Oil Stockholding Act to put these new rules in a legal framework.

Stockholding and Maintenance

COVA currently holds about 20% of total compulsory stocks in crude oil in salt caverns in Germany. In accordance with the current Stockholding Act, the Minister of Economic Affairs could also instruct COVA to hold up to a maximum of 20% extra stocks above its minimum obligation level.

Company stockholding in the Netherlands is characterised by high stock levels, as most companies in the Netherlands, due to their international activities, hold more than 90 days of stocks as part of normal operations. Part of these stocks is held for companies with head offices abroad, by bilateral agreement.

Although authority exists to instruct the release of any volume of COVA stocks, it is current policy to release only those stocks held by COVA in excess of IEA obligations. This is currently equivalent to 15% of COVA stocks or about 360 thousand tons crude oil equivalent. The Administration envisages that the stockdraw by COVA would be augmented by voluntary company stockdraw. Mandatory stockdraw of company stocks is not foreseen in the early stage of a crisis.

The current system as worked out in the Oil Stockholding Act will accommodate the rise in the mandatory level of stocks. This will be done partly by the industry and the importing traders and partly by COVA.

COVA has annual operationing expenditures of about $29 per ton or $4 per barrel. The main cost elements are financing (58%) and storage (39%). A dedicated levy on gasoline and some other oil products generates annual proceeds to the amount of the total annual operational costs of the entity. Fiscal authorities collect both the levy and the excise tax.

Depending on the frequency of changes in the relevant environmental regulations, there can and will be extra costs for the extra necessary refreshment of the stocks to meet the new regulations.

Operational Aspects of Stockdraw

The Netherlands makes the IEA distinction between a sub-crisis (Co-ordinated Emergency Response Measures) and an IEP crisis situation. In both cases the emphasis will be put on COVA stockdraw, but stockdraw procedures for the two situations would be different.

In a sub-crisis situation, stockdraw will be implemented as a part of an internationally co-ordinated joint action with several other countries. Stocks that are held by COVA in excess of the stockholding obligation could be made available to the market. Within the framework of international co-ordination, the Minister of Economic Affairs will determine the timing and quantities of the stockdraw. In principle, there will be an open tender procedure for these stocks.

In the event of an IEP-triggered operation, in principle, the Minister will use COVA stocks to implement an IEA stockdraw obligation. Net importers, which are generally the companies with a stockholding obligation, are entitled to purchase equivalent shares of the monthly COVA emergency stockdraw. Sales of the released stocks would follow market conditions. In addition to the IEA stockdraw implementation, COVA stocks could also be made available to companies as a temporary advance on fair sharing. This would only happen in very severe cases, to be determined by the Minister of Economic Affairs. The Minister will decide mandatory drawdown of company stocks, although it is not foreseen in the early stage of a crisis.

The Managing Director of COVA would be solely responsible for reaching a commercial agreement on the transfer price for such stocks with each company, within the framework established by the Minister of Economic Affairs. National Fair Sharing would take place – to the extent necessary – after stockdraw and would be based primarily on a redistribution of national allocation rights.

Crisis stockdraw procedures have been tested as a part of IEA emergency exercises and during the Gulf Crisis. No special separated physical test stockdraw has yet been carried out. However, given the location of most of the COVA stocks in the Rotterdam-Amsterdam area, the Administration envisages that any drawdown decision could be implemented quickly. For COVA crude stocks in the salt caverns at Etzel (Germany), the period between a government stockdraw decision and the physical deliveries of products onto the markets would be about six weeks.

In an energy crisis, government power over oil stocks in bonded areas (e.g. in Euro-poort) is limited to the stocks owned by companies operating in the Netherlands. However, in an extremely severe situation, the government could extend its power to stocks in bonded areas.

Compliance Issues

Under the Oil Stockholding Act, since January 2000, companies report each month on possible changes in the size of their obligations and on their stock levels. The Economic Inspection Service holds regular administrative and physical checks. Under the Oil Stockholding Act, non-complying companies can be – and occasionally have been – fined. No financial support is given to companies with a stockholding obligation.

Stockdraw as an instrument in a sub-crisis situation will primarily take place through COVA. Mandatory stockdraw by companies – a heavy measure – will only be considered in a crisis situation and then be implemented under the strict regime of the Rationing Act of 1939.

The Oil Stockholding Act requires companies to own or fully control certain quantities of stocks; it does not require a physical separation or even an administrative distinction between the various types. The mandatory stocks held by the companies are to varying degrees also operational and commercial stocks.

International Co-operation on Oil Security Issues

Currently, formal bilateral stockholding agreements exist with Belgium, Germany and Luxembourg. There are also informal bilateral agreements with the United Kingdom, Ireland, Denmark, France and Italy. In the agreements, guarantees are given for the accessibility of stocks under contracts, but there are

some restrictions made for "*force majeure*" situations. At present for the Netherlands, only COVA holds stocks abroad, which are covered by the stockholding obligations described above.

Under the Stockholding Act of 1976, companies are required to report quarterly to the Ministry of Economic Affairs on possible changes in the size of their stock obligations and in their actual stock levels, with cross-checks made against monthly oil questionnaires provided by companies to the Central Bureau of Statistics (CBS). By the end of the month, the figures of available stocks are reported by the companies.

The Economic Inspection Service of the Ministry of Economic Affairs carries out regular administrative and physical checks at random or at the request of the Ministry. Under the 1976 Law, companies failing to comply with the regulations can be fined. In practice, it has never been necessary to penalise an oil company, but one importing trader has been punished. There have also been some cases (in the beginning of mandatory stockholding) of an official warning to companies not fulfilling their obligations. After such warnings, they fulfilled their obligations.

Demand Restraint Measures

Policy and Legal Instruments

Most of the demand restraint measures are based on the Rationing Act of 1939. The procedures for activating the Rationing Act have been simplified and the IEP Implementation Act makes approval by Parliament unnecessary. As a consequence of the 1984 Governing Board Co-ordinated Emergency Response Measures Decision, the IEP Implementation Act was amended in order to create the possibility to take demand restraint measures in sub-crisis situations.

The Netherlands' demand restraint programme covers most of the inland oil consumption and is divided in the following three steps:

1. The first step is based on voluntary measures and exhortations to the public and industry to reduce oil consumption, followed by a nation-wide intensive information campaign relying on the civic responsibility of the population. At the same time, the data information systems and the core of the emergency organisation become operational and consultations take place with the oil industry and other bodies concerned in order to evaluate the seriousness of the emergency and the results of the measures taken.
2. To the extent that the voluntary measures prove to be inadequate, the Dutch authorities can proceed to compulsory measures. These would be used with the dual intention of increasing supply and further reducing consumption. The NESO will aim at reducing the private and recreational use of products while keeping basic economic activities untouched as much and as long as possible. The compulsory measures would mainly consist of driving bans, reductions and/or stricter enforcement of the speed limits, a ban on filling containers and a reduction of recreational use of gasoline and middle distillates. A "Decision on Speed Limits in Case of an Oil Crisis" in an updated version of the 1994 Road Traffic Act will be sent to Parliament during 2000.

   In the past these measures had quite extensive exceptions, especially as concerns the driving ban. The administrative process of these measures was rather complex and required inspection and work from police forces, for which they were not equipped.

3. If further action is required, a rationing system for motor fuels and a purchase license system for most of the other products can be implemented. The purchase license system operates through delivery restrictions. It can reduce consumption to various degrees, even up to very high percentages. During 2000, a discussion in the parliament on emergency policy has been taking place. It may result in revision to the demand restraint policy.

Procedures and Monitoring

On the basis of a proposal of the Minister of Economic Affairs, the Cabinet would take decisions about implementation of demand restraint measures. The Minister would base his proposal on the advice of the Interdepartmental Committee on Oil Problems (ICA), in which all government departments are represented. The Unit of Emergency Preparedness of the Division of Energy Markets of the Ministry of Economic Affairs would prepare draft recommendations of the Committee.

Normally, the preparation of a Cabinet's decision in this way takes about two to three weeks or shorter, if an emergency so requires.

Other Response Measures

As Dutch oil fields normally operate at full capacity, there is little potential for increasing indigenous production in an emergency. Market forces (price-induced optimisation of production profiles during the lifetime of the fields) will induce oil producers to increase production during an emergency.

Data Collection

The basic oil statistics for the IEA are gathered by the Dutch Central Bureau for Statistics (CBS). All the final figures are checked for consistency, including harmonisation with the figures of the Dutch Foreign Trade statistics.

During a crisis, data collected for the IEA emergency questionnaires would be processed by the Dutch NESO at the Ministry of Economic Affairs. In principle, all the companies active in the Dutch oil market, (i.e. refineries, importers, producers, trading companies, wholesalers, and distributors) are compelled by law to report all necessary data.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Esso	Rotterdam	9.10	183.82	4.50	83.25	2.31	44.35			2.10	40.32				
KPC	Europort	3.81	76.96	2.13	39.41	0.50	8.89					0.49	9.10	0.40	6.85
NRC (BP/Texaco)	Rotterdam/Pernis	20.52	414.52	4.89	90.39	4.28	79.89	3.22	61.79					2.13	36.21
Shell	Pernis	21.00	424.20	8.00	148.00	6.81	127.78	2.60	49.92	2.60	49.92			2.70	45.90
Smid & Hollander	Amsterdam					0.00	0.00								
Total/Dow	Vlissingen	7.35	148.51	3.13	57.91	2.79	53.54			2.54	48.67				
Total		**61.78**	**1248.01**	**22.65**	**418.95**	**21.97**	**404.21**	**5.82**	**111.71**	**7.24**	**138.91**	**0.49**	**9.10**	**5.23**	**89.0**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Esso	Rotterdam	2.20	37.40	1.20	27.96	3.40	69.70								
KPC	Europort			0.97	22.60	1.55	31.78		0.00		0.00	0.25	5.95		
NRC (BP/Texaco)	Rotterdam/Pernis			1.22	28.40	4.10	84.03	0.33	7.92		0.00		0.00	0.09	2.26
Shell	Pernis			1.80	41.94			0.30	7.20						
Smid & Hollander	Amsterdam														
Total/Dow	Vlissingen			1.08	25.23	1.41	28.93								
Total		**2.20**	**37.4**	**6.27**	**146.14**	**10.46**	**243.72**	**0.63**	**15.12**	**0.00**	**0.00**	**0.25**	**5.95**	**0.09**	**2.26**

Map of New Zealand



NEW ZEALAND

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	0.4	1.4	2.1	1.9	2.3	2.2	2.2	2.2
Imports	4.3	3.4	4.0	5.2	6.4	4.5	6.1	6.8
Exports	0.0	–0.4	–1.5	–1.1	–1.7	0.0	0.0	0.0
Bunkers	–0.4	–0.2	–0.3	–0.3	–0.3	–0.4	–0.4	–0.4
Net Imports – NI	4.0	2.8	2.2	3.7	4.4	4.1	5.7	6.4
Total Supply	4.3	4.2	4.3	5.7	6.7	6.3	7.9	8.6
Import Dependence (%)	91.4	66.4	51.9	66.9	65.6	65.6	72.7	74.9
Stocks – Days of NI	109	122	165	149	111	..	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Oil and gas currently dominate New Zealand's primary energy requirements. New Zealand depends on imports for 66% of its oil requirements. Current energy supply of about 17.5 Mtoe comprises 37% oil, 27% natural gas, 6% solid fuels, 12% hydro, 14% geothermal and 4% other sources, mainly wind and wood. Oil is imported mainly from Australia, Saudi Arabia, Malaysia, Oman, Argentina and Qatar.

New Zealand is well-endowed with energy resources and is completely self-sufficient in all but liquid fuels. New Zealand is currently about 90% self-sufficient in its primary energy and 45% self-sufficient in liquid fuels.

The New Zealand economy consumes about 5.5 million metric tons per annum of refined petroleum products. According to IEA statistics, consumption is over 80% transport fuels (of which 41% are gasolines, 15% aviation fuels and 44% diesel). Geographically, demand is spread over quite a large isolated area with a long logistics chain that has a strong influence on distribution costs. The geography and low population density of New Zealand result in significant movement of petroleum products around the country by sea. It may take up to five months from the time crude oil is ordered to when it is distributed at the retail level as a refined product.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	2 183	2 152	–1.4
of which unleaded	2 164	2 140	–1.1
Kerosene and jet fuels	921	928	0.8
Gas/diesel oil	1 749	1 740	–0.5
Residual fuel oil	214	218	1.9
Other	397	453	14.1
Total	**5 464**	**5 491**	**0.5**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Australia	545	754	82	0	113	47	1 541
Saudi Arabia	907	37	10	0	2	0	956
Malaysia	556	0	0	0	0	0	556
Oman	534	0	0	0	0	0	534
Other Near/Mid-East	432	0	0	0	0	0	432
Argentina	329	0	0	0	0	0	329
Other	1 332	103	144	0	0	114	1 693
Total	**4 635**	**894**	**236**	**0**	**115**	**161**	**6 041**

Source: IEA Quarterly Oil Statistics.

Motor gasoline growth during the second half of the 1980s was boosted by the decline in compressed natural gas usage in vehicles when the government eliminated financial incentives for using CNG. During the 1990s, motor gasoline growth moderated as the share of diesel-powered new registrations increased. Domestic demand for diesel grew by over 5% per annum between 1985 and 1995. During the 1990s, diesel demand grew by nearly 9% per annum due to stronger economic growth and the lower level of taxation on diesel. Domestic oil product consumption is concentrated in the transport sector. Motor gasoline is practically all used in domestic transport, while 67% of diesel (excluding international marine fuel sales) is consumed in the transport sector.

Production of crude oil and condensate peaked in the 1990s, declined slightly, and is on the rise again. The recent rise is the result of newly discovered oil fields. A significant proportion of indigenous production is exported, while oil companies import crude oil mainly from Saudi Arabia, the United Arab Emirates, Malaysia and Australia. There was a peak at the beginning of the 1990s, with a declining trend since that time. This trend in self-sufficiency is largely due to a decline in the use of natural gas as a feedstock for the production of synthetic gasoline (discussed in more detail below).

In the late 1980s, as a result of the expansion of the Marsden Point refinery and the construction of the synthetic fuels plant at Motunui, New Zealand was briefly a net exporter of petroleum products. Since

then, New Zealand has again become a significant and growing net importer of petroleum products, mainly motor gasoline.

Oil reserves are also dominated by the Maui field, which contain around 70% of New Zealand's reserves. The Kupe field contains about 12%, Kapuni around 5%, McKee around 7%, and the remaining fields about 6%.

New Zealand's production of crude oil and condensate was about 2.3 Mtoe in the year ending December 1999. This production is dominated by the Maui field, supplying about 69% of the total, with 8% from the Kapuni field, 5% from the Waihapa field, 13% from the McKee field, 2% from the Ngatoro, and 4% from the remaining fields.

In 1999, New Zealand imported 6.4 Mtoe of crude oil and oil products, of which 90% was crude oil. The New Zealand Refining Company (NZRC) operates the only refinery in the country at Marsden Point, around 150 km North of Auckland, the country's largest population centre. The 95 000 b/d refinery processes imported crude oil and locally produced crude and condensate. The refinery currently supplies around 75% of total New Zealand demand. About a third of the refined product from the NZRC refinery is transported by a company-owned pipeline to Wiri in South Auckland; the remainder is shipped by coastal tankers to the rest of the country. A small amount of refined product is exported.

Coastal Tankers Ltd. was established by the major oil companies to ship petroleum products from the Marsden Point refinery (and the Methanex synthetic gasoline plant at Motunui) to terminals at ports located mainly on the eastern coasts of the North and South Islands. Coastal Tankers Ltd. moves 3.5 to 4 million tonnes of refined products, crude oil and condensate per year between New Zealand ports. It also has shipped crude oil and condensate to Australian refineries and backhauled products to New Zealand ports. The major product import ports are Tauranga (Mt. Maunganui), Wellington and Lyttelton (Christchurch).

Emergency Response Policy and Organisation

Emergency Response Policy

The core members of the New Zealand National Emergency Sharing Organisation (NESO) are the Ministry of Economic Development (Resources and Networks Branch), formerly the Ministry of Commerce, and the major oil operators in the country. The composition of the New Zealand NESO has recently been changed, in part in recognition of recent changes in the downstream petroleum product market (the addition of Fletcher Challenge Energy Ltd.). Also, two upstream operators, New Zealand Oil and Gas Ltd. and Shell Todd Oil Services Ltd. have been added. Other government agencies, user groups, etc. would be invited to participate as required, either in the NESO itself or as part of any subcommittee set up to deal with particular emergency response activities.

The New Zealand NESO is convened and activated only when required, i.e. for actual or prospective crises, and for allocation systems or other tests. Accordingly, the NESO is not closely tied into other crisis management activities, such as Civil Defence emergency plans, or the oil spill management capability maintained by the Maritime Safety Authority.

The principle acts and regulations pertaining to oil supply crisis management are:

- the International Energy Agreement Act of 1976;
- the Petroleum Demand Restraint Act of 1981; and
- the Petroleum Demand Restraint (Regulations Validation and Revocation) Act of 1981.

Under the IEA Act of 1976, the Governor-General may proclaim a petroleum emergency, and during a petroleum emergency and after appropriate consultations by the Minister with interested persons and organisations, regulate to restrain demand for petroleum and ensure supplies of petroleum. The Minister is also authorised to give directions to persons producing, trading or otherwise using petroleum. The Minister may give directions in order to maintain supplies of petroleum in New Zealand at a level required by the IEP. The Minister may also request submission of any necessary information.

Emergency Organisation

In the event of an oil supply emergency situation, the Minister is normally provided with advice by the Resources and Networks Branch of the Ministry of Economic Development. If major action is required by the government, it is likely that the Minister would seek the agreement of his Cabinet colleagues. The Minister would then request the Ministry to propose a course of action for the Minister to recommend to the Cabinet. If necessary, this could all be done within a period of a few days.

There exists an Officials Committee on Energy Policy (OCEP) chaired by the Department of the Prime Minister and Cabinet which has as members the Ministry of Economic Development, the Treasury, and the Ministry for the Environment. This committee has focused on electricity sector reform in recent years, although occasionally other issues have come before it.

Whether an item should be handled through the committee depends on the gravity of the issue and the Prime Minister's wishes. The official response to the Gulf Crisis was handled entirely through the (then) Ministry of Energy and the Ministry of Economic Development, although the Cabinet was kept informed; it is likely that if a serious international oil supply crisis developed, the OCEP would become involved. OCEP prepares advice for a Minister (or Ministers) to recommend to the Cabinet.

If implementation of actions is required by the government in terms of the activation of demand restraint measures, drawdown of stocks or surge production, the Ministry of Economic Development would arrange this, either through gaining the co-operation of the industry or by invoking regulations, as appropriate. Co-operation of the industry would be obtained by initially contacting the people who are members of the NESO. If IEA Co-ordinated Emergency Response Measures were required, then the NESO would be formally convened.

Allocation Procedures

New Zealand does not have specific guidelines on national fair sharing. This would be handled in consultation with the major operators in the oil market. An Oil Stocks and Supply Advisory Committee could be established for this purpose, if necessary. The government is confident it could meet its IEA obligations through this mechanism, as it has always worked closely with the oil industry in emergency situations. The legal authority (through the IEA Act of 1976) provides a back-up. In the first instance,

resort to legal authority would not be considered. Only in the unlikely event of a breakdown in industry co-operation or a very severe and prolonged crisis would it be necessary to invoke the available legislation.

Under the provisions of the PDR Act, the Minister has the power to regulate and control the acquisition, supply, distribution and marketing of oil and oil products.

Emergency Reserves

Policy and Legal Instruments

The only crude oil and product stocks held in New Zealand are company stocks. The legal powers existing for the drawdown of these stocks reside within the provisions of the PDR Act.

At the operational level, the Resources and Networks Branch of the Ministry of Economic Development is responsible for co-ordinating any emergency response measures required in sub-crisis and crisis situations. It is the expectation that a stockdraw would be achieved on a mutually agreed basis between the government and the major stockholders (as happened during the 1990/1991 Gulf Crisis). Operational aspects would be handled by the stockholders. The maximum stockdraw envisaged is 10% of stocks during a three-month period. Industry stocks would be released through normal commercial channels with prevailing market prices.

Stockholding and Maintenance

Under the International Energy Agreement Act of 1976, the Minister has the authority to order the maintenance of reserve supplies of petroleum at a level required by the IEP. However, the government does not place legal stockholding obligations on industry. New Zealand meets its IEA commitment with a generous margin. All reserve stocks are commercially held stocks. Detailed data on the purchasing, storing and logistics, and management of these stocks are not collected by the government.

New Zealand will become increasingly dependent on imported oil as the Maui and other fields deplete, especially if there are no significant new oil and gas discoveries and demand continues to increase, as forecast. Projections indicate that this will occur in the first two decades of the next century. New Zealand is also becoming increasingly reliant on specific product imports, notably gasoline. Any disruption in product supply could produce shortages of specific products.

The government has no current intention of changing its stockholding policy. However, the policy is kept under review in the light of changing circumstances. Any fall in stockholding capacity would be handled on an *ad hoc* basis.

Operational Aspects of Stockdraw

Industry stocks would be released through normal commercial channels at prevailing market prices. As outlined above, this would be done through a process of consultation and co-operation between

the government and the oil industry. Lead times would vary from almost nil for locally held stocks (terminal/port stocks) to about two weeks for stocks at the refinery.

Normal supply-demand market mechanisms will signal the occurrence of a supply shortage through a price rise. It is not envisaged that any form of price control would be applied. The major mechanism for the release of information on this aspect of emergency response would be through media releases.

Compliance Issues

There are no compulsory stock levels beyond what is implied by IEA commitments. To ensure that New Zealand maintains sufficient stock levels, the government monitors industry activity on a monthly basis, and would consider what action should be appropriate if and when stock levels fell close to the level designated by the IEA.

Under an emergency situation, reporting procedures would be included in the procedures agreed voluntarily or incorporated in the applicable regulations. There is also the regular ongoing monitoring which occurs through the return of monthly questionnaires to the IEA containing oil industry statistics.

Demand Restraint Measures

Policy and Legal Instruments

On the basis of experience in previous actual oil crises and review of the wide range of measures which are potentially available, New Zealand has determined that market mechanisms are the most cost-effective, first order response to a supply shortage. These mechanisms can be supplemented with direct intervention, as required. The most immediate interventions would be light-handed measures such as publicity campaigns, speed limit restrictions, etc. Heavy-handed interventions such as increased fuel taxes, car-less days, petrol-less weekends and allocation are regarded as instruments of last resort.

Procedures and Monitoring

See Table on page 212.

Evaluation of Measures

No recent studies have been undertaken, largely because the Administration believes there is no evidence to indicate that a re-evaluation of past studies would yield significantly different results. The estimated savings figures shown in the following table are based on experience, and partly based on the following factors:

- Price elasticities are based on work undertaken in New Zealand in the 1970s and 1980s, and take into account overseas studies. These figures have been recently re-evaluated by the Ministry of Commerce.

- Speed limit savings were examined in some detail by the Ministry of Transport at the time of the Gulf Crisis.
- Publicity campaign savings were investigated by the Ministry of Commerce during the Gulf Crisis.

Other Response Measures

Within the constraints of responsible field management, operators make the decisions concerning extraction rates. The depletion rates are noted in licenses/permits and government permission may be required for substantial production increases. Any production increase to mitigate a supply shortage would be a matter for consideration by the field operator, probably with discussion and co-operation by the government.

During the 1990/91 Gulf Crisis, discussions between the government and field operators were held with a view to increasing local production rates, and surge production made a significant contribution to New Zealand's response.

An oil supply disruption could be complicated significantly by a simultaneous disruption in indigenous natural gas supply. A disruption in imported supplies will cause stockdraw initially and would, under otherwise normal circumstances, encourage Methanex to consider producing synfuel for the local market if petrol prices rose significantly. Without any gas feedstock, this contingency could not occur. Also, as the Maui field supplies significant quantities of condensate, any disruption between the platform and the separation facilities would halt this supply of condensate as feedstock for refining.

New Zealand's fuel-switching capabilities are limited. Over 80% of electricity is generated by renewables (mainly hydro), with oil generation virtually non-existent and gas supplying around 13% currently. The 1000 MW Huntly power station, which currently runs predominantly on gas, could be converted in a crisis situation to run entirely on coal. This would release some gas for use as feedstock for synfuel production or conceivably for use directly as a motor vehicle fuel, making allowance for conversion of vehicles and re-establishment of infrastructure.

There is no legislation specifically designed to enforce fuel-switching, but the provisions of the PDR Act are sufficiently wide to allow the Minister to regulate in this area, if necessary. It is not envisaged that regulations regarding fuel-switching would ever be invoked however, as market mechanisms would ensure fuel-switching through the price mechanism.

Data Collection

Data are collected monthly by the Ministry and entered into the Ministry's Powerhouse Database. The Ministry also collects data for IEA emergency questionnaires. Full coverage of the domestic oil market is achieved. Information is sent to the IEA via the Internet.

Summary of Response Measures

Measure	Activity targeted	Estimated saving	Lead time[1]	Cost	Experience	Comments
Price mechanism	Demand	Will depend on price[2]	Immediate	–	1990	
Low cost publicity campaign	Road transport (petrol)	0.5%	Immediate	–	1973, 1979, 1990	
Strong publicity campaign	Road transport	1.0%	7 – 30 days	$0.5 million[6]	1973, 1979	
Stockdraw	Crude oil and products	10% max for 3 months[3]	2 weeks	–	1990	Voluntary or Ministerial directive[4]
Increased fuel taxation	Petroleum fuels	Will depend on tax level[5]	2 weeks	–		Amend tax legislation
Increased policing of speed limits	Road transport	0.25%	Immediate	$1 million (promotion)	1973. 1979	
Reduced open-road speed limits	Road transport	0.35%	7 days	$1.25 million (promotion and signs)	1973	Amend regulations
Bulk user allocation restrictions	Petroleum products	10% max	7 – 14 days	$0.5 million (admin)	1973. 1979	Voluntary/Regulations under PDR Act
Retailer allocation restrictions		10% max	14 days	$100 000 (publicity)	None	Regulations under PDR Act.

Notes:

1. The time required to make a decision would vary from nil for item 1 (full price pass-through) to 2 weeks if new or amended regulations were required.
2. Analysis of information available to-date indicates a price elasticity of demand for petrol conservatively of 0.05. A 50% price increase would therefore result in a reduction in consumption of 2.5%.
3. This would reduce stocks, which are usually over 100 days of normal consumption, by 10 days.
4. A Ministerial directive, together with regulations if required, could be made under existing legislation (PDR Act).
5. Based on the price elasticity of demand for petrol, a tax increase of 50c/litre would raise the price around 50% and would reduce consumption 2.5%.
6. 1 million NZD = US$ 445 256.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
NZRC	Whangerei	5.01	101.20	2.46	45.51	1.70	32.73			1.55	29.76				

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
NZRC	Whangerei			1.15	26.79	2.61	53.50								

Map of Norway



NORWAY

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	25.0	39.5	84.4	142.3	153.4	..	..
Imports	8.0	4.2	4.5	4.7	5.4	..	..
Exports	–23.1	–35.3	–78.0	–137.8	–149.7	..	..
Bunkers	–0.3	–0.3	–0.4	–0.7	–0.9	..	..
Net Imports – NI	–15.4	–31.4	–73.9	–133.8	–145.2	..	..
Total Supply	9.6	8.1	10.4	8.5	8.2	..	..
Import Dependence (%)	0	0	0	0	0	..	..
Stock – Days of NI	0	0	0	0	0	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structure

Norway produces sufficient oil for all of its requirements and exports 98% of its production. Current energy supply of 25 Mtoe comprises 34% oil, 17% natural gas, 4% solid fuels and 45% other sources. A small amount of oil is imported mainly from the United Kingdom, Sweden and Denmark.

In 1999 Norway was the third largest oil producer in the OECD after the United States and Mexico and the largest oil exporter in the OECD, and was ranked seventh in production and second as an exporter in the world. The following chart is the latest estimate of Norwegian oil production by the Ministry of Petroleum and Energy (MPE). It should be noted that the oil production forecast in the Norwegian Continental Shelf towards the year of 2006 involves considerable uncertainties.

According to the estimates of the MPE, total reserves of the Norwegian Continental Shelf amount to 11.1 billion tons of oil equivalent, with uncertainty ranging from 8.6 to 13.9 billion toe. Petroleum resources corresponding to 8.0 billion toe have been discovered on the Shelf, including the potential for enhanced oil recovery and resources already produced. The predominant part of discovered resources are located in the North Sea. Total hydrocarbon production on the Norwegian Continental Shelf was 197.4 Mtoe, out of which production of crude and NGL accounted for 150.4 Mtoe (3.1 mb/d) in 1999. Some 141 Mtoe (2.9 mb/d) were exported.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	1 682	1 696	0.8
of which unleaded	1 682	1 695	0.8
Kerosene and jet fuels	741	870	17.4
Gas/diesel oil	3 716	3 892	4.7
Residual fuel oil	364	316	–13.2
Other	2 041	1 959	–4.0
Total	**8 544**	**8 733**	**2.2**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

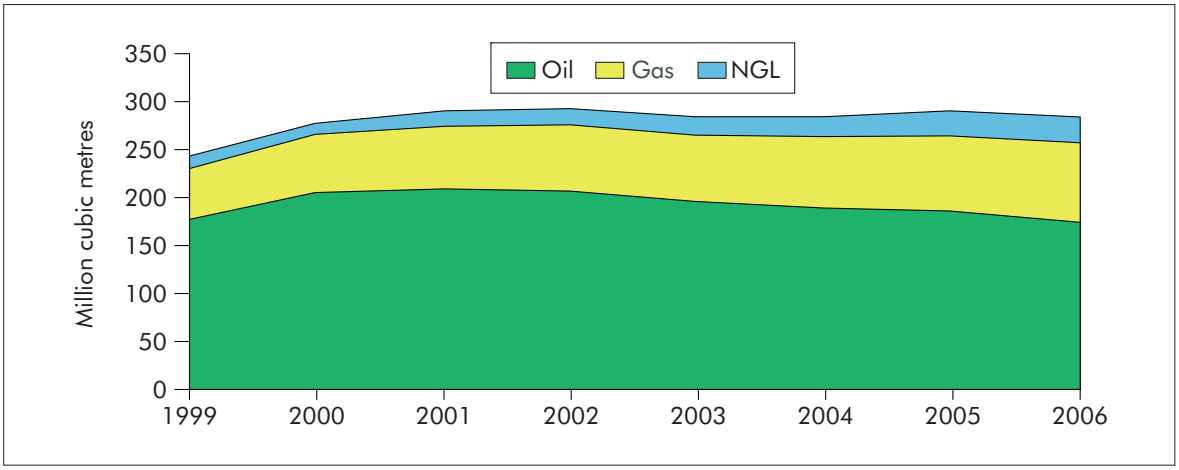
Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
United Kingdom	1 333	34	2	478	18	281	2 146
Sweden	0	232	250	138	25	261	906
Denmark	563	16	37	112	111	11	850
Former Soviet Union	189	11	71	16	24	7	318
Poland	0	0	7	217	0	0	224
Germany	0	27	5	142	2	20	196
Other	0	20	20	60	94	607	801
Total	**2 085**	**340**	**392**	**1 163**	**274**	**1 187**	**5 441**

Source: IEA Quarterly Oil Statistics.

The Norwegian refinery sector has considerable flexibility to adapt to available supplies. Relaxation of product specifications might in theory be a possibility, but a very hypothetical one and subject to approvals by several ministries. Generally, such measures (e.g. increase in maximum lead and sulphur contents) are not assumed to have a large impact on product supply, but could make it easier to find product suppliers on the international market. According to the Norwegian Petroleum Institute, total refinery production was 13.05 Mt in 1998 and 14.31 Mt in 1999, while total capacity was 23.5 Mt (primary distillation, upgrading capacity included). Domestic consumption (non-energy products not included) constituted 8.34 Mt in 1998 and 8.06 Mt in 1999. Imports of products made 2.1 Mt 1998 and 2.4 Mt in 1999. Exports of products in 1998 were 10.8 Mt, and 10.9 thousand tons in 1999.

The petroleum sector's share of GDP was 16% or so in 1996 and 1997, fell to some 12% in 1999, and has risen again in 2000 with the rebound of prices. The export value of petroleum, including products, has represented about 40% of total Norwegian exports value in recent years. Norway's oil trade is predominantly within the OECD region, but lately cargoes have also moved into the non-OECD, especially Asia Pacific region. As a consumer, excluding the energy sector and ships engaged in foreign trade, about one-third of Norway's total primary energy supply is oil, out of which three quarters is consumed within the transport sector.

Production forecast for petroleum, 1999-2006



Source: Norwegian Petroleum Directorate.

Emergency Response Policy and Organisation

Emergency Response Policy

Norway as a crude oil producer and significant net oil exporter has a particular position within the IEA and the IEP based on the Agreement concluded between the IEA and the government in February 1975. The Norwegian government has the right to decide whether and how it will participate in the IEA Emergency Response Programme. However, in a given emergency situation, the views of the partners in the IEA and IEA decisions will weigh heavily in Norwegian national policy considerations and decisions. Procedures for Norwegian participation in IEA response measures were further developed in connection with the Contingency Plan during the Gulf Crisis, IEA emergency response exercises of recent years and the IEA Y2K Response Plan.

Emergency Organisation

The composition of the Norwegian NESO, in case of a peacetime oil supply crisis, is as follows:

- The Ministry of Petroleum and Energy;
- The Norwegian Petroleum Institute, including committees for National Fair Sharing and Allocation to dealers and consumers;
- The Directorate of Civil Defence and Emergency Planning;
- Rationing units at regional and local levels.

The Oil Contingency Division in the Ministry of Petroleum and Energy (the MPE) is the core of the NESO, which is responsible for liaison with the IEA and its Standing Group on Emergency Questions. In order to assist the Ministry in its emergency preparations and handling of oil crises in both peacetime and wartime, the Oil Emergency Board was established in December 1982. It is made up of one high-ranking representative and his deputy, both from ministries and institutions involved in oil emergency

preparedness. The Board has a counselling function for the MPE. Since the Norwegian authorities have close contact with the oil industry, the Administration does not foresee any difficulties regarding its planning and management in a crisis. At regional and local administrative levels (county and municipality), there are units which will take part in the implementation of restrictive measures and rationing in a crisis. The establishment and operation of the NESO are authorised by the Act of Supply and Contingency Measures of 1956, amended in 1975. Introductory training courses in oil emergency preparedness are regularly carried out for personnel at regional and local levels.

Allocation Procedures

Given the government's right to decide whether and how they will participate in the IEA sharing system, a Cabinet decision is necessary as the first step. In the event that Norwegian participation, wholly or partially, is decided, the close contact between Norwegian authorities and the oil companies will make for voluntary participation in the international reallocation process. The Administration also considers that increasing prices might promote such participation.

Emergency Reserves

The status as a net exporter, together with the Agreement, means that Norway does not have any peacetime stockholding commitments. Nor does the Administration have a legal basis to require oil companies to either procure and stock oil or instruct physical release of company stocks in a peacetime supply crisis. The Norwegian Continental Shelf's production is expected to provide sufficient emergency stocks to meet national needs in a peacetime emergency. However, Norway has certain amounts of government-owned stocks of oil products, which in principle could be utilised as a crisis management measure in situations ranging from disturbances caused by uncertainties in the oil market up to an emergency/war situation in Norway. In such cases, MPE volumes would be utilised by the civilian part of society according to strict priorities reflected in the detailed Norwegian rationing system. Norwegian government-owned stocks are not counted in the IEA stock calculation.

Policy and Legal Instruments

The basic legal framework in an oil supply disruption is the Supply and Contingency Measures Act. In accordance with the Act, Norwegian authorities are only authorised to require oil companies to procure, stockhold and draw industry stocks as part of Norway's military defence preparedness, that is, in an emergency prior to war or in a war situation. On the basis of the experience during the Gulf Crisis, the Administration does not foresee any problems in the event that a minor "voluntary" stockdraw in company stocks should take place.

Stockholding and Maintenance

According to the latest available estimates, operational and maintenance costs for storage facilities operated by oil companies are about NOK 55 000 per thousand tons per year on average. Environmental

regulations will impose increased costs on administrations if it is a policy that administrations, not the oil companies (i.e. the consumers), should pay for carrying out such improvements as desulphurization of auto diesel and reduction of maximum contents of benzene in mogas.

Operational Aspects of Stockdraw

In the event that the government decides on stockdraw as a Norwegian response measure, the oil companies have to release onto the market the decided quantity of governmental stocks in accordance with agreements with the MPE. Implementation of such stockdraw is assumed to be fairly simple because a considerable part of emergency stocks is held by the industry on behalf of the government. The quantities in question will be sold and delivered onto the market through the usual commercial procedures.

Compliance Issues

The part of the emergency stockholding included in industry stocks is regulated by detailed agreements between the Norwegian Administration and oil companies. The companies are obliged to keep the emergency stock levels at 100%; otherwise they will be penalised by fines. According to the agreements, the Administration receives detailed reports on emergency and commercial stocks once a month. Since all information available is handled by a computer programme, unauthorised company drawdown of the emergency stocks is easily exposed. In addition, the Administration has hired an independent firm to implement physical controls of stocks several times a year on its behalf.

Demand Restraint Measures

Policy and Legal Instruments

In accordance with the Act on Supply and Contingency Measures, the MPE established a set of regulations for a comprehensive demand restraint programme for oil products in 1983. The demand restraint programme consists of three phases: saving campaigns (based on persuasion), restrictions (both light- and heavy-handed) and rationing. If participation is decided as a part of an IEA emergency response measure, the Norwegian authorities consider it appropriate to implement saving campaigns in combination with stockdraw, rather than restrictions and rationing.

The government's right to decide whether and how to participate in the IEP response measures and the CERM presupposes a governmental decision as a basis for activation of demand restraint or other emergency response measures in a situation below the 7% threshold as well as one above it. On the whole, the formal procedures for IEA response measures will be identical, independent of the nature and magnitude of the crisis situation.

Procedures and Monitoring

Demand restraint measures consist of the following three parts:

Saving campaigns

Saving campaigns are organised as an information campaign through the mass media. The aim of this stage is a consumption reduction of about 4-5%. Fuel-switching is regarded as an integral part of demand restraint in Norway. The Administration considers that a saving campaign would be wholly dependent on moral persuasion of consumers. It would therefore be tailored to the actual situation. Furthermore, there will always be an element of uncertainty attached to calculating the effects of measures based on this approach.

Restrictions

These consist of two principal phases: limitation of fuel consumption by implementing restrictions on sales of fuel for motor vehicles and recreation craft and on their use, and limitation of the amount of oil available for consumption by regulations on deliveries from oil companies to dealers and large consumers. A national committee within the NESO, including representatives from Reporting Companies (RCs), RC Affiliates and the Secretary General of the NP, will be responsible for carrying out these measures.

If restrictions on fuel deliveries were to be introduced, the oil companies would not be allowed to deliver more oil to retailers and customers than a certain calculated share of the so-called "basic delivery", which is the amount of oil products delivered during the last calendar year. The share of delivery is calculated on the basis of its normal distribution over the year and the reduction decided on. The share has to cover three months of consumption, and the companies have to divide the share into monthly quotas before delivering to dealers. Implementation of restrictions aims at reducing total consumption by about 15% on an average and for some products as much as 20%.

Rationing

Rationing by coupons is regarded as a last resort measure and would be implemented only on the basis of the following criteria:

- the oil supply shortage is expected to last a minimum of 6 months;
- there has been a previous period of restrictions for 3 to 4 months;
- consumption must be cut by 20% or more on average.

The first two phases of the programme, savings campaigns and restrictions, can be operational within a relatively short time. Implementation of rationing will only be considered when other response measures have been in effect for 3 to 4 months. At regional and local levels, introductory courses in rationing preparedness are regularly carried out and tested for units which will take part in the implementation of restrictions and rationing measures in crises.

Price controls could be established under the Price Act of 26 June 1953. There are no price control procedures and Norway does not have any plans to establish any. During the Gulf Crisis, the Administration considered that price controls could be quickly established under the Act.

Decision Process

The imposition of demand restraint measures will be decided at Cabinet level. The minister of the MPE can adopt any formal demand restraint measures after a Royal Decree has been passed via the Cabinet.

The decision process necessary for these measures was put into practice during the Gulf Crisis. The Administration considers that the Crisis also demonstrated that stockdraw might be an effective measure at an early stage of a crisis.

Evaluation of Measures

Saving objectives stemming from each demand restraint measure are mentioned above. In practice, the Norwegian Administration would gradually increase emergency response measures until the desired consumption reduction was achieved. Costs have not recently been estimated. However, when a savings campaign was put together as part of Norway's contribution to the 1990 - 91 IEA Contingency Plan, the total budget of the campaign, including production costs, advertisements, air time on the local radio net works etc., was approximately 5 million NOK.[17]

Other Response Measures

Norway does not have any potential for increased indigenous oil production. Reported increases in production levels are due to new fields coming into production and increased production from existing fields as a result of the development of new technology and upgraded reserves. Fuel-switching is regarded as an integral part of demand restraint. Switching from fuels to hydro-electricity depends on price. No legal powers for fuel-switching exist or are deemed necessary.

Data Collection

Reporting of energy statistics to the IEA is carried out by Statistics Norway. The reporting now also includes preparation and transmission of IEA emergency questionnaires, when tested or activated.

17. By current exchange rates, this would roughly be equivalent to US$568 000.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Esso	Slagen	5.43	109.69			0.79	13.35							1.57	26.69
Shell	Sola	2.62	52.92			0.58	10.77					0.97	17.95		
Statoil	Mongstad	6.78	136.96			2.69	51.65	2.69	51.65						
Total		**14.83**	**299.56**			**8.31**	**147.98**	**2.69**	**51.65**			**0.97**	**17.95**	**1.57**	**26.7**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Esso	Slagen			0.52	12.12	3.47	71.14								
Shell	Sola			0.47	10.95							0.16	3.84		
Statoil	Mongstad	1.77	30.09	0.89	20.74					0.29	6.96	0.14	3.36		
Total		**1.77**	**30.09**	**1.88**	**43.80**	**3.47**	**71.14**	**0**	**0**	**0.29**	**6.96**	**0.30**	**7.20**	**0**	**0**

Map of Portugal

Storage Facility Location	Capacity Oct. '96 (M^3)	Capacity Early '97 (M^3)	Types of Fuels (LPG excluded)
1. Porto	749 743	749 743	Gasoline, gasoil, fueloil, kerosene
2. Regua	118	118	Gasoline, gasoil, kerosene
3. Aveiro	7 465	7 465	Gasoil
4. Nelas	119	119	Kerosene
5. Figueira da Foz	5 638	5 638	Gasoil
6. Santa Iria	20 683	20 683	Gasoline, gasoil, aviation gasoline, jet fuel
7. Aveiras	NIL	215 000	Gasoline, gasoil, jet fuel
8. Lisboa	237 103	NIL	Gasoline, gasoil, jet fuel
9. Evora	134	134	Gasoil
10. Monte Caparica	439 945	439 945	Gasoline, gasoil, fueloil, jet fuel
11. Setúbal	47 817	80 817	Gasoline, gasoil, fueloil
12. Sines	763 200	763 200	Gasoline, gasoil, fueloil, kerosene
13. Portimão	2 103	2 103	Gasoil
14. Faro	12 100	18 100	Gasoline, gasoil, kerosene, jet fuel
Total	**2 286 168**	**2 303 065**	**All fuels**



Note: Pipelines and refineries are shown on the oil infrastructure map of the Iberian Peninsula

PORTUGAL

Key Oil Data
(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	0	0	0	0	0	0	0
Imports	9.8	9.2	14.9	18.1	18.2	14.6	14.7
Exports	–0.4	–0.5	–2.5	–3.8	–1.5	0	0
Bunkers	–0.4	–0.5	–0.6	–0.5	–0.5	–1.1	–1.4
Net Imports – NI	9.0	8.2	11.8	13.8	16.2	13.5	13.3
Total Supply	9.0	8.2	11.8	13.8	16.2	13.5	13.3
Import Dependence (%)	100	100	100	100	100	100	100
Stock – Days of NI	119	102	94	86	68	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Portugal depends on imports for all of its oil requirements. Current energy supply of 22 Mtoe comprises 72% oil, 3% natural gas, 14% solid fuels and 11% other sources. Oil is imported mainly from the United Kingdom, Nigeria, Iran, Saudi Arabia, Iraq and Norway.

Portugal's main energy policy objective is to open the energy sector to competition and private investment in order to improve economic performance and industrial competitiveness. The oil sector has undergone a major liberalisation in the last decade. The elimination of quota systems in the import/distribution activities resulted in a significant increase in the number of oil companies operating in the market. The changes were slower in the refining sector. Price controls have largely been eliminated, but price ceilings remain for such products as premium leaded gasoline, diesel oil and high-sulphur fuel oil.

Other important energy policy objectives are to encourage efficient energy use, diversify types and origins of energy supply and, in particular, reduce Portugal's dependence on oil, all of which is imported. Oil currently accounts for 72% of primary energy supply, but this share is expected to fall to 53% by the year 2010, reflecting a growing reliance on natural gas, which has been imported from Algeria since

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	2 016	2 060	2.2
of which unleaded	1 084	1 692	56.1
Kerosene and jet fuels	691	723	4.6
Gas/diesel oil	3 963	4 243	7.1
Residual fuel oil	4 036	3 951	–2.1
Other	3 676	3 642	–0.9
Total	**14 382**	**14 619**	**1.6**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999
(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
United Kingdom	1 474	0	0	434	0	501	2 409
Nigeria	2 294	0	0	0	0	0	2 294
Iran	2 019	0	0	0	0	0	2 019
Saudi Arabia	1 972	0	0	0	0	0	1 972
Iraq	1 508	0	0	0	0	0	1 508
Norway	1 275	0	0	0	0	37	1 312
Other	3 721	10	271	1 357	2	1 326	6 687
Total	**14 263**	**10**	**271**	**1 791**	**2**	**1 864**	**18 201**

Source: IEA Quarterly Oil Statistics.

1997. If demand for gas increases significantly, diversification of sources will be considered, including the possibility of constructing an LNG terminal in Setúbal and accessing gas from Nigeria and Libya through the existing and planned terminals in Spain. The security of gas supply may also be enhanced through contemplated construction of an underground storage facility in a salt dome, which would provide emergency storage equivalent to 20 days of consumption.

Portugal's two refineries, located in Porto and Sines, are both owned by Petrogal. The Porto Refinery has a capacity of 4.7 million tons per year (Mt/yr). It comprises a hydro-skimming unit, a lube plant, an aromatics production facility and, since 1997, a gas oil/diesel desulphurisation plant. The refinery has a maritime terminal with a monobuoy, allowing for distribution of products by both sea and road. The Sines Refinery has a capacity of 10 Mt/yr. It has a fluid catalytic cracker, visbreaker and alkylation units and a gasoil/diesel desulphurisation plant. The refinery can receive crude oil tankers of any size and distribute products by sea, road, rail or the new pipeline to Aveiras. The rate of refinery utilisation has been high as a result of the rapid growth in domestic consumption.

In 1999 total primary storage capacity was estimated at 5.7 million cubic metres. Storage and distribution plants are located at Leixões, Ílhavo, Tejo, Setúbal, and Faro. Most of these facilities are owned by Petrogal, which allows their use by third parties. Independent storage and terminal facilities

have recently been built on the left bank of the Tejo River near Lisbon. In 1999 a new oil product pipeline built by CLC started supplying the Lisbon area with products from the Sines refinery.

The government started to privatise the national oil company in 1992 with the sale of a 25% stake to Petrocontrol, a consortium a group of Portuguese industries and banks. In June 1995, Petrocontrol increased its share in Petrogal to 45%, thus reducing the share of the state to 55%.

In 1999, the Portuguese oil sector was dominated by Petrogal (Petróleos de Portugal S.A.), which operated in the downstream sector in Portugal (refining and distribution) and Spain (distribution) and owned more than 40 companies involved in marine transport, marketing, pipelines and storage activities. Petrogal also owned 4.6% of a gas transport company, Transgás, and several stakes in gas distribution companies. Its upstream activities were concentrated in Angola.

In April 1999, the Decree-Law Nº 127-A/99 created a holding company, *Petróleos e Gás de Portugal, SPGS, S.A.* (GALP). The company groups the shares of the State in Petrogal, *Gás de Portugal* and *Transgás*, and is responsible for the operation and management of the Portuguese oil and gas industries. When created, GALP was owned 61% by the State, 33% by Petrocontrol, 3% by EDP, 2% by the *Caixa Geral de Depósitos* (CGD), 0.04% by Portgás and 0.04% by Sergás. In January 2000, the Italian oil and gas group Eni acquired 33% of GALP (11% from the State and 22% from Petrocontrol). Petrocontrol sold its remaining 11% shares of GALP to Electricidade de Portugal, whereas the State sold 4% to a Spanish utility. The CGD increased its share in GALP to 13.5%.

According to forecasts of the Ministry of Economy, natural gas is expected to progressively replace oil in power generation, industry and residential/commercial sectors. As a result, total oil use is expected to decline from 16.2 Mtcoe in 1999 to 13.4 Mtcoe in 2010, despite continued rapid increase in the transport sector which is expected to account for 55% of total oil use in 2010. The share of oil in total energy use is expected to fall to 53% in 2010, whereas the share of oil in total net energy imports is expected to fall from nearly 80% in 1998 to 59% in 2010.

Emergency Response Policy and Organisation

Emergency Response Policy

Oil dependence is a major factor in most energy policy decisions, as oil represents 71% of primary energy consumption. One of the main policy objectives is to reduce Portugal's oil dependence and diversify supply sources. The introduction of natural gas from Algeria in early 1997 has begun to lessen oil dependence and, consequently, improve the response potential in an oil supply disruption.

Liberalisation of the highly regulated and largely state-owned sector implied a major change in the way emergency response was perceived. Previously, the state-owned company could be used as a direct instrument of emergency policy, and the largely discretionary quotas system was a powerful instrument to obtain co-operation from the others. However, the Administration is not concerned that the IEP or CERM implementation would be affected, as Portuguese oil companies have in the past participated voluntarily and actively in emergency preparedness exercises and training, and are expected to do so in the future.

Preparations for oil emergencies, through the creation of compulsory reserves and through oil crisis management and training by the Ministry of Economy date back to 1938. The basic legislation is

Law 1947, drafted in 1937, which has since been amended primarily to comply with EU requirements. The legislative acts empowering the government to fulfil its IEA obligations are Decree-Law 77/91, Decree-Law 153/91, and the Council of Ministers Resolution 29/92. These laws define stockholding obligations, the conditions for drawdown of emergency stocks and the structure of the Portuguese NESO.

The IEP Agreement was ratified by Parliament and integrated into the Portuguese legal system through Law 6/81. The Governing Board Decisions adopted under the Agreement provisions and the CERM Decision are equally binding. Flexible response and reliance on market mechanisms, which are emphasised in the above-mentioned Governing Board Decisions, are reflected in general principles for oil crisis management contained in the Portuguese NESO's Manual.

Since there is no domestic oil production and since participation in foreign oil production is currently very limited, an oil supply disruption would fully translate into a domestic supply deficit. The two existing refineries are well equipped and have a high capability to adapt supplies to market requirements in a crisis situation. Also, the fact that most companies operating in the Portuguese market are affiliates of Reporting Companies should facilitate an efficient oil reallocation, domestically and within the IEA.

Emergency Organisation

The Portuguese NESO, *Organização para Emergência Energética* (OEE), was created by Council of Ministers Resolution 29/92 through reorganisation of previously existing structures. OEE comprises:

- ***Direcção Geral de Energia*** - General Directorate for Energy (DGE), the main department of the Ministry of Economy responsible for energy policy preparation and implementation;
- ***Comissão de Planeamento Energético de Emergência*** - Energy Emergencies Planning Board (CPEE), a small body representing all sectors of the energy industry which is in charge of emergency planning and preparation; and
- ***Conselho Nacional de Emergência Energética*** - National Council for Energy Emergency (CNEE), a council of energy operators and consumers which may be called upon by the Director-General for Energy in the event of a crisis. It is a consultative body without executive powers.

In an emergency, OEE will assume the role and functional structure of a NESO. It will be staffed with DGE officials who are familiar with the specific needs in their area of responsibility, and supported with CPEE in planning activities. This will guarantee efficient operation of the crisis management structure. OEE participates through CPEE in *Conselho Nacional de Planeamento Civil de Emergência* (CNPCE), which is headed by the Minister of Defence. CNPCE comprises administration, army representatives, and the chairmen of all sectoral emergency organisations. OEE may be activated at the discretion of the government, or according to international obligations (i.e. IEP Agreement and European Union directives for oil emergencies).

Allocation Procedures

In a crisis, oil companies would be encouraged to participate in international reallocation of oil in order to comply with the provisions of the IEP. A "fair sharing" calculation would also be made by the

statistical section of OEE in order to define reallocation between companies operating in Portugal. Oil companies can be expected to adhere to this voluntary approach because the market is mainly supplied by Reporting Companies and their affiliates, which are familiar with the sharing system, recognise its potential, and are expected to co-operate in its implementation. This has also been evidenced by the companies' co-operative approach during a national crisis simulation exercise. Oil companies would meet in a reallocation forum convened in order to solve allocation and sharing problems in a most efficient way. Such a meeting would require clearance under the competition and anti-trust regulations.

The refusal to participate voluntarily in international allocation or domestic fair sharing would trigger compulsory actions, including requisition. This could be possible in extreme situations, when relevant defence or crisis legislation would be implemented. For less extreme situations, specific legislation would have to be issued to allow enforcement of allocation and of some other emergency measures. In 1999, new legislation empowering the government to implement compulsory allocation was submitted to the Cabinet for its consideration.

Emergency Reserves

Policy and Legal Instruments

There are no government or agency-owned emergency stocks in Portugal. The obligation to hold emergency stocks is instead imposed on oil companies. The obligation was first stated in Law n° 1947 and its implementing Decree nº 29034. At present this obligation appears in Decree-Law 77/91, which stipulates the following minimum product requirements: 120 days of imports for gasoline, gas oil, kerosene and fuel oils and 90 days for jet fuel and fuel oil for power generation. The same legislation gives the government the power to order the use of reserves in a crisis. Decree-Law 77/91 (Article 3) states that "compulsory reserves can be used only with the Minister's authorisation and, in a supply disruption, they must be released into the market at the rate defined by the government". In the event of a supply disruption, a drawdown decision taken according to the IEP Agreement would be a sufficient condition for that article's implementation.

No specific legislation exists for holding stocks in excess of the IEP commitment. Since the complementary emergency response measures established by a 1984 IEA Governing Board Decision have the same legal basis as the IEP measures, participation in a CERM programme does not raise any legal problems. When the government determines the existence of an energy crisis, the same authority may be used to authorise stock drawdown in both IEP and CERM situations.

Stockholding

The obligation to build emergency stocks is imposed on oil companies and direct importers. Stocks may be made up of finished products, intermediates, crude oil or other feedstocks. Crude oil stocks are held at the Sines Refinery, whereas product stocks (i.e. gasolines, gas oil, kerosene, jet-fuel and fuel oil) are currently spread across the country, but will be consolidated in fewer sites in the future. The legislation contains a provision for separate tankage for compulsory stocks but, in practise, most companies commingle compulsory and commercial stocks. One exception is Shell's Costa de Caprica facility, which is reserved for emergency reserves only. Storage costs of reserves are directly borne by oil companies. No subsidy or other financing is given by the government to oil companies. Portugal has no bilateral stock arrangements, as all stocks must be kept within the national territory.

A new storage and distribution centre at Aveiras near Lisbon replaced storage facilities of the old Lisbon Refinery which were dismantled to create space for the Expo 98 Exhibition. This new facility has a total capacity of 209.3 Mtoe for the following products: butane (9.4 Mtoe), propane (16.9 Mtoe), gasoline (68.1 Mtoe), gas oil (80.9 Mtoe) and jet fuel (34 Mtoe). It is owned by *Companhia Logística de Combustíveis* (CLC), but serves various oil companies on the basis of service agreements or shared ownership. It is supplied by a 16″ multi-product pipeline from Sines Refinery and distributes LPG, gasolines, gas oil and jet-fuel (40% of domestic consumption) by road to the central region. In addition to Aveiras, smaller storage facilities are under construction at: Sines (5.6 Mtoe for LPG), Faro (5.1 Mtoe for jet fuel) and Setubal (21.3 Mtoe for gas oil, 6.8 Mtoe for gasoline and 17.7 Mtoe for LPG). Site preparation works began in the Sines Port area for a new underground rock storage for LPG (0.8 Mtoe).

Operational Aspects of Stockdraw

The government has broad powers concerning oil stock drawdown. Decree-Law 77/91 confers to the Minister of Industry and Energy the authority to order stock release in case of an oil supply crisis, according to a plan to be defined by the government. The legislation stipulates that stocks must be released into the market and that non-compliance is punishable as illegal hoarding. Such a practice could be signalled by consumer complaints and confirmed through analysis of statistical data submissions. During a stockdraw, companies would be allowed to deduct a certain quantity from emergency stocks and add the same quantity to their operating/commercial stocks. Those quantities would subsequently be released to consumers through normal commercial channels. Accordingly, no physical tests of stockdraw are deemed necessary. The stockdraw procedures are the same for CERM and IEP conditions.

The Administration indicated that no bidding process would be necessary, as compulsory stocks are owned by oil companies and commingled with commercial stocks. This also implies that physical deliveries to the market could be made almost immediately after a stockdraw decision.

Compliance Issues

According to Decree-Law 106/93, oil companies and direct importers must provide DGE with monthly information on oil supplies, deliveries and stocks. Calculation of emergency stock obligations are updated and checked against values reported by oil companies in order to control their compliance with legal obligations. Officials from the Energy Department may conduct physical checks any time. Non-fulfilment of compulsory reserves obligation is punishable by Law 1947 and its implementing orders.

The Administration has prepared a draft law to ensure efficient solutions to hold and manage stocks, including the utilisation of stocking agencies. This law should be adopted early in 2001.

Demand Restraint Measures

Policy and Legal Instruments

The implementation of demand restraint measures would be based on a set of guidelines contained in the Manual of the Portuguese NESO (OEE). These include: (a) the reliance on market mechanisms;

(b) the avoidance of unnecessary regulations; (c) the combined use of voluntary and compulsory measures; and (d) definition of priority users to protect consumers considered essential to the economy, national defence, or social services.

As specific demand restraint measures are not described in the IEP Agreement, no measure is considered subordinated to the IEP. The Agreement creates the obligation to reach a certain objective, but that obligation does not make the implementation of procedures and measures *ipso facto* legal, and therefore specific national legislation may be required. Some voluntary restraint measures, such as persuasion for household electricity savings and for car-pooling or voluntary restraint of short distance driving, do not require any legal authority. A number of measures may be implemented on the basis of existing legal powers. Examples are: equitable allocation of resources, anti-hoarding procedures, lower speed limits, reductions of public lighting periods and temperature control in public buildings.

Some other measures would require appropriate legislation or implementing orders to establish priorities and entitlements for various sectors of the industry to ration energy supplies. These include: reductions of opening hours of service stations; differentiated allocation of resources to protect essential activities; driving bans; limits on radio and TV broadcasting periods or restrictions on movies and theatre opening hours; rationing of motor fuels or requisition of oil products. Some of these measures could also be implemented under existing defence or catastrophes legislation, but the enforcement of such legislation requires extreme conditions which may not be present during a minor oil supply disruption. Specific legislation concerning this subject is being drafted. Supply side measures affecting commercial activities of oil distribution companies and retailers would also be used as they allow effective upstream control of consumption and facilitate implementation of fair-sharing and allocation.

Procedures and Monitoring

Implementation of the voluntary measures would be effected through media campaigns. A decision to implement these measures would be very quick, following or even anticipating any international decision. Campaign design and production would not take very long, as there is some experience with similar campaigns for energy savings. Effective consumption reduction achieved would probably be low.

The set of compulsory measures not requiring new legislation could also be implemented quickly, and the efficiency of some of them could be very high (i.e. allocation by restricting deliveries to retail and direct consumers to a certain percentage of the previous year's consumption). Anti-hoarding measures would apply particularly to bottled LPG: the return of an empty bottle would be required when buying a new one. The impact of lower speed limits in reducing consumption of motor fuels is expected to decline over time, as driving habits regain influence. Public lighting and temperature controls are important, as they help to enforce a crisis consciousness, but the resulting reductions in oil consumption would probably be low.

The third group of compulsory measures requiring the issue of appropriate legislation would take more time to be implemented. Some of these measures would be used as a last resort during serious disruptions and could be very effective (i.e. rationing of motor fuels or requisition of oil products).

The Administration indicated that cross-border distortions would be impossible to avoid with some demand restraint measures, unless similar ones were implemented in neighbouring countries. Nevertheless, the Administration was confident that cross-border effects would generally have a limited effect.

Decision Processes

There are no pre-defined measures for oil disruption management. The approach to such emergencies relies on flexibility and compliance with a few general guidelines and principles. The decision process is schematically explained in the OEE Manual. It comprises: the analysis of the situation and the preparation of proposals by the NESO; the decision by the government; implementation by appropriate entities; and the follow-up and control by the NESO. This decision process has been tested during exercises.

Other Response Measures

An oil disruption could be aggravated by a simultaneous disruption in the supply of natural gas or other energy sources. This could affect particularly the power generation sector, which, in addition to coal and hydro, uses fuel oil and will soon start using natural gas in the Tapada do Outeiro power plant, a combined-cycle gas turbine currently under construction by Turbogas. Simultaneous disruptions in the availability of these primary energies would reduce the flexibility of the electricity producing system.

There is no specific legislation regarding compulsory fuel-switching. At present, fuel-switching capability is concentrated mainly in the power generation system. In case of an oil disruption, it would be possible to produce more electricity from the coal-fired or hydro plants. This would allow oil consumption to be reduced by up to 250 000 metric tons over a three-month period. In case of a gas disruption, further flexibility will be provided by the new power plant in Tapada do Outeiro, which will be able to switch to light heating oil. In addition, the oil-fired plant in Carregado was recently converted to dual-firing with gas. As a result, the share of dual-fired capacity will increase from zero to 5-10%.

In an emergency situation, the supply of oil products could also be increased through temporary waivers of certain product specifications. The Administration confirmed that such waivers would be possible, subject to approvals by the Department of Environment, but could not point out specific modifications or quantify their likely impact on supply.

Data Collection

Portugal's capacity to collect and transmit data has not changed in recent years. Oil companies supply their data to the Statistical Department of DGE on floppy disks and paper. The Department then checks and aggregates these data and submits them to the IEA. The emergency oil supply data (QuB) collected by the NESO are checked against available monthly oil data for consistency. Data preparation facilities and communications with the IEA have been improved.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Petrogal	Oporto	4.40	88.88	0.60	11.00										
Petrogal	Sines	10.00	202.00	3.70	65.80	2.84	52.99	1.70	32.64	0.40	7.68			1.40	23.80
Total		**14.4**	**290.88**	**4.30**	**76.80**	**2.84**	**52.99**	**1.70**	**32.64**	**0.40**	**7.68**			**1.40**	**23.80**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Petrogal	Oporto	1.12	26.10	0.45	9.23										
Petrogal	Sines	1.11	25.86	2.16	44.28	0.22	5.28								
Total		**2.23**	**51.96**	**2.61**	**53.51**	**0.22**	**5.28**								

Map of Spain


France
REPSOL
La Coruña
El Ferrol
Gijon-Musel
Santander
PETRONOR
Bilbao
Lezo
S. Sebastian
Santiago
Rivabellosa
Vitoria
Pamplona
Vigo
Leon
Burgos
Gerona
Zaragoza
REPSOL
Lerida
Sabadell
Barcelona
PETROGAL
CALM
Terminal Offshore
(Crude Oil Import)
Porto
Pipeline Nato
Valladolid
Salamanca
Tarragona
ASESA
Ovar
Atlantic Ocean
Aveiro
Torrejon
Barajas
Villaverde
Madrid
Loeches
C. Vientos
PORTUGAL
SPAIN
BP OIL ESPAÑA, S.A.
Castellon
Balearic Islands
Mahon
Aveiras
de Cima
Valencia
Palma de Mallorca
Santa Iria
Alcazar
de San Juan
Ibiza
REPSOL
Merida
Lisbon
Montijo
Multiproduct Pipeline
Sines - Aveiras
(CLC)
Monte da
Caparica
Setúbal
Puertollano
Alicante
Mediterranean Sea
PETROGAL
Sines
Cordoba
CEPSA
Sevilla
Granada
San Javier
Coria
REPSOL
Cartagena
Huelva
Jerez
Faro
Motril
Rota
CEPSA
Malaga
Almeria
Canary Islands
CEPSA
Tenerife
Cadiz
San Roque
Algeciras
Km
0
50
100
Storage Site
Crude Oil Pipeline
Oil Product Pipeline
Maritime Supply Base
Aviation Supply Centre
Refinery

SPAIN

Key Oil Data
(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	1.8	2.4	1.2	0.8	0.3	..	..
Imports	53.1	50.2	61.8	68.2	76.9	..	..
Exports	–3.2	–10.4	–12.3	–8.7	–7.1	..	..
Bunkers	–1.6	–2.2	–3.7	–3.2	–5.9	..	..
Net Imports – NI	48.3	37.7	45.9	56.4	63.9	..	..
Total Supply	50.1	40.1	47.1	57.2	64.2	..	..
Import Dependence (%)	96.4	93.9	97.5	98.6	99.5	..	..
Stock – Days of NI	80	100	81	82	88	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Spain depends on imports for 99.5% of its oil requirements. Current energy supply of 113 Mtoe comprises 55% oil, 10% natural gas, 15% solid fuels, 14% nuclear and 6% other sources. Oil is imported mainly from Nigeria, the countries of the former Soviet Union, Libya, Mexico, Saudi Arabia and Iraq. Indigenous production of 0.65 Mt in 1999 was equivalent to 1% of total oil consumption.

Spain has made considerable efforts to diversify its primary energy sources and, in particular, to reduce its reliance on oil imports. This share is expected to fall as natural gas consumption will increase with the completion of the Maghreb pipeline from Algeria. For the year 2000, natural gas consumption is projected to reach 167 000 Mtoe (84.3% increase over 1995), boosted by increased imports from Algeria, Libya and Norway. According to the Spanish Energy Plan, between 8.3 and 11.3% of the electricity generated will come from natural gas by 2000, compared to 0.1% in 1994.

There are ten refineries in Spain, of which five are owned by Repsol, S.A. (60% of refining capacity), three by Cepsa (30% of refining capacity), one by British Petroleum Oil S.A. and one jointly owned by Repsol and Cepsa. Total refining capacity is 64.2 Mtoe, including the cracking conversion capacity of 14.3 Mtoe. The existing refining and conversion capacity in Spain is considered sufficient and no

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	9 234	9 046	–2.0
of which unleaded	4 286	4 823	12.5
Kerosene and jet fuels	3 654	3 987	9.1
Gas/diesel oil	21 496	23 160	7.7
Residual fuel oil	6 368	7 402	16.2
Other	14 945	14 360	–3.9
Total	**55 697**	**57 955**	**4.1**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Nigeria	8 679	0	0	32	0	24	8 735
Former Soviet Union	6 210	0	829	765	0	78	7 882
Libya	6 380	0	339	0	8	644	7 371
Mexico	6 685	0	0	0	0	4	6 689
Saudi Arabia	6 310	12	235	0	0	23	6 580
Iraq	6 061	0	0	0	0	0	6 061
Other	18 586	867	5 346	1 438	423	5 924	32 584
Total	**58 911**	**879**	**6 749**	**2 235**	**431**	**6 697**	**75 902**

Source: IEA Quarterly Oil Statistics.

expansions are expected, with an exception of some investment in methyl tertiary butyl ether (MTBE) and desulphurisation plants.

Spain's current energy policy emphasises as its main goals: the security of energy supply, improving the competitiveness of the energy sector, environmental protection and increased energy efficiency. It includes a privatisation programme and new rules which promote competition. As projected in the plan, the use of oil during the 1990s increased somewhat faster in the transport sector compared to the other sectors, where natural gas started playing an increasing role (particularly in power generation).

The transition to a decentralised market system has led to some privatisation and opening up of the oil sector and to restructuring of national oil companies. The former oil monopoly of CAMPSA was dismantled in the early 1990s and its assets distributed to its shareholders, Repsol, Cepsa and BP Oil. Logistical and transport assets remained with *Compañía Logistica de Hidrocarburos* (CLH), which is jointly owned by Repsol, Cepsa, BP Oil and Shell. This created an oligopolistic situation with three companies - Repsol, Cepsa and BP Oil - controlling about 86% of the retail market and enjoying through CLH a quasi-monopoly in oil pipeline transport.

CLH transports about 95% of all fuels and owns most of the pipelines and storage facilities (capacity of 6 million m^3). The CLH pipeline network includes three main products pipelines linking the main consuming areas to the coastal terminals and the main refineries on the Atlantic Ocean, the Bay of Biscay and the Mediterranean. CLH has made large modernisation investments, including a pipeline monitoring system and a satellite-controlled dispatching system which allows for the real time tracking of shipments and stocks. Articles 25 to 29 of the Royal Decree 7/1996 stipulate that CLH is obliged, as a common carrier, to provide transport services to all oil operators in a non-discriminatory and open manner.

Emergency Response Policy and Organisation

Emergency Response Policy

Spain's energy policy recognises the importance of oil for the Spanish economy and aims at ensuring secure supplies and use of oil in the most efficient manner. Since Spain is almost totally dependent on oil imports, it attaches high priority to the maintenance of adequate oil stocks and other emergency response measures.

Spain's policies and legislation provide a framework for emergency response measures such as stockdraw and demand restraint, and for the fulfilment of IEA and EU stockholding obligations. Law 34/1998 establishes the operators' obligation to hold emergency stocks up to a maximum of 120 days (Article 50) and various measures that the government can implement during a supply disruption in order to reduce oil demand. Royal Decree 2111/1994 "Maintenance Obligation of Minimum Emergency Stocks and Creation of *Corporación de Reservas Estratégicas* (CORES)" defines the obligation to hold minimum emergency stocks and establishes a stockholding agency in charge of creating and maintaining strategic stocks, and monitoring the fulfilment of the minimum emergency stock obligation. Article 3 of this Royal Decree establishes the obligation that operators hold a minimum of 90 days of stocks as emergency reserves. Article 17 stipulates that the government can regulate the use of emergency stocks during a supply disruption.

CORES is a public corporation under the authority of the Ministry of Industry and Energy. Its functions are to create and manage strategic stocks (30 days plus a 10% margin for unavailable stocks) and to monitor the minimum stockholding obligation (60 days plus a 10% margin for unavailable stocks). The legislation allows CORES to purchase strategic stocks or to rent up to half of them from the operators. The latter option has not been exercised, as CORES prefers to hold its own stocks. Agency stocks are at present commingled with industry stocks. CORES has no plans to build its own tanks, as this is considered to be more costly than the existing rental arrangements with storage companies and refineries. The legislation allows the creation of crude oil stocks, but this option has not been favoured to date, due to the longer time before crude oil could be refined and marketed in a crisis and the EU requirement to hold minimum reserves of three main groups of products.

Law 34/1998 created the National Energy Commission, a body responsible for regulation of the energy sector's operations. The aim of the Commission is to ensure effective competition in that sector and transparency of its operations to the benefit of energy companies and consumers.

Emergency Organisation

The National Civil Emergency Planning Committee [*Comité Nacional de Planes Civiles de Emergencia* (CNPCE)] is a permanent body established by the Administration in 1988 as part of an organisation

responsible for handling crises. The Government Presidency heads the organisation, in co-operation with several ministries. There are ten working committees placed under the CNPCE, including the National Energy Resources Committee [*Comité Sectorial de Recursos Energéticos* (CSRE)] which forms the basis for the NESO. The main functions of these committees are supply/demand analysis, demand restraint plans and preparation of rationing schemes. The law of January 1988 constitutes the legal basis for the operation of both CSRE and CNPCE. The new Law 34/98 has not introduced any changes in this system.

Emergency planning is the responsibility of the CSRE, which is in charge of the development and implementation of plans to guarantee the availability of resources, and of necessary measures to be implemented in crisis situations. CSRE comprises officials and experts from CORES and main oil and gas companies. The chairman of the CSRE is the Deputy Director for the Oil, Gas and Petrochemical Sector, who reports to the Deputy Director General for Energy. CSRE periodically informs CNPCE about the market situation and the needs of the sector. It plays the primary role during oil crises, as it monitors the oil market situation, proposes to the CNPCE specific emergency measures and plans their implementation.

Allocation Procedures

In case of an activation of the IEA trigger mechanism, CSRE representatives will be in emergency status and will co-ordinate monitoring of movement and consumption of oil with the EU Oil Crisis Committee and with the IEA. They will also advise the CNPCE on the most appropriate types of measures to be taken. Following a meeting with the Crisis Committee and in accordance with Article 49 of the Law 34/1998, the government can introduce demand restraint measures at the appropriate level.

The Administration anticipates that Spanish oil companies would participate voluntarily in the implementation of emergency response measures. Since the oil industry is represented at the CSRE, continuous monitoring and control of the emergency measures can be achieved. During an emergency, the operation levels of oil companies would be reduced in such a manner that the sum of their supply rights would equal the Spanish supply right.

Emergency Reserves

Policy and Legal Instruments

Law 34/1998 provides the government with the powers to ensure that oil stocks are sufficient to meet the IEA emergency reserve commitment and to draw stocks during an emergency under a wide range of situations, including those not foreseen in the IEP agreement. In particular, Spain's participation in CERM programmes would be based on Article 14 of Law 34/1992 and Article 17 of Royal Decree 2111/1994.

Stockholding and Maintenance

According to Article 49 of Law 34/1998, the government can establish up to a maximum of 120 days of consumption as emergency stocks. Oil companies do not receive any financial support for holding emergency stocks.

Since 1997, oil operators are required to increase storage capacity in line with demand growth. Some of the increase has been achieved through better utilisation of existing storage capacity and conversion of some CLH fuel oil tanks to gasoline use. Spain's general policy is to hold product stocks, whenever possible, close to the refinery terminals in order to facilitate their turnover in line with changing specifications. No specific problems are envisaged with the product mix and specifications during emergencies.

Strategic reserves were set up by CORES at the end of 1995 and by late 1996 comprised around 3.6 million m^3 of oil products (gasoline, gas oil, kerosene and fuel oil) covering 30 days of internal sales. Since 1997, strategic reserves have been increased to 33 days of sales and will be maintained at that level in the future. CORES' activities are funded by a levy on internal product sales which is charged to all operators in proportion to their shares of the Spanish oil market.

Article 3 of the Royal Decree 2111/1994 allows for the holding of emergency stocks in another EU country provided that there is a bilateral agreement with that country. Spain is in the process of negotiating bilateral stock agreements with France, Italy, the United Kingdom and the Netherlands which are expected to be finalised before the end of 2000.

Operational Aspects of Stockdraw

In case of an emergency, strategic and company stocks will be drawn down according to the procedures agreed upon during the CSRE meeting, under both the CERM and the IEP conditions. Inspectors from CORES and the Administration would monitor the drawdown under supervision of CSRE and in accordance with IEA requirements. CORES is in charge of releasing its own stocks, but the NESO would oversee the release of industry stocks, relying mainly on voluntary participation. Since strategic stocks are held together with company stocks, they would be released to the market through the existing distribution channels. No physical tests have been carried out as they are considered unnecessary for commingled stocks. Strategic stocks would be released through competitive sales to the operators.

Law 34/1992 and Royal Decree 2111/1994 provide a general framework for stockholding, but there are no specific formal rules for stockdraw and bidding processes. Additional legislation is now under consideration which will include clear rules for bidding and market pricing of released oil. The Administration would rely on voluntary industry participation in case of an activation of the IEA trigger mechanism, although Article 13 of Law 34/1992 also allows for the use of compulsory measures. New legislation may be required, however, to allow enforcement of Type 3 allocation and of some other emergency measures.

Once the government stockdraw decision is made, the preparation and implementation of necessary orders would take approximately one day. After that, it is estimated that the bidding, sale and release of strategic product stocks to the market would take up to one week. Crude oil stocks could be refined and made available to the market within one week.

Compliance Issues

The existing storage capacity is sufficient for the maintenance of a 90-day stock level. The monitoring of stocks is performed by means of monthly reports and periodical inspections. Every month, all refineries

and operators submit a detailed report to the government and CORES about the stock level, location and sales of each oil product. CORES and the Administration have the right to inspect and audit stocks on site. If companies do not comply with the 60-day stock obligation, they can be penalised with sanctions included in Law 34/1998. The sanctions are proportionate to the type of infringement and, in severe cases, may entail fines of up to 100 million pesetas and the loss of a licence to operate in the Spanish market.

Demand Restraint Measures

Policy and Legal Instruments

In accordance with Article 49 of Law 34/1998 and Article 5 of the IEP, the government can introduce the following types of demand restraint measures in an emergency:

- publicity campaigns to encourage voluntary actions to reduce unnecessary oil consumption;
- speed limitations for vehicles;
- traffic limitations for vehicles, airplanes and ships;
- limitations of opening hours for retail service stations;
- limitations or suspensions of oil products exports in situations of acute fuel scarcity;
- control of minimum compulsory stocks (i.e. increase in compulsory stocks level, drawdown of stocks to avoid price increases or speculation and regulation of the use of products);
- rationing of oil products; and
- other measures as recommended by relevant international organisations.

Each measure can be activated independently prior to the triggering of the IEA Emergency Sharing System. The scope and sequence of these measures would depend on the magnitude of an oil crisis. There have been no attempts to-date to co-ordinate demand restraint measures with Portugal in order to avoid cross-border distortions, mainly because the scope for cross-border shopping is limited by the low density of population along the border.

Procedures and Monitoring

Upon government approval, demand restraint measures would be immediately introduced by means of a Royal Decree. The time from implementation to first measurable volumetric effects would depend largely on the types of demand restraint measures adopted. For example, public appeals and information would have an immediate effect, other "light-handed" measures would take two to three days, while allocation might take between one and two weeks.

Other Response Measures

Spanish indigenous oil production is small and could be increased only marginally during an emergency. Supply of oil products could be increased through temporary waivers of certain product specifications,

increasing the cloud temperature for gas/diesel oil and increasing volatility and lead and benzene content for gasoline.

Spain has some dual-fired power plants which can use both fuel oil and natural gas. These plants offer the possibility of reducing oil consumption during an emergency through fuel-switching. The scope for that is expected to increase as a result of planned additional dual-fired power plants. In the Canary and Balearic Islands, Ceuta and Melilla, fuel oil will continue to be used by power plants. In the peninsular territories, however, all fuel oil used in power generation will be replaced by natural gas, resulting in a 20% reduction (350 000 metric tons) in fuel oil consumption by that sector.

New supplies of natural gas from Algeria do not seem to raise any serious security problems as natural gas currently accounts for only 10% of Spain's primary energy supply. Although Algeria now supplies 50% of Spain's gas consumption, security will be enhanced through: new connections with the European gas system, possible new contracts with Norway and Trinidad and Tobago, and plans to upgrade LNG terminals. In addition, storage capacity will be expanded from the current 30 - 40 days to 90 - 100 days over the next decade, even though there is no legal obligation at present to hold natural gas stocks.

Data Collection

The forms and procedures to collect and process data from refineries and operators are compiled in accordance with the information requirements of the EU and the IEA. The data on imports and exports are verified against the figures provided by the Customs Office in the Finance and Economy Ministry. In case of discrepancies, a confirmation is obtained from the oil companies involved. The annual oil statistics are reconciled with the monthly statistics received from oil importers. Monthly data are processed and periodically transmitted to the EU and the IEA Secretariats by e-mail. Communication with oil companies, the NESO and other participating bodies during a crisis would not present any difficulties.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Asesa	Tarragona	1.50	30.30	0.91	16.84	0	0								
Cepsa	Algeciras	10.39	209.88	2.19	40.52	3.02	55.68	2.01	38.59					2.01	34.17
Cepsa	Tenerife	4.14	83.63	0.00	0.00	0.99	16.75							1.97	33.49
Cepsa	Huelva	4.85	97.97	2.01	37.19	1.18	22.02	0.93	17.86					0.49	8.33
BP Espana	Castellon	6.00	121.20	2.70	49.95	1.40	26.88	1.40	26.88						
Repsol	Bilbao	11.50	232.30	4.89	90.47	3.51	64.75	2.31	44.35					2.40	40.80
Repsol	Cartagena	5.00	101.00	0.84	15.54										
Repsol	A Coruna	6.00	121.20	2.87	53.10	1.65	31.68	1.65	31.68						
Repsol	Puertollano	7.00	141.40	3.10	57.35	1.55	29.76	1.55	29.76						
Repsol	Tarragona	8.00	161.60	3.21	59.39	1.74	31.55			0.85	16.32			1.60	27.20
Total		**64.38**	**1300.47**	**22.72**	**420.32**	**20.66**	**374.95**	**9.85**	**189.12**	**0.85**	**16.32**			**8.47**	**144.00**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Asesa	Tarragona														
Cepsa	Algeciras			1.54	35.88	2.75	56.38	0.23	5.52			0.30	7.20	0.05	1.20
Cepsa	Tenerife			0.65	15.15	1.26	25.83						0		
Cepsa	Huelva			0.71	16.54	1.95	39.98						0		
BP Espana	Castellon			0.70	16.31	4.20	86.10	0.10	2.40			0.40	9.60		
Repsol	Bilbao			1.28	29.82	5.14	105.37	0.20	4.80					0.06	1.44
Repsol	Cartagena			1.13	26.33	1.46	29.93								
Repsol	A Coruna			0.85	19.81	1.90	38.95							0.04	0.96
Repsol	Puertollano			0.71	16.54	3.35	68.68	0.13	3.12			0.10	2.40	0.06	1.44
Repsol	Tarragona			0.95	22.14	3.28	67.24							0.14	3.36
Total												**0.80**	**19.20**	**0.35**	**8.40**

Map of Sweden



SWEDEN

Key Oil Data

(million metric tons oil equivalent)

	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	0	0	0	0	0	0
Imports	23.5	24.2	26.2	26.1	28.3	27.3
Exports	–6.1	–8.7	–9.8	–9.5	–9.6	–9.5
Bunkers	–0.6	–0.7	–1.0	–1.5	–1.2	–1.4
Net Imports – NI	16.8	14.9	15.3	15.1	17.5	16.4
Total Supply	16.8	14.9	15.3	15.1	17.5	16.4
Import Dependence (%)	100	100	100	100	100	100
Stocks – Days of NI	149	169	153	161	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Sweden depends on imports for all of its oil requirements. Current energy supply of 52 Mtoe comprises 31% oil, 1% natural gas, 5% solid fuels, 37% nuclear and 26% other sources. Crude oil is imported mainly from Norway, the countries of the former Soviet Union, Denmark, Finland, Iran and the United Kingdom.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	4 019	4 033	0.3
of which unleaded	4 019	4 033	0.3
Kerosene and jet fuels	853	908	6.4
Gas/diesel oil	5 059	5 238	3.5
Residual fuel oil	2 022	2 247	11.1
Other	4 587	4 329	–5.6
Total	**16 540**	**16 755**	**1.3**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Norway	10 485	247	45	3	8	532	11 320
Former Soviet Union	2 338	0	257	71	127	95	2 888
Denmark	1 496	588	14	6	118	75	2 297
Finland	6	714	946	12	319	3	2 000
Iran	1 954	0	0	0	0	0	1 954
United Kingdom	796	23	18	45	51	269	1 202
Other	2 616	21	269	380	78	360	3 724
Total	**19 691**	**1 593**	**1 549**	**517**	**701**	**1 334**	**25 385**

Source: IEA Quarterly Oil Statistics.

Sweden has no indigenous production of crude oil. Almost 60% of the country's crude oil imports come from the North Sea. Sweden has been a net exporter of refinery products (gasoline and fuel oil) for many years. There are five oil refineries in Sweden, with a combined capacity of around 21 million metric tons.

Prospects for energy supply in Sweden are shown in the following Table.

Total Energy Supply

Economic growth	1995	2005		2020	
		Low	High	Low	High
Oil	209	212	218	254	259
Natural Gas	9	15	15	97	112
Coal	28	29	30	26	31
Bio. Peat. Waste	82	89	89	91	99
Hydropower68	64	64	66	66	
Nuclear	67	72	72	38	38
Industrial CHP4	4.7	9.3	9.3	12	12
Oil Condense	0.4	1	2.3	1.6	1.6
Gas turbines	0.2	0.1	0.1	0.1	0.1
New Natural Gas Condensate				35.4	42
Wind		0.2	0.2	4	4
Net imports of Electricity	–1.8			3.8	7.2

1. The energy balance method is that used by the Swedish Administration: Twh = Terawatthours.
Source: NUTEK.

Emergency Response Policy and Organisation

Emergency Response Policy

The legal framework for emergency response measures in Sweden consists of the following instruments:

- the Contingency Storage of Oil and Coal Act and the Contingency Storage of Oil and Coal Ordinance of 1987;

- the Oil Crisis Act of 1975;
- the Rationing Act of 1978;
- the Total Defence Bill of 1986/87.

The Contingency Storage of Oil and Coal Act and the Contingency Storage of Oil and Coal Ordinance enable the government to ensure that it has sufficient oil stocks. Demand restraint measures are carried out in accordance with the Rationing Act. The Swedish National Energy Administration will be given authority to implement necessary actions decided by the government.

In deciding the necessary drawdown of compulsory stocks, the government and the Swedish National Energy Administration would always take into account market forces and avoid government interference with operation of the price mechanism.

Emergency Organisation

The Swedish National Energy Administration, which was set up in January 1998 as a new central energy authority, has the main responsibility for emergency response. All the emergency preparedness functions within the NUTEK were integrated into this Administration. The Rationing Act is the legal authority for establishing and operating the Swedish National Emergency Sharing Organisation (NESO) for IEA emergency response measures. The Department for Strategic Energy Preparedness of the Swedish National Energy Administration is the core of Sweden's NESO. It consists of about a dozen members. They are responsible for all emergency energy planning and preparations. In an emergency, industry experts and advisers will participate in NESO activities.

The market function should be maintained as long as possible during a crisis. The NESO will implement information and saving campaigns at the early stage of the crisis and supervise the domestic stock situation and pattern of supply and demand and finally determine the price structure. The NESO could advise the government of further actions, such as stockdraw and/or implementation of rationing schemes.

In a trigger situation, the Swedish Petroleum Institute will organise a national fair sharing office affiliated with the NESO.

Allocation Procedures

In the event that Sweden's available supply exceeds its supply right, the approach of the government to meet its allocation obligation is as follows. Firstly, negotiations will be conducted between the Swedish NESO and oil companies that import crude oil and products. The Swedish Petroleum Institute would be involved in this process.

The Administration considers that voluntary offers would be secured by the oil companies. However, if these negotiations fail despite all possible efforts by the government, as a last resort, it could fulfil the allocation obligation in accordance with the Oil Crisis Act, which would enable the government to transfer industry oil to the State.

Emergency Reserves

Policy and Legal Instruments

The Contingency Storage of Oil and Coal Act provides the government with the legal power for the drawdown of stocks under the relevant articles of the IEP. Since there is no threshold in terms of depth or duration of a disruption in the Swedish legislation, how emergency stocks are to be used is at the discretion of the stockholders.

Stockholding and Maintenance

The Contingency Storage of Oil and Coal Act and the Contingency Storage of Oil and Coal Ordinance enable the government to ensure that it has sufficient oil stocks in non-emergency periods to meet the IEA emergency reserve commitment. Stockholders are oil industry companies and large consumers such as manufacturing industries and heating stations. In accordance with the Act, each stockholder must submit an annual declaration on its import or sales or consumption of the previous calendar year. The stockholding obligation is 25% of the previous year's deliveries or consumption, in accordance with the Total Defence Bill.

At present, the government does not have any legislation for holding stocks in excess of the IEP commitment, and no financial support is given to the oil companies or the large consumers in building stocks. The Administration, therefore, considers it difficult to maintain stocks well above the 90-day commitment.

Sweden has bilateral stockholding agreements with Denmark, Finland, the United Kingdom and Ireland, and negotiations with the Netherlands.

Operational Aspects of Stockdraw

If a supply shortfall occurs and the drawdown of stocks is required, the government will determine the implementation of the stockdraw. The Swedish National Energy Administration would decide on the percentage of stockdraw for each stockholder. The release of stocks would immediately follow an administrative decision. Since oil companies will release their stocks into the market through their normal channels, the Administration expects that 2-4 days will be required from a government stockdraw decision until impact on physical deliveries.

Compliance Issues

Oil companies and large consumers maintaining compulsory stocks are obliged to report stock levels to the Swedish National Energy Administration on a monthly basis in accordance with the Contingency Storage of Oil and Coal Act and its Ordinance. The Administration is also authorised to monitor data on imports, sales and consumption. Under the reporting system, the Administration is able to monitor product movements throughout the country, and stock changes, in particular. If a company or large consumer fails to fulfil the stockholding obligation, the Administration could require it, under threat of

penalty, to carry out is obligation. The penalty is usually a fine, calculated with a formula which involves multiplying the product price with the missing amount. The Administration has the legal authority to conduct on-site investigations.

Demand Restraint Measures

Policy and Legal Instruments

Demand restraint measures are carried out in accordance with the Rationing Act. The Swedish National Energy Administration has the authority to implement a variety of demand restraint measures with government approval and without Parliamentary ratification, except for formal rationing. Rationing measures must be ratified by the Parliament.

The Swedish Administration considers that demand restraint measures are effective and rates them on an equal footing with stockdraw.

Given the importance of stockdraw as an effective means of response in the early stage of a crisis, the Swedish Administration is reviewing combined use of demand restraint and stockdraw, especially in situations not requiring use of the full range of measures defined in the International Energy Program.

Procedures and Monitoring

The Administration defines demand restraint measures according to the depth of a crisis, taking into account nature, size and duration.

The First Step - Information and Saving Campaign

- a general campaign directed at all citizens;
- a campaign directed at the transport sector and the housing sector; and
- a campaign more specifically directed at certain groups, such as truck drivers.

In each step, the government provides the necessary information about the crisis to the nation. If the Administration considers that information and saving campaigns are not enough, the second step, which includes both light- and heavy-handed measures, is implemented. In this step, the following compulsory measures are considered:

The Second Step - Restrictions and Bans

- speed restrictions for road traffic;
- introduction of higher parking fees;
- temperature and hot water restrictions in public buildings; and
- a Sunday and week-end driving ban.

The Third Step - Delivery Quotas

Sales quotas to oil companies are considered as the third step. The Swedish National Energy Administration calculates each company's monthly delivery quota for a certain period, taking into account the size of shortfall on the basis of the company's deliveries in the same month of the previous year.

The Fourth Step - Rationing Schemes

Rationing schemes would be activated as the fourth step. The government is prepared for rationing, especially in the transport sector, where it would use coupons and licenses. Much of the work needed for the schemes is computerised.

Decision Processes

The decision process necessary for the demand restraint programme has been well-developed and tested during past oil crises. In addition, the Administration has studied those measures during IEA activities such as Allocation Systems Tests and other tests and training for IEA Co-ordinated Emergency Response Measures.

The government will carry out a new study in co-operation with the Swedish Petroleum Institute. The work started in April 2000.

Other Response Measures

The government has no legal authority to implement fuel-switching. Any fuel-switching measure from imported fuel to electricity or domestic fuel is taken voluntarily by consumers through negotiations between the Administration and electricity and domestic fuels producers.

Data Collection

The National Board of Statistics carries out oil data collection, except for IEA questionnaires for emergency purposes. The Swedish National Energy Administration is responsible for collecting emergency data such as Questionnaire A (QuA) and Questionnaire B (QuB).

The Administration ensures consistency between Annual Oil Statistics (AOS), Monthly Oil Statistics (MOS) and QuB by using the same database for AOS and MOS, and by comparing MOS data with the QuB data, which is collected directly from the industry.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Nynas	Gothenburg			0.40	7.40										
Nynas	Nynashamn			1.00	18.50										
OK Petroleum	Gothenburg	5.20	105.04												
Shell	Gothenburg	4.00	80.80	1.62	29.97							1.35	24.98		
Skan Raf (OK/Norsk)	Brofjorden	10.00	202.00	3.60	66.60			1.75	33.60					2.15	36.55
Total		**19.20**	**387.84**	**6.62**	**122.47**			**1.75**	**33.60**			**1.35**	**24.98**	**2.15**	**36.55**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Nynas	Gothenburg														
Nynas	Nynashamn					0.42									
OK Petroleum	Gothenburg	1.00	23.30			1.70	34.85					0.30			
Shell	Gothenburg	0.80	18.64			2.80	57.40					0.19			
Skan Raf (OK/Norsk)	Brofjorden	1.70	39.61			5.70	116.85			0.20	4.80	0.60			
Total		**3.50**	**81.55**			**10.62**	**209.10**			**0.20**	**4.80**	**1.09**			

Map of Switzerland



SWITZERLAND

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	0	0	0	0	0	0	0
Imports	13.6	12.8	13.5	12.6	13.2	12.0	11.8
Exports	0	–0.3	–0.2	–0.4	–0.5	..	..
Bunkers	0	0	0	0	0	..	..
Net Imports – NI	13.5	12.5	13.4	12.2	12.6	12.0	11.8
Total Supply	13.5	12.5	13.4	12.2	12.6	12.0	11.8
Import Dependence (%)	100	100	100	100	100	100	100
Stock – Days of NI	159	185	175	117	170	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Switzerland depends on imports for all of its oil requirements. In 1999 total primary energy supplies of about 26 Mtoe comprise 50% oil, 9% natural gas, 1% solid fuels, 25% nuclear and 16% other sources.

Switzerland is a compact country (41 000 sq. km), geographically isolated and landlocked in the centre of Western Europe without sea access. It has no domestic oil production and is therefore entirely dependent upon foreign oil. Consumption is approximately 49% transport fuels, of which 29% are gasolines, 11% aviation fuels and 8% diesel fuels.

Switzerland depends 100% on oil imports, and only a negligible amount of oil products is re-exported (mainly heavy refinery throughput). Accordingly, oil supply is subject to monthly survey.

In 1999, Switzerland imported 13.2 Mtoe of crude oil and oil products, of which 37% was crude oil and 63% was oil products. Major crude oil import sources include Nigeria and Libya. The oil product import structure appears well diversified, both in geographic origin and logistics. Oil product sources are: Germany (25%, using mainly barges along the Rhine); France (23%, pipelines and Rhine barges); the Netherlands (22%, Rhine barges); Belgium (18%, mainly by rail); and Italy (11%, tank trucks). There are two refineries: the one is located at Cressier, while the other is at Collombey.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	3 857	3 984	3.3
of which unleaded	3 590	3 821	6.4
Kerosene and jet fuels	1 431	1 526	6.6
Gas/diesel oil	6 474	5 963	–7.9
Residual fuel oil	351	219	–37.6
Other	667	682	2.2
Total	**12 780**	**12 374**	**–3.2**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Nigeria	2 017	0	0	0	0	0	2 017
Germany	1	1 070	483	0	154	179	1 887
Libya	1 860	0	0	0	0	0	1 860
France	0	519	564	0	609	81	1 773
Netherlands	27	285	1 328	0	55	15	1 710
Belgium	0	388	738	0	198	18	1 342
Other	1 188	374	421	0	14	76	2 073
Total	**5 093**	**2 636**	**3 534**	**0**	**1 030**	**369**	**12 662**

Source: IEA Quarterly Oil Statistics.

Imported crude oil for domestic refineries is mainly of light and low-sulphur quality. This reflects both high middle distillate and gasoline consumption with almost no heavy fuel oil domestic demand, and environmental legislation.

The Swiss oil supply system is based on the following elements:

- Two crude oil pipelines and one oil products pipeline (crude oil from Fos-sur-Mer, France and Genoa, Italy, and oil products from Lavera, France) representing some 53% of total oil supply;
- The Rhine river, railway and, marginally, trucks from the refineries in southern Germany, Belgium and the Netherlands account for about 40% of total supply;
- Finally, trucks, and to a lesser extent, railway, for the supply of oil products from Italian refineries are equivalent to about 7% of Swiss oil supply.

The Swiss oil market continues to consolidate. Membership in the association of Swiss oil imports, Carbura (Central Swiss Office for Imported Fuels and Combustible Liquids) is compulsory for all Swiss oil product importers. The current membership has significantly decreased, from 88 importers in 1990 to 53 importers in mid-2000. Fewer oil importing companies with larger imported oil volumes have led to easier data handling and better oil import monitoring.

Emergency Response Policy and Organisation

Emergency Response Policy

As Switzerland is land locked and situated at the end of international logistic lines, it has always followed a robust stockholding policy covering more than the 90-day net imports emergency reserves commitment required by the IEP, and it maintains a detailed demand restraint programme kept in readiness for immediate implementation.

The Constitution (Art. 31)[18] guarantees freedom to commercial and industrial activities; this basic principle can be overcome only when the national interest deems it necessary (in matters such as defence and supplies of basic goods and materials). Thus, the federal government has the right to intervene in the market only when national defence considerations apply or when emergency situations result in physical supply shortages of essential goods. Following the principle of subsidiarity, the State may intervene only when commerce and industry are unable to satisfy the basic supply needs of the country.

The Federal Law on National Economic Supply of 8th October 1982 provides the legal basis on which measures may be taken and establishes the organisation for ensuring supplies in cases concerning national defence or serious shortages. The federal government starts from the premise that it must ensure Switzerland's supply of essential goods and services in situations of shortage when there is i) military or political threat, or ii) a supply disruption with which the private economy cannot cope on its own. Consequently, oil security is one part of an overall structure co-ordinated by the Federal Office of National Economic Supply. The organisation becomes operational in case of need.

Following the Gulf Crisis of 1990/1991, Switzerland carried out a four-year review of its oil emergency policies which was finalised in March 1996. One of the main outcomes of this review has been a change in its approach with respect to IEP Article 5. In the first stage (e.g. first three months) of an IEP implementation, Swiss authorities now envisage substituting for heavy-handed demand restraint measures the use of emergency reserves held in excess of its emergency reserve commitment, as provided for in IEP Article 16.

The IEA Governing Board Decision of February 1995 does not imply any new legal commitment. Stocks held in excess of the IEP requirement remain at the exclusive disposal of the government, which may use them as the first means to avoid economic damage resulting from physical oil shortfall. Measures aiming at fighting oil price fluctuations remain excluded from Swiss emergency response policy, as they are prohibited by law.

There is no automaticity of the stockdraw response separate from the IEA Agreement on an International Energy Program (IEP). In an IEA Co-ordinated Emergency Response Measures (CERM) situation, Swiss authorities would react on a case-by-case basis in close consultation with neighbouring countries, as well as with the IEA.

The Swiss oil market has to meet product specifications in accordance with environmental legislation. However, since dependence on imported oil products is high (60% of total supply) the Swiss Administration would act pragmatically in a crisis situation and environmental standards (e.g. sulphur content) might be temporarily waived in order to ensure adequate supply.

The share of natural gas in total primary energy supply has increased from 2% in 1973 to 11% in 1999, according to the latest statistics available to the Administration. This change has led the government to take measures. In case of gas supply disruption, natural gas users with dual or multi-firing capacity will

18. Art. 27 under the revised Constitution came into force January 1, 2000.

switch to oil or other alternative fuels. Switch capacity to oil represents about 37% of total gas demand. Furthermore, an emergency stocks policy has been designed for those gas consumers with oil-switching capacity comprised of stocks of light heating oil, covering about 4 months of consumption. In order to avoid double counting, oil stocks maintained on behalf of the gas industry are not reported under IEA Emergency Reserves because they are already earmarked for a natural gas supply disruption and will not be available for an oil emergency.

Emergency Organisation

The Swiss NESO is established on a stand-by basis and combines governmental authority for national oil emergency management with domestic oil industry experts, to reflect a market-oriented approach in dealing with a physical oil shortfall situation. The main body of the Swiss NESO is the Emergency Assessment Task Force, which is chaired by the Delegate to National Economic Supply. This body comprises representatives of all important parties involved in importing, refining, wholesaling and consuming oil in Switzerland. This task force evaluates on a case-by-case basis the disrupted supply situation and comes to conclusions on what measures are to be proposed to the Federal Council (Swiss government) for implementation.

A Co-ordination Group composed of experts from Carbura and from the Federal Office for National Economic Supply will manage international oil allocation and national fair sharing issues.

Crisis planning and management follows the same decision process chain as normal business and the NESO is fully imbedded in this structure. This process can be accelerated in case of an emergency.

The Ordinance on Organisation and Tasks of the National Economic Supply (1983) provides the legal basis for calling in industry associations to co-operate and to carry out measures required by national economic supply. According to these provisions, industry associations would be placed under the supervision of the Swiss authorities.

Allocation Procedures

As a consequence of IEA allocation obligations, during a disruption, oil which was destined for the Swiss market may be redirected to other IEA markets. Oil importers who have to give up a part of their supply to cover these obligations would receive their missing oil through national fair sharing. This issue would be dealt with on a case-by-case basis (e.g. larger stockdraw entitlement). The allocation obligation will be part of the decision made by the Federal Council and no additional legal basis would be required to implement it.

Emergency Reserves

Policy and Legal Instruments

Switzerland's compulsory stocks policy, which pre-dates the IEP Agreement, is based on the Federal Law on National Economic Supply (1982) as well as on the Ordinance on the Main Principles of Stockholding (1983) and the Ordinance on Establishing Compulsory Stocks on Fuel Oils and Transport

Fuels (1983). All companies importing oil in quantities greater than 3000 cubic metres per year into Switzerland are compelled to apply for an import licence which is conditional upon signing a contract with the Federal Office for National Economic Supply, by which the importer commits himself to hold an amount of stocks in relation to its domestic market share. Although compulsory stocks remain in the ownership of the oil importers, they are under the control of the Swiss authorities, who can dispose of them, should the need arise.

The Federal Law on National Economic Supply has been recently revised and will come into force July 1, 2001. The major change deals with compulsory stockholders' registration. Today, oil can be imported with an import license which is conditional upon signing a compulsory stockholding contract. In the future, import licenses will no longer be required and oil compulsory stockholding will be based on market deliveries. This revision, however, affects neither the principles of the Swiss emergency response policy nor its emergency reserves policy. The above-mentioned ordinances are presently also under revision.

Stockholding and Maintenance

The national consumption coverage that should be met by compulsory stocks is set by a directive of the Federal Department of Economics. Swiss stockholding policy aims to cover oil product demand according to market share. The coverage aims are stated in terms of months of average inland deliveries of the previous three years. Until end-June 2000, six-month consumption coverage was required for motor gasoline, diesel and heating oils and three months for jet fuel. From 1st July 2000 onwards, stockholding aims have been reduced to four and a half months for motor gasoline, diesel and heating oils, while jet fuel remains at three months. Consistent with security improvement in Europe, this is part of a general stockholding policy – including oil and non-oil products – to decrease costs generated by compulsory stocks to consumers.

Months of Consumption Cover of Compulsory Stocks

	Until 30/06/2000	From 01/07/2000
Motor gasoline	6	4 1/2
Diesel	6	4 1/2
Heating fuel	6	4 1/2
Jet fuel	3	3

Source: Carbura.

No crude oil compulsory stocks are maintained because the Swiss Administration believes that the time lag stemming from crude oil processing into products would be disadvantageous in an oil supply shortfall situation and its use would result in too much heavy fuel oil being produced with no domestic outlet.

Operational Aspects of Stockdraw

Under present legislative and administrative procedures, compulsory stocks can only be released in case of domestic physical oil shortage. The Swiss Emergency System assumes that in case of a supply

disruption, oil companies operating in Switzerland would be affected according to their supply sources and their supply flexibility. Therefore, compulsory stocks would be released company-by-company, considering their respective supply and delivery obligation situation. Oil companies would be requested to present a supply/delivery position stated for each product. Based on this information, the compulsory stock release would be calculated according to the following formula:

	estimated imports
–	export commitments
+	domestic refineries deliveries
+ / –	national fair sharing transfers
+ / –	commercial stocks variations
–	delivery obligations towards consumers or other suppliers
=	supply to be covered by compulsory stock release

As an operational organisation of the Administration, Carbura has experience with stockdraw, as it manages practical aspects of oil stockholding while rotating compulsory stock and releasing temporary compulsory stock due to quality changes or environmental prescriptions.

Compulsory stocks held by oil companies are normally stored together with commercial stocks. Oil companies will receive a stockdraw entitlement in relation to their available supply and delivery obligations. The Ordinance on Stockdraw with Delivery Obligation exists on a standby basis and establishes a link between the right of companies to be adequately supplied and their obligation to deliver oil products to the market. Furthermore, this ordinance would also prohibit hoarding on all distribution levels, so that oil companies would be compelled to deliver the oil released to the market.

Stocks rotation and temporary compulsory stocks release have led Carbura to develop a price calculation scheme by determining oil product prices on the Swiss oil market and pricing adequately in- and outgoing compulsory stocks on a daily basis. Compulsory stocks are released at market prices both in normal times (stocks rotation and temporary compulsory stocks release), and during a crisis.

Since compulsory stocks are commingled with commercial stocks of oil companies, the time required for the administrative preparations from the Federal Council stockdraw decision until its impact on physical deliveries will be limited to a maximum of five days.

Compliance Issues

Monitoring of compulsory stocks (physical availability and quality) has been established for many years with the permanent audit of Carbura, which acts on behalf of the Federal Office for National Economic Supply. Regular on-site controls assure that compulsory stocks match contracts signed with the government. Contract infringements are identified and severely punished.

Infringements to compulsory stock contracts, which stipulate quality, quantity and location of oil products, are prosecuted according to administrative law, and heavy financial penalties are inflicted. In the event of serious breaches to compulsory stock contracts, import licences might be withdrawn. Furthermore, the government can institute penal law proceedings against faulty management.

Compulsory stocks are usually stored together with commercial stocks. It is also common for compulsory stocks of more than one company to be stored together with commercial stocks. Carbura's task is therefore to cross-check the physical availability of compulsory stocks of each stockholder with the storage site records.

Demand Restraint

The Administration, in collaboration with the oil companies, is reviewing its rationing and allocation policies and procedures with the intent to bring them up-to-date with the current market situation and to correspond more closely with the needs of consumers.

Policy and Legal Instruments

As noted earlier, Switzerland has changed its approach with respect to IEP Article 5. In the first stage (e.g. first three months) of an IEP implementation, use of emergency reserves held in excess of its emergency reserve commitment would be substituted for demand restraint measures, as provided for in IEP Article 16.

Should the IEP remain fully implemented for a longer period than three months, then heavy-handed demand restraint measures could be introduced, such as a *pro rata* allocation system for heating fuel oil (Ordinance on Allocation for Fuel Oils) and a rationing system for transport fuels such as motor gasoline and diesel (Ordinance on Rationing Transport Fuels). Under the allocation scheme, purchasers have a *pro rata* allocation right, which is established on the basis of a reference period. The reduction could go as far as 15% for motor fuels and fuel oils.

The Ordinance on Rationing Transport Fuels and the Ordinance on Rationing of Transport Fuels for Private Traffic Users and Other Groups of Users allow rationing beyond the 15% of the above-mentioned allocation scheme. Private car owners will receive rationing cards. The Federal Law on National Economic Supply states the conditions for demand restraint measures and clearly identifies the Authorities in charge of the decision. Related ordinances govern the implementation of the demand restraint measures.

Procedures and Monitoring

Light-handed measures such as persuasion, reduced speed limits and Sunday driving bans, are also part of the demand restraint programme and might be implemented in connection with stockdraw or to accompany heavy-handed demand restraint measures.

In line with the IEA rules on demand restraint measures, Switzerland also has an allocation scheme for aviation fuels which would be applied at the outset of a crisis.

Since Switzerland does not intend to use heavy-handed demand restraint measures in the first stage of an oil supply, this issue has lost its relevance for our country. Activation of IEP response measures would be met with stockdraw only. Under this new approach the Administration believes enough time

would be available to prepare, decide upon and implement demand restraint measures required by the situation.

Plans for an information campaign are available. Press material has been set up in such a way as to enable the Administration to adequately meet public information requirements in a crisis situation.

Decision Processes

The decision process follows the usual procedure for governmental affairs at Federal Council level and needs no testing, since it is used on a regular basis. The decision process for the emergency response programme implies the consultation of governmental bodies, some of which are already represented in the NESO. The decision process could be substantially accelerated in case of necessity.

Evaluation of Measures

No studies have been conducted to estimate volumetric saving from demand restraint measures and no such survey is envisaged for the time being.

Other Response Measures

The simultaneous occurrence of an oil disruption and a gas supply shortfall would, under extreme circumstances (e.g. hard winter conditions), complicate the energy crisis management process. However, industrial gas consumers (e.g. the cement industry) might switch to light heating oil, coal or even to wood waste. Additional light heating oil stocks are maintained to cover this kind of situation.

Fuel-switching is not really available as a measure to reduce oil consumption in Switzerland. Dual- and multiple-firing plants use natural gas as fuel under normal circumstances, and they would switch to oil or other alternative fuels only when gas supply is interrupted. Moreover, electricity generation in Switzerland is not based on gas, but rather on hydro power and nuclear plants.

Data Collection

Acting on behalf of the Federal Office for National Economic Supply, Carbura is responsible for the collection, transmission and monitoring of data. IEA data and emergency data questionnaires are prepared by Carbura. The Swiss data system is regularly updated to fulfil IEA commitments. In addition to Carbura's members, data are collected from the refineries (bonded areas) and from Swiss custom clearance (import and export figures) and controls for consistency.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Shell	Cressier	3.22	65.04	1.30	24.00	0.62	11.10					0.59	11.00	0.53	9.00
RSO (Tamoil)	Collombey	2.50	50.50												
Total		**5.72**	**115.54**	**1.30**	**24.00**	**0.62**	**11.10**					**0.59**	**11.00**	**0.53**	**9.00**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Shell	Cressier			0.69	16.08	2.80	57.40					0.15	3.60		
RSO (Tamoil)	Collombey			0.50	11.65	0.95	19.48					0.24	5.76		
Total				**1.19**	**27.73**	**3.75**	**76.88**					**0.39**	**9.36**		

Map of Turkey



TURKEY

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	2.4	2.2	3.8	3.6	3	1.5	1	0.6
Imports	13.8	17.0	22.8	28.9	29.5	38	45.2	53.9
Exports	–0.2	–1.7	–1.9	–1.6	–2.5	..	..	..
Bunkers	0	–0.1	–0.1	–0.2	–0.3	..	..	..
Net Imports – NI	13.5	15.2	20.8	27.1	26.8	38	45.2	53.9
Total Supply	15.9	17.4	24.6	30.7	29.8	39.5	46.2	54.5
Import Dependence (%)	85	87.6	84.5	88.2	89.9	96.2	97.9	98.8
Stocks – Days of NI	96	48	45	76	90	..	..	

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Turkey depends on imports for 90% of its oil requirements. Current energy consumption of 73 Mtoe comprises 42% oil, 12% natural gas, 30% solid fuels and 16% other sources. Oil import dependence is expected to increase as domestic crude oil production falls from 3 Mt in 1999 to 1 Mt in 2010.

In 1999 oil product consumption was 27 million metric tons, consisting of 15% gasoline, 4% kerosene/jet fuel, 30% gas/diesel oil, 24% residual fuel oil and 27% other products. Consumption of liquefied petroleum gas and ethane was 3 million metric tons. Oil product consumption is forecast to increase with the growth in energy demand. The forecast shows consumption growing by 6.7 Mt (22%) from 1999 to 2005 and 6.4 Mt (17%) from 2005 to 2010. The fastest growth is expected to occur in liquefied petroleum gas, 101% and naphtha/gasoline, 52% from 1999 to 2010.

In the mid- and late-1990s, Turkey imported oil mainly from Iran, Iraq, the countries of the former Soviet Union, Saudi Arabia, Libya, and Syria. Imports from Saudi Arabia have declined in recent years as those from Iraq have increased.

While domestic oil consumption in Turkey at about 27 million tons was some 10% below refinery output in 1999, consumption is expected to rise to 44 million tons in 2010 against existing refining

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	4 486	4 195	–6.5
of which unleaded	864	1 105	27.9
Kerosene and jet fuels	1 599	1 198	–25.1
Gas/diesel oil	6 688	8 111	21.3
Residual fuel oil	7 119	6 653	–6.5
Other	7 733	7 228	–6.5
Total	**27 625**	**27 385**	**–0.9**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Iraq	4 776	0	0	11	0	0	4 787
Iran	4 755	0	0	0	0	0	4 755
Former Soviet Union	3 218	0	668	33	0	147	4 066
Saudi Arabia	3 630	0	0	0	0	89	3 719
Libya	3 571	0	2	0	0	13	3 586
Syria	2 137	0	0	0	0	0	2 137
Other	898	1 146	441	126	85	2 832	5 528
Total	**22 985**	**1 146**	**1 111**	**170**	**85**	**3 081**	**28 578**

Source: IEA Quarterly Oil Statistics.

capacity of 32 million tons. Tupras, the major national oil company, has four refineries. It dominates Turkey's downstream sector. Most of the refineries are earmarked for modernisation and a programme has been underway for some time, aimed at increasing production of light products. Turkey's only privately-owned refinery is the Atas plant, near Mersin, which is operated as a joint venture between Mobil (51%), Shell (27%), BP Amoco (17%) and Marmara Petrol ve Rafiner Isleri (5%).

Tupras' refining capacity is around 27 million metric tons per year and its market share in Turkey is around 85%. The Izmit refinery accounts for just under half of the total national capacity, with Izmir the second largest, followed by Kirrikale, with Batman the smallest facility. Izmit is located around 200 km east of Istanbul and has a capacity of 230 000 barrels per day (b/d). Its operations were seriously disrupted by an earthquake in August 1999, and it has only recently begun again to operate at full capacity. For some months after the earthquake, its throughput was reduced to less than half design capacity. Its products are mainly destined for Turkey's industrial heartland between Istanbul and Izmit. Izmir, on the western coast of Aliaga, has a capacity of 200 000 b/d and has the country's only lube facility. It supplies the south of the country.

Kirrikale, which is the most modern refinery, is in Central Anatolia and has a capacity of 100 000 b/d. It is linked to a pipeline from the south of the country and supplies the rest of the country not covered

by the two larger facilities. Batman has a capacity of 20 000 b/d and is the most sophisticated of Tupras' refineries. The private Atas refinery has an annual capacity of 4.4 Mt.

Tupras was a loss-maker for many years, mainly due to government price controls. This was amended to a much less rigid system in 1998, which allowed the company to return to profitability. Tupras recently made a public offering of shares and a block offering is planned for late 2000. The new pricing system enables refineries to adjust their product prices to reflect the changes in crude oil prices as well as lira/dollar exchange rate fluctuations. The new system permits prices to fluctuate by plus or minus 3% on Mediterranean benchmarks. Tupras markets almost all its products through distribution companies, which include Petrol Ofisi, BP/Amoco and Shell. Its other major client is Petkim, which buys just under 2 Mt of products from Tupras each year.

The arrival of the new pricing structure has been successful in other respects. It has resulted in more efficient differentials between product prices and provided an incentive for international majors to remain in the Turkish market.

Tupras embarked on a major refinery investment programme in 1997, which runs through 2003. The project was designed to change its products configuration and to meet European Union standards. The main aim has been to minimise the lead content of gasoline and minimise the sulphur content of diesel fuel. Lead content was reduced to zero by the end of 1999 and sulphur content will be zero by the end of 2000.

During 1998, 27.13 Mt of crude oil were processed, yielding 26.65 Mt of products. During the same period, 5.0 Mt of products were imported, while 2.3 Mt of products were exported. Civilian consumption of petroleum products reached 28.1 Mt. (The years 1999 and 2000 reflect the effects of earthquake damage.) A refinery with a capacity of 5 Mt is planned for 2005. In 2010, either another refinery with a capacity of 5 Mt will be required, or the first refinery's capacity will be increased to 10 Mt. Projections of refining output, consumption and trade, without additions to refinery capacity, are shown in the Table below.

2005-2010 Refinery Production, Consumption and Trade Forecast

Products	2005			2010		
	Production	Consumption	Trade	Production	Consumption	Trade
LPG	1 310	3 198	–1 888	1 276	3 217	–1 941
Naphta + Gasoline	6 978	9 180	–2 202	6 976	11 391	–4 415
Jet Fuel + kerosene	2 677	1 465	1 212	2 961	2 181	780
Diesel Oil	8 859	13 503	–4644	8 384	15 756	–7 372
Lube Oil	342	470	–128	350	549	–199
Heating Oil + Fuel Oil	8 259	6 565	1 694	8 264	6 907	1 357
Asphalt	1 508	1 960	–452	1 789	2 300	–511
Others	258	1 178	–920	256	1 150	–894
Total	**30 191**	**37 519**	**–7 328**	**30 256**	**43 451**	**–13 195**

Note: In Trade columns, negative numbers indicate imports and positive numbers indicate exports.
Source: General-Directorate of Petroleum Affairs.

In order to attract private investment to meet growing energy demand and to improve the functioning of the energy sector, the government has decided to privatise the state refineries and the oil products

distributing companies. For this purpose, the sixth article of Petroleum Law Nº 6326 was changed in 1994 and the article on the restriction of the construction of refineries and pipelines was removed. In this way it was made possible for the private sector to build and buy a refinery and to form partnerships with the public sector.

Turkey has been using several seaports for oil imports from other countries (mainly Izmit, Izmir, Mersin) and international pipelines from Iraq for its primary supply of oil. Major pipelines in Turkey are as follows: 1) Two pipelines with a total capacity of 71 Mt per year from Iraq to Ceyhan; 2) a pipeline with a capacity of 3.5 Mt per year from Batman oil fields to the port of Dortyol; and 3) a pipeline with a capacity of 5 Mt per year from the port of Ceyhan to the Kirikkale Refinery. There are 13 distribution companies in Turkey. All of them have total storage capacity of 1.5 Mt. Also, TUPRAS and ATAS refineries have total storage capacity of 5.6 Mt.

Turkey as a Transit Country

Turkey is an important link from the oil-producing areas of the Middle East and the Caspian to Europe. It will play an important role in future strategies for the development and exports of crude oil and natural gas from the Caspian region for several reasons. Firstly, thanks to its geographic proximity and expected robust growth in domestic energy demand (particularly for natural gas), Turkey is a natural market for Caspian hydrocarbon resources. Turkish gas use is projected to increase by as much as 10% per year. Botas, the national pipeline company, is making arrangements to supply by 2010 some 60 Bm^3 per year from various sources. Secondly, the Turkish national oil company TPAO is involved in oil production activities in the region, including the AIOC project offshore Azerbaijan. Thirdly, Turkey provides one of the principal and most feasible routes for Caspian oil and gas deliveries to Europe that do not require transit through Russia.

The planned crude oil pipeline from Baku to the Mediterranean port of Ceyhan would bypass not only Russia, but also the environmentally sensitive Turkish Straits. There is a concern that future oil exports through the Black Sea could significantly increase tanker traffic through the Straits, thereby raising the chance of tanker accidents and resulting oil spills. Besides environmental concerns, there are security of supply concerns related to shipping all oil via one route. A serious accident in the Straits could potentially disrupt the flow of oil from the region. A pipeline bypassing the Turkish Straits would enhance energy security by increasing the number of export options.

The 900 kb/d Baku-Ceyhan pipeline will have to overcome several obstacles in order to meet the planned start-up by 2004. These include still insufficient oil reserves earmarked for this project and cost competition from two alternative export routes – an expanded northern route to Russia's Black Sea port of Novorossiysk and an expanded western route to Georgia's Black Sea port of Supsa. These issues are discussed in some detail in the 1998 IEA publication "*Caspian Oil and Gas. The Supply Potential of Central Asia and Transcaucasia*".

Turkey may also become one of the main recipients of Caspian gas in the near future. Three alternative export routes considered are: 1) a line from Azerbaijan via Georgia to Turkey; 2) a line from Turkmenistan via Iran, and 3) a line from Turkmenistan under the Caspian Sea via Azerbaijan. The second project is hampered by the US sanctions against Iran, whereas the third is contingent upon resolution of a dispute between Azerbaijan and Turkmenistan over pipeline capacity allocation. Moreover, gas exports to Turkey from these two countries will face intense competition from Russian and Iranian gas exports, as well as from various LNG export schemes. The main frontrunner is the

Blue Stream line under the Black Sea which may start delivering 16 Bm^3/year of Russian gas by 2002. The main shareholders in that project – Gazprom, ENI and Botas – have recently announced the start of construction of the line on the Russian and Turkish shores.

In September 1994, TPAO bought a stake of 6.75% in the Azerbaijan International Operating Company (AIOC), a consortium of foreign oil companies in a multi-billion dollar oil production-sharing agreement with the Azeri state oil company to develop offshore oil fields in the Caspian. In November 1999 in Istanbul, the Presidents of Turkey, Azerbaijan, and Georgia signed a legal framework intended to allow Baku-Ceyhan to begin. One advantage of Baku-Ceyhan over other potential options for Caspian oil transport is that Ceyhan can handle Very Large Crude Carriers (VLCCs), while key ports in Georgia and Russia cannot.

Emergency Response Policy and Organisation

Emergency Response Policy

The policy of the Turkish Administration is to observe strictly all IEA emergency response commitments.

Retail prices of petroleum products were formerly determined by the fuel distribution companies within the framework of liberal applications started in the petroleum sector in 1989. In Turkey, in order to adjust the oil product prices of refineries to the daily declared prices in the world, a model called Automatic Price System (APS) has been adopted. A Decree on the Oil Product Price Stabilisation Fund (AFIF), which defines the application of the APS, mentioned above, was published on March 14, 1998 in the Official Gazette. This Decree was implemented on July 1, 1998. The Decree also contains the principles of buying, selling and pricing crude oil and oil products. POAS is the National Distribution Company, with a 51% share of market. TUPRAS and POAS are soon to be privatised. The privatisation of these two companies will activate the competitive mechanism and increase profitability. In this way, import and export of products will become more attractive for the industry.

The Turkish Petroleum Law Nº 6326 Article 13 stipulates that oil-producing companies must increase their production significantly in an oil supply emergency. The Turkish Administration has compulsory specification for gasoline and diesel oil and voluntary standards for LPG and fuel oil. The Turkish Standards Institute (TSE) prepares standards. But according to Decree Nº 98/10745 Article 19, "Products subject to AFIF shall be marketed in accordance with the compulsory or voluntary standards put into effect by the TSE. Establishment of standards which are not set by the TSE or improvement of products' quality with the use of additives is subject to the approval of Ministry." According to this Article, in case of disruption, these specifications can be relaxed to increase refinery output with the approval of the Ministry.

Introduction of natural gas since 1987 has resulted in much substitution of light and heavy fuel oil in power generating plants, industry and home heating sectors and also replaced naphtha as a feedstock for fertiliser plant. Turkey produces only a small amount of natural gas, and thus natural gas imports have increased rapidly. The government is in the process of diversifying its gas suppliers. Several transmission pipelines are being considered to bring natural gas from Iran and the Caspian area, as well as to increase imports from Russia and Algeria. These imports will further diversify Turkish energy supply and will decrease air pollution and CO_2 emissions to the extent that natural gas replaces more carbon-intensive fuels. The supply of natural gas will reach 40 Bm^3 in 2010.

Emergency Organisation

The Turkish NESO was established in the Ministry of Energy and Natural Resources on a stand-by basis for an emergency. The General Directorate of Petroleum Affairs will be the core of the Turkish NESO and is in charge of overall emergency planning and would serve as the secretariat for involved Ministries, national organisations and the industry. The distinguishing characteristic of the Turkish NESO is that it comprises senior officials of the relevant administrations and heads (or deputies) of the oil companies and is chaired by the Deputy Under Secretary of the Ministry of Energy and Natural Resources. Therefore, decision-making would be quick and the emergency measures could be implemented immediately. The staff of the following administrations would also participate in the NESO when deemed necessary.

- General Secretariat of National Security Committee activates relevant Ministries on behalf of the Prime Minister and ensures co-ordination and public communications.
- The Ministry of Transport controls both the transport of crude oil and oil products by vessels and pipelines, as well as the communication systems of the country. Due to the control of the communication facilities, co-ordination with the local provinces is its responsibility.
- The Ministry of Foreign Affairs is primarily responsible for international co-ordination, notably with the IEA in an emergency.
- Other competent Ministries would participate in the NESO in order to secure the implementation of relevant Government Decrees.

The following legislation gives the Turkish NESO wide-ranging authority for emergency management and control of the oil industry.

- Province Administrations Law N° 5442/1949
- National Security Law N° 3634/1939
- National Protection Law N° 79/1960 (revised in 1980)
- The Decree of Council of Ministers N° 98/10745 on the Oil Product Price Stabilisation Fund (AFIF)/1998
- Petroleum Law N° 6326/1954
- Organisation and Functions Law of Ministry of Energy and Natural Resources N° 3154/1985
- Circular N° 22854/1996. (Establishment of Marketing and Distributing Companies)
- Petroleum Regulation N° 14111/1989

Allocation Procedures

Tupras as a state-owned company handles a major portion (86%) of petroleum product supply. For this reason, it could easily handle national allocation liabilities by means of voluntary offers. The allocation of products to consumers would be calculated on the historical market of their consumption and according to the priority list prepared by the Administration. Tupras could co-operate closely with the NESO. Turkey is confident that other companies would participate in the voluntary offer process due to their close ties and co-operation with the Administration.

If voluntary action does not produce the desired results, the government has legal authority to enforce implementation of Type 3 transactions in accordance with the National Security Acts and National Protection Law Nº 79.

Members of the NESO were trained on the occasion of the IEA Allocations Systems Test and CERM tests, organised by the IEA. In addition, there are national exercises using national scenarios.

Emergency Reserves

Policy and Legal Instruments

The legal power of the government in an emergency over the drawdown of product stocks comes from the National Security Acts. The National Protection Law No: 79, together with the National Security Act, provided the government with a broad range of authority to control the oil sector. AFIF, in accordance with Article 5 of Law N° 79/1960, was issued in 1989 and updated in 1998.

With the government statutory power for the implementation of the National Security Acts, according to the National Protection Law N° 79, voluntary action can be obtained immediately.

Stockholding and Maintenance

Turkey has the following regulations regarding oil and product stocks:

a) According to the Petroleum Law Article 37, a refinery cannot be the subject of any transaction apart from the certificate. In one of the conditions of the annex of this certificate it is specified that refineries have to provide stocks equal to 30 days of their process.

b) According to Article C of the Circular of the Ministry of Energy and Natural Resources (N° 28854/1996), every Fuel Distribution and Marketing Company should maintain a product stock for a period of ten days based on their daily sales.

c) According to Article A of the above-mentioned Circular, the newly-established Fuel Distribution and Marketing Companies must have a storage capacity total of 30 000 tons, which is foreseen in at least two consumption regions.

d) According to Article 8, the Decree of the Fuel Price Stabilisation Fund Nº 98/10745, companies and organisations which import petroleum products have to possess a minimum storage capacity of 3 000 tons for LPG and 30 000 tons for other petroleum products. And those companies have to keep as product stocks a minimum of 10% of the import quantity of the products other than LPG, for a period of two months that follow the month during which importation has been effected.

e) According to Article 9 of the above-mentioned Decree, products can be moved on a transit basis between refineries, main depots and warehouses with customs facilities. The distribution companies may hold petroleum products up to the quantity that they have to hold in accordance with the relevant legislation on compulsory stocks, at their main depots (bonded warehouses) that have customs clearance possibilities.

The Turkish demand restraint programmes in an emergency would cover wide-ranging measures such as energy-saving campaigns through mass media, compulsory measures such as weekend and short distance driving bans and introduction of delivery quotas of gasoline, and finally, rationing. Every year, Turkey organises in the first week of October an intense energy and natural resources saving campaign. During this week, competitions and exhibitions of posters, paintings and slogans, as well as seminars, have been undertaken nation-wide. The material for the campaign is prepared by the Ministry of Energy and Natural Resources, the Ministry of Education and other relevant administrations. Turkey considers that in a real crisis, the demand restraint programmes could be easily developed using the existing peacetime campaign programmes.

The National Protection Law and the National Security Acts give the government authority to implement all types of demand restraint programmes, including rationing, in an emergency. To implement light-handed demand restraint measures such as information and energy-saving campaigns, activation of the relevant Law and/or Acts is not required, and thus the Ministry of Energy and Natural Resources, in co-operation with the NESO, could implement these measures on its own initiative.

Procedures and Monitoring

Parliamentary ratification is not required to implement demand restraint measures other than rationing in an emergency, The Administration, notably the General Directorate of Petroleum Affairs in the Ministry of Energy and Natural Resources, is given strong authority to plan and implement any kind of demand restraint. Therefore, the decision-making and the implementation of the NESO would be quick and flexible. The Directorate would prepare demand restraint programs and a draft decree for the final decision of the Council of Ministers. The local governors of 80 provinces implement the decision of the central government. The governor of the province has a corresponding organisation to the central government and communication between the central government and the governor will be kept in close contact in an emergency. The implementation would be carefully monitored and controlled by the central government.

The Administration envisages that a combination of demand restraint measures, in practice, could be easily developed from the peace-time energy saving campaign and introduced in a real emergency without major difficulties, taking the nature, size, and expected duration of the crisis into consideration.

The lead time of the demand restraint measures, other than the rationing schemes, is estimated to be about seven days for the administrative preparation and decision-making, four days from implementation to the full operation and about 14 days from implementation to the first measurable effect.

If the information and saving campaigns are not enough, the compulsory orders and delivery quotas could be introduced. These measures are the primary tools for reducing the oil consumption in the second stage of the demand restraint measures. The compulsory orders include speed limits, short distance driving ban, use of public transportation, odd/even numbered plates driving privilege, weekend driving ban, temperature restrictions for houses and public buildings, restriction of lighting for show windows and prohibition of motor sports.

As for the delivery quotas, the government could introduce a delivery quota system of oil products to distribution companies, large-scale industry, local provinces and other large consumers. The allocation of the products to consumers is to be calculated on their historical consumption and according to a detailed priority list prepared by the Administration during the national economic crisis which followed the oil crisis of 1979.

There are no available estimates of the annual financial costs of purchasing emergency oil stocks. For storage, according to Council of Minister Decree N° 98/10745 Article 17, "Expenditures incurred as a result of a requirement by the Prime Ministry to keep crude or product stocks in quantities above the operating stock levels or to keep stocks in case of a State of Emergency." (The method of refunding the stock values shall be determined by the Prime Ministry.) According to Article 9 of the above-mentioned Decree, products can be moved on a transit basis between refineries, main depots and warehouses with customs facilities. The distribution companies can keep petroleum products up to the obligatory stocks quantity that they have to keep in accordance with the legislation of distribution companies, at their main depots (bonded warehouse) that have customs clearance facilities.

Operational Aspects of Stockdraw

Detailed stock drawdown procedures have not yet been established. The Administration intends to conduct a study on stock drawdown procedures after privatisation of the refineries and the state-owned marketing company.

Oil products would be released into the market at prevailing market prices. A recently issued AFIF Decree has set pricing mechanisms very firmly. But in case of emergency, the Council of Ministers Decree could set the price of oil products according to the National Protection Law.

The Administration envisages that the lead time from an administrative decision until physical delivery would be 2-5 days, depending upon the locations of the tanks and type of the products.

Compliance Issues

The General Directorate of Petroleum Affairs is given legal authority to conduct on-site base or regular inspections and to order a company to provide any data or documents necessary for its stockholding obligations. The import license of an oil product importer could be cancelled if the company failed to meet its stockholding obligation.

It is government policy that the stockholding obligation of each company should be achieved keeping the balance between the financial burden and earnings of each company.

The companies operating in Turkey commingle compulsory stocks. The Administration leaves this issue to the companies' judgement and responsibilities. It considers that the stock drawdown could be secured in an emergency without problems arising from commingling.

Demand Restraint Measures

Demand restraint measures would be a primary response of Turkey in an emergency, since the quantity of available stocks in a crisis would be limited. However, the Administration would not exclude the possibility of a stockdraw in an emergency. The use of stockdraw could be effective in alleviating the severity of the crisis, particularly in the early stage and at the most critical stage of the crisis. The Turkish NESO would be given wide-ranging and strong authority to decide on the appropriate mix of demand restraint measures and stockdraw in an emergency.

Coupon rationing schemes would be introduced for the most severe crisis. A decree of the Council of Ministers is to be issued and Parliamentary approval is required before its implementation. The Administration considers that rationing schemes, from their preparation to their implementation, could be introduced within one or two weeks. Although Turkey has never introduced rationing schemes in past emergencies, the Administration envisages that the experience of the gasoline and diesel oil delivery quotas to major cities for a three-month period during the national economic crisis followed by the 1979 oil crisis could be a model for future rationing schemes. In the crisis of 1979, coupons and priority lists for fuel oils were prepared and issued by each local government. In a real crisis, coupons would be prepared by the central government and allocated to each local government. Vehicle owners registered in the transport administration who had paid the car tax will have the right to receive coupons. Turkey has prepared several kinds of rationing schemes for other commodities, so that the rationing could cover all commodities and sectors in Turkey. In practice, rationing schemes in non-energy fields have been experienced in the past and, therefore, the public is accustomed to the rationing. The Administration is confident that rationing could be introduced smoothly and without major difficulties.

The lead time for demand restraint measures other than the rationing schemes is estimated at seven days for the administration, preparation and decision-making, four days from implementation to the full operation and about 14 days from the implementation to the first measurable effect.

Decision Processes

The decision-making process in an emergency in Turkey has been well-established. Administrative procedures, including the decision-making process, proved to fully function during the Gulf Crisis.

Evaluation of Measures

Turkey does not have any study on estimated volumetric savings from demand restraint measures. However, the Administration is confident that the demand restraint target could be achieved in a real emergency. Distribution companies and local provinces have to report the situation of product delivery and saved amount by the implementation of the government decision to the General Directorate of Petroleum Affairs of the Ministry of Energy and Natural Resources weekly or on a daily basis, if need be. Therefore, volumetric effects of the measures could be monitored and the targets to be achieved would be secured.

Other Response Measures

Indigenous production can be increased between 5 - 10% for ten days in an emergency case.

According to the Petroleum Law, the Minister may require petroleum right holders to produce petroleum from their existing wells at a sufficient rate. But no holder shall be required:

a) to produce from any well at more than its maximum efficient rate of production, or,

b) to increase its production beyond the proportion required from other petroleum producers. By decision of the Council of Ministers, deviation from this rule may be made to the extent necessary to prevent waste or to meet the exigencies of national security or equity.

Turkey is diversifying its natural gas sources. LNG storage capacity will increase in the following years.

It is government policy to encourage building of an electricity generation plant to provide fuel-switching facilities. Therefore, some of the power plant has been built recently to use dual fuels like fuel oil and natural gas.

Data Collection

The Turkish Administration uses the Internet for transmission of data, text and graphics to the Secretariat.

Various questionnaires are used to collect data on indigenous production, stock levels, and refinery operation. The data is processed through a computerised procedure (relational database and relating programs) before being compiled into the MOS questionnaire.

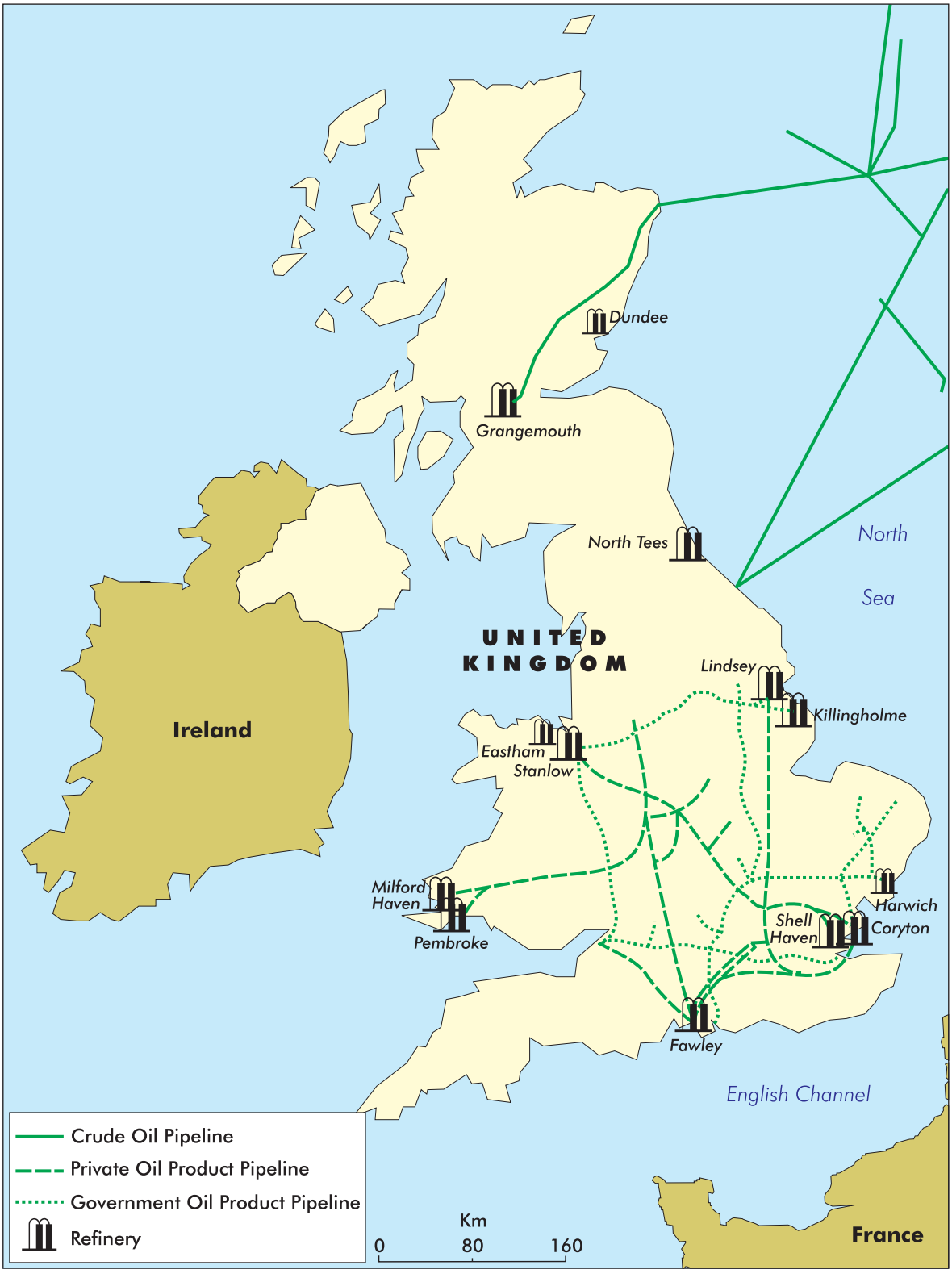
Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Atas	Mersin	4.40	88.88												
Tupras	Izmir	11.30	228.26	4.20	77.70	1.98	28.42	0.60	11.52	0.80	15.36			1.00	
Tupras	Batman	1.10	22.22	0.10	1.85	0	0								
Tupras	Izmit	11.30	228.26	4.40	81.40	2.31	44.35	1.10	21.12	1.10	21.12				
Tupras	Kirikkale	5.00	101.00	1.50	27.75	0.77	14.78			0.70	13.44				
Total		**33.10**	**668.62**	**10.20**	**188.70**	**5.06**	**96.05**	**1.70**	**32.64**	**2.60**	**49.92**			**1.00**	**17.00**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Atas	Mersin			0.60	13.98										
Tupras	Izmir			0.40	9.32	1.30	26.65								
Tupras	Batman			0.50	11.65										
Tupras	Izmit			0.80	18.64	2.80	57.40								
Tupras	Kirikkale			0.80	18.64	1.40	28.70								
Total				**3.10**	**72.23**	**5.50**	**112.75**								

Map of the United Kingdom



THE UNITED KINGDOM

Key Oil Data
(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[1, 2]	2010[1, 2]
Production	82.6	132.5	95.3	136.5	145.6	150	126
Imports	57.3	49.7	65.4	60.0	54.8	70	70
Exports	–55.4	–101.2	–76.5	–110.5	–118.1	–123.3	–95.5
Bunkers	–2.4	–2.1	–2.5	–2.4	–2.3	–2	–2
Net Imports – NI	–0.5	–53.7	–13.6	–52.9	–65.7	–55.3	–27.5
Total Supply	82.1	78.8	81.6	83.5	79.9	94.7	98.5
Import Dependence (%)	0	0	0	0	0	0	0
Stocks – Days of NI	0	0	0	0	0	0	0

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Current total primary energy supply of 231 Mtoe comprises 35% oil, 36% natural gas, 16% solid fuels, 11% nuclear and 2% other sources. Although the United Kingdom is one of the major exporters of oil, it imports oil mainly from Norway, the countries of the former Soviet Union, Libya and Denmark.

The United Kingdom is the fourth largest oil producer in the IEA. A large proportion of UK oil production is exported. According to IEA Monthly Oil Statistics, an estimated 88 million metric tons of crude oil and NGLs was exported in 1999 (an increase of 3 million metric tons on 1998), principally to the United States, Germany, France and the Netherlands. Total exports of crude oil, NGLs and products in 1999 were an estimated 118 million metric tons. Major product export destinations are France, Germany, Ireland, Italy, the Netherlands and the United States. UK refineries currently process about 95 million metric tons per annum and net exports of products were around 13 million metric tons in 1999.

Oil production prospects have changed significantly since the early 1990s, when indigenous production was presumed to have already peaked in 1985 at about 131 million metric tons and to continue to decline. With the discovery of new oil fields and the implementation of new technology, production has

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	21 884	21 559	–1.5
of which unleaded	–	–	–
Kerosene and jet fuels	12 816	13 197	3.0
Gas/diesel oil	23 149	22 830	–1.4
Residual fuel oil	2 936	2 185	–25.6
Other	12 455	13 314	6.9
Total	**73 240**	**73 085**	**–0.2**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Norway	25 947	312	1 020	0	37	156	27 472
Former Soviet Union	2 783	25	1 148	24	203	142	4 325
Libya	1 768	0	58	0	210	0	2 036
Denmark	1 669	0	47	0	24	14	1 754
France	568	214	238	195	179	348	1 742
Czech Republic	46	195	110	0	5	3	359
Other	8 159	1 500	2 382	159	2 069	880	15 149
Total	**40 940**	**2 246**	**5 003**	**378**	**2 727**	**1 543**	**52 837**

Source: IEA Quarterly Oil Statistics.

been on the increase since 1992. Changes to the Petroleum Revenue Tax (PRT) in 1993 are considered to have played a positive role in the development of new fields. More recently, the oil price increase of 1999/2000 has had a major impact on North Sea exploration and development activity.

According to the Administration, production from UK oil fields is generally maintained at the optimum rate for ultimate maximum increased production of oil over the expected life of the field. If constraints imposed to ensure optimum recovery and environmental protection were relaxed, an increase of 4% in oil production could be achieved within one month. A further increase of 4% could be achieved within three months if the oil price or other incentives made more costly improvements to field developments viable.

The government would expect the effect of an oil crisis on prices to induce increased production. Discussions would take place with the industry regarding any scope for further increases and the government would use its powers under the Energy Act 1976, if necessary. However, the potential for an increase in production could depend on the time of the year. Moreover, it could involve decreased production later as a result of postponement of maintenance and relaxation of other constraints.

Oil Consumption Projections to 2010

(million tons oil equivalent)

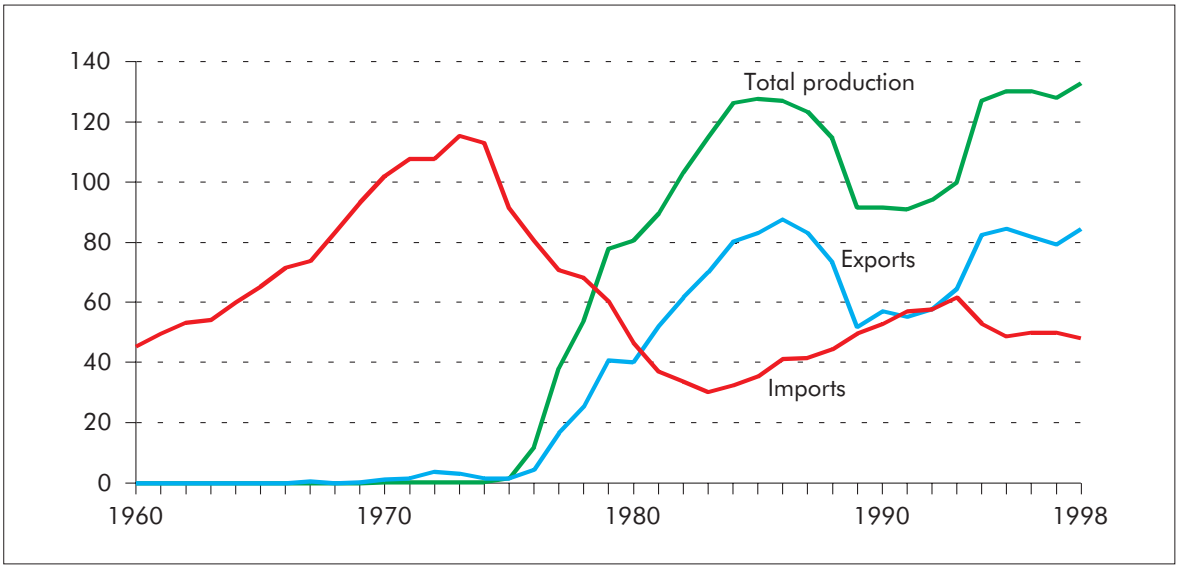
	2000	2005	2010
Total final use	67.8	70.8	75.0
Industrial sector	7.3	7.0	6.1
of which: petrochemical feedstock	*5.5*	*5.5*	*5.5*
Transport sector	56.3	60.8	66.4
of which: road	*44.3*	*46.8*	*49.9*
Other sectors	4.2	3.1	2.6
of which: residential	*1.2*	*0.7*	*0.4*
Own use and losses (energy industries)	7.4	7.7	8.1
Non-energy use	4.7	4.7	4.7

N.B.: excludes international marine bunkers.
Source: Department of Trade and Industry.

During the 1990s, diesel oil demand grew while gasoline demand declined slightly. At present it is uncertain how far these trends will continue, though the industry currently expects diesel demand to exceed gasoline demand in the long-term. The United Kingdom is currently a net exporter of gas/diesel oil. This situation may only continue in the longer term so long as UK refiners adapt to changing market trends and product specification requirements. These are particularly important, given the introduction of new lower permitted levels within fuels for sulphur, volatile organic compounds such as benzene.

In 1998 oil accounted for 42% of UK energy consumption by final users. In 1973, when oil use peaked, the corresponding percentage was 53%. While oil made up 26% of the fuels used for electricity generation in 1973, in 1998 this percentage had fallen to some 2%, reflecting the declining use of oil for electricity generation. In the future, oil use is forecast to become even more concentrated in the transport sector, with demand growth strong in the case of diesel oil and aviation fuel.

United Kingdom Oil Market, 1960 to 1998



Source: Department of Trade and Industry.

Percentage Oil Use by Sector

	1973	1994	1998	2000	2005	2010
Transport	42	75	79	83	86	88
Industrial	39	14	10	11	10	8
Domestic	6	5	5	2	1	1
Other	13	7	5	5	3	3
Total*	100	100	100	100	100	100

Source: DTI.

Since 1973 the share of industry and commerce in total oil consumption has fallen from over half to about one-eighth, but transport's share has increased from just over 40% to over four-fifths. These trends are expected to continue in future, though at a somewhat slower pace.

Oil as Percentage of Sector Energy Use

	1973	1994	1998	2000	2005	2010
Transport	99	99	99	99	99	99
Industrial	44	24	18	18	16	14
Domestic	11	7	8	3	1	1
Other	52	21	15	13	11	8

Source: DTI.

Emergency Response Policy and Organisation

Emergency Response Policy

The government's approach to both oil stocking and emergency planning focuses on encouraging and supporting industry-led arrangements, in favour of market mechanisms. If a crisis were to emerge, the government would monitor and consult with industry about the extent to which market mechanisms were affected (in terms of incremental production, fuel-switching, stocks and demand) before taking any action. If necessary, the first response would be to arrange appropriate release of stocks onto the market. In preparation for crises, the United Kingdom places greater emphasis on information availability, industry co-operation and flexibility rather than detailed planning within the industry. However, detailed plans do exist for certain emergency measures. These are regularly reviewed and revised by the government in liaison with the overall industry body, the Oil Industry Emergency Committee. These plans would allow oil companies operating in the United Kingdom to be rapidly informed of the detailed actions necessary if emergency measures other than stockdraw were activated.

Consistent with the IEA Governing Board Decision of 1995, if an oil crisis arose, the United Kingdom would expect stockdraw, demand restraint and complementary measures to form the first stage of any international action and other measures to be introduced as and when appropriate.

The United Kingdom prefers stockdraw to demand restraint as the first response in temporary disruptions. As the likely duration of a supply disturbance will often be uncertain, the United Kingdom

accepts that demand restraint will also have a substantial role if the crisis looks likely to persist into the medium or longer term. The precise mix of stockdraw and demand restraint measures would be determined in the light of the circumstances at the time, taking account of the nature of the crisis (i.e. the size and source of the disruption), its likely duration and the balance between the desire to maintain certain levels of stocks throughout the disruption, on the one hand, and the containment of economic and social effects of consumption reduction on the other.

The United Kingdom is self-sufficient in natural gas, and it became a net exporter in 1997. In a crisis, the possibilities for switching into gas would be one of the potential responses that would be fully investigated. Natural gas production has increased from 40.9 Mtoe in 1990 to 87.2 Mtoe in 1998 and is forecast to increase to 101.0 Mtoe by 2005. According to UK statistics, gas consumption in the United Kingdom grew from 15.6% of total energy supplied in 1973 to 37.3% in 1998. This level of use almost meets the level of 37.5% that was expected to be reached by 2005 when the projection was first published in 1995. The fast growth in demand in recent years reflects increased use for power generation in the United Kingdom.

In September 2000, supply disruptions occurred in the United Kingdom due to widespread protests at fuel refineries and distribution terminals in reaction to high fuel prices, with these protests having widespread public support. These protests, along with the associated heavy demand from the public for key road fuels, rapidly led to severe shortages of oil products.

As a result of these disruptions, a task force was established involving Ministers, the oil industry, the police, the trade unions and road hauliers to develop a series of practical arrangements involving all the key parties, with the goal of maintaining the continuity of oil supply. This work resulted in a Memorandum of Understanding (MoU).

Key elements of the MoU committed the relevant parties to (1) joint early warning systems and co-ordinated contingency plans, and (2) joint crisis management systems.

As such, the new procedures put in place represent a refinement of the existing plans and an enhancement of the information-gathering and dissemination that will occur during any fuel emergency.

Emergency Organisation

The powers under the Energy Act 1976 can be fully implemented by an Order in Council, either (a) because European Commission or IEA obligations necessitate it, or (b) because an actual or threatened emergency affecting fuel or electricity supplies within the United Kingdom makes it necessary for the government to have temporary powers to control the sources and availability of energy.

In a domestic emergency, the Order in Council is subject to affirmative resolution in both Houses of Parliament, but it can remain in force for 28 days without this resolution. Orders arising out of international obligations are free from Parliamentary control. As such, the powers under the Energy Act can be enacted with a minimal level of delay involved.

The new procedures (under the MoU) include a matrix covering four stages of fuel alert. The criteria for assessing the stage of alert is set out at each stage, along with the responsibilities of both the government and oil industry in terms of reporting information and decision-making.

A key aspect of the revised systems is a change in the working relationship between the DTI and the oil industry. In the first instance, the DTI and the oil industry will operate what is called the Joint Response

Team. The team has both an information collection role and a trouble-shooting role. The team also provides the means to provide answers to any queries that arise from others during any emergency situation, providing quick access to a core of knowledgeable industry staff. By co-locating these representatives together, the chains of communication are shortened, thus minimising any delays in resolving problems. In addition, representatives of other key departments and the police will also be included as members of the Joint Response Team, depending on the level of the alert.

If a crisis emerged, the National Oil Board (NOB) would be set up under the authority of the Secretary of State for Trade and Industry, depending on the level of the alert. In the event of activation of the IEA emergency procedures, the NOB would function as the UK National Emergency Sharing Organisation (UK NESO). The NOB is activated on an *ad hoc* basis. It could be established at any time when a shortage of oil in the United Kingdom or compliance with international obligations requires government control and direction of oil supplies and usage.

The organisation of the NOB would include personnel responsible for all emergency response functions. Staffing would be drawn mostly from existing DTI staff, with secondment from other governmental departments and industry experts, as necessary.

The NOB would be supported by the Oil Industry Emergency Committee (OIEC). The OIEC represents major oil companies, all of them refiners, which account for about 90% of inland deliveries of oil products in the United Kingdom. It has a small permanent secretariat provided by Shell UK. It is assisted on a part-time basis by advisers as well as specialist committees, *ad hoc* working parties and a regional organisation that involves representatives from the other oil companies. In most cases these committees are nominated experts. Members of the UK Offshore Operators Association (UKOOA) will submit data under the Petroleum Production Reporting System (PPRS), but it will not play any role under the OIEC. Outside of contacts during any emergencies, the DTI holds regular meetings and training sessions with the OIEC.

The OIEC works under government direction. Individual oil companies provide the staff to operate a control centre when the government decides to activate the full OIEC structures. To do so, the government must first implement emergency legislation that allows the member companies to operate as a combined entity free of normal commercial constraints. Nothing that the OIEC does in its planning activities in normal times transgresses any national or international legislation concerned with fair-trading, competition or similar requirements.

The government would need to invoke the Energy Act 1976, which allows the member companies of the OIEC to operate as a combined entity free of normal commercial constraints. In an emergency, the OIEC may contact individual oil companies on behalf of the government

An OIEC Operations Group (OOG) would be set up under an Operating Executive, who would be a senior oil industry appointee with experience in oil emergency planning. During an oil supply emergency, close co-operation between the NOB and OOG would take the form of daily liaison at appropriate levels between the two bodies, with two-way data flows and meetings between relevant personnel at key stages.

Overall responsibility for co-ordinating the planning and responses to civil emergencies in the United Kingdom is vested in a Cabinet Committee, the Civil Contingencies Unit (CCU). The CCU can be convened rapidly and would provide a forum for Ministerial discussion and collective decision-making concerning any aspect of the UK response to an oil emergency. The DTI has been nominated by the CCU as the lead governmental department for an oil emergency.

The government would not be likely to activate the powers of the Energy Act 1976 in a sub-crisis situation. In this case, the Head of the Oil and Gas Division in the DTI would have overall responsibility for emergency management. In such a case, the DTI would ensure that each company received the same information on the nature and background to any emergency, and would work to ensure that companies took the required action on any issue of joint concern to all companies.

As the OIEC needs specific legislative action to be active, this vital organisation is not foreseen to operate except in an advisory role, and companies would not benefit from the ability to operate as a combined entity free of normal commercial constraints. However, the government would make use of the permanent secretariat, as well as bilateral contacts with the oil companies themselves, to ensure that all oil companies were kept fully informed during any sub-crisis situation.

Allocation Procedures

Information on allocation rights and obligations would be presented to a combined NOB/OOG meeting after the NOB had received allocation rights and obligations from the IEA.

The combined NOB/OOG meeting would decide which companies are best placed to meet the UK's allocation obligation (or right) under the IEA Emergency Sharing System and would seek to persuade these companies to make the necessary voluntary offer(s) of oil, if needed. The powers contained in the Energy Act 1976 would enable the government to enforce any oil re-allocation transactions required. Failure to comply with such directions is a criminal offence. The full powers of the Energy Act 1976 to issue directions to companies can be exercised only when an Order in Council under Section 3 of the Act is in place.

The UK's national fair sharing scheme has been developed in consultation with the oil industry and arrangements are closely linked to IEP oil sharing rules. These arrangements have been theoretically tested, although prices were not included. The following is a summary description of the United Kingdom's fair sharing plan. The UKOOA will not be formally involved in the sharing.

- The NOB would liase with the EU and the IEA. The NOB and the oil industry would meet to make arrangements for monitoring and control.
- Refiners and importers are defined as primary suppliers. Importers will include traders and consumers who import for their own needs. All refiners and importers known to the DTI would submit emergency data questionnaires.
- From this data, the NOB would draw up a matrix of allocation rights and obligations of the refiners and importers. This information would be presented to the combined NOB/OOG meeting that would take place after the NOB would have received the Allocation Right/Obligation information from the IEA.
- The NOB would decide on any necessary reallocation and it would then be up to the companies to get in touch in order to effect the transfer of oil. At the NOB/OOG meeting, it will also be decided what arrangements should be made to meet the UK's requirement. It may be that the United Kingdom will have an allocation obligation and it will be up to the meeting to decide which companies are in the best position to be able to make the necessary voluntary offers.

Emergency Reserves

Policies and Legal Instruments

The Energy Act 1976 provides the necessary legislative basis for action by the United Kingdom to implement any IEA or EU obligations and to control the production, supply, acquisition and use of oil, including the release of stocks. Companies hold all non-military stocks directly. No special conditions apply which would prevent the powers of the Act from becoming available under any IEA measures.

Stockholding and Maintenance

Although the United Kingdom is a net exporter of oil and thus is not obliged to hold stocks under the IEP, it is obliged to hold stocks equivalent to 67½ days of the previous year's consumption. The government implements the stockholding obligation through the issue of annual directives to companies supplying more than 100 000 metric tons of finished oil products (revised in 1999 from a level of 50 000 metric tons previously used following changes to the EU Directive in 1998). Companies with an obligation are notified of the total amount of stocks which must be held and the amount which must be held in each of three categories (Category 1 is mostly motor gasoline, Category 2 is middle distillates such as kerosene and gas/diesel oils, and Category 3 is fuel oils). In practice, about half of stocks are held as crude oil and half as products, so there is some flexibility in the mix of products that could be made available.

The DTI carried out a consultation exercise between February and May 1999 as part of a review of the implementation of the compulsory oil stocking obligation in the United Kingdom following changes introduced with the revision of the EU Directive governing the holding of emergency stocks of oil. The aims of the review were to seek changes to the system to ensure that the benefits of the increased derogation granted the United Kingdom would be fairly shared amongst all companies being active in the UK market.

Proposals on how the system might be changed were issued to the oil industry in February 1999. The main changes made during 1999, apart from the increase in the threshold for deliveries into the UK market below which companies do not have an obligation placed on them, are:

- The obligation of refiners has been reduced by 7½ days, from 75 to 67½ days;
- The obligation of non-refiners has been reduced by 16½ days, from 65 to 48½ days;
- Offshore stocks held on platforms, loading and storage vessels since July 1995 count towards total UK stocks, as a single block figure (i.e. they are not counted towards the obligations of individual companies). Such stocks currently amount to around four days' supplies, compared with 1 to 1½ days in 1993, and are, at most, about three days' sailing from the UK mainland;
- As under the old form of the EU Directive, companies are given the freedom to hold stocks either themselves or to contract other companies to hold the stocks on their behalf, subject to such provisions being agreed with the United Kingdom government.
- As part of this, companies are also allowed to hold stocks abroad, subject to the fact that only those quantities stored that are held in countries where official bilateral governmental agreements exist can count towards their stockholding obligations, as only stocks held under such agreements have a guarantee that it will prove possible to repatriate them in case of any oil emergency.

- Previously, electricity generators were given a stockholding obligation based on their level of imports of fuel oils. However, with the increased use of gas for electricity generation, the reliance of power generators on oil has been drastically reduced, and the level of their direct imports of fuel oils has significantly fallen in recent years. As such, they no longer have an obligation placed on them, with the supplies that they receive and consume each year incorporated within the stocking obligations placed on individual companies.

Even after the recent changes to EU legislation, it remains true that if called upon under IEA obligations to carry out stockdraw, the United Kingdom could possibly go below its level of obligation as a member of the European Union. However, there does exist a certain margin between the level of obligation required under the EU legislation and the level of stocks actually held. As mentioned above, the recent changes to the EU legislation have reduced the level of obligatory stocks held by UK companies to 67.5 days' worth of consumption of certain key products. Even after this reduced level was implemented in the United Kingdom (through a reduction in the level of stocks individual companies are required to hold), companies still continue to hold levels of stocks above this obligatory minimum. In addition, there is flexibility within the EU legislation for an individual Member State to go below the level of its obligation in any emergency situation without seeking prior consent or approval from the Commission or other Member States as a whole. The flexibility within the EU legislation is such that there would not exist any conflict between complying with both IEA measures and EU measures during any oil emergency.

Operational Aspects of Stockdraw

Oil companies can be requested to reduce levels of stocks and to deliver more oil into the market. As emergency oil stocks are held by the oil companies as part of normal industry stocks, they would be distributed via the existing distribution system when needed in an emergency. The government would not define any specific target for company stockdraw, although the provisions in the Energy Act make it possible for the government to set such targets. However, when the Energy Act 1976 is invoked, the government will make necessary arrangements for drawdown of stocks of individual companies in liaison with the OIEC.

Under an IEA co-ordinated action, the government would expect to draw down stocks in co-operation with the OIEC through administrative procedures as a first response, on the grounds that it is quick and effective in reducing market pressure and has a positive psychological effect through the announcement that supplies are being released.

Guidance on company stockdraw would rely on the informal working relations with the oil industry, with no formal legal basis or administrative procedures.

Compliance Issues

Stockholding is financed by the oil industry. Oil companies are required to submit monthly returns for United Kingdom and European Union commercial statistical purposes. The main basis of the statistical reporting system is known as 'Keydata', which covers the full range of upstream and downstream activities, including UK Continental Shelf production, disposal, refining, trade and stock levels. By this reporting system, the government monitors each month the compliance of companies with the

obligations placed on them under the EU oil stockholding directive. The returns, illustrating the drawdown position, can be required every fortnight in an emergency. The powers available under the Energy Act 1976 enable the government to control and direct the use of all company stocks in an emergency. Data provided under the Emergency Reporting Oil System (EROS) will enable timely monitoring of stock changes.

No distinction or separation is made between commercial and compulsory stocks within the reporting system, although during the recent consultation process, the concept of operational stock levels was used in order to determine an equal level of additional burden to be placed on refiners and non-refiners.

An unlimited fine can be imposed under section 19(2) of the Energy Act 1976 for failure to comply with a stocking direction following conviction on indictment. The amount is limited to £5 000 if imposed by a magistrate's court.

International Co-operation On Oil Security Issues

The United Kingdom has a formal bilateral stockholding treaty agreement with Ireland and informal agreements with Belgium, Denmark, France and the Netherlands. The United Kingdom and Belgium are currently seeking to formalise their agreement. The United Kingdom is in negotiations with Sweden and has also approached Spain and Italy in view of possible bilateral agreements.

United Kingdom companies notify the government of their intention to hold stocks in another Member State, giving the amounts, categories and location, usually at least 10 days prior to the commencement of the period (normally quarterly) to which the arrangement applies. The government then writes to the relevant country authority in order to seek their approval and conveys the response back to the company concerned. Similarly, overseas authorities write to the government in order to seek approval for a foreign company to hold stock in the United Kingdom. Companies are also required to submit monitoring reports of their stockholding each month, including stocks held on behalf of overseas companies.

Each of these agreements allows national stocks to be maintained in each other's country in accordance with the provisions of EC Directive 68/414 and Article 3 of the Annex to the Agreement on an International Energy Program. These agreements are all undergoing a process of revision to ensure that they are revised to be in accordance with the revised EU Directive 98/93.

Demand Restraint

Policy and Legal Instruments

The Energy Act 1976 enables the government to control the production, supply, acquisition and use of oil and oil products.

The United Kingdom would seek to allow market mechanisms to resolve temporary disruptions wherever possible, with light-handed measures, if necessary. Demand restraint measures are not expected to be needed immediately in most crisis scenarios, given the length of time needed for such measures to be imposed and for a beneficial effect (in terms of a reduction in demand) to be seen. However, should a serious crisis emerge, they could be introduced as and when necessary. The main

instrument would be the Oil Products Allocation Scheme (OPAS) which has recently been reviewed and its manuals have been updated. Working with the OIEC, the United Kingdom regularly reviews its plans for various aspects of demand restraint, ranging from motor fuel rationing to limitation of filling station opening hours. Motor fuel rationing was reviewed recently and it was confirmed that, due to the complexity and necessarily complex nature of any such system, it would be only implemented amongst a range of last resort measures in case of a longer duration oil supply disruption. As such, it remains a potential tool for supply restraint, but it is not thought that it will be used in most supply disruption scenarios.

Procedures and Monitoring

The government has identified three stages of demand restraint that would be accompanied by appropriate measures:

a) Light Handed Measures;

b) Oil Products Allocation Scheme (OPAS); and

c) Motor Fuel Rationing (MFR).

a) **Light-Handed Measures**. Consistent with its overall approach, the government would first prefer to use light-handed measures in an emergency. The government considers that at least a 5% reduction in transport requirements could be achieved within a few weeks by the use of light-handed measures such as public appeals and speed limits. Winter reductions in heating oil demand could be made by relaxing requirements on minimum temperatures in offices and factories. Such methods could be introduced quickly through administrative orders.

b) **Oil Products Allocation Scheme (OPAS)**. OPAS would be introduced during any period in which oil shortages were too great to be dealt with by voluntary measures. It would most likely be used following an IEA trigger finding in order to bring UK consumption quickly into line with its supply right under the IEA Emergency Sharing System, but it could be introduced at any time following the issue of an Order in Council under the Energy Act 1976. The Secretary of State would then issue Orders under the Act to restrict the supply of oil products and, if necessary, to restrict opening hours at filling stations or to designate filling stations/residual supplies for use by priority users only.

   OPAS would be administered by the NOB and could be implemented within a few days once initial allocations had been calculated. However, full operation is dependent upon the establishment of an appeals machinery in the form of Regional Petroleum Offices that would take about 12 days to establish.

   Public information campaigns would be mounted through the media, post offices and suppliers. Suppliers would be required to submit monthly returns to the NOB including customer entitlements, deliveries, stockholding and expected future supplies. The NOB would then use this information to assess forward demand and to re-adjust allocation percentages, if necessary.

c) **Motor Fuel Rationing (MFR)**. Present policy assumes that MFR will only be implemented in the case of a substantial cut in international crude oil supplies which would be likely to last for more than six months and where OPAS alone was insufficient to deal with the crisis. As such, it is very much seen as a measure of last resort.

The aim of MFR is to reduce motor fuel consumption while maintaining as near normal economic and community life as is possible. The current scheme involves the distribution of non-transferable ration coupons to vehicle owners. Foreign vehicles will not get automatic ration coupons under the scheme, but special provision is likely to be made in any international crisis. The introduction of MFR would require an Order in Council to be obtained under the Energy Act 1976.

MFR would also be administered by the NOB and would take about ten weeks to implement fully, including three weeks for the distribution of ration coupons, which is one of the reasons why its use would only be considered in a lengthy supply disruption.

The effects of MFR would be estimated from the monthly returns on inland consumption made by UKPIA. These could be used by the NOB to change the entitlement or value of ration coupons, if required.

Other Response Measures

Given that the United Kingdom is self-sufficient in natural gas, the potential for switching into gas would be one of the responses that would be fully investigated.

There remains little oil use in the electricity generation sector, following switching to alternative fuel sources, notably gas. Fuel substitution would be possible if any disruption to gas supplies occurred.

Similar switching to gas has occurred in the industrial sector. Those industries that are still burning fuel oil do so to provide either heat and steam or electricity. In the case of the former, it is unlikely that they would be able to switch to alternative fuel sources in an emergency. In the case of the latter, it is possible that some could substitute electricity from the grid.

If necessary, Energy Act powers could be used to direct fuel-switching.

Data Collection

There are three types of data reporting systems by which the DTI receives oil and gas information on a monthly basis. They are: the Petroleum Production Reporting System (PPRS), data submission from the UK Petroleum Industry Association (UKPIA) and the Keydata Reporting System.

The PPRS monitors the performance and rate of hydrocarbon production. The legislative backing for this system is the Petroleum and Submarine Pipelines Act 1975. The information collected through this system satisfies the following two distinct and separate information needs:

- The Oil and Gas Division of the DTI is concerned with the technical and engineering aspects of the data in order to monitor and influence well and reservoir activity. This information can have strategic importance for extraction policy, while the technical data provides information on life profile, production expectancy and technical characteristics of each reservoir, well or field, in addition to monitoring the field management of the operator.
- The DTI Energy Policy, Technology, Analysis and Coal Division is concerned with data on production, disposals and stocks, information which can be extracted from the PPRS returns.

The UKPIA submits returns to the DTI which include a refinery intake of crude oil, production, imports/exports, deliveries to international marine bunkers, stocks and inland deliveries for consumption. This system was run by KPMG (a consulting firm) for the UKPIA, which finances the system, but the work has recently been taken over by the DTI. The information produced from the system is provided to oil companies and to the DTI. The system is supported by the Statistics of Trade Act, which gives the government general powers to collect information from industry.

The Keydata System is used to collect company data from the refiners, importers and other companies (e.g. major electricity generators) with stockholding obligations on a monthly basis. In an emergency, data is reported under the Emergency Reporting Oil System (EROS). The data cover a span of three months (current, next and the month after next).

The collection for each of the surveys is comprehensive, in that it collects information from all the oil market participants so there is no need for sampling. The UKPIA system collects information from some 60 to 80 companies, and the non-emergency Keydata System from about 30 companies with stocks data only from a further ten or so companies. In an emergency, Keydata coverage would be extended by the coverage of 20 or so companies with upstream activities only. The response rate to the different surveys is 100%.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
BP Oil	Grangemouth	10.20	206.04			3.41	65.47	1.10	21.12	2.10	40.32				
Nynas UK	Dundee	0.73	14.75												
Nynas/Shell	Eastham	1.00	20.20	0.93	17.21										
Conoco	Killingholme	9.40	189.88	7.90	146.15	4.18	79.29	2.80	53.76			2.30	42.55		
Carless	Harwich	0.60	12.12												
Elf/Murco	Milford Haven	5.29	106.80	2.99	55.30	1.72	32.95	1.72	32.95						
Esso	Fawley	15.60	315.12	8.00	148.00	4.51	86.54	4.40	84.48			0.19	3.44		
Gulf Oil	Milford Haven														
Lindsey	Killingholme	9.50	191.90	4.40	81.40	3.35	62.67	2.60	49.92					1.50	25.50
BP	Coryton	9.60	193.92	3.50	64.75	3.31	63.63	3.31	63.63						
Phillips/ICI	Teesside	5.00	101.00												
Shell	Stanlow	11.50	232.30	2.60	48.10	3.80	72.86	3.80	72.86						
Texaco	Pembroke	10.10	204.06	5.81	107.52	5.32	100.43	4.54	87.17					1.56	26.52
Total		**88.52**	**1788.08**	**36.13**	**668.42**	**29.60**	**563.84**	**24.27**	**465.89**	**2.10**	**40.32**	**2.486**	**45.99**	**3.06**	**52.0**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
BP Oil	Grangemouth			1.60	37.28	1.70	34.85					0.20	4.80		
Nynas UK	Dundee														
Nynas/Shell	Eastham														
Conoco	Killingholme			2.05	47.77	7.45	152.73	0.65	15.60			0.95	22.80		
Carless	Harwich														
Elf/Murco	Milford Haven			0.78	18.22	2.03	41.70	0.24	5.86	0.06	1.39	0.21	5.11		
Esso	Fawley			2.80	65.24	5.20	106.60			0.35	8.40	0.98	23.40		
Gulf Oil	Milford Haven														
Lindsey	Killingholme			1.41	32.85	4.66	95.43	0.26	6.12					0.26	6.12
BP	Coryton			1.60	37.28	2.60	53.30	0.91	21.94			1.21	29.02		
Phillips/ICI	Teesside														
Shell	Stanlow														
Texaco	Pembroke			1.39	32.39	3.89	79.75	0.40	9.60						
Total				**13.08**	**304.81**	**30.29**	**620.84**	**3.67**	**87.98**	**0.41**	**9.79**	**4.56**	**109.32**	**0.26**	**6.12**

Map of the United States



THE UNITED STATES

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]	2015[2]
Production	498.3	514.3	431.2	399.6	370.3	330.9	329.2	337.6
Imports	355.9	264.5	414.7	463.7	555	704.6	775.7	837
Exports	–15.6	–29.2	–38.6	–41.1	–45.7	–45.2	–45.6	–45
Bunkers	–28	–17.3	–28.7	–28.6	–27.1	–18.7	–22.2	–25.7
Net Imports – NI	312.4	218	347.5	393.9	482.2	640.6	707.9	766.4
Total Supply	810.7	732.3	778.7	793.5	852.5	971.6	1 037.2	1 104
Import Dependence (%)	38.5	29.8	44.6	49.6	56.6	65.9	68.3	69.4
Stocks – Days of NI	168	297	187	176	143	..	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence And Market Structures

The United States depends on imports for 57% of its oil requirements. Current energy supply of 2 183 Mtoe comprises 40% oil, 23% natural gas, 24% solid fuels, 8% nuclear and 5% other sources. Oil is imported mainly from Venezuela, Saudi Arabia, Canada, Mexico, Iraq and Nigeria.

Demand

According to the Energy Information Administration (EIA), product consumption in 1999 amounted to 19.4 mb/d.[19] The EIA *Short-Term Energy Outlook* forecast is for consumption to rise to 19.5 mb/d in 2000, and to 20 mb/d in 2001. The EIA *Annual Energy Outlook* longer-term forecast shows consumption rising above 21 mb/d by 2005, and at 22.5 mb/d in 2010. Between 1998 and 2020, the fastest growth is expected to occur in jet fuel (2.9% annually), with middle distillates increasing at 0.8% annually and gasoline at 1.5%. Gasoline will continue to account for more than 40% of oil product demand.

19. The territorial definition of the United States used by the Energy Information Administration is narrower than that used by the IEA, which includes Puerto Rico and the Virgin Islands.

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	350 841	355 802	1.4
of which unleaded	349 977	354 884	1.4
Kerosene and jet fuels	79 675	81 258	2.0
Gas/diesel oil	165 230	168 213	1.8
Residual fuel oil	32 014	26 606	–16.9
Other	144 686	154 287	6.6
Total	**772 444**	**786 166**	**1.8**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999
(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Venezuela	75 559	4 874	2 950	2 571	1 441	2 360	89 755
Saudi Arabia	73 616	1 928	302	10	73	0	75 929
Canada	64 911	2 603	3 810	1 028	289	1 313	73 954
Mexico	64 518	398	0	759	175	1 538	67 388
Iraq	37 212	0	0	0	0	0	37 212
Nigeria	34 895	94	121	160	0	11	35 281
Other	142 814	11 005	2 074	6 897	3 129	8 752	174 671
Total	**493 525**	**20 902**	**9 257**	**11 425**	**5 107**	**13 974**	**554 190**

Source: IEA Quarterly Oil Statistics.

Strong growth in gasoline demand continues, despite increased fuel efficiencies and a steep price increase over the last year. Since the early 1990s, miles per gallon have increased only slightly, due both to the increasing number of light trucks and sport utility vehicles, which are less fuel-efficient than conventional passenger cars, and the increasing number of miles travelled, reflecting decreasing real prices of gasoline over much of the period.

Imports

The import share of total petroleum products supplied in 1999 was approximately 50%. The EIA Annual Energy Outlook 2000 (dated November 1999) forecasts the import share of total products supplied to rise to 60% in 2005 and to 62% in 2010. On IEA definitions based on weight/calorific value rather than volume, the level of dependence would be significantly higher in all cases. In 1999, for example, the level of dependence by IEA definitions was 57%.

Supply

The EIA estimates that total US crude oil production averaged 5.93 mb/d in 1999, a decline of 320 000 b/d from 1998 levels. Low oil prices at the beginning of 1999 contributed to the year-on-year decline. EIA forecasts crude oil output in 2000 to average 5.96 mb/d, slightly higher than 1999 due to the substantial increase in oil prices. In the longer term, it is expected that the downward trend of domestic crude oil production will continue, with EIA forecasts of 5.36 mb/d in 2005 and 5.18 mb/d in 2010. Production may then cover less than a quarter of demand. After 2005, technological improvements and rising prices are expected to arrest the decline in production, leading to relatively stable production in the lower 48 states. Crude oil production in Alaska is expected to decline at an average annual rate of 3.7% between 1998 and 2020.

Recent Initiatives

The United States has taken a number of initiatives to promote oil exploration and production:

- Federal royalty relief for Californian producers of heavy oil on federal lands was announced in February 1996.
- Between February 1996 and February 1998, the Department of Energy sold off the Naval Petroleum and Oil Shale Reserves at Elk Hills, which holds approximately 351 million barrels of proven reserves.
- In recent years the federal government has taken a number of initiatives to promote efficient and environmentally-sensitive development of oil and natural gas resources on federal lands, including leasing and regulatory streamlining, safety and environmental programmes, and selected royalty relief for deepwater projects, heavy oil, and marginal wells.
- In 1998, the federal tax code was changed to assist small producers with relief from some Alternative Minimum Tax provisions and through less restrictive net income limitations for depletion allowances.
- In April 1998, the "Comprehensive National Energy Strategy" was issued, presenting the Administration's strategy for developing the nation's energy resources.

Refining

United States refinery capacity has risen slowly over the past five years, from nearly 15 million barrels in 1995 to a level of 16.3 million barrels in 1999, with the additional capacity being added at existing facilities. The United States is expected to add another million barrels of refining capacity by 2005, mainly at existing facilities. Despite more stringent environmentally-driven product specifications, refinery output of gasoline and distillates has continued to rise. The growing technical sophistication of the US refining industry continues to enhance its flexibility to respond to a cut in crude oil supplies. Given environmental concerns, a relaxation of product specifications, even during an emergency response, is a step the United States would wish to avoid. Any proposal for such relaxation of specifications for emergency response purposes would have to be evaluated on a case-by-case basis.

Emergency Response Policy and Organisation

Emergency Response Policy

The United States carried out a review of its policy on responding to oil supply disruptions during 1993-1994 (*United States Policy for Responding to Oil Supply Disruptions*, February 1994) and in 1997-1998 reviewed its policy on maintaining strategic oil reserves (*United States Statement of Policy on the Strategic Petroleum Reserve*, May 1998). Both policy reviews endorsed the view that the United States believes strongly in utilising the market to allocate scarce oil resources during a disruption and considers that government response measures should be designed to complement, rather than supplant, market forces. United States policy targets avoidance of disruption-induced economic damage as the primary objective for emergency response. In the event of a severe disruption, US policy is to make early use of the Strategic Petroleum Reserve (SPR).

The principal statutory authorities pertinent to emergency response and notably to the operation of a National Emergency Sharing System, the establishment of the Strategic Petroleum Reserve and fulfilment of the United States' obligations under the IEP are contained in the Energy Policy and Conservation Act.

In May 1998, the US Congress amended the Energy Policy and Conservation Act (EPCA). This amendment expanded the antitrust defence provided to US companies when they assist the IEA to incorporate company participation in the planning for and implementing co-ordinated stockdraw and complementary measures under the flexible arrangements available under IEA Co-ordinated Emergency Response Measures (CERM). This amendment enabled much broader oil company participation in a November 1998 IEA Emergency Response Exercise and the September 1999 Disruption Simulation Exercise. The EPCA legislation lapsed as from 1st April, 2000, including authorisation pertinent to co-operation with the IEA, and it was renewed by Congress in P.L. 106-469, enacted November 9, 2000 for a period of three years.

Natural gas plays a role in US oil emergency planning to the extent that some industries and utilities have the capability to switch primary fuels.

Emergency Organisation

The Department of Energy (DOE) comprises the energy component of a federal emergency response process under the Federal Emergency Management Agency (FEMA). The Department's Office of Security and Emergency Operations provides domestic co-ordination (including contact with states) for an emergency response and is also responsible for managing the Department's Emergency Operations Center. During a domestic emergency, the Department becomes actively involved in crisis response, serving as part of a FEMA response team.

The President, by Executive Order 11912, as amended, authorises the DOE to function as the National Emergency Sharing Organisation (NESO) for the United States. Authority for the President to establish a NESO or to provide for the functions of a NESO to be performed by an existing agency or department within the government stems from 3 USC Section 301, the DOE Organization Act, which established the DOE, and authority in EPCA, Sections 251-254, recognising US obligations under the IEP.

The responsibility for co-ordination of the NESO with all participants resides in the Office of International Affairs. The Office of International Affairs also co-ordinates with the Department of State. This Office would communicate with the Secretariat regarding a disruption response and maintain liaison with US reporting companies. Other offices which play key roles are the:

a) Energy Information Administration (EIA), which is responsible for assembling oil supply/demand data and projections and for carrying out quantitative analyses of the possible impacts of disruption. The EIA manages DOE participation in the IEA emergency data system;

b) Strategic Petroleum Reserve Office, which is responsible for the Strategic Petroleum Reserve, including the drawdown and sale or exchange of SPR oil;

c) Office of Policy, which is responsible for providing advice and guidance on domestic policy ramifications;

d) Office of Security and Emergency Operations, which is responsible for providing domestic operational co-ordination for a response effort as well as providing Emergency Operations Center support;

e) Office of Energy Intelligence, which is responsible for providing intelligence support to a response effort;

f) Office of Public Affairs, which is responsible for developing and carrying out public information/awareness activities;

g) Office of Energy Efficiency and Renewable Energy, which is responsible for the Federal Energy Management Program (FEMP) under which energy use in Federal facilities is reduced; and the

h) Office of the General Counsel, which is responsible for providing oversight and guidance on legal issues.

Within the Department, personnel from these offices would be drawn together in an emergency management team to formulate and manage a response. Technical working teams would address specific issues that arise, with an executive team made up of departmental leadership making key decisions.

Industry personnel would not normally take part in NESO activities, but during an emergency, close consultations with industry would be maintained.

The principal statutory authorities pertinent to the operation of the NESO are the following:

- Sections 151-167 of EPCA provide for the establishment of the SPR for the purposes of reducing the impact of future disruptions in supplies of petroleum and fulfilling obligations of the United States under the IEP, and set forth the method and circumstances for drawdown and distribution of the SPR.
- Section 251 of EPCA authorises the President to require US companies to divert oil supplies to other IEA Participating Countries in satisfaction of the United States' allocation obligations.
- Section 252 of EPCA makes available to US Reporting Companies a limited antitrust defense and breach of contract defence for actions taken to carry out a voluntary agreement or plan of action to implement international emergency response provisions. (As previously discussed, Section 252 was amended in 1998 to expand the antitrust defence to cover US company actions to assist the IEA in planning for and implementing CERM.)

- Section 254 of EPCA authorises the NESO to transmit to the IEA information and data related to the energy industry necessary to carry out the provisions of the IEP.
- Section 11 of the Energy Supply and Environmental Coordination Act and Section 13 of the Federal Energy Administration Act authorise the NESO to collect confidential or proprietary oil supply information or data from US oil companies.

Other statutes also provide authority with respect to emergency preparedness activities that could be used by the NESO or by other departments and agencies of the Administration in connection with IEP activities.

Allocation Procedures

The antitrust and breach of contract protection made available under Section 252 of EPCA is essential to the voluntary participation of US oil companies in the IEA's Emergency Sharing System. Section 252 authorises the development of voluntary agreements and plans of action to implement the international emergency response provisions of the IEP, and makes available a limited antitrust defence and a breach of contract defence with respect to actions taken by US oil companies to develop or carry out such voluntary agreements and plans of action. Under this authority, a Voluntary Agreement and Plan of Action to Implement the International Energy Program was agreed to in 1976 by a number of US oil companies. On January 26, 1988, the Secretary of Energy approved the Second Plan of Action to Implement the International Energy Program, which describes the types of actions that US Reporting Companies may take while implementing the Emergency Sharing System. The Voluntary Agreement and Plan of Action was amended in 1998 to reflect the newly passed amendments to Section 252 of the Energy Policy and Conservation Act.

Authority to use the Strategic Petroleum Reserve to augment US supplies and thereby facilitate voluntary offers by US companies is contained in Section 161 of EPCA, which authorises the President to draw down and distribute the oil stored in the SPR if he finds that such actions are "required by a severe energy supply interruption or by obligations of the United States under the International Energy Program." Under the DOE's "Drawdown" (Distribution) Plan, there are two options for the sale of SPR oil. The basic method of distribution of SPR oil will be by price-competitive sale, with awards going to the highest bidders. Under the second option, the Secretary of Energy may, in any calendar month, direct the distribution of up to 10% of the volume of SPR oil sold in that calendar month.

Authority for compulsory international allocation is contained in Section 251 of EPCA, which authorises the President to require US oil companies to allocate petroleum to other IEA Member countries, if such allocation is necessary for the purpose of implementing obligations of the United States under the IEP. Implementing regulations for this authority are contained in Part 218 of Chapter II, Title 10 of the Code of Federal Regulations.

Emergency Reserves

The drawdown of the Strategic Petroleum Reserves is an important element of the US emergency response programme. According to the Administration, the SPR crude oil can be drawn down at a maximum rate of 4.1 mb/d without pipeline or tanker loading bottlenecks.

Policy and Legal Instruments

The legal authority pertaining to the IEP emergency reserve commitment is contained in Title I (Sections 151-167) of EPCA, which authorises the development of the US government-owned Strategic Petroleum Reserve to be available for the purposes of reducing the impact of future disruptions in supplies of petroleum and fulfilling obligations of the United States under the IEP.

The Administration has exclusive authority over the drawdown and distribution of oil from the SPR under EPCA, but does not have powers over company stocks except as mentioned above (i.e. EPCA Sec. 251), or below in regard to creation of an industrial petroleum reserve.

Title I of EPCA, which in 1975 authorised the creation of the SPR, also provides the statutory basis for the SPR's drawdown and distribution by the Department. Section 161(d) of EPCA authorises the President to draw down and distribute oil from the SPR if the President finds that such actions are "required by a severe energy supply interruption or by obligations of the United States under the International Energy Program." A "severe energy supply interruption" is defined in Section 3(8) of EPCA as a "national energy supply shortage which the President determines:

a) is, or is likely to be, of significant scope and duration, and of an emergency nature;

b) may cause major adverse impact on national safety or the national economy; and

c) results, or is likely to result, from (i) an interruption in the supply of imported petroleum products, (ii) an interruption in the supply of domestic petroleum products, or (iii) sabotage or an act of God."

In 1990 the US Congress authorised a number of changes to the EPCA. It now authorises the President to use the SPR in the event of a disruption of domestic supplies; previously the EPCA authorised drawdown of the SPR only in response to "an interruption in the supply of imported petroleum products, sabotage, or an act of God." EPCA now:

- Permits the export of SPR oil for refining outside the United States in connection with arrangements to import refined petroleum products;
- Empowers the DOE to sell oil that is in the process of being acquired for and is in transit to the SPR if the Secretary of Energy finds that a severe energy supply interruption may be imminent;
- Establishes a new basis for SPR drawdown. This amendment provides authority to drawdown the SPR despite the absence of a "severe energy supply disruption" or a need to meet US obligations under IEP. Under this authority, the President may authorise the drawdown of the SPR for other circumstances that constitute, or are likely to become, "a domestic or international energy supply shortage of significant scope or duration" if the President finds that drawdown would assist directly or significantly in preventing or reducing the adverse impact of such a shortage. However, there are several limitations on the use of this authority: the Reserve may not be drawn down more than 30 million barrels or for longer than sixty days with respect to a single event, or if the Reserve would be reduced below the level of 500 million barrels.

In 1992 the Congress amended the EPCA basis for SPR drawdown to permit the President to take price increases into account. This new provision provides that a "severe energy supply interruption" .... "shall be deemed to exist if the President determines that

a) an emergency situation exists and there is a significant reduction in supply which is of significant scope and duration;

b) a severe increase in the price of petroleum products has resulted from such emergency situation; and

c) such price increase is likely to cause a major adverse impact on the national economy."

Upon a Presidential decision to draw down the SPR, Section 161(d) of EPCA requires that the drawdown and distribution of oil from the SPR be accomplished in accordance with an effective Distribution Plan. The principal method for distributing SPR oil under this Plan would be a price-competitive sale open to all interested bidders, with awards going to the highest bidders.

The Plan also provides that under extreme circumstances, the Secretary of Energy, in any calendar month, may direct the sale of up to 10% of the volume of SPR oil sold in that calendar month to specific purchasers to fulfil priority needs. The price for directed sales of SPR oil will be at the average price of SPR oil sold at the contemporaneous competitive sale, or the most recent competitive sale if no contemporaneous competitive sale is held. The Secretary's authority in the Distribution Plan to make directed sales of SPR oil derives from Section 161(e) of EPCA, which specifically authorises the Secretary to allocate and control the price of any petroleum withdrawn from the SPR.

The Department has adopted a sales regulation and Standard Sales Provisions (SSPs) (containing contract terms and conditions which are to be included in contracts for the sale of SPR oil) governing price-competitive sales of oil from the SPR. The sales' rule and SSPs are contained in Part 625, Title 10 of the Code of Federal Regulations.

Section 161(d) of EPCA authorises the President to draw down and distribute the SPR if the President finds that such actions are required either "by a severe energy supply interruption" or "by obligations of the United States under the International Energy Program". The EPCA also provides authority to draw down the SPR despite the absence of a "severe energy supply disruption" or a need to meet IEP obligations. This separate drawdown authority could also be a basis for participation in Co-ordinated Emergency Response Measures (CERM). Under EPCA authority, the President has discretion to draw down and distribute the SPR based on his judgement as to the likelihood that a national energy supply shortage may result from an oil supply interruption, even though, as yet, these events have not transpired, and the IEP emergency response measures have not been activated.

On July 10, 2000, the Department of Energy transmitted to Congress the Strategic Petroleum Reserve Plan to provide for the creation of a regional middle distillate oil reserve (Distillate Reserve) in the US Northeast that contains up to 2 million barrels of product. The Plan Amendment (Nº 6) became effective on September 8, 2000. The Plan Amendment indicated that the Reserve would be located in no more than four sites in one or more of the following states: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont. These states, which qualify for a regional reserve based upon import dependence, are also heavily dependent upon heating oil and have the poorest logistical infrastructure for deliveries during severe winter weather conditions.

The Reserve, known as the Northeast Home Heating Oil Reserve, consists of 2 million barrels of distillate, stored in privately-owned commercial facilities contracted by the DOE. The initial inventory for the Reserve was acquired by exchanging crude oil from the SPR inventory for the distillate to be delivered to the storage facilities.

The Energy Act of 2000 was enacted on November 9, 2000. The law authorizes the establishment of a 2 million barrel Northeast Home Heating Oil Reserve, to be managed separately from the Strategic Petroleum Reserve. It would be managed by the Department of Energy in the same manner as the Distillate Reserve established in Plan Amendment Nº 6.

Conditions for release of the Distillate Reserve in P.L. 106-149 SEC. 183: "(a) Finding. The Secretary may sell products from the Reserve only upon a finding by the President that there is a severe energy supply interruption. Such a finding my be made only if he determines that

1) a dislocation in the heating oil market has resulted from such interruption; or

2) a circumstance, other than that described in paragraph (1), exists that constitutes a regional supply shortage of significant scope and duration and that action taken under this section would assist directly and significantly in reducing the adverse impact of such shortage."

Authority to develop and implement an emergency energy conservation programme for Federal facilities is contained in Section 381 of EPCA, Sections 541-549 of the National Energy Conservation Policy Act, and Section 656 of the DOE Organization Act. The Department has implemented this authority in regulations contained in Part 436 (Subpart F), Title 10 of the Code of Federal Regulations. Many state, local government and private-sector organisations and institutions have emergency energy conservation plans and these entities could be assumed to implement their plans during a severe petroleum supply interruption.

With respect to dissemination of public information, a number of Federal statutes authorise the DOE to gather and publish information relevant to energy supplies and energy emergency preparedness activities, including EPCA, the Federal Energy Administration Act of 1974, and the DOE Organization Act.

The United States does not require private companies to hold emergency stocks. No financial support is given for this purpose, and there are no elements of the tax code which are designed to encourage holding of inventories. The Administration does, however, have discretionary authority, under Section 156 of EPCA, to create an Industrial Petroleum Reserve (IPR) as part of the SPR by requiring importers and refiners of petroleum products to acquire, store, and maintain up to 3% of the amount they imported or refined in the previous calendar year. The IPR authority has never been implemented, and the Administration has no current plans to use this authority.

Stockholding and Maintenance

The Energy Policy and Conservation Act and Amendments to legislation in 1990 authorised the expansion of the Strategic Petroleum Reserve (SPR) to 1 billion barrels. However, after decommissioning the Weeks Island storage site, the SPR has a *de facto* capacity of 700 million barrels. SPR facilities have been refurbished and streamlined to provide drawdown capability through the year 2025.

The inventory as of 1st January 2000 was 566.9 million barrels of crude oil. The United States projects that its net imports will increase as its domestic production declines and consumption rises. However, current US inventory levels are sufficient to satisfy the obligation to the IEA for the foreseeable future.

Based on studies prepared in 1992 for potential expansion of the SPR, additional capacity could be created at a completely new site for approximately $5 per barrel. However, the cost estimate would vary depending on the size of the new site, and expansions at existing sites would be less expensive.

Operational Aspects of Stockdraw

The drawdown and release of SPR stocks would be primarily accomplished by means of a competitive sale. Detailed procedures which can be used under CERM or IEP conditions have been established and

published which encompass the functions of both the government and industry in conducting a drawdown and distribution of the SPR crude oil inventory. The DOE's "Drawdown and Distribution Management Manual for the SPR" contains the general procedures for the government's implementing and managing a SPR drawdown, and the DOE's "Standard Sales Provisions for SPR Petroleum" provides the contract terms and conditions and procedures for conducting SPR oil sales.

The DOE has performed numerous tests of these procedures, as well as of the SPR's physical capability to draw down and deliver oil from its storage sites to connected distribution terminals where, in an actual drawdown and sale, the purchasers would take delivery and transport the oil to their refineries. The DOE also periodically conducts studies in conjunction with industry to assure that the US commercial distribution and refining systems are capable of handling SPR crude oil. Additionally, in 1991, the United States released 17.2 mb into the market as part of the IEA's response to the conflict in the Middle East.

On September 22, 2000, President Clinton directed the DOE to begin an exchange of 30 million barrels of crude oil from the SPR. The action was taken to bolster oil supplies, especially the critically low inventories of heating oil for the winter season. The additional flow of crude oil to refineries was expected to create incentive for additional refinery production of 3 to 5 million barrels of distillate products to commercial inventories.

Companies awarded the oil were required to return a like quantity of crude oil plus a bonus percentage next year. In a competitive process, contracts were awarded to nine companies for oil deliveries to be made in November and December.

Following a decision to begin a sale or exchange, the key steps involved in the process of releasing SPR oil are:

- Issuance of a Notice of Sale to prospective 'offerors' requesting bids for purchase/excange of SPR oil;
- Completion of final readiness preparations for drawing down and delivering SPR oil;
- Receipt and evaluation of bids and notification of successful 'offerors';
- Receipt of financial guarantees from successful 'offerors', typically letters of credit, to assure their ability to pay for the oil and perform under the sales contracts;
- Awarding the sales/exchange contracts and the purchasers arranging for the oil's transport from the SPR terminals; and
- Drawing down oil from the storage sites to the terminals and delivering it into the purchaser-arranged commercial pipelines and vessels.

Price or exchange determination will be a function of market conditions and the bidding process. Under a policy of open disclosure of information, the government will continuously inform the public of the various stages of the process. Announcements would include the following: the Presidential decision to draw down the SPR; issuance of the Notice of Sale seeking industry bids; the results of the sales, including the sales contracts awarded; making the first physical oil delivery, etc.

Assuming a Notice of Sale for SPR crude oil (no refined products are held in SPR storage) was not issued until after the Presidential drawdown decision, the sales process, in conjunction with the level of operational readiness maintained by the SPR and its contracted distribution terminals, provide the ability to begin delivering oil to the purchasers within 15 days from the decision date. While the timing of physical oil deliveries is dependent on the purchasers' ability to arrange for transport, it is expected

that some oil will be delivered at this point and that deliveries at the full contracted rates will occur about one to two weeks later.

The initial steps of the sales process could commence prior to the drawdown decision with the ultimate awarding of contracts contingent upon the decision. In that event, the time required could possibly be reduced to as short as five days.

For allocation of the Distillate Reserve the Secretary shall determine procedures after consultation with the heating oil industry.

"The procedures shall provide that –

1) the Secretary may –
   a) sell petroleum distillate from the Reserve through a competitive process, or
   b) enter into exchange agreements for the petroleum distillate that results in the Secretary receiving a greater volume of petroleum distillate as repayment than the volume provided to the acquirer;
2) in all such sales or exchanges, the Secretary shall receive revenue or its equivalent in petroleum distillate that provides the Department with fair market value. At no time may the oil be sold or exchanged resulting in a loss of revenue or value to the United States; and
3) the Secretary shall only sell or dispose of the oil in the Reserve to entities customarily engaged in the sale and distribution of petroleum distillate."

Compliance Issues

As the United States does not require companies to hold stocks in order to meet its IEP emergency reserve commitment, it does not exercise control over the disposition of privately held petroleum inventories.

Demand Restraint Measures

Policy and Legal Instruments

The United States demand restraint programme consists of two sets of measures:

1) The Federal Energy Management Program (FEMP), implemented during crises to reduce consumption of oil in Federal agencies, including fuel substitution and fuel conservation in Federal buildings and operations; and,
2) A public information programme to encourage voluntary demand restraint via mass media of the general public, industry, and state and local governments.

All legal authorities needed to implement the approach to demand restraint are available, and each of these authorities can be implemented prior to activation of the IEP emergency measures. The decision

process for activation of the public information programme was tested during an IEA CERM test. A draft schedule of public information events (e.g., the Presidential announcement, press releases) was developed as part of this process.

The US policy not to rely on demand restraint as the primary response measure is based, in part, on the belief that the economic losses resulting from an oil supply disruption can best be mitigated by supplementing the disrupted oil supplies, and, in part, on US experience with the demand restraint measures which, at the national level, were considered to have caused extensive and costly misallocation of energy resources during past oil crises.

The Administration's policy is to use Article 16 of the IEP, which states that "When demand restraint is activated in accordance with this Chapter [i.e. Chapter IV], a Participating Country may substitute for demand restraint measures use of emergency reserves held in excess of its emergency reserve commitment as provided in the Program". The United States at mid-2000 held more than 120 days of stocks in terms of net imports, compared with its IEA commitment of 90 days.

Procedures and Monitoring

The United States periodically reviews the state of energy emergency planning, including demand management programs. The last review was in 1990.

Programmes in the federal agencies are designed to reduce the consumption of oil products in their facilities, operations and vehicle fleets through the reduction of those fuels, or their replacement by alternative fuels.

Each federal agency is responsible for collecting the necessary fuel use data and reporting those consumption levels to FEMP (Federal Energy Management Program) on an annual basis. FEMP does not have any enforcement authority over other federal agencies and relies on the individual agencies to track their progress and forward reliable and accurate information to FEMP for inclusion in an overall Federal Report to the President and Congress.

Information disseminated from FEMP is through meetings, fact sheets and a bi-monthly newsletter available to anyone interested in federal efforts in energy and water efficiency, renewable energy opportunities and other programmes and policies affecting federal energy and water use.

Decision Processes

The FEMP process has not been tested recently. Capability to communicate directly with states as part of an energy emergency response process is maintained in a state of readiness, with exercises held periodically.

Other Response Measures

The United States believes that market forces will induce domestic oil producers to increase production during an emergency. The potential for increased production is, however, viewed as limited. The

impact on production of the major increase in oil prices between early 1999 and 2000 was not significant. Opportunities for government to encourage increased production will be evaluated at the time of a disruption.

The United States has authority in Section 106 of the Energy Policy and Conservation Act to require surge production from fields on federal government lands and, subject to certain conditions, from fields on state lands. This authority has not been implemented and presently there is no plan to implement it for use in a petroleum supply emergency.

There are no recent studies or information on fuel-switching from oil to natural gas. The EIA estimates that the United States could produce an additional 800 million cubic metres per day of natural gas during an emergency.

Data collection

The Energy Information Administration is responsible for assembling oil supply/demand data and projections and for carrying out quantitative analyses of the possible impacts of a disruption. Created in 1977, the EIA is the independent statistical and analytical agency within the Department of Energy. The EIA has legal authority to survey energy companies in the United States. It manages the DOE's participation in the IEA emergency data system.

The *Weekly Petroleum Statistical Report* and the *Short-Term Energy Outlook* play a large role in data estimations for IEA emergency purposes. The EIA collects primary data for oil in barrels, whereas most IEA country data is reported in tons. For IEA emergency purposes, US data includes Puerto Rico, Guam, the US Virgin Islands and the Hawaiian Free Trade Zone.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

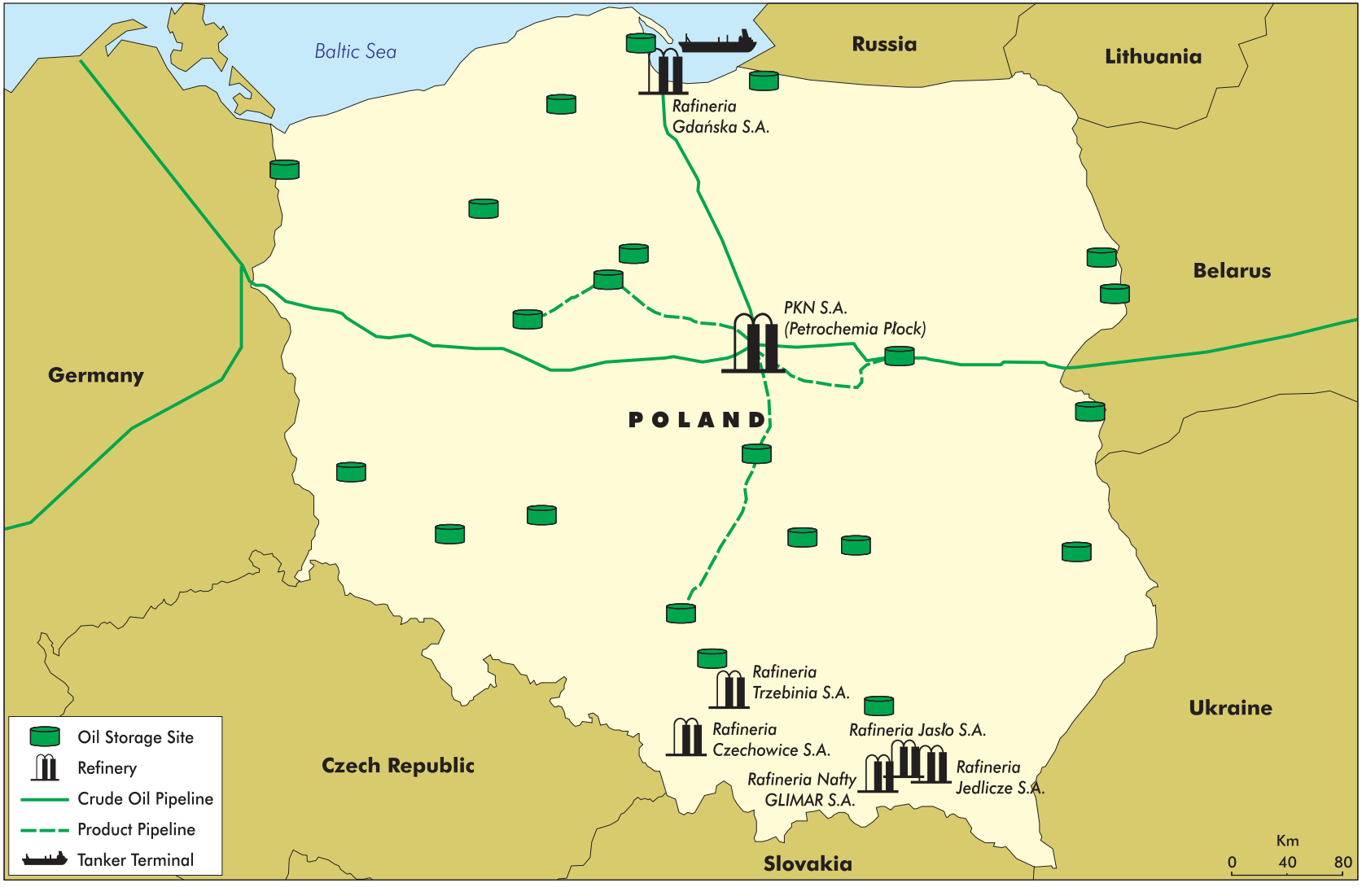
Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
PAD District 1		84.4	1704.0	35.8	661.7			34.2	657.5	2.0	38.0	n/a	n/a	n/a	n/a
PAD District 2		179.2	3619.4	74.1	1370.2			60.0	1152.9	7.3	141.0	n/a	n/a	n/a	n/a
PAD District 3		373.9	7552.9	76.8	1421.5			137.6	2641.5	36.3	696.3	n/a	n/a	n/a	n/a
PAD District 4		26.8	540.8	10.9	202.0			8.5	163.7	0.8	14.9	n/a	n/a	n/a	n/a
PAD District 5		153.2	3094.8	75.7	1399.8			38.5	738.5	27.5	528.0	n/a	n/a	n/a	n/a
Total		**817.4**	**16511.9**	**370.5**	**6855.1**	**629.6**	**11496.2**	**278.9**	**5354.0**	**73.9**	**1418.2**	**9.6**	**10.8**	**2.4**	**97.4**

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
PAD District 1		n/a	n/a	12.4	289.6	44.4	910.1	3.9	93.7			1.0	23.6		
PAD District 2		n/a	n/a	34.6	805.3	111.2	2280.2	10.2	243.9			6.7	160.7		
PAD District 3		n/a	n/a	71.0	1653.8	241.7	4955.0	21.5	515.5			11.3	271.0		
PAD District 4		n/a	n/a	4.8	111.3	15.9	325.2	1.5	35.3			0.6	13.3		
PAD District 5		n/a	n/a	22.9	532.9	89.0	1825.2	7.4	178.0			4.6	109.7		
Total		**111.7**	**1898.7**	**145.6**	**3392.9**	**502.2**	**10295.7**	**44.4**	**1066.5**			**24.1**	**578.3**		

CHAPTER IV

THE RESPONSE POTENTIAL OF INDIVIDUAL NON-MEMBER COUNTRIES

Map of Poland



POLAND

Key Oil Data
(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	0.3	0.2	0.2	0.4	0.5	..	..
Imports	20.3	16.9	15.8	15.6	20.4	..	..
Exports	–1.6	–0.2	–1.5	–0.9	–1.5	..	..
Bunkers	–0.1	0.0	–0.4	–0.2	–0.3	..	..
Net Imports – NI	18.6	16.7	13.9	14.5	18.6	..	..
Total Supply	19.0	16.8	14.1	14.9	19.1	..	..
Import Dependence (%)	98.2	98.8	98.8	97.6	97.2	..	..
Stock – Days of NI	0	0	0	0	52	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structure

Current energy supply of 96 Mtoe comprises 19% oil, 10% natural gas, 67% solid fuels, and 4% other sources. Over the past ten years, the share of solid fuels (hard coal and brown coal) in the primary energy mix has decreased by about 11%. Meanwhile, the share of oil has increased by 5%, whereas the share of natural gas has increased by 2%.

Indigenous crude oil production in 1999 was only 0.43 Mt, equivalent to about 2% of domestic demand. Exploration for and extraction of crude oil are carried out by the Polish Oil and Gas Company (PGNiG) operating in the south-eastern and middle-western parts of Poland, and by Petrobaltic, operating offshore in the Baltic.

Poland depends on imports for 97% of its oil requirements. Oil is imported mainly from the countries of the former Soviet Union, Sweden, Norway, Germany, the United Kingdom and the Czech Republic. Imports in 1999 comprised 16.5 Mt of crude oil and 3.8 Mt of oil products. About 1.7 Mt of heavy fuel oil was exported. Crude oil is imported from Russia via the Druzhba pipeline (80%) and from the Middle East and the North Sea via the port of Gdańsk (20%). Oil products are imported mostly from northwest Europe. These import sources are not expected to change significantly in the near future.

Oil Consumption

(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	5 461	5 524	1.2
of which unleaded	3 584	4 305	20.1
Kerosene and jet fuels	484	258	–46.7
Gas/diesel oil	7 329	7 623	4.0
Residual fuel oil	1 456	1 315	–9.7
Other	4 063	3 726	–8.3
Total	**18 309**	**18 446**	**0.7**

Source: IEA *Quarterly Oil Statistics*.

Origin of Oil Imports, 1999

(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Former Soviet Union	14 759	203	209	29	123	636	15 959
Sweden	0	447	347	0	5	21	820
Norway	696	15	5	0	0	31	747
Germany	0	439	163	28	1	68	699
United Kingdom	529	55	0	0	2	20	606
Czech Republic	46	195	110	0	5	3	359
Other	429	302	141	0	57	180	1 109
Total	**16 459**	**1 656**	**975**	**57**	**193**	**959**	**20 299**

Source: IEA *Quarterly Oil Statistics*.

Poland has seven refineries with total primary distillation capacity of 19.5 Mt/year at the end of 1999. The largest refineries in Płock and Gdańsk have capacities of 13.5 Mt and 4.5 Mt, respectively. The remaining five refineries are located in the southern part of Poland and have very small processing capacities, ranging from 0.1 Mt/year to 0.6 Mt/year. The Płock refinery, located in the central region, is supplied mainly with Russian crude oil through the Druzhba Pipeline. Since 1992 it has also been occasionally receiving crude oil from the port of Gdańsk through the Pomeranian pipeline. Located on the Baltic seacoast, the Gdańsk refinery processes crude oil imported by sea and Russian crude oil through the reversed Pomeranian pipeline.

Polish refineries processed 16.7 Mt of crude oil in 1999. They produced 4.3 Mt of gasoline, 6.0 Mt of gas/diesel oil and 5.3 Mt of heavy fuel oil and 0.3 Mt of LPG. Domestic production of oil products covers about 80% of Polish demand. This is supplemented by imports, which in 1999 reached 1.7 Mt of gasoline and 0.9 Mt of diesel oil. Oil product demand has increased steeply by about one quarter since the mid-1990s. This trend is expected to continue in coming years, requiring growing imports of both crude oil and petroleum products.

The main oil import terminal in Gdańsk has a capacity of 33 Mt/year. In addition, there are three small terminals in Szczecin, Świnoujście (1.5 Mt/yr), Gdańsk Naftoport (1.2 Mt/yr) and Gdynia Dębogórze (1.0 Mt/yr).

The oil pipeline system comprises two large crude oil lines. The Druzhba Pipeline is a 650-km line (diameter 820, 630 and 529 mm) running from the Belarus border via Płock to the German border, with an annual capacity of 38-40 Mt from the Belarus border to Płock and 27 Mt from Płock to the German border. The Pomeranian Pipeline is a 237-km line (diameter 820 mm) linking Gdańsk with Płock, with an annual capacity of 30 Mt. – direction Gdańsk-Płock and 18 Mt – direction Płock-Gdańsk. In addition, there are several product pipelines linking the Płock refinery with Warsaw and Czestochowa to the south and Bydgoszcz and Poznan to the west.

The majority of pipelines are owned by PERN (Petroleum Pipelines Exploitation Enterprise). Other key oil enterprises include DEC Ltd. (Tankers Exploitation Directorate Ltd.) which offers railway transport for petroleum products, and CPN, owning about 1 400 filling stations as of June 1999. In 1999, CPN was incorporated into the Płock refinery, thereby creating the new corporation *Polski Koncern Naftowy* (PKN), recently renamed PKN Orlen. At the end of November 2000, PKN Orlen owned 2 058 filling stations, which is 31% of the entire Polish distribution network of 6 300 filling stations. Over 640 stations are owned by foreign companies, the most prominent of which are: British Petroleum, Statoil, Shell, Aral and Preem.

Existing storage capacity for compulsory and operational reserves is estimated at 3 million cubic metres (Mm^3), including 1.5 Mm^3 in 22 fuel storage depots owned by Naftobazy Ltd. Capacities of these depots range from 10 000 m^3 to 260 000 m^3. The five largest – Koluszki, Nowa Wieś Wielka, Boronów, Rejowiec, Emilianów – have pipeline links with the Płock refinery. Four other depots – Małaszewicze, Zawadówka, Narewka and Chruściel (located along the eastern border) – perform transloading of petroleum products from wide gauge to standard gauge railway tracks. The remaining storage facilities are owned mainly by the refineries, CPN, PERN and large oil consumers.

The Polish energy sector has been undergoing rapid transformation over the past few years. In December 1996 Poland reached an agreement with the European Union concerning an extension of import duties on fuels. The agreement stipulated that import duties on gasoline and diesel fuel from EU countries would be phased out by 2001, and that price controls and quantitative restrictions on imports would be abolished in early 1997. In keeping with the agreement, the government lifted the remaining price controls on gasoline in February 1997. Due to high prices of fuels, duties on imports of gasoline and gasoil from countries of the European Union and the CEFTA (Central European Free Trade Agreement) and the EFTA (European Free Trade Agreement) were phased out by the Polish government in September 2000, four months earlier than agreed with the EU. At the same time, duties on fuels imported from countries of the former Soviet Union were suspended.

The new Energy Law of April 1997 defined the roles and obligations of the state and the private sector, separated the state's policy-making, regulation and ownership functions, and established the Energy Regulatory Authority, empowered to licence energy sector entities and to regulate energy prices. The law also envisaged splitting the power sector into three separate components – generation, transmission and distribution – and opening it to third party access by obliging authorities to liberalise utility rates for customers within two years. These provisions appear consistent with general principles advocated by the IEA and the EU.

The Administration has since focused on strategic issues and on setting the general guidelines for energy policy. The ownership issues have become the responsibility of the Ministry of State Treasury, whereas the regulation of the energy sector is now in the domain of the newly created Energy Regulation Authority. The latter has the authority to approve, *inter alia*, rates for electricity supply proposed by power companies.

In May 1996 the government adopted a Programme of Restructuring and Privatisation of the Oil Sector in Poland, based on the idea of establishing two vertically integrated business groups around the Płock and Gdańsk refineries. The responsibility for restructuring and privatisation of the oil sector was placed in the hands of the newly established holding company Nafta Polska. Until the recent privatisation of the Płock refinery, the company owned 75% shares in the refineries, whereas the state held the remaining 25% (15% for workers and 10% for reprivatisation and pension funds) and 100% shares in "Naftobazy" and DEC. As of November 2000, Nafta Polska owned 18% of PKN, 75% of the Gdańsk refinery, 100% of three southern refineries in Czechowice, Jedlicze and Jaslo, and 100% of Naftobazy. Two other southern refineries – Trzebinia and Jedlicze – were sold to PKN in 1998 and 1999, respectively, whereas DEC was sold in 2000 to the American-based GATX Rail Overseas Holding Corporation.

The privatisation of PKN began in late October 1999 with the floating of 30% of shares on the Warsaw and foreign stock exchanges. An additional 27% of shares of PKN were sold in the second quarter of 2000. At present, 72% of the company shares are in private hands, and 28% of shares are still owned by Nafta Polska and the State Treasury together. According to the Programme of Restructuring and Privatisation of the Oil Sector updated by in 2000, an additional 18% of shares of PIKN are expected to be offered for sale in 2001. The remaining 10% of shares will probably be kept by the State Treasury.

The search for a strategic investor in the Gdańsk refinery continues. According to initial plans, the Gdańsk refinery was to absorb about 160 CPN filling stations and offer a majority stake to a strategic investor. The first-round bids were declared unsatisfactory by the supervisory board of Nafta Polska. In September 2000, Nafta Polska hired the consulting company Rotshild Poland to prepare a privatisation memorandum for the Gdańsk refinery. The memorandum will be offered to potential investors interested in the purchase of up to 75% of the company's shares. Currently higher oil prices and a more flexible privatisation plan may encourage more attractive bids in the second round. It is expected that the process of oil sector privatisation will be completed by the end of 2001, after which time Nafta Polska may be dissolved.

The latest official government forecast of Polish energy balances is contained in "Energy Policy Guidelines for Poland until the Year 2020" that was approved in February 2000. The forecast is developed for three GDP growth scenarios: 2.3% per annum (low case), 4.0% per annum (base case) and 5.5% per annum (high case).

Total primary energy demand is projected to increase from 107.3 Mtoe in 1997 to around 109 Mtoe in 2010 and 112-121 Mtoe in 2020. All three scenarios project the declining shares of coal and central heating in primary energy balances and the increasing shares of natural gas and oil. The share of gas will more than double (from 11% in 1997 to 23-25% in 2020) whereas the share of oil will increase more modestly (from 17% in 1997 to 19-23% in 2020), reflecting expected robust growth in demand for transport fuels. The share of renewable energy sources will stabilise at around 5-6%.

According to the same government forecast, Polish energy self-sufficiency is expected to fall from 92% in 1998 to just over 50% in 2020. This is in line with the May 1999 projections by the Institute of Power Engineering, which anticipates that the country's energy self-sufficiency will drop to 61-65% in 2010 and 51-53% in 2020. However, self-sufficiency in motor fuels will be reached by 2010, assuming that the planned expansions of the Płock and Gdańsk refineries to 17 Mt/yr and 10 Mt/yr, respectively, will materialise.

Projected Primary Energy Demand

Scenario	Energy Source	Unit	1997	2005	2010	2015	2020
Low	Hard Coal	mln ton		92.9	87.9	86.0	83.5
	Brown Coal	mln ton		66.8	67.2	66.1	65.6
	Crude Oil	mln ton		20.4	20.2	20.8	21.1
	Natural Gas	billion m^3		16.4	19.7	22.9	26.0
	Nuclear	Mtoe		0.0	0.0	0.0	0.0
	Renewable*	Mtoe		5.3	5.5	5.7	5.9
	Domestic Demand	Mtoe		106.2	108.6	110.7	112.2
Base	Hard Coal	mln ton	104.5	91.3	84.3	83.9	81.9
	Brown Coal	mln ton	65.4	66.8	67.4	66.2	65.6
	Crude Oil	mln ton	18.6	20.2	20.4	21.4	22.3
	Natural Gas	billion m^3	12.0	17.9	22.0	25.0	29.3
	Nuclear	Mtoe	0.0	0.0	0.0	0.0	0.0
	Renewable*	Mtoe	5.5	5.5	6.0	6.5	7.1
	Domestic Demand	Mtoe	107.3	106.4	109.1	112.4	116.2
High	Hard Coal	mln ton		85.5	84.6	84.5	82.4
	Brown Coal	mln ton		66.4	67.2	66.2	65.6
	Crude Oil	mln ton		22.2	23.5	25.3	27.9
	Natural Gas	billion m^3		15.7	18.4	22.1	27.6
	Nuclear	Mtoe		0.0	0.0	0.0	0.0
	Renewable*	Mtoe		5.8	6.3	6.9	7.7
	Domestic Demand	Mtoe		103.7	109.7	114.7	121.3

* Hydro, wind, solar, geothermal, biomass, ethanol and waste.

Emergency Response Policy and Organisation

Emergency Response Policy

Poland's energy supply is dominated by indigenous production of solid fuels which are used for electricity and heat generation. Security of energy supplies is one of the main objectives of the new Polish energy policy that was adopted in the spring of 2000. This will be achieved through greater diversification across energy sources and geographic origins of imports. Other objectives include: increasing energy efficiency; fostering competition; creating conditions for sustainable development and meeting environmental protection requirements and commitments arising from international agreements. The pace of market reforms in the energy sector will be accelerated to conform with the timetable for accession negotiations with the European Union.

Security of oil supplies to Poland has been greatly enhanced through the construction of the Pomeranian pipeline and expansion of the tanker terminal in Gdańsk, which more than tripled loading capacity from 10 Mt/yr (one berth) before 1992 to 32.8 Mt/yr (four berths) at present. The port and the pipeline have sufficient capacity to replace all Russian oil supplies received through the Druzhba pipeline with imports from other sources. The line can also be reversed at short notice in order to ship Russian crude oil to Gdańsk.

There are plans to enhance the security of oil supply through further diversification of oil import sources. In addition to increased imports of North Sea and Middle East crude oil via Gdańsk, Poland may begin to import Caspian oil using a planned pipeline from Odessa through Brody to Gdańsk. The programme to build oil reserves to a level of 90 days of net imports by 2005 will also contribute to improved supply security.

Emergency Organisation

There is to-date no permanent organisational structure to deal specifically with oil or energy emergencies. In a crisis, the Ministry of Economy, the Department of Energy and the Department of National Reserves and Defence Affairs would be responsible for energy emergency policy. They would co-ordinate appropriate measures on an *ad hoc* basis with Nafta Polska and the Material Reserves Agency. Emergency measures would be based on the Energy Law of 10 April 1997, the Act on State Reserves and Compulsory Reserves of Fuels of 30 May 1996 and on secondary legislation.

The Administration became particularly aware of the need to establish a permanent NESO-type structure to deal specifically with oil emergencies during its participation in the IEA's Emergency Response Exercise in 1998. Some draft proposals to create a NESO have already been prepared and they are now being discussed within the government and with the oil industry. The most likely outcome will be a simple and low-cost structure, with the Ministry of Economy as its core, complemented by representatives from the Ministries of Interior, Defence, Transport and Finance. The Administration envisions that the NESO will eventually control compulsory stocks and assume responsibility for the development and implementation of allocation procedures.

Emergency Reserves

Policy and Legal Instruments

The legal basis for the creation, maintenance and use of emergency stocks is provided by:

- The Act on State Reserves and Compulsory Reserves of Fuels of 30.05.1996;
- The Ordinance of the Minister of Economy of 29.09.1997 on determination of the method of creation, determination of quantity and quality of compulsory reserves of liquid fuels and principles and method of their utilisation, as well as control of creation and management of compulsory reserves of liquid fuels;
- The Ordinance of the Council of Ministers of 06.01.1998 on the establishment, management, disposal and financing of state reserves, control and establishment of the state reserves information system.

This set of legislation authorises the Minister of Economy to control and use compulsory stocks held by oil companies, as well as a part of state reserves not restricted as special (i.e. for military or mobilisation purposes). The restricted stocks could be used after a decision by the Prime Minister based on proposals from the Minister of Defence, the Minister of Internal Affairs and the Administration or the Head of the State Security Office.

Stockholding and Maintenance

There are three types of oil stocks in Poland: state economic reserves, compulsory stocks and operating stocks. State economic reserves are held, financed and managed by the governmental Material Reserves Agency (MRA) and owned by the State Treasury. The legal basis for these reserves is provided by the Act on State Reserves and Compulsory Reserves of Fuels and the Ordinance of the Council of Ministers on the establishment, management, disposal and financing of state reserves, control and establishment of the state reserves information system. The MRA holds oil stocks for both military and civilian purposes. Only the civilian stocks that are not reserved for mobilisation purposes qualify as emergency stocks under the IEA definition. As of September 2000, the amount of such stocks was estimated at 0.64 Mt, or 13 days of net imports.

Compulsory stocks are held, financed and managed by companies subject to the stock obligation. The legal basis for these stocks is the same as for state reserves. Since 1998 the obligation to create such stocks is imposed on companies which import or produce more than 200 000 tons of crude oil or petroleum products in the previous year. Each year, companies are obliged to increase their stocks by 2% (around 7 days of consumption) until compulsory stocks reach 90 days. Recently created, PKN is now responsible for about 70% of total compulsory stocks, which in September 2000 were estimated at 0.66 Mt, or 13 days of net imports. The remaining compulsory stocks are held by the Gdańsk refinery and by three other small refineries. Companies are exempted from the excise tax on fuel stocks and partially reimbursed for the cost of holding compulsory stocks.[20] The level of reimbursement is gradually being reduced.

In addition, oil companies also hold stocks for operating purposes. These commercial stocks are difficult to measure because of their daily fluctuations, large number of storage sites and the lack of legal requirement to hold or report them. A part of these stocks held in wholesale depots and at power stations can be included in stock data reported to the IEA, thereby adding several days to the stock coverage. On September 30, 2000 commercial stocks stood at 1.6 Mt, equivalent to 34 days of net imports.

With all types of oil stocks aggregated according to IEA definitions, total stocks amounted to 2.9 Mt, or 60 days of net imports as of September, 2000. This represents a significant upward revision from the previously reported levels that comprised only stocks held by the refineries and the CPN distribution company. In addition to these categories, the latest estimate includes non-military stocks held by MRA, new compulsory stocks and commercial stocks held by other distributors and major consumers.

Until recently, the Administration planned to meet the IEA stock obligation by 2005 through a combination of compulsory stocks (52 days) and state reserves (38 days), without taking account of commercial stocks, over which the government has little control. After 2005, further increases in compulsory stocks were to be offset by gradual reductions in state reserves. At present, however, the outlook for state reserves seems less favourable, due mainly to financial constraints. Government expenditures on state reserves have been declining in recent years and are not likely to increase in the future, implying that state reserves may remain around the current level of 14 days. To remedy this situation, the Administration is contemplating introducing new legislation that would give it authority to use a part of commercial stocks in a crisis. With these stocks complementing the state reserves and compulsory stocks, the 90-day target could still be reached by around 2005.

20. In 2000, annual stocks subsidies amounted to 17.48 zl [US$ 3.95] per tonne of gasoline and fuel oil and 6.99 zl [US$ 1.58] per tonne of crude oil.

Existing facilities provide storage for around 60 days of consumption. This implies an urgent need to expand the capacity in order to allow operators to meet their growing stockholding obligation. A long-term goal is to triple the existing capacity of 1.5 Mm^3 which, according to estimates by Nafta Polska, could cost as much as US$1.2 billion. The cost estimates vary depending on the types of new storage facilities and the types of products stored, with the least expensive option being the storage of crude oil in salt caverns located in the south of Poland. The cost of storage in underground caverns is estimated at only $12/$m^3$ compared to $400/$m^3$ for above-ground tanks constructed on new land. A detailed expansion programme is being developed.

Poland has no bilateral stockholding arrangements or oil security agreements with other countries. The Administration reported that it is considering holding some strategic stocks abroad as a short-term alternative to expanding storage capacity in Poland. This would require amending the existing legislation[21] and reaching satisfactory intergovernmental agreements.

In 1999, the stock obligation applied only to the five largest refineries and state-owned CPN, with annual turnovers in excess of 200 000 tons. The Administration contemplates eliminating this threshold and extending the stock obligation to all operators, a step that would immediately increase the required stocks by about 20% and speed up the future process of building strategic stocks. This would also ensure equal treatment for all operators but could complicate data collection and impose on small operators a difficult task of securing increasingly scarce storage.

Contemplated implementing decrees to the State Reserves Bill may establish a specialised stockholding agency for oil stocks and define the usage of these stocks. Nafta Polska has recently proposed establishing such an agency, suggesting that it could play a key role in expanding storage capacity and building up stocks to the 90-day level. The proposed structure of the agency is generally modelled on the German EBV. The government would be represented on the Board of Directors, and could be asked to provide credit guarantees for commercial loans. Such loans could easily be obtained by the storage company Naftobazy, which at present is debt-free.

Polish legislation requires that compulsory stocks be held in the form of gasoline and diesel oil. The maximum share of crude oil in compulsory stocks is set at 30%, reflecting insufficient domestic refining capacity and the need to import oil products.[22] The Minister of Economy has the authority to determine this limit through an administrative decision.

Operational Aspects of Stockdraw

Existing legislation enables the government to implement an IEA drawdown obligation using state reserves and compulsory stocks, should the Governing Board decide on a co-ordinated stockdraw. State economic reserves and compulsory stocks may be drawn down after a decision by the Minister of Economy. The decision may be triggered by a request from local authorities (*voivodships*) or oil operators in cases of oil market disruptions. Two to five days would be needed to obtain a decision. The stocks could be released immediately after the decision. State economic reserves could be transferred to the oil industry through public tenders. Compulsory stocks could be released to the market through the

21. The legislation does not prohibit holding stocks abroad, but at the same time does not provide any explicit (and necessary) authorisation.
22. When commercial and state reserves are also considered, crude oil currently accounts for 56.7% of the total.

distribution network of the company owning them, or could be passed to a third party, depending on a decision by the Minister of Economy.

Commercial stocks are managed exclusively by oil companies and could be released through their distribution networks. At present, Nafta Polska owns or controls most oil companies and, therefore, can influence their commercial decisions, including those concerning the stock levels. Apart from this tool, which will be lost after the imminent privatisation of the oil sector, the government does not have any legal powers over commercial industry stocks.

Compliance Issues

State economic reserves and compulsory stocks are distinguished from commercial stocks through separate accounting systems. In many cases, they are also stored in separate tanks. The Material Reserves Agency has a list of companies obliged to hold compulsory stocks and is authorised to supervise these stocks. The Agency controls not only the levels of compulsory stocks, but also their use. Companies are not allowed to use these stocks without a permit from the Minister. In case of non-compliance with the Act on State Reserves and Compulsory Reserves of Fuels, companies may be penalised by the Agency with fines of up to 150% of the cost avoided. To date there has been no need to apply such penalties, as companies generally meet their stock obligations.

Demand Restraint Measures

Policy and Legal Instruments

Poland's demand restraint system comprises mainly a fuel rationing programme that can be activated and implemented by the Council of Ministers in crisis situations. The Council has all necessary legal powers to deal with various emergencies. Art. 11 of the Energy Law authorises the Council to introduce limitations in sales of solid or liquid fuels and limitations in supply and drawing of gaseous fuels, electricity, gas and heat in cases of:

- a threat to national energy security;
- a threat to the safety of the population; or
- a danger of major economic loss.

The measures would only be used as a last resort. These measures have not yet been tested. The lack of other measures and detailed implementing regulations reflects partly the fact that there has not been any serious fuel crisis in recent years and partly the government's concerns that demand-side measures might be very unpopular with the public for historical reasons. However, the Administration intends to assess the effectiveness of alternative light-handed measures that could complement the existing rationing programme.

At present there are no plans to co-ordinate demand restraint measures with neighbouring countries in order to avoid cross-border distortions. However, the Administration is ready to intensify the exchange of relevant information and experience with neighbouring countries in order to increase the effectiveness of measures taken at the national level.

Procedures and Monitoring

On the proposal by the Minister of Economy, the Council of Ministers would introduce the limitations in sales in order to reduce fuel consumption. The Ordinance of the Council of Ministers defines specific measures and compels energy operators to implement them. The President of the Energy Regulatory Authority and local administrators are authorised to supervise related actions.

Decision Processes

The decision process necessary for programme activation has already been tested with satisfactory results for electricity and gas supplies, but not for liquid fuels.

Evaluation of Measures

No estimates are available of the cost of implementing each of the demand restraint measures. No studies have yet been conducted on estimated volumetric savings from demand restraint measures. Such studies may be initiated by the end of 2000.

Other Response Measures

Polish indigenous oil production is insignificant (2% of consumption), and cannot be increased in a crisis. Moreover, there is virtually no potential for switching away from oil or natural gas, as the power sector relies exclusively on coal (97% of electricity production) and hydro power (3%). There is only one small power station near Warsaw that uses natural gas and could switch to coal. However, in the future, the scope for fuel-switching is expected to increase gradually as more power plants start using natural gas.

In a crisis, Poland has a capacity to increase production of coal for use by existing, partially obsolete, power stations, heat stations and CHP (combined heat production) plants. Current production capacity of power stations is 33.7 GW with peak demand of 24 GW. Some 3 GW of additional capacity could be used immediately and another 1-2 GW after one or two months. Article 11 of the Energy Law gives the government necessary powers to issue ordinances for fuel-switching in case of emergency.

Existing Polish regulations do not provide for any relaxation of product specifications in oil emergencies. However, in an extreme situation, appropriate decisions on that matter could be taken and implemented through a Ministerial decree. Polish standards for motor fuels do not yet meet the new, more stringent, EU requirements that came into effect on January 1, 2000. The Administration intends to adopt and implement the EU regulations concerning fuel quality (Directive 98/70), as well as EU environmental regulations, before the end of 2002.

Poland imports about 70% of its natural gas requirements (about 7% of total primary energy supply). Assuming that a disruption of gas supply is limited to imported gas, some 30% of gas supply would still be guaranteed from indigenous production. This production could be increased somewhat in a crisis. Nevertheless, the disruption of imported gas supply would lead to serious limitations in energy use.

To remedy associated risks, new gas storage facilities are being commissioned or under construction to supplement the existing storage capacity of around 40 days of supply. The latest such addition is an underground facility at Mogilno. The Administration is also considering plans to construct a gas pipeline from Norway and import up to 3 bm^3 of gas from Germany through the existing pipeline network. In the longer term, natural gas from Kazakhstan and other Caspian countries could be supplied through a new pipeline linking Poland with Odessa. LNG imports are also under consideration.

Data Collection

The statistics law has recently been amended, making monthly oil reporting compulsory from January 2000. The Central Statistical Office has developed a new monthly questionnaire for oil supply and stocks which has been in operation and has provided IEA MOS data since March 2000. The questionnaire is designed to meet all EU and IEA statistical requirements. It must be completed by refinery and licensed wholesalers. The latter category involves some 700 to 1 000 traders, although only 50 to 100 have significant turnover. Collection of questionnaire data is to be delegated to the Energy Markets Agency (ARE), a public research institute with expertise in the energy field.

Commercial stock data will also be collected through the new monthly oil questionnaire. As this questionnaire has to be completed by all wholesalers, care will have to be taken to exclude stocks which, according to IEA definitions, cannot be considered as emergency reserves. There is a concern that respondents will not complete the questionnaire correctly, or that they will double count compulsory stocks as commercial stocks. The Administration intends to ensure the accuracy of MOS data through the monitoring of aggregate data and comparison with monthly data from Nafta Polska and other sources.

The data on two other categories of stocks – state reserves and compulsory stocks – are currently being collected by the Material Reserves Agency (MRA). The Agency has a legal obligation to produce only bi-annual reports, but has been able to estimate monthly stock figures thanks to a small number of operators with this obligation. From year 2000, MRA will supply this data to ARE, which will compile it with its own data on commercial stocks and report the total stock levels to the IEA.

Current statistics cover virtually all companies operating in the Polish oil market except small importers of fuels. Data are collected primarily through public statistics channels. Oil companies submit all relevant information on statistical questionnaires to the Central Statistical Office and/or the Energy Market Agency. These two institutions verify and aggregate information before preparing the Annual Oil Questionnaire, national energy balance and other statistical reports. With the creation of a Polish NESO, data collection and transmission will be amended accordingly.

Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Location	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Petrochemia	Plock	13.50	272.70	6.43	118.96	5.16	99.07	2.30	44.16	2.60	49.92				
Gdańsk		4.50	90.90	1.80	33.30					1.50					
Czechowice		0.60	12.12	0.32	5.92										
Trzebinia		0.39	7.88	0.20	3.70										
Gorlice		0.17	3.43	0.09	1.67										
Jasło		0.15	3.03	0.08	1.48										
Jedlicze		0.14	2.83	0.07	1.30										
Total		**19.45**	**392.89**	**8.99**	**166.32**	**5.16**	**99.07**	**2.30**	**44.16**	**4.10**	**49.92**				

Refinery	Location	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
		mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
Petrochemia	Plock			2.00	46.60	2.82	57.81	0.15	3.60					0.12	2.88
Gdańsk				1.00	23.30	1.80	36.90					0.35	8.40		
Czechowice															
Trzebinia															
Gorlice															
Jasło															
Jedlicze															
Total				**3.00**	**69.90**	**4.62**	**94.71**	**0.15**	**3.60**			**0.35**	**8.40**	**0.12**	**2.88**

* commissioned in December 1999.

Map of the Republic of Korea



REPUBLIC OF KOREA

Key Oil Data
(million metric tons oil equivalent)

	1980	1985	1990	1995	1999[1]	2005[2]	2010[2]
Production	0	0	0	0	0.4	..	..
Imports	27.2	30.4	55.4	114.3	145.1	..	..
Exports	0	–3.5	–3.7	–15.6	–39.3	..	..
Bunkers	–0.1	–0.5	–1.6	–4.6	–6.5	..	..
Net Imports – NI	27.1	26.4	50.1	94.1	99.3	..	..
Total Supply	27.1	26.4	50.1	94.1	99.8	..	..
Import Dependence (%)	100	100	100	100	99.6	..	..
Stocks – Days of NI	0	0	0	0	0	..	..

1. Estimated data.
2. Latest available forecast.

Oil Import Dependence and Market Structures

Current energy supply of 163 Mtoe comprises 56% oil, 8% natural gas, 21% solid fuels, 14% nuclear and 1% other sources. Korea imports all of its oil requirements. Crude oil is imported mainly from Saudi Arabia, the United Arab Emirates, Iran, other Gulf countries and Indonesia.

Korea is the fourth largest importer and the sixth largest consumer of oil in the world. Its imports exceeded 140 million tons (2.0 mb/d) in 1999 rose 5.5% in the first nine months of 2000. Oil constitutes the largest share of Korea's total energy consumption, although its share has been declining in recent years because of the rapid increase in the use of natural gas and nuclear power. Dependence on oil decreased from 62.5% in 1995 to 53.6% in 1999. Crude oil imports may increase to 121 Mt by the year 2004 and petroleum products imports are forecast to increase to 27 Mt by the year 2004. Given the dynamic nature of the Korean economy, growth may, in practice, exceed these forecasts.

The Korean government is pushing ahead with a fuel-switching policy to natural gas. This will permit Korea to diminish excessive oil dependence and move toward a more environmentally friendly consumption structure. Korea is also the second largest importer of LNG (489 billion cubic feet in

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	6 968	7 414	6.4
of which unleaded	6 968	7 414	6.4
Kerosene and jet fuels	10 243	13 274	29.6
Gas/diesel oil	16 512	17 268	4.6
Residual fuel oil	16 758	17 717	5.7
Other	29 036	29 739	2.4
Total	**79 517**	**85 412**	**7.4**

Source: IEA Quarterly Oil Statistics.

Origin of Oil Imports, 1999
(thousand metric tons)

Country	Crude	Gasoline	Gasoil	Fuel Oil	Kerosene	Other	Total
Saudi Arabia	32 946	0	0	0	115	6 028	39 089
United Arab Emirates	15 832	0	0	0	124	1 827	17 783
Iran	11 236	0	0	0	0	568	11 804
Kuwait	7 666	0	0	0	139	3 165	10 970
Indonesia	5 730	0	0	2 045	0	608	8 383
Oman	8 004	0	0	0	0	0	8 004
Other	38 851	51	319	484	596	4 810	45 111
Total	**120 265**	**51**	**319**	**2 529**	**974**	**17 006**	**141 144**

Source: IEA Quarterly Oil Statistics.

1998). Korea will have a limited amount of domestic natural gas production starting in 2003. The production from *Donghae-1* gas field will be Korea's first gas production. It is expected to produce 420 thousand tons of natural gas per annum as of 2003, which will satisfy around 2% of Korea's gas demand.

The latest achievement of Korea's effort to diversify its crude oil sources is the discovery of an oil field offshore Vietnam, which was announced in September, 2000. KNOC has been engaged in oil exploration in the region as a member of a consortium. It is the first time that KNOC has taken part as an operator in the discovery of oil in an overseas oil exploration project. The commercial production is slated to begin in 2004.

Oil consumption is forecast to increase from 95 Mt in 2000 to 111 Mt by the year 2005, and then rise to 125 Mt by the year 2010 with a 3% increase annually on average. The prospect for oil products demand is shown in the Table below.

With the expansion of crude distillation facilities already achieved by 1996, the combined official crude oil distillation capacity of the nations' five oil refineries stood at 331 thousand tons per day (2.4 mb/d) as of the end of 1999. It has increased about three times from 114 thousand tons per day in 1990.

Prospect of Oil Products Demand

(thousand metric ton equivalent)

	1999	2000	2005	2010	Increase rate (%)			
					2000	00-05	06-10	00-10
Total	88 273	94 851	110 919	122 542	7.1	3.9	2.0	3.0
Gasoline	7 489	7 984	9 930	11 278	6.6	4.8	2.6	3.8
Other Kerosene	9 939	10 795	13 314	15 123	8.6	5.0	2.6	3.9
Gas Diesel Oil	16 900	18 056	20 845	22 775	6.8	3.6	1.8	2.7
Distillate Fuel Oil	424	468	443	477	10.4	0.7	1.5	1.1
Low Sulphur	227	224	414	447	1.5	10.5	1.5	6.4
High Sulphur	17 458	19 619	23 401	25 616	12.4	5.0	1.8	3.5
Aviation Gasoline	2 064	2 229	2 854	3 667	8.0	5.5	5.1	5.4
Naphtha	25 754	26 991	29 235	31 400	4.8	2.1	1.4	1.8
White Spirit and Industrial Sprit	92	113	135	148	22.5	6.6	1.8	4.4
LPG	6 639	6 959	8 640	9 733	4.8	4.6	2.3	3.5
Bitumen	1 287	1 413	1 658	1 723	9.8	4.3	0.8	2.7

Source: MOCIE.

Domestic oil refiners are also equipped with secondary facilities as follows:

- cracking facilities: 31 thousand tons per day;
- heavy oil desulphurising facilities: 18 thousand tons per day;
- naphtha reforming facilities: 23 thousand tons per day;
- kerosene-diesel desulphurising facilities: 82 thousand tons per day.

Compared to the surplus of crude oil distillation capacity, it is expected that heavy oil cracking facilities and heavy oil desulfurising facilities will be in 19 thousand ton per day shortages in 2004 due to environmental constraints.

Refining throughput in 1999 was as follows:

- Light products and middle distillates: 66% (gasoline –8%, diesel –24%, naphtha –18%, etc.);
- Heavy products: 29%(high sulphur fuel oil - 25%, etc);
- LPG: 5%.

At present, refinery expansion projects include construction of heavy oil cracking facilities (hydro crackers) totalling 5 thousand tons per day, and heavy oil desulphurising facilities reaching 15 thousand tons per day. Refinery output of oil products will increase by about 4% per year, from 113 Mt in 1999 to 116 Mt in 2004.

IPIC of UAE and ARAMCO of Saudi Arabia have invested respectively in Hyundai Refinery Oil Co, and in S-Oil corporation according to the Foreign Investment Promotion Act.

The bulk of imported crude oil and petroleum products is imported through five main ports (Ulsan, Onsan, Daesan, Yosu and Inchon). Petroleum products, imported or refined, are distributed to storage

facilities near major consuming areas by barges, rail, tank cars and the pipelines listed below. The products are then delivered along marketing chains of products from storage facilities.

Korea has no crude oil pipelines. Oil product pipelines are as follows:

Oil Products Pipelines in Korea

Pipeline	Length	Diameter	Daily Capacity
Ulsan-Daegu	101 km	12 inches	8 000 tons
Daesan-chonan	93 km	12 inches	10 300 tons
Incohon-Koyang	31 km	14 inches	9 000 tons
In chon-Kimpo	24 km	12 inches	8 000 tons
Yochon-Songman	461 km	10-12 inches	31 300 tons
Onsan-Songnam	439 km	18-24 inches	46 000 tons

Source: MOCIE.

The Korean government has relaxed its control on the petroleum industry as follows:

- November 1995: De-regulation of distance limits on the operation of service stations;
- January 1997:
  - Liberalisation of domestic prices for petroleum,
  - Liberalisation of export-import business of petroleum products,
  - Deregulation of retail business of petroleum products;
- May 1998: Opening of domestic retail business of petroleum products for foreigners;
- October 1998:
  - Deregulation of entry into oil refining business,
  - Opening of domestic refining business for foreigners,
  - Deregulation on new construction and expansion projects of refining facilities.

Emergency Response Policy and Organisation

Emergency Response Policy

Given a continuing high rate of dependence on oil from the Middle East, Korea is highly vulnerable to oil supply disruption. Oil security is an important element in the country's overall energy policy. Korea has made efforts to diversify imports of crude oil from the Middle East to other areas in order to improve supply security.

There are several elements in the Korean government approach to security of oil supplies, as follows:

i) The government has for many years given high priority to development of strategic oil reserves. Over two-thirds of these are under direct government control and built under long-term

programmes, which are regularly updated. The government aims to achieve oil stock levels equivalent to 60 days of government stocks and 30 days of company stocks of domestic consumption of the previous year under the Korean national definition. Government stocks have been built by the Korea National Oil Corporation (KNOC), which was designated as the government stockholding agency. In 2001, some $200 million will be spent to achieve a stockbuild of some 6%. The legal basis for company stocks is the Petroleum Business Act. In late 2000, government and company stocks totalled 66 days of domestic consumption of the previous year (1999), which means that, if converted to IEA calculations, the Korean petroleum stock levels currently meet the IEA requirements. The government is pushing ahead with the Third Stockpiling Plan, by which government stocks may reach 60 days of domestic consumption earlier than 2006, bringing total stock, including compulsory industry stocks, to 90 days of domestic consumption under Korean stock definitions.

ii) As price stabilisation will be the prime objective for the government in case of oil supply disruptions, the government is developing the "Oil Price Buffer Reserve Fund" to deal with possible price rises caused by supply disruptions.

iii) The government encourages oil companies to diversify sources of crude oil imports away from the Middle East.

iv) The government is diversifying energy sources to decrease oil dependence. Natural gas will have an increasing role in Korean energy consumption.

v) With regard to demand restraint measures, the Ministry of Commerce, Industry and Energy (MOCIE) has legal authority to implement these measures based on the Petroleum Business Act and the Energy Use Rationalisation Act. The demand restraint measures are intended to be implemented flexibly according to the degree of gravity of an oil supply disruption.

As Korea is not a member of IEA, it does not have the legal power or arrangements for emergency oil sharing within the IEA framework. But Korea will be able to co-operate with the IEA in a co-ordinated emergency response in an international oil crisis.

Under the Petroleum Business Act, the Minister of Commerce, Industry and Energy may order the adjustment of demand and supply of petroleum and other measures. MOCIE is also responsible for the establishment and enforcement of a fundamental and comprehensive policy on demand and supply of the energy and its rational and efficient use according to the Energy Use Rationalisation Act.

Emergency Organisation

Korean emergency organisation involves MOCIE, KNOC, Korea Energy Economics Institute (KEEI), the Korea Petroleum Association, oil companies, and the governments of local provinces.

KNOC is responsible for oil stocks and oil statistics. KEEI carries out analytical work, including the preparation of the energy outlook. MOCIE co-ordinates these two organisations, as well as key operations of the oil companies. The close co-ordination and division of labour among MOCIE, KNOC, and KEEI form a strong basis for emergency organisation.

The following structure is being contemplated for establishing the NESO after accession to the IEA:

- A decision-making organisation to decide important policies such as conversion into the emergency management system and the selection of response measures;

- A secretariat to manage the operation of the organisation;
- An implementation organisation to accomplish detailed response measures; and
- An advisory agency to gather the industry's opinions.

The emergency organisation would implement demand restraint measures, stockdraw and other emergency response measures, including diplomatic efforts for crude oil, safety of tankers, substitution of water routes for transportation, etc.

Korea does not yet have legislation for a NESO in the meaning of the IEA definition. But the Petroleum Business Act, which makes provision for emergency reserves and the stability of the demand and supply, is the most significant relevant legal background for operating an emergency organisation.

The government will review the emergency response system and organisation in the near future and plans to conduct emergency response training. Korean members participated in the IEA 1998 Emergency Response Exercise.

Emergency Reserves

Policies and Legal Instruments

Korea has both government stocks and industry stocks. Government stocks are held by the KNOC, based on the KNOC Act. Oil companies are required to maintain oil stocks equivalent to 38 days of domestic sales, in accordance with the Petroleum Business Act.

The Korean stock situation is encouraging. IEA statistics show that stocks were at the level of 94 days of net imports by IEA definitions on the 1st of October, 2000. Under Korean national definitions, emergency stocks are shown in days of domestic consumption of the previous year and include naphtha in both numerator and denominator. As naphtha accounts for 30% of Korean oil consumption, the IEA calculation yields higher stocks in terms of net imports than Korean national statistics. The Korean economy is, however, very dynamic and oil imports may in the next few years sometimes rise more rapidly than oil stocks.

The legal power for the drawdown of stocks, whether it is held by government or company, is in the Petroleum Business Act.

The Petroleum Business Act

Article 21 (Adjustment of Demand and supply of Petroleum)

In a case where deterioration of the domestic and foreign petroleum situations causes or may cause a serious disruption to the demand and supply of petroleum or where a disruption in the distribution of petroleum impedes or may impede the stability of national life and harmonious operation of the national economy, the Minister of Commerce, Industry and Energy may impose controls in areas under the following headings to apply to the petroleum refiners, petroleum export-import traders or petroleum retailers for the purpose of stabilising the demand and supply of petroleum:

1. Allocation of petroleum by area and major consumers and suppliers;
2. Rules for operation of petroleum refining facilities;

3. Imposition of production ratios by product for petroleum refiners;
4. Rules for use of oil stocks and storage facilities;
5. Import method of petroleum, and export-import of petroleum;
6. Refining and processing of petroleum for third parties;
7. Specifications of petroleum products, and establishment of trade orders by a fixed quantity;
8. Exchange and use of oil among petroleum refiners, petroleum export-import traders or petroleum retailers;
9. Distribution facilities for oil, and use thereof;
10. Distribution structure and channels for oil;
11. Other matters defined by the Presidential Decree for the purpose of stability of demand and supply of petroleum.

As mentioned above, Korea can co-operate with the IEA in an early co-ordinated response under the Petroleum Business Act, which defines the adjustment of demand and supply of petroleum, measures of petroleum rationing and other response measures.

Stockholding and Maintenance

The law relevant to stockholding and maintenance of government stocks in Korea is the KNOC Act, which endows KNOC with responsibilities for government stocks. The law related to compulsory industry stocks is the Petroleum Business Act, which sets up the target amount for petroleum reserve for refiners, exporters, importers and retailers. Registration as operators would be revoked or surcharges would be imposed for failure to meet the target. In the case where serious supply disruptions happen, the government can put into action various policy options, including stockdraw and rationing.

The Korean government aims to achieve 60 days' domestic consumption of the previous year, according to "The National Basic Energy Plan". It is expected that a 60-day stockpiling target will be achieved with "The Third Stockpile Plan" by 2006, totaling 90 days stock level, including industry stocks. The government will amend the requisite stocks of private companies if important changes in oil importing patterns occur.

In 1999, purchasing costs of government stocks were 184 million Korean Won[23] per thousand ton and storing and logistics costs (including management costs) in the public sector were about 8 million Korean Won per thousand ton. However, costs for storing and logistics in the private sector are not known. Environmental regulation may increase costs somewhat, but not significantly.

In accordance with the provisions under the Petroleum Business Act, a surtax of 13 won per litre is imposed on oil refiners, petroleum importers and petroleum sellers who either import petroleum (crude oil, petroleum products and LNG) or sell petroleum products. However, volumes imported for emergency reserves are exempted from the taxation. The surtax is being accumulated in the "Oil Price Buffer Reserve Fund" to deal with possible price rises caused by supply disruptions. In case of a sharp price increase, the government will set up a target price for oil products and refiners will be obliged to

23. 1000 Won equal US$0.89.

supply products to the markets at the price set by the government. The government will pay compensation for the refiners from the Fund.

Operational Aspects of Stockdraw

The government can order the KNOC, which manages government stocks, and private companies to drawdown their stocks in emergency situations according to the Petroleum Business Act. But physical tests for emergency situations have not been systematically carried out.

KNOC, by the government's order, will release government stocks into five refining companies with broad logistic networks across the country. The price of released stocks will be determined according to the price on the international oil market, the Korean economic situation and other relevant factors. Around 10% of the KNOC stock is held in the form of products for the purpose of quick delivery to the market. Physical deliveries to final consumers can be accomplished within 15-30 days after the stockdraw decision by the government.

Compliance Issues

According to the Petroleum Business Act, oil companies which have stockholding responsibility must report their stock level on a monthly basis to the KNOC, which enables the KNOC to monitor their compliance on behalf of the government. The government also has the legal power to penalise companies which do not fulfil their stockholding obligations.

In this context, the KNOC visits the companies' storage facilities to verify actual stocks against figures reported. If companies do not fulfil their stockholding obligations, the government can penalise them.

Although compulsory and commercial stocks are commingled, every company which has responsibility for stockholding according to Petroleum Business Act must keep 38 days' worth of stocks (which are crude oil, jet-fuel, LPG, gasoline, gas oil, kerosene, bunker-c) of the previous year's sales on a basis of a 12-month average.

Demand Restraint Measures

These measures are divided into the following three stages:

The first stage will be based on light-handed measures such as restrictions on vehicle use in the public sector, temperature and illumination control of buildings, and limitation of television broadcasting hours. These measures could be supplemented with a public campaign for potential savings in oil product consumption.

In the second stage, oil demand and supply will be adjusted through regional oil allocation, allocation to major oil consumers and suppliers, as well as through restrictions on the operation of oil refineries. These measures would be activated when an oil supply disruption "impedes, or may impede the stability of the national life and harmonious operation of the national economy" in accordance with the Energy Use Rationalisation Act. Price controls could be also introduced by MOCIE when deemed necessary.

Rationing of oil for household use would be the last stage in implementation of the demand restraint measures. This would include restrictions and prohibition of oil use and transfer. These measures are activated only when a serious impediment to the supply of oil takes place or appears imminent.

Policy and Legal Instruments

The Petroleum Business Act and the Energy Use Rationalisation Act endow MOCIE with legal authority to implement oil demand restraint measures. The Minister of MOCIE would make a decision on demand restraint measures flexibly according to the degree of gravity of an oil supply disruption.

Procedures and Monitoring

The government is considering enhancing its demand restraint measures, including estimating the time needed for administrative preparations and decision-making procedures, a timetable from the implementation decision to full operation, and the time needed from the implementation decision to the first measurable volumetric effect. The government will inform and persuade consumers through the mass media, and co-operate with civil economic organisations.

Other Response Measures

The latest national statistics show that oil and natural gas comprise 53.6% and 9.3%, respectively, of primary energy consumption in 1999. An oil disruption might be aggravated by a simultaneous disruption of natural gas supply and its indirect impact might be stronger. The Energy Use Rationalisation Act defines fuel-switching as an emergency response.

Keeping pace with intensifying environmental regulations both at home and abroad, the Korean government modifies its stocks to correspond to new specifications of products. The government has the authority to relax and suspend the application of laws regulating the environment temporarily in case of oil supply disruptions by the negotiation among the relevant ministries.

Data Collection

Using the forms defined in the Petroleum Business Act, KNOC regularly collects oil data directly from refineries, trading companies and oil sellers on a monthly basis, and compiles the data electronically. The processed data is made public via publication or Internet. KNOC has been collecting and processing the data through “Petronet”, which has been operational since 1998.

The current statistics cover almost every company operating in the Korean oil market. Korea has adjusted its data and information on demand and supply of petroleum to the standard of the IEA, and the KEEI has been submitting its monthly energy report, including oil data, to the IEA since 1997.

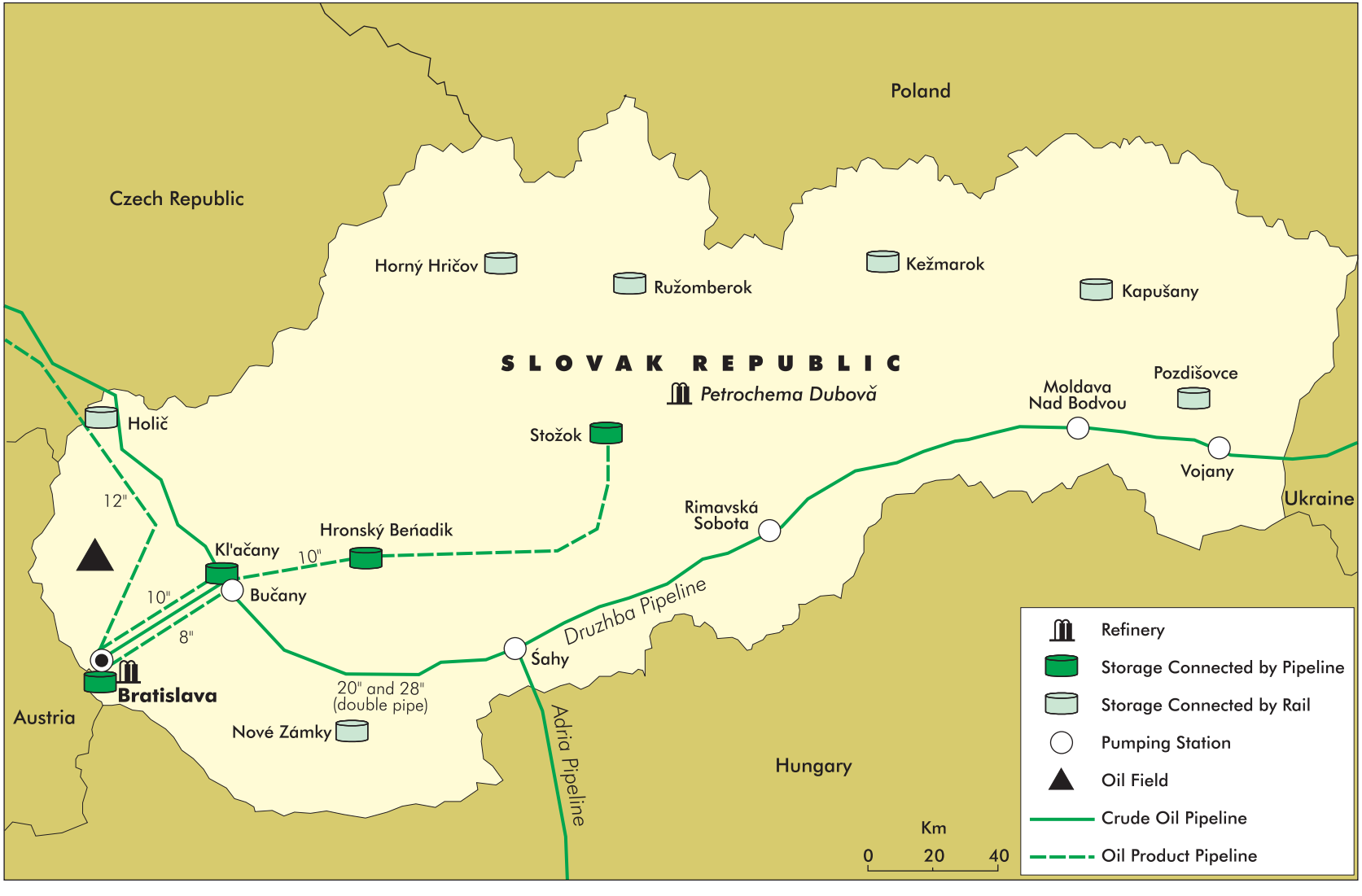
Refining Capacity

(million metric tons/year and thousand barrels/calendar day)

Refinery	Atmospheric distillation		Vacuum distillation		Cat. cracking equivalent		Catalytic cracking		Hydro-cracking		Thermal cracking		Visbreaking	
	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
SK	36.1	729.0	3.3	61.2	3.9	74.7	2.3	45.0	1.4	27.0		0.0		
LG–Caltex	27.7	560.2	0.6	10.3	3.4	65.4	3.4	65.4	0.0					
Hanwha	12.3	247.5	1.0	18.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		
Ssangyong	24.2	489.1	7.6	140.0	6.0	115.2	2.9	56.3	2.8	53.5				
Hyundai	13.8	279.0	1.7	30.6	1.4	26.7	0.0	0.0	0.9	16.7	0.8	14.0		
Total	**114.0**	**2304.8**	**14.0**	**260.1**	**14.6**	**281.8**	**8.6**	**166.6**	**5.0**	**97.1**	**0.7**	**14.0**		

Refinery	Catalytic coking		Catalytic reforming		HDS/HT		Alkylation		Polymerisation		Isomerisation		MTBE production	
	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd	mt/yr	kb/cd
SK			1.6	37.2	13.4	274.7	0.2	5.4						
LG–Caltex			2.1	48.6	8.3	170.9								
Hanwha			1.2	28.4	5.3	109.0								
Ssangyong			1.8	41.2	7.7	157.6							0.1	1.5
Hyundai			0.9	20.7	5.2	107.0	0.0	0.0						
Total			**7.5**	**175.9**	**39.9**	**819.1**	**0.2**	**5.4**					**0.1**	**1.5**

Map of Slovak Republic



SLOVAK REPUBLIC

Key Oil Data

(million metric tons oil equivalent)

	1980	1985	1990	1995	1998[1]	2005[2]	2010[2]
Production	0	0.1	0.1	0.1	0.1	..	..
Imports	10.0	8.2	6.3	5.4	5.7	..	..
Exports	–2.6	–2.3	–1.6	–1.8	–2.4	..	..
Bunkers	0	0	0	0	0	..	..
Net Imports – NI	7.4	5.9	4.7	3.6	3.3	..	..
Total Supply	7.5	6	4.8	3.7	3.3	..	..
Import Dependence (%)	99.4	98.9	98.4	98	98.2	..	..

1. Last available data.
2. Latest available forecast.

Oil Import Dependence and Market Structure

Since 1990, Slovak primary energy consumption has declined by about 25% to around 19.2 million tons of oil equivalent (Mtcoe) in 1999. This decline was due primarily to the economic contraction in the early 1990s and to slow economic growth in recent years. Slovak primary energy consumption per capita is now equivalent to approximately 85% of the average consumption for European Union countries.

Energy intensity, expressed as a proportion of total primary energy consumption in GDP, has been on a downward trend since the creation of the Slovak Republic on 1st January, 1993. However, it remains high in comparison with the typical levels of European Union countries; about 7.7 times higher at the nominal exchange rate and 2.3 times higher at the purchasing power parity. This is due to the major contribution to the economy of highly energy-intensive industries and lower labour productivity in the Slovak Republic. Energy intensity is expected to decline further with the planned elimination of subsidies on electricity, natural gas and heat by the end of 2002.

The current structure of final energy consumption is as follows: 26% oil products, 39% natural gas, 14% solid fuels, 6% heating (mainly with coal) and 15% electricity. The share of oil products is relatively low, due mainly to a limited use of oil in the power sector.

Oil Consumption
(thousand metric tons)

Product	1998	1999	% Difference
Gasoline	570	643	12.8
of which unleaded	0	0	0
Kerosene and jet fuels	31	20	–35.5
Gas/diesel oil	820	845	3.0
Residual fuel oil	509	442	–13.2
Other	1 320	1 037	–21.4
Total	**3 250**	**2 987**	**–8.1**

Source: IEA Quarterly Oil Statistics.

The latest energy policy document developed in 1999 anticipates that energy consumption will shift toward greater utilisation of natural gas. The share of gas will increase substantially as gas-fired power plants replace some old coal-fired plants for environmental reasons. The use of liquid fuels and nuclear energy is also projected to increase somewhat, whereas the use of solid fuels is projected to decline due to more stringent emission controls.

Indigenous oil resources are low and declining. Slovak oil production has fallen from 75 000 tons in 1995 to 66 000 tons in 1999. This represents less than 2% of current domestic oil requirements. The remaining 98% is imported from Russia via the Druzhba Pipeline on the basis of annual intergovernmental framework agreements. Crude oil blend imported from Russia is currently priced more competitively than imports from other sources. Russian imports have gradually increased from just over 5.0 Mt in 1995 to 5.3 Mt in 1999.

Slovak refinery output has been rather constant in recent years, fluctuating between 5.3 and 5.4 Mt/year. In 1999, two Slovak refineries – the Slovnaft-owned complex in Bratislava and the Dubova refinery – jointly produced around 5.3 Mt of petroleum products, including 3.2 Mt of light and middle distillates and 1.8 Mt of residual fuels. Refinery production is projected to increase slightly to 5.5 Mt in 2002, with the Slovnaft refinery accounting for all of the increase. Domestic oil consumption is currently around 3.2 Mt/year, allowing for exports of oil products in the amounts of 2.3 Mt/year, mainly to the Czech Republic, Austria, Hungary and Poland. Foreign operators import small amounts (about 0.3 Mt/year) of blending components.

The Bratislava refinery currently has a distillation capacity of 5.6 Mt/year. In 1999, it processed 5.3 Mt of crude oil, all of which was imported. The refinery produces a wide range of petroleum products, including motor gasoline (19%), diesel oil (34%), high-sulphur fuel oil (19%), jet fuel, hydrocarbon solvents, lubricants, and bitumen, as well as petrochemical feedstock and plastics.

The much smaller Dubova refinery has a capacity of only 100 kt/year. In 1999, it processed 98 kt of domestically produced low-sulphur crude oil delivered from the fields by rail. The refinery produces light and heavy fuel oil (69%), diesel oil (26%) and gasoline (5%).

The Druzhba Pipeline is the most important element of Slovak oil supply system. The Slovak section of the pipeline has been in operation since February 1962. It comprises two parallel lines extending from the Ukrainian border to the Czech border. A combined annual capacity of 22 Mt for the two lines

Current Capacities of the Slovnaft Refinery (kt/year)

Atmospheric Distillation	5 600
Vacuum Distillation	2 800
Catalytic Cracking	850
Catalytic Reforming	800
Hydro Cracking	2 000
Hydrogen Processing	430
Oils	155
Asphalt	435
Alkylation	155
MTBE	55

Source: Slovnaft.

could be increased to about 29 Mt with some technical modifications. Only half of the existing capacity (11.2 Mt) is currently utilised for imports of Russian crude oil to Slovakia (around 5 Mt/year) and to the Czech Republic (6 Mt/year). Deliveries to the Czech Republic have declined somewhat since 1995 as they have been partially replaced by imports through the Ingolstadt Pipeline. With respect to the unused capacity of the system, three projects are currently being considered for the westward transport of Russian and Caspian oil from Odessa and Constanza to Slovakia and further to the west.

At Śahy, the Druzhba Pipeline connects with the Adria Pipeline that runs south through Hungary to the Croatian pipeline system. The pipeline provides an alternative oil supply route for Slovak oil imports of up to 4.5 Mt/year. In 1991, the pipeline was used to import 0.9 Mt of crude oil from the Middle East and North Africa. The operations were halted in September 1991 when war broke out between Croatia and Serbia. At present, the line is not in use, but it is available and maintained in serviceable condition in co-operation with Hungary. The line could be made part of the normal supply system into the Slovak Republic if economic conditions were favourable. Similarly, in any supply disruption not affecting Russian imports, the Adria Pipeline would be brought into operation only if its economics were more favourable than the option of increasing the flow of oil through the Druzhba Pipeline.

The Slovak oil industry is dominated by two large companies – Transpetrol and Slovnaft. Transpetrol is a state-owned company operating Slovak pipeline systems and engaged in oil transport, distribution and stockholding. In addition to the Slovak section of the Druzhba Pipeline, the company owns half of the country's oil storage capacity and a small number of petrol stations. The company has been transformed into a state limited company and will soon be privatised as a vertically integrated company. The state will retain a 51% share as required by the Law 92/1991. The remaining shares will be sold to strategic investors or through the stock exchange.

Transpetrol is in the process of modernising and upgrading its ageing pipeline system. This reflects the need to reduce the risk of oil spills and to increase reliability of the system. In addition to new pipes, the company is also installing remote-controlled leak detection systems and valves that will replace the existing manual valves by the end of 2001. At the next stage, old storage tanks that are now becoming obsolete will be replaced with larger, double-walled tanks.

Slovnaft is a private incorporated company responsible for crude oil purchasing, refining, petrochemical processing, oil distribution and stockholding, as well as wholesale and retail distribution and product exports. It is owned by several domestic shareholders led by Slovintegra (40.7%). Negotiations are now

concluded to create a partnership with Hungarian MOL which will give Slovintegra and MOL equal shares of 36% each. Within the next two years, MOL may obtain a majority share in the Slovnaft refinery.

The company's main assets are the Bratislava refinery and the Slovak section of a petroleum product pipeline linking that refinery with a tank farm near Brno in the Czech Republic. In addition, Slovnaft's affiliate Benzinol owns 316 filling stations in Slovakia. These represent half of the domestic retail market, down from three-quarters in 1995. The other half of Slovak filling stations is owned mainly by foreign companies (i.e. Shell, OMV, MOL, Esso, Conoco, and Aral). Slovnaft also owns 49 stations in the Czech Republic and two in Poland. In late 2000, the company upgraded the control and dispatching systems for refinery and pipeline operations and early detection of leakage.

Emergency Response Policy and Organisation

Emergency Response Policy

The current Slovak energy policy was adopted by the government in January 2000. The main pillars of this new policy are the preparation of Slovak integration into European structures, sustainable development and security of supply. There is strong emphasis on the need to restructure and liberalise the energy sector, develop new principles of its regulation, eliminate price subsidies, and further improve energy efficiency.

Slovak gas and electricity markets, which are now dominated by state monopolies, will be gradually liberalised on the basis of Energy Act Nº 92/1991. The Act authorises the construction of new energy sources based on a non-discriminatory principle and a regulated access for third parties. An independent body will be set up in 2001 to regulate all natural monopolies. Starting from 2001, consumers will be gradually allowed to choose their electricity suppliers from among electricity production license holders. The percentage of the market opened will match or exceed the requirements of the recent EU directives. Prices for heating, electricity and gas are being adjusted according to a schedule adopted in June 1999 with the aim of correcting price distortions, particularly for households, by 2002.

Concerning the oil sector, the new energy policy has set the objectives to:

- identify the possibilities of oil supply diversification;
- build up oil storage capacity and stocks to the level of 90 days of consumption;
- co-operate with international organisations in order to enhance security of oil supply; and
- reduce crude oil imports through the use of substitute fuel components (mainly alcohol).

Oil security is an important element of the energy policy. One of the short-term goals in this area is to create a legislative basis for the creation of a 90-day stockpile of crude oil and oil products by 2008, in accordance with the requirements of IEA and EU.

In a crisis, Russian oil could be replaced with imports through the Adria Pipeline, which may be activated within three weeks. Another alternative is a possible use of the Trans-Alpine Line (TAL) which ties in with the Ingolstadt-Kralupy Line (IKL), thereby allowing for oil deliveries from the Adriatic Sea

via Ingolstadt to the Czech refineries in Litvinov and Kralupy. A section of the pipeline linking Slovakia with the Czech Republic would have to be reversed to allow reverse pumping between Kralupy (the Czech Republic) and Bučany (the Slovak Republic). This would require an investment of SK 100 million[24] in pipeline infrastructure and would reportedly take about four weeks, as all pumps and documentation required for the reversal are ready.

While Russia has built a loop line by-passing the Chechen territory and is at present upgrading the Druzhba Pipeline to ensure smooth and reliable operation, the danger of deliberate blockade is considered limited, given Russia's heavy reliance on oil and gas export revenues. The construction of the Ingolstadt-Kralupy pipeline has also contributed to enhancing Slovakia's security of oil supply. Construction of any additional pipelines would not be economic, given the current surplus capacity on the Druzhba Pipeline.

Emergency Organisation

At present, there is general legislation for emergency situations, but no legislation developed specifically for oil crises and no specialised organisation to deal with such crises, apart from the Administration of State Material Reserves (ASMR), which holds emergency stocks of crude oil and raw materials. The Ministry of Economy and ASMR are responsible for handling emergencies, including oil crises. However, there is no law regulating these responsibilities in detail.

The draft legislation on stockholding that is currently under consideration proposes establishing a NESO-type structure that would be a co-ordinating committee of important government bodies and industry representatives. It would be comprised of representatives of ASMR, the Ministries of: Economy, Transport, Post and Telecommunication, Interior, Defence and Finance, Statistical Bureau, Customs Directorate, and the Slovak Association of Petroleum Industry and Trade (SAPPO).

According to the draft law, ASMR would constitute the core of the NESO, with a key role in decision-making. The Chairman of ASMR would issue statutes and other important documents after governmental approval of the proposed structure. The organisation would be based on the principle that crisis management (including stockdraw) and state supervision should rest with the same body.

Emergency Reserves

Policies and Legal Instruments

Mandatory oil reserves are maintained as state reserves and are currently governed by the State Material Reserves Act 82/1994. This law regulates all aspects of creation, financing, storage and ownership of the state reserves of oil and other key raw materials, including metals and agricultural products, for emergency situations. This system is currently undergoing the process of restructuring. It is expected that the reserves of some redundant or non-essential materials will be sold and the proceeds will be used for the purchase and storage of emergency oil reserves.

24. 100 million Slovakia Korunas = US$ 2.1 million.

ASMR has recently drafted the Act on Emergency Reserves of Crude Oil and Petroleum Products and on Addressing Oil Crises. When approved, the Act will authorise ASMR to administer and regulate:

- the creation of the 90-day stockpiles;
- the use of stocks in an oil emergency;
- the implementation of demand restraint measures during oil emergencies; and
- the co-ordination of crisis management.

The proposed draft stipulates that state oil reserves should reach 90 days of consumption by 2008. It would provide sufficient legal basis for the meeting of IEA and EU emergency reserve commitments from 2008, including the maintenance of stocks covering at least 90 days of net imports, the drawdown of stocks in emergency and non-emergency situations, and the fulfilment of allocation obligations in accordance with the IEP and the Emergency Management Manual.

The proposed new stock legislation would permit holding oil stocks abroad. The Administration has already made exploratory contacts with German and Austrian storage companies concerning possible use of their storage capacities. ASMR may negotiate bilateral stockholding arrangements with these or other companies if domestic storage capacity becomes inadequate.

After being approved by the Governmental Committee for OECD Membership in early 2000, the draft stock legislation was submitted to the Legislative Council in May 2000. During the review, the Council raised no objections to the proposed timetable for stock build-up, the list of demand restraint measures or the proposed NESO. However, it requested ASMR to make several minor revisions in the draft and prepare additional directives concerning oil statistics, trigger mechanisms for demand restraint measures and crisis management. It is expected that the law will be approved by the Parliament and come into force on January 1, 2001. It will harmonise stock requirements with those of the IEA and the EU.

Stockholding and Maintenance

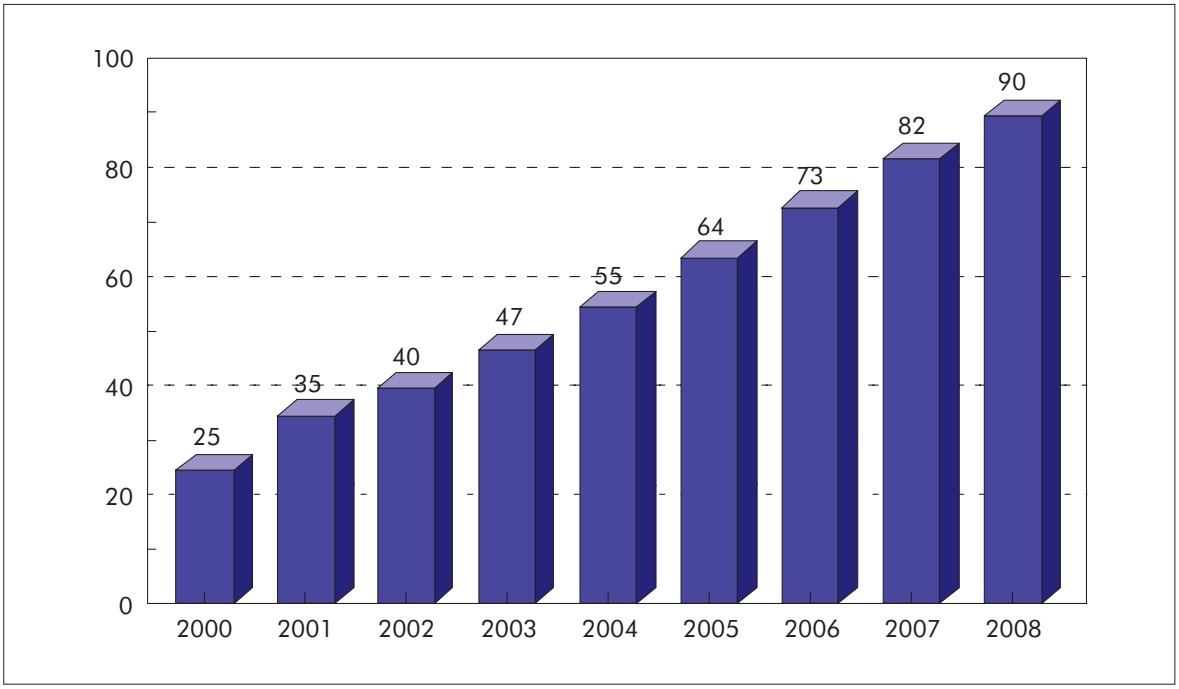
State oil reserves are held by ASMR. In March 2000, these reserves stood at 177 kt (around 25 days of net imports), and comprised crude oil (42%), motor fuels (20%) and diesel fuels (38%). The provisions of the draft act imply that these reserves will have to reach the required level of 90 days of consumption by the end of 2008. The expansion programme will be administered by ASMR and financed from the state budget.

There is no stockholding obligation for the industry and there are no plans at present to impose such an obligation in the first stage of building the emergency reserves. All commercial stocks are therefore held for operating purposes and financed by oil companies. In March 2000, these stocks amounted to 237 kt (or 31 days of net imports), with crude oil accounting for about 80% of the total. Commercial stocks typically fluctuate around 25 days of net imports. At present, the government has no legal authority to use these stocks in an emergency.

Current oil storage capacity is 1015 thousand cubic metres (km^3). ASMR presently owns approximately 100 km^3 of capacity for emergency stocks of oil products. ASMR also leases about 75 km^3 of crude oil storage capacity from Transpetrol. The latter owns a total capacity of 540 km^3, a large part of which is used to hold military stocks. Two other major storage operators are Slovnaft, with a capacity of 190 km^3, and Slovnaft Benzinol, with a capacity of 172 km^3.

Projected State Oil Reserves

(days of consumption)



Source: ASMR.

The largest oil storage facility is located at Sahy on the Druzhba Pipeline. It consists of eight crude oil surface tanks with a total capacity of 300 km^3. All tanks have floating roofs and conform to EU technical standards. Another major storage facility in Budkovce has a capacity of 210 km^3, one quarter of which conforms to EU standards. The older non-conforming tanks will be gradually replaced with new tanks.

About 160 km^3 of total Slovak capacity has to be taken out of operation, as it does not meet environmental requirements. Another 350 km^3 has to remain idle for operational, safety and other reasons (e.g. repairs and maintenance). This implies that almost all of the available storage capacity is taken up by emergency and commercial stocks. Some of the facilities are now old and need to be modernised. The process of modernisation will be completed within the next five years. The plans to build Slovak emergency stocks up to the 90-day level (about 600 kt) will necessitate constructing new storage facilities. ASMR intends to acquire an idle storage facility from Slovnaft, and is studying plans to build new facilities with above-ground tanks. Some new storage facilities will also be built by Transpetrol.

Additional emergency stocks will be financed from the state budget and held by ASMR. The Administration has concluded that there is no need to create another stock entity in addition to ASMR. Similar to the average ratios in EU countries, half of emergency stocks will be held in crude oil and the other half in petroleum products.

The costs of storage depend on the volume, logistics, type of crude oil and/or product and location of storage facilities. The latest available estimate for the cost of oil acquisition, storage, construction of storage facilities and maintenance is US$167.8 million for a period of eight years. This estimate is based on the average oil price in 1998, and includes the cost of complying with existing environmental regulations.

Slovak Oil Storage Capacities (km³)

		1	2	3	4	5
		Used capacities	Unused capacities	Total existing capacities (1+2)	Capacities under construction	Projected Capacities (3+4)
Transpetrol	Crude Oil	540	0	540	350	890-160**
	Products	0	0	0	0	0
Slovnaft	Crude Oil	190	0	190	0	190
	Products	0	0	0	0	0
Slovnaft Benzinol	Crude Oil	0	0	0	0	0
	Products	60	112*	172	0	172
Petrochema Dubova	Crude Oil	6	0	6	0	6
	Products	7	0	7	0	7
Administration of State Material Reserves	Crude Oil	0	0	0	0	0
	Products	100	0	100	0	100
Total		**903**	**112**	**1 015**	**350**	**1365-160**

* Unused capacity available for lease.
** Transpetrol's old facility for 160 000 m³ shall be taken out of operation for technical and environmental reasons.
Source: ASMR.

Operational Aspects of Stockdraw

The government can declare a state of emergency after an assessment of the oil market situation by the NESO and in accordance with a recommendation of the ASMR Chairman. ASMR would then have the authority to manage the crisis and release state reserves up to the limits approved in advance by the government. The stockholding companies would act on the orders of ASMR (Contracts on Stockholding). Drawdown of state reserves could be implemented immediately after an order by the ASMR Chairman and the preparation of contracts with individual distributors. Crude oil stocks would be delivered to the refineries subject to the availability of their processing capacity.

Commercial stocks are at the complete disposal of the oil companies which own them. However, the proposed draft law stipulates that these stocks could be used in times of emergency according to NESO instructions. In a crisis, the stock drawdown would be carried out under the supervision of ASMR. Stocks would be released based on agreements between ASMR and recognised stockholders and distributors.

Compliance Issues

The government will ensure full compliance with the legal obligations for state reserves by supplying required funds from the state budget and by controlling operations of ASMR. Since oil operators have no stockholding obligation, there is no need for a system of penalties for their non-compliance.

Demand Restraint Measures

Policy and Legal Instruments

Article 6 of the proposed act on emergency reserves contains a list of demand restraint measures designed to comply with Article 5 of the IEP. Specific measures to be implemented would depend on the severity of a crisis. Publicity campaigns would be followed by such other measures as:

- reductions of speed limits;
- limits or bans on the use of some classes of vehicles during specific days or for specific modes of transport;
- limits on opening hours of petrol stations,
- limits or bans on the sales of products; and
- limits or bans on exports of crude oil and petroleum products that do not violate international obligations.

Article 9 of the same act stipulates that the police, the Trade Inspection Board and the Customs Office would enforce these measures. These bodies could impose penalties for non-compliance as defined in Article 11.

Some Slovak legislators have raised concerns that certain demand restraint measures imposing limitations on the activities of the distributors or bans on exports may violate the Slovak Constitution. This issue is now being considered by the state legal authorities. A constitutional amendment may be required to allow for the adoption of such measures into the law.

Procedures and Monitoring

Procedures for the activation and implementation of demand restraint measures have not yet been tested. However, it is expected that most measures could be implemented at very short notice (e.g. one day after official public announcement). Full implementation of rationing could take more time, as the coupons would have to be printed and distributed. Moreover, the bans on exports would have to take into account the existing contractual obligations. Detailed implementation procedures will be specified after the new law concerning demand restraint comes into effect. At that time, ASMR intends to initiate discussions with corresponding organisations in the neighbouring countries concerning possible co-ordination of demand restraint measures in order to avoid or reduce cross-border distortions.

Evaluation of Measures

The decision-making process has not yet been tested. There are no estimates of the implementation costs or the effects of various demand restraint measures. The Administration intends to develop such estimates in the near future.

Other Response Measures

There is no scope for increasing domestic crude oil production in times of emergency. Moreover, the Administration does not contemplate any measures to relax existing product specifications in a crisis in

order to increase the supply of oil products. Such measures could have adverse effects on the environment and regional trade in oil products.

The scope for fuel-switching is also very limited, as oil currently accounts for only 3% of Slovak power generation. This share is expected to decline further with the recent commissioning of two blocks at the Mochovce nuclear power plant and possible replacement of 46 kt of fuel oil used by the Vojany power plant with natural gas or coal.

In 1999, Slovak electricity was supplied by nuclear plants (44%), thermal plants (38%) and hydro power plants (18%). The two blocks at Mochovce will replace Bohunice reactors that will be shut down in 2008. An additional two blocks are in advanced stages of construction. However, after the recent withdrawal of state funds, private investors will have to be found in order to complete these two units. The combined generating capacity of the four planned units at Mochovce is equal to the existing capacity at Bohunice. Several combined-cycle gas plants that are being developed will replace the existing coal-fired plants.

Oil emergency policy is not connected with the crisis policy for natural gas. Slovakia uses natural gas for heating purposes and meets its entire import requirements with Russian supplies. It is also a transit country for Russian gas deliveries to the Czech Republic and further to the western markets. The Slovak Gas Industry (SPP) – the state-owned company responsible for gas imports – currently holds stocks of more than 100 days of consumption to ensure uninterrupted and secure supplies of gas. These operating stocks are one of the key conditions underlying SPP's licence to import gas.

SPP is the world's second largest gas transit company, with an annual transit capacity of 90 billion cubic metres (Bm^3). It will be privatised by the end of 2000 or early 2001. The current proposal is to privatise 49% of the company, with 34% of its shares being offered to strategic investors and 15% offered through the stock exchange. Slovak legislation presently requires that the state retain a 51% controlling stake.

Slovak gas storage facilities are owned mainly by Nafta Gbely, a company privatised in 1996 and responsible for oil and gas exploration as well as gas storage. Nafta Gbely operates 1.8 Bm^3 of storage capacity. About half of the total Slovak capacity of 2.5 Bm^3 is used for domestic needs and the other half is rented to the Czech Republic, France, Germany and Austria. There are plans to construct new underground facilities that will boost Slovak gas storage capacity to 4.0 Bm^3.

To further improve the security of gas supply, the government has signed contracts with several companies, including Wintershall, for emergency deliveries of gas. There are also plans to build pipeline connections with Poland that would allow for imports from such other sources as Norway and Germany. The planned Yamal-2 project will also contribute to reducing the supply risks by transiting the territory of Belarus instead of Ukraine.

Data Collection

At present, there is no legal requirement for oil operators to supply monthly statistics. A new annual directive to the statistics law will create a legal basis for such an obligation. The directive has been approved by the Statistical Council and will come into effect on 1 January 2001.

With respect to the data requirements, a draft questionnaire was prepared by the Statistics Office in co-operation with ASMR. This draft will be discussed with the state bodies concerned and with the oil

industry. The Statistical Board will then give its final approval. An estimated 50 to 100 entities will have an obligation to fill out the questionnaire.

ASMR has volunteered to take the responsibility for data collection on Monthly Oil Statistics from various oil companies. It will develop special software for data collection and will provide technical assistance to the companies required to fill in the questionnaires. The aggregate data will be submitted to the IEA, EU and other international organisations in accordance with proposed domestic legislation.

Oil data from the companies on supply, demand, trade and company stocks will be supplemented with the information on emergency oil stocks, which are managed by ASMR. The monthly oil data will be supplied with a standard delay of two months. Statistical requirements concerning the energy balances are now being harmonised with the OECD and EU standards. The new system will be in operation at the beginning of 2001. However, the IEA has received annual fuel statistics dating back to 1995 that conform with the IEA methodology.

In order to ensure adequate quality of the data submitted, the Administration plans to meet with the largest operators to perform comparison checks between the monthly and quarterly statistics. Article 8 of the proposed law imposes an obligation to supply emergency data in addition to regular monthly oil statistics.

ANNEX I

THE LEGAL BASIS FOR IEA MEMBER COUNTRY EMERGENCY RESPONSE ORGANISATIONS

	Legislation	Powers
Australia	Section 61B of the Liquid Fuel Emergency Act 1984.	Provides a comprehensive national approach to manage a severe fuel shortage.
Austria	The Energy Steering Law of 1982 (*Energie-lenkungsgesetz*) and the Stockholding and Reporting Law of 1982 (*Erdöl-Bevorratungs und-Meldegesetz*).	Provides the legal framework for Austrian emergency management.
Belgium	Royal Decree of 11th October 1984 (MB 27th November 1984)	Provides powers to create the National Oil Board, the single body responsible for oil crisis management, to implement IEA emergency measures and function as NESO.
Canada	The Energy Supplies Emergency Act of 1978/79 amended in 1990.	Provides the primary basis for the Canadian Federal Government to respond to oil emergencies.
	The Emergencies Act of 1998.	Provides the statutory power to deal with and establish planning and preparedness programmes for different national emergencies.
		Canadian legislation provides the basis for establishing the Energy Supplies Allocations Board which has the necessary powers to impose demand restraint, allocate crude oil and products and ration gasoline and diesel fuel in an IEP or national emergency.
Czech Republic	Emergency Oil Stocks Act of 1999.	The Administration of the State Material Reserves (ASMR) is the core of NESO.

	Legislation	Powers
Denmark	The 1975 Act on the Reporting and Selling Obligation.	Provides the Minister of Energy with powers to establish a NESO, administer an oil emergency, require oil companies to sell crude oil and products in fulfilment of international allocation commitments.
Finland	The Act on the Adoption of Certain Provisions in the International Energy Program and its Application in 1991.	Provides the Council of State with wide-ranging powers to meet IEP requirements. This includes the necessary power to establish a NESO within the Ministry of Trade and Industry.
France	The Law Nº 92-1443 of 1992.	Regulates security of oil supply. The DIMAH would play the role of NESO and has all powers necessary for implementation of IEP measures, including demand restraint and allocation.
Germany	The Energy Security Law of 1974 (*Energiesicherungsgesetz*).	Provides all powers necessary for participation of Germany in IEP measures and any IEA response to international oil disruptions below the IEA trigger.
Greece	The Civil Emergency Planning Law 17 of 1974.	Deals with civil emergency situations of all kinds. It provides powers for setting up a NESO and implementing IEP measures.
	The Oil Law 1571/1985.	Provides for oil industry compliance with Government plans for coping with an oil crisis including implementation of IEP emergency measures.
	The Fuel Acts 1971 and 1982 European Communities Regulations, 1995.	The Greek NESO is a permanent structure which becomes fully operational during oil crises.
Hungary	The Act on Security Stockholding of Imported Oil and Oil Products (49/1993) amended in 1997.	Provides for the establishment and operation of a NESO under the supervision of Minister of Economic Affairs.
Ireland		Provides for the establishment of a NESO within the Department of Public Enterprise and for implementation of IEP measures.
Italy	Decree of the President of the Council of Ministers of May 31st 1985 as amended by Law 608 of May 1994.	Provides for the establishment of the Executive Board for the co-ordination of response to energy emergencies, the functions of which include those of a NESO.
Japan	The Establishment Law of the Ministry of International Trade and Industry.	This law provides wide powers including the ability to establish a NESO in the Agency of National Resources and Energy.

	Legislation	Powers
Luxembourg	The Law of 22nd September 1982 on Oil Supply in Case of Emergency.	Provides for the constitution of the NESO under the authority of the Minister for Economic Affairs.
The Netherlands	Ample legal authority for dealing with oil emergencies existed in the Netherlands prior to the setting up of the IEA. The Oil Stocking Act of 1974 as amended in 1986 and 2000 strengthened these powers.	The Emergency Preparedness Unit of the Energy Market Division of the Directorate General for Energy will be the core of a NESO. The Oil Stocking Act was amended in 2000 by Parliament to take account of new EU regulations.
New Zealand	The International Energy Agreement Act of 1976; The Petroleum Demand Restraint Act of 1981: The Petroleum Demand Restraint (Regulations Validation and Revocation) Act of 1981.	Provides necessary powers to implement all obligations of New Zealand under the IEP including the setting up of a NESO.
Norway	The Act of Supply and Contingency Measures of 1956, amended in 1975.	Authorizes the establishment and operation of the NESO.
Portugal	Council of Ministers Resolution 29 of 18th August 1992.	Authorizes establishment of the NESO under the authority of the Minister of Economy.
Spain	The Law establishing the Civil Emergency Planning National Committee of 15th January 1988.	Provides the basis for the establishment and operation of a NESO.
Sweden	The Rationing Act of 1978.	The Act is the legal authority to establishing and operating the NESO. The Swedish National Energy Administration is its core.
Switzerland	The Federal Law of National Economic Supply of 8th October 1982.	Entitles the Government of Switzerland to take measures in order to ensure the supply of oil in case of serious supply disruptions. Allows the setting up and operation of a NESO to implement IEP measures and respond flexibly to international oil disruptions.
Turkey	The legislation is an internal circular of the Ministry of Energy and National Resources based on the Prime Minister's Order of Emergency Planning and Organisation.	Turkish legislation provides powers for establishing and operating the NESO within the Ministry of Energy and Natural Resources.

	Legislation	Powers
Turkey *(continued)*	The Province Administrations Law Nº 5442/1949. The National Security Law Nº 3634/1939. The National Protection Law Nº 79/1960 (revised in 1980). The Decree of Council of Ministers Nº 98/10745 on the Oil Product Price Stabilization Fund (AFIF)/1998 The Petroleum Law Nº 6326/1954.	
The United Kingdom	The Energy Act of 1976.	Provides powers to set up a National Oil Board (functions as the UK NESO) under the authority of the Secretary of State for Trade and Industry.
The United States	Executive Order 11912 as amended. The DOE Organization Act. The Energy Policy and Conservation Act, Sections 251-254.	The President, by the Order, authorises the DOE to function as the NESO.
	Section 254:	Authorises the NESO to transmit to the IEA information and data related to the energy industry necessary to carry out the IEP.
	Section 11 of the Energy Supply and En-vironmental Co-ordination Act and Section 13 of the Federal Energy Administration Act:	Authorises the NESO to collect confidential or proprietary oil supply information or data from U.S. oil companies.

ANNEX II

THE LEGAL BASIS FOR THE 90-DAY STOCK OBLIGATIONS AND COMPULSORY STOCKDRAW OF MEMBER COUNTRIES

	Legislation	Powers
Australia	The Liquid Fuel Emergency Act of 1984. **Section 12** The Liquid Fuel Emergency Act of 1984. **Section 12-15**	**A. Stockholding** Minister(s) may specify quantity, locations and period of duration of reserves. **B. Stockdraw** Commonwealth Government could require maintenance of stocks, stockdraw, the physical transfer, the sale of liquid fuels to designated customers and the regulation of refinery operations.
Austria	The Stockholding and Reporting Law of 1982 (Erdol-Bevorratung und-Meldegesetz) as amended in 1987 and in 1988. The Energy Steering Law of 1982 as amended in 1995.	**A. Stockholding** The Law obliges all importers of crude oil and oil products to maintain emergency reserves equal to 25 % of the previous year's net imports, plus 10% for unavailable stocks. **B. Stockdraw** The Law provides for the Minister for Economic Affairs to determine by ordinance a certain percentage for stock drawdown.
Belgium	The Royal Degree of 11 Oct 1971 as amended in 1976.	**A. Stockholding** The Decree obliges importing companies to hold stocks of three groups of products, crude oil or feedstock, corresponding to 25 % of their sales in the national market during the previous calendar year. **B. Stockdraw** The Decree gives broad power to the Minister of Economic Affairs including requisition of emergency stocks.

	Legislation	Powers
Canada	*(No compulsory stockholding legislation exists. As a net exporter, Canada is not obliged to hold emergency stocks under the IEP)* The Energy Supplies Emergency Act of 1978/79 as amended in 1990.	**Stockdraw** In a declared IEP or a national emergency, gives the power to the Energy Supply Advisory Board (ESAB) to regulate stock building, storage, disposal of stocks and export. ESAB would have the authority to prices.
Czech Republic	The Act Nº 189/99 on Emergency Oil Stocks. The Act Nº 272/1996 on the Authority of the State Material Reserves Administration.	**A. Stockholding** The Act provides the necessary basis for meeting IEA and EU stockholding requirements. **B. Stockdraw** The Act empowers the ASRM to release the state-owned stocks and to control company stocks in time of emergency.
Denmark	*(No stockholding legislation exists under the IEP as Denmark is a net exporter. However Denmark is obliged to hold stocks equivalent to 67.5 days of the previous years' consumption under EU Directives.* The Minimum Mineral Oil and Oil Products Stocks Act Nº 208/1972, as amended in 1992. The Act on Supply Measures of 1986.	**A. Stockholding** The Act obliges oil companies to hold emergency stocks equal to at least 81 days of consumption of the previous calendar year. **B. Stockdraw** The Act empowers the Minister of Energy to establish provisions regarding the use, distribution, price equalisation, and physical placing of stocks.
Finland	The Act on Compulsory Stockholding of Imported Fuels of 1983 as amended in 1997. The Security of Supply Act. The Act on the Adoption of Certain Provisions in the IEP Agreement.	**A. Stockholding** All major crude oil and products importers are obliged to maintain emergency stocks corresponding to 2 months of the average of previous three calendar years' net import. Under the Act, State-owned stocks are held by the National Emergency Supply Agency. **B. Stockdraw** The Act enables the Council of State to enforce implementation of stockdraw.
France	The Law 92/1443 dated 31st December 1992. Article 2-4 The Ministerial Decrees 93/131 of State on 29th January 1993 (revised). The Law 74/908 of 29th October 1974 on Energy Savings The Governmental Order of 1959 on the Organisation of National Defence The Law on the Oil Regime in 1992 and its Implementing Decrees and Orders.	**A. Stockholding** The Law defines the obligation to hold emergency stocks for all operators. The Decrees requires that each operator must build and maintain oil stocks equivalent to 26% of the previous year's consumption of crude oil and products which is equal to 95 days of consumption. **B. Stockdraw** These Laws, Decrees and Orders, together with the Law 92/1443, give the Minister for Energy the legal and regulatory authority to drawdown emergency stocks in any circumstances.

	Legislation	Powers
Germany	The Oil Stockholding Law of 1978 as amended in 1987 and 1998. **Section 3** **Section 25** **Section 30**	**A. Stockholding** The Law requires the EBV to hold , on behalf of member companies, oil stocks of each of three categories of oil products: motor gasolines, middle distillates and heavy fuel oils, at least at the level of 90 days of consumption of the previous calendar year in order to comply with IEP and EU commitments. Refiners producing the three categories of products have to maintain 15 days of products stocks of the previous calendar year. Crude oil and semi-finished products could be counted towards the obligations. **B. Stockdraw** The Federal Minister for Economic Affairs shall have the power to order stockdraw, for the purpose of preventing imminent or existing problems in securing energy supplies and/or meeting obligations arising from the IEP Agreement and EU directives.
Greece	The Law 2289/95 and the Ministerial Decision D1/FA33/11264/367/1995. The Civil Emergency Planning Law 17/74.	**A. Stockholding** The Law and the Decision oblige the oil companies to maintain the three categories of product stocks corresponding to 90 days of their sales in the internal market during the previous calendar year. **B. Stockdraw** The Law provides the Government with the statutory power without parliamentary approval to direct oil companies to draw down stocks.
Hungary	The Act IL of 1993 on Emergency Stockholding of Imported Crude Oil and Oil Products, as amended in 1997.	**A. Stockholding** The Crude Oil and Oil Product Stockholding Association (KKKSZ) maintains, on behalf of member companies, strategic stocks of crude oil and products (motor gasoline and middle distillates) separately from normal industry stocks. **B. Stockdraw** Under the Act, the Minister of Economic Affairs has the authority to order the release of oil stocks under both CERM and IEP provisions.
Ireland	The Fuels (Control of Supplies) Act of 1971 and 1982. The European Communities (Minimum Stocks of Petroleum Oils) Regulation 1995.	**A. Stockholding** Under the law the National Oil Reserve Agency is responsible for ensuring that sufficient stocks are in place to meet stockholding obligations. **B. Stockdraw** The Act enables the Minster for Public Enterprise to control all aspects of fuels distribution within the country.

	Legislation	Powers
Italy	The Law Nº 22 of 10th February 1981. (changes to cover IEA requirements under way) The Law Nº 61 of 10th March 1986, as amended by Law 427/1993 and Law 30/1997.	**A. Stockholding** The Law obliges all oil companies which market imported oil products or products refined in Italy to maintain at least 90 days of inland consumption of the previous calendar year. **B. Stockdraw** The Law gives the Minister the authority to activate by decree the use of compulsory stocks.
Japan	The Petroleum Stockholding Law, as amended in 1978 and 1995. The Japan National Oil Corporation Law, as amended in 1983. The Petroleum Stockholding Law, as amended in 1978. The Petroleum Supply and Demand Adjustment Law. The Japan National Oil Corporation Law, as amended in 1983.	**A. Stockholding** The Law obliges major oil refiners, oil marketers, oil importers and LPG importers to maintain emergency stocks equivalent to 70 days of the previous year's domestic consumption. The Government initiated its national stockholding programme through JNOC in 1978. 50 million kl of the Government stocks, all of which are crude oil, are held by JNOC. **B. Stockdraw** **The Petroleum Stockholding Law** gives the power to the Minister for International Trade and Industry to reduce the stockholding obligations of companies in a sub-crisis situation. **The Demand Adjustment Law** gives the power to the Government to order stockdraw by companies in a declared emergency and/or under the IEP trigger. In accordance with **the JNOC Law**, Government stocks could be released on the basis of an instruction or an approval of the Minister for International Trade and Industry.
Luxembourg	The Decree of 31st October 1973. The Law of 22nd of September 1982 and 8th December 1981 amended in 1991.	**A. Stockholding** The Decree defines a compulsory stock level of oil products for all oil importers as 90 days of the previous year's consumption. **B. Stockdraw** The Law gives the Government the legal authority to take decisions on emergency sharing, including stockdraw, if oil product supply is endangered.
The Netherlands	The Oil Stockholding Act of 1976, as amended on 1st January 1987 and 2000. The IEP Implementation Act of 1979, as amended in November 1990.	**A. Stockholding** The Act stipulates stockholding obligations for the stockholders of three categories of products to meet IEP obligations and the EU Directive in the following manner: – Refiners - 50 days of their inland sales; – Importers - 16 2/3 days of their inland sales; – COVA - the rest of the national obligations. **B. Stockdraw** The Act gives the Minister of Economic Affairs to instruct COVA and companies to draw down the compulsory stocks.

	Legislation	Powers
New Zealand	The International Energy Agreement Act of 1976. The Petroleum Demand Restraint Act of 1976.	**A. Stockholding** The Act stipulates that the Minister of Energy has the authority to order the maintenance of stocks by oil producers, refiners and importers at a level required by the IEP. **B. Stockdraw** The Act provides for regulations on stock drawdown.
Norway	*(No stockholding legislation exists. As a net exporter, Norway has no stockholding obligation under the IEP.)* The Supply and Contingency Measures Act of 1956, as amended in 1975. The Royal Decree of 1983.	**Stockdraw** **The Act** stipulates that stockdraw of commercial company stocks is only compulsory in an emergency prior to war or in a war situation.
Portugal	The Law 1947, as amended in 1991. The Law Decree Nº 77/91 of 16th February 1991. The Law Decree Nº 77/91 of 16th February 1991.	**A. Stockholding** The Decree and the legislation oblige oil companies to maintain emergency reserves corresponding to 120 days of imports for gasoline, gas oil, kerosene and fuel oils and 90 days for jet fuel and fuel for power generation. **B. Stockdraw** The Decree gives the Government the power to order use of reserves in a crisis.
Spain	Law 34/1998 and Royal Decrees 2111/1994.	**A. Stockholding** The Law obliges the oil operators to maintain emergency stocks up to a maximum of 120 days of sales and the Decree sets the minimum stockholding obligation at 90 days. Under the Decree CORES is established and empowered to build and manage strategic stocks. **B. Stockdraw** The Government is generally given implicit powers to drawdown stocks when necessary.
Sweden	The Contingency Storage of Oil and Coal Act of 1987. The Contingency Storage of Oil and Coal Ordinance of 1987. The Total Defence Bill of 1986/87. The Contingency Storage of Oil and Coal Act of 1987.	**A. Stockholding** **The Act** and the Ordinance oblige major oil importers, refiners, marketers and large consumers to maintain emergency stocks to meet the IEA emergency reserve commitment. The Bill sets the obligation as 25 per sent of the previous year's deliveries or consumption. **B. Stockdraw** **The Act** gives statutory power to the government to order company stockdraw in an IEP trigger situation.
Switzerland	The Federal Law on National Economic Supply of 1982. The Ordinance on the Main Principles of Stockpiling of 1983. The Ordinance on Establishing Compulsory Stocks on Fuel Oils and Transport Fuels. The Federal Law on National Economic Supply of 1982.	**A. Stockholding** The Law and the Ordinances provide for coverage of the 90 days net imports of the previous calendar year required under the IEP. The stockholding obligation is imposed on oil importers. **B. Stockdraw** The Law gives power to the Government to require the company stockdraw.

	Legislation	Powers
Turkey	The Petroleum Law Nº 6326/1954. The Circular of the Ministry of Energy and Natural Resources (Nº 22854/1996). The Decree of the Fuel Price Stabilization Fund Nº 98/10745.	**A. Stockholding** The Petroleum Law obliges all refiners to maintain crude oil stocks at least equal to 30 days of their annual throughput. According to the Circular, all of fuel distribution and marketing companies should maintain a product stock of ten days of daily sales. The Decree obliges all oil product importers to maintain minimum 10 per sent of the import quantity of product stocks.
	The National Protection Law Nº 79 of 1960, as amended in 1980. The National Security Acts.	**B. Stockdraw** The Law and Acts provide the Government with a broad range of authority to control company stockdraw.
The United Kingdom	*(No stockholding legislation exists under the IEP as a net exporter. However the UK is obliged to hold stocks equivalent to 67.5 days of the previous years' consumption under EC Directives.)* The Energy Act of 1976.	**Stockdraw** **The Act** gives power to the Government to require drawdown of stocks of individual companies.
The United States	The Energy Policy and Conservation Act (EPCA) as amended in 1990, 1992 and 1998. **Section 151-167**	**A. Stockholding** **These Sections of the EPCA** provide for the establishment of the Strategic Petroleum Reserve (SPR) to be available for the purposes of reducing the impact of future disruptions in supplies of petroleum and fulfilling obligations under the IEP.
	Section 3(8)	**B. Stockdraw** This section defines severe energy supply interruption, a key criterion the President is to use in deciding whether a drawdown of the SPR is called for.

ANNEX III

SUMMARY OF EUROPEAN UNION LEGISLATION CONCERNING CRISIS MEASURES AND OIL STOCKS

Compulsory Oil Stocks

Council Directive nº 68/414 of 20 December 1968, amended by Directive 98/93 of 14 December 1998, provides the legal basis for holding compulsory stocks in the European Union.

According to these directives, the Member States must maintain at all times stocks of petroleum products at a level corresponding to at least 90 days of average daily consumption in the preceding calendar year. A maximum of 25% is deducted in case of inland production.

For the Calculation of this Consumption

Three categories of products are taken into account:

- motor spirit and aviation fuel (aviation spirit and jet fuel of the gasoline type);
- gas oil, diesel oil, kerosene and jet-fuel of the kerosene type (middle distillates);
- fuel oil.

The level of 90 days must be maintained for each category.

Quantities, which may be included in the stocks, are also listed in Directive nº 68/414 (article 6 paragraph 3).

Data

The Member States must submit to the Commission a monthly statistical summary of their existing stocks. This summary must be submitted at the latest by the 25th day of the second month after the month to be reported.

Calculation Methods

The European Union (EU) calculation method is different from the IEA method both for calculating the storage obligation and for determining the actual level of stocks.

For the storage obligation, the difference results mainly from the fact that:

- The IEA uses, as the basis of its calculation of the 90 days, the total net oil imports[25] of the preceding year for each participating country concerned.
- Whereas the European Union uses, as the basis of its calculation of the 90 days, the inland oil consumption for the three categories of products mentioned above for each of its Member States. As noted above, a deduction of up to 25% from the stockholding obligation is allowed to take account of indigenous production of Member States - Consequently, on the basis of the present oil production:
  - the United Kingdom and Denmark must hold stocks under EU regulations, but they are granted a 25% reduction of obligation due to their inland production. The actual obligation of the United Kingdom and Denmark is therefore $90 \times 75\% = 67.5$ days of consumption;

For the level of stocks, the differences result mainly from the fact that on one hand,

- the IEA converts stocks of finished products into crude oil equivalents by multiplying them by one of the two IEA predetermined coefficients (either 1.065 in the case of method 1: all product stocks minus naphtha taken into account, or 1.2 in the case of method 2 which applies to the same products as the Council Directive),[26]
- whereas the European Union converts the stocks of crude oil and feedstocks into finished products equivalents on the basis of Article 5 of the Directive 68/414 offering the choice between three different formulae.

and on the other hand,

- The IEA applies a 10% deduction for unavailable stocks (mainly tank bottoms);
- whereas the European Union does not apply any deduction for unavailable stocks in its Directive 68/414.

What effect do these different methods have on emergency reserve commitments? Put otherwise, in which system, IEA or EU, must the member countries stock more crude oil and products?

One can take a practical example, that of France which joined the IEA in 1992. At that time France met its community obligation with a certain margin but its stocks were insufficient in IEA terms. In general, for countries having little or no domestic crude oil production in relation to their oil consumption, the IEA method of calculation implies a stockholding obligation higher than the community method of calculation applied to the same country. This is due in part to the fact that the IEA deducts 10% of quantities physically available which are considered unusable as tank bottoms or for other reasons. Above a certain level of domestic crude oil production the relationship is reversed and the community commitment exceeds the IEA commitment.

25. Naphtha and marine bunkers excepted.
26. Gasolines (cat. 1), middle distillates (cat. 2) and fuel oil stocks (cat. 3).

The stocks may be established within the territory of a European Union Member State for the account of undertakings of another Member State. They may be included in the calculations and in the regular statistical summary of the Member State which owns the stocks, provided that:

- a specific storage agreement has been concluded between the two governments concerned (Council decision 68/416 of 20 December 1968);
- these stocks remain at the free disposal of the Member State on whose behalf the stocks are held.

Difficulties in the Supply of Crude Oil and Petroleum Products

The related Directives are:

a) Council Directive 73/238 of 24 July 1973 which stipulates that the Member States in case of difficulties in the Community oil supply, will be able in particular to:
   - draw on emergency stocks (in accordance with the Council Directive 68/414 of 20 December 1968);
   - reduce consumption (demand restraint measures).

If these difficulties arise, the Commission convenes, at the request of any Member State or on its own initiative, a group of delegates from the Member States (Oil Supply Group) which will carry out the necessary consultations in order to ensure co-ordination, under the Commission's chairmanship, of the measures to be taken.

b) According to Council Decision 77/706 of 7 November 1977, the Commission, in case of oil shortfalls, may set a target for reducing consumption of petroleum products by up to 10% of normal consumption, for a maximum period of two months.[27] The Commission will act, in such a case, at the request of a Member State or on its own initiative and after consultation of the Oil Supply Group.

c) Finally, Commission Decision 79/639 of 15 June 1979 lays down detailed rules for the implementation of Council Decision 77/706. Attention is drawn to the fact that, in accordance with Article 4 of this Decision, a Member State may, instead of restricting consumption, draw on stocks of crude oil and/or petroleum products held in excess of its obligation (Directives 68/414 and 98/93).

27. The Commission shall produce to the Council new targets upon the expiry of the two month period and/or in case of a larger shortfall.

ANNEX IV

DEVELOPMENTS IN IEA EMERGENCY MECHANISMS, 1974-2000

This Annex outlines the main developments contributing to the emergency preparedness of the IEA since the plan for its creation was put forward at the Washington Energy Conference of February 1974.

1974

February/October: The Washington Energy Conference chaired by Mr. Henry Kissinger and subsequent work by the Energy Co-ordination Group in Brussels resulted in the formulation of the International Energy Program (IEP) as a legally binding international agreement.

November: Sixteen of the twenty-four OECD member countries signed the IEP Agreement to be implemented by the International Energy Agency established within the framework of the OECD.

Among the main objectives of the IEP are reduction of IEA dependence on imported oil, a commitment to hold minimum levels of emergency reserves and agreement to share available oil supplies in the event of a major supply disruption.

A major disruption would activate IEP emergency measures. The activation of a «trigger» of IEP measures is based on calculated available supply of IEA countries or a single country as being less than 93% or less of the annual average supply in the most recent previous four quarters (considered the base period) available from the Monthly Oil Statistics Questionnaire. Unless the Governing Board decides otherwise, activation of response measures proceeds. These comprise drawdown of emergency reserves, demand restraint, fuel-switching and sharing of available supplies. Implementation of measures involves operation of the emergency data system under which oil companies transmit supply data directly to the IEA Secretariat.

1975

February: Norway agrees to participate under the terms of a special agreement. The Industry Advisory Board (IAB) is established. This group provides advice on emergency oil sharing and related questions.

In the event of the activation of the emergency system, the IAB is responsible, through its Industry Supply Advisory Group (ISAG) for the practical execution of the allocation programme under the supervision of the IEA.

March: New Zealand joins the IEA.

May: The first IEA Ministerial meeting reviews the world energy situation, confirms that an emergency response system is in place which could be activated whenever needed and sets guidelines for the Agency's future work.

September: IEA countries agree to increase their emergency oil reserve commitment from 60 to 70 days of net oil imports by the beginning of 1976.

1976

September: Greece joins the IEA.

October: The first Allocation Systems Test (AST-1) is held from 4th October to 18th November. The goals of this test included the assessment of the effectiveness of technical machinery, communications and procedures necessary in an emergency to implement the IEP oil sharing programme and as elaborated in the Emergency Management Manual.

November: IEA countries agree to increase their emergency oil reserve commitment to 90 days of net imports by the beginning of 1980.

1977

October: The second IEA Ministerial meeting agrees on twelve Principles for Energy Policy; and initiates the annual review of the energy policies and programmes of Member countries.

1978

April: AST-2, 31st March to 19 May 1978. Reporting company affiliates and the National Emergency Sharing Organisation (NESOS) were involved in the Test for the first time.

December: In response to the cessation of exports from Iran following the revolution, the IEA activated the Emergency Data System. During its period of activation, disrupted supplies remained above the threshold for triggering the IEP Emergency Sharing System.

1979

March: Given the tightness of oil supplies, the Governing Board agreed to guidelines for Member countries to reduce oil consumption.

May: Australia joins the IEA.

October: AST-3, October 1979 to November 1979. The scope of the disruption assumed during this test was considerably larger than in the first two tests. Communications between ISAG and NESOs improved as the prohibition of direct contact between these two groups was eliminated. Further, the addition of a Deputy Manager and a Marine Adviser strengthened ISAG.

1980

July: The Governing Board established the IEA Dispute Settlement Centre, which provides a system of binding arbitration for disputes among participating oil companies arising out of oil supply emergency actions.

October: In late September war broke out between Iran and Iraq. The Governing Board agreed on measures to reduce oil consumption by some 5 %, IEA-wide.

1981

July: Portugal joins the IEA.

December: December 1981 Decision on Preparation for Future Supply Disruptions.

Disruptions in oil supply which do not reach the level required to trigger the emergency allocation system recently caused and could again cause damage to member country economies through sharp oil price increases. To respond to this a new monthly information system on short term supply prospects was introduced.

1983

May: AST-4, May and June 1983. An improved data processing system for handling of Voluntary actions by participating oil companies to reallocate oil was tested. For the first time Voluntary Offers of oil from NESOs on behalf of Non-Reporting Companies played an important role in balancing allocation rights and obligations.

1984

July: The Governing Board agreed to establish procedures to enable governments to implement promptly early co-ordinated stockdraw and other measures in a significant supply disruption. The procedures were termed Co-ordinated Emergency Response Measures (CERM).

1985

AST-5: October - November 1985. A number of NESOs simulated the drawdown of oil stocks (government and company) for the first time. New procedures for resolving trade discrepancies between company and countries were tested. Also, all initial data transmission and processing procedures were accelerated.

1988

January: The first Co-ordinated Emergency Response Measures Test was conducted during January and February in order to test the procedures necessary to implement a co-ordinated emergency response under the July 1984 Governing Board Decision on Stocks and Supply Disruptions.

July: The CERM Operations Manual was adopted by the Governing Board.

October: AST-6 was held in October and November.

In this test the Voluntary Offer System was modified to include the «Wider Window» concept which extends the period and expedites the processing of Closed Loop Voluntary Offers (supply offer linked with a matching receive offer from the same company or its affiliate, or from a non-affiliated company). Countries and companies were given for the first time the option to have a direct computer to computer link with the IEA for submitting emergency questionnaires. Also, a micro-computer software version of the questionnaires was developed to speed up producing, receiving and processing questionnaire information.

1990/1991

August 1990 - February 1991: The Gulf Crisis

Following the Iraqi invasion of Kuwait the IEA Governing Board met on August 9th 1990 to review available IEA emergency response capabilities including demand restraint measures, stockdraw, short-term fuel-switching to energy sources other than oil and increased oil production.

The Governing Board agreed that individual countries should where possible strengthen their individual efforts to increase available oil supplies and urged oil companies and consumers to continue to refrain from abnormal purchases and to take advantage of their generally excellent stock positions as well as promote policies which would enhance energy efficiency, conservation, fuel diversity, indigenous production and energy research and development.

The Standing Group on Emergency Questions worked intensively from the outset of the crisis with individual member countries on measures to be taken at various levels of further disruptions and profiles on individual countries emergency capabilities.

As reflected in data submitted by international oil companies on their current and scheduled operations, IEA countries had ample stocks throughout the fourth quarter of 1990. Also, increased production (especially in OPEC countries), unusually large stocks at sea and weakening demand in many countries, notably the United States, ensured that supplies of OECD countries remained adequate.

However, given the risk of a further supply loss from the Gulf in the event of hostilities, the Governing Board with the participation of France, Finland and Iceland, unanimously decided on the 11th of January 1991 that they would implement a programme to make available to the market an additional 2.5 mb/d through oil stockdraw, demand restraint measures, fuel-switching and increased indigenous production.

On 17th January 1991, following the start of military action by Allied forces to liberate Kuwait, the IEA implemented a Contingency Plan to make available to the market 2.5 mb/d of oil. Stockdraw accounted for some four fifths of the 2.5 mb/d response. The remaining one-fifth (0.5 mb/d) included in the

Contingency Plan consisted of demand restraint (0.4 mb/d), fuel-switching (0.1 mb/d), and increased indigenous production. On January 28th, the Governing Board decided the Contingency Plan would remain in effect and would be implemented flexibly, according to supply/demand developments. Seventeen OECD members made stocks available according to their national situation. Some countries offered oil to the market from strategic stocks whereas other countries reduced company stockholding obligations and yet other countries made arrangements with private companies for oil to be made available to the market. With industry oil stocks high and oil demand weakening, only a part of strategic stocks made available in Denmark, Germany, the Netherlands and the United States was actually taken up. For example, United States refiners purchased 17.3 million barrels of the 33.75 million barrels US authorities made available from the SPR. The fact that additional quantities of oil were still available in the United States and other countries for use if needed helped buoy the public confidence at a critical time.

1992

January: Finland joins the IEA.

August: France joins the IEA.

October-November: AST-7.

In this test Finland, France and Germany's eastern *Länder* participated for the first time. Software was developed and used successfully by oil companies and countries to complete and submit voluntary offers.

Based on the experience of the Gulf Crisis and AST-7, a review of the IEA's emergency response measures was initiated and a revision of the Emergency Management Manual was started.

1994

February: IEA procedures for stockholding and stockdraw were reviewed at a Workshop in Kagoshima, Japan, involving IEA countries, the Czech Republic, Hungary, the Republic of Korea, Thailand, and oil industry experts of the IEA's Industry Advisory Board.

The IEA Governing Board adopted a revised Emergency Management Manual covering all operations required by the Secretariat, Governments and oil companies in a severe emergency.

1995

February: A Governing Board Decision confirmed the importance of maintaining and strengthening the emergency response system of the IEA and the need to enhance its flexibility and effectiveness of IEA response systems. Against the background of the evolving oil market situation, the Governing Board emphasised that priority should be given to the use of coordinated stockdraw and other measures to apply to all disruptions regardless of size and before activation of the allocation mechanisms.

October / November: A comprehensive test of the emergency data system was held involving all IEA administration and international oil companies operation within IEA countries.

1996

June: An IEA Conference on Long-Term Oil Security Issues reviewed IEA strategy against the background of oil security as a global concern.

1997

April: An IEA Global Oil Security Conference involved participation by ten non-member countries and several non-member country regional energy organisations. Non-member country participants were briefed on a range of IEA emergency response measures.

June: Hungary joins the IEA.

1998

May: A seminar was held on "The Effects of the Oil Price Drop of 1997/98".

The seminar examined the short-term and potential long-term effects of a sustained price drop on oil-producing countries as well as oil consumers.

November: An Emergency Response Exercise (ERE 98) was held. Its main objective was to train oil company personnel and member government representatives in IEA emergency procedures. The exercise included the preparation of a 3 stage IEA emergency response over a 3 week period. This was followed up by training and discussions in Paris and included a surprise scenario exercise.

1999

September: An Oil Stockholding Seminar and a Two Stage Disruption Simulation Exercise were held as part of the follow-up work of ERE 98.

The main objective of the seminar was to assess the current IEA stock situation and develop a strategy for the maintenance and use of emergency stocks in a future oil crisis.

The purpose of the Disruption Simulation Exercise was to use hypothetical scenarios in a real-time setting to enhance understanding of the probable development of market reactions in an emergency with a view to improving the speed and effectiveness of IEA emergency response.

December 31, 1999: IEA Y2K Response 1998/2000.

IEA work on Y2K formally started with the Governing Board discussion February 1998. From that time onwards planning and preparations were continuous through to the roll-over to the year 2000. Some of the specific activities included:

Early 1999 to July 1999: The IEA held a series of five awareness raising seminars targeted at Non-member countries (Caracas, Singapore, Abu Dhabi, Moscow and Prague).

September: The IEA held a two-day Disruption Simulation Exercise which included a Y2K Scenario.

December 1999-January 2000: Following a Governing Board adoption of "IEA Y2K Response Plans" the IEA Secretariat prepared and maintained an emergency response team for the roll-over period. Corresponding arrangements were made in IEA member countries.

2000

March: Seminar on Mergers and Acquisitions in the Energy Sector.

September: SEQ Session on Tanker Market Developments and Oil Security Issues
Special SEQ/SOM Session on Oil Market Issues.

2001

February: The Czech Republic joins the IEA.

IEA MEMBER COUNTRY ENERGY WEBSITES

• **Australia:** www.isr.gov.au	• **Italy:** www.minindustria.it/DGERM/DGERM.htm
• **Austria:** www.bmwa.gv.at	• **Japan:** www.miti.go.jp
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• **France:** www.industrie.gouv.fr/energie	• **Sweden:** www.stem.se
• **Germany:** www.bmwi.de	• **The United Kingdom:** www.dti.gov.uk/energy (energy policy and energy statistics) www.og.dti.gov.uk (Oil and Gas Directorate
• **Ireland:** www.irlgov.ie/tec	• **The United States:** www.eia.doe.gov http://www.fe.doe.gov/spr/spr.html_(stockholding)
• **European Union:** europa.eu.int/eur-lex/en/lif/reg/en_register_125010.html.	

LIST OF ABBREVIATIONS

AST	Allocation Systems Test
AR/AO	IEA EMM Allocation Rights and Obligations
B/D	Barrels per day
CERM	IEA Co-ordinated Emergency Response Measures
COE	Crude Oil Equivalent
EC	European Community
EMM	IEA Emergency Management Manual
ERDO	Emergency Reserve Drawdown Obligation
EU	European Union
FERC	US Federal Energy Regulatory Commission
IEA	International Energy Agency
IEP	International Energy Program
NESO	National Emergency Sharing Organisation
NRC	IEA Non-Reporting Company
OECD	Organisation for Economic Co-operation and Development
QOF	IEA Quarterly Oil Forecast
QOS	IEA Quarterly Oil Statistics
QuA	Questionnaire A (companies)
QuB	Questionnaire B (administrations)
RC	IEA Reporting Company
RCA	IEA Reporting Company Affiliate
SEQ	Standing Group on Emergency Questions
TPES	Total Primary Energy Supply

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