International Energy Agency
2006 Standard Review of the Netherlands

MAJOR POLICY DEVELOPMENTS

On 27 April 2006, the Second Chamber of Parliament approved the Ownership Unbundling Act, which aims to create fully independent grid managers. The act proposes to prohibit grid managers from being part of groups that also includes producers, suppliers and traders of power and gas in the Netherlands. As a consequence, current integrated energy companies must be split into two separate companies: a company responsible for network activities and another company responsible for the supply, trade and production activities of gas and electricity. The separation must be finalised two-and-a-half years after the legislation comes into force.

The Dutch Cabinet argues that full ownership unbundling will improve competition by creating a level playing field, improving the reliability and quality of energy networks and improving market transparency and supervision. As an additional benefit, current public shareholders will be able to sell shares in the commercial companies.

In addition to the mandatory separation, other important provisions of the legislation are the creation of a so-called "fat" grid manager – meaning that grid managers are no longer allowed to outsource strategic tasks – and the extension of national electricity transmission network management by TenneT, the transmission system operator, to lower voltages, improving security of supply.

The proposed legislation next passes to the First Chamber of the Dutch Parliament, which is expected to vote on the legislation in the fall of this year.

GENERAL ENERGY POLICY

Dutch long-term energy policy is focused on sustainable, competitive and secure energy. To realise this, the Netherlands has chosen a transition approach, under which the government takes into account that changes are not only necessary but also that they create opportunities for innovation and economic growth.

Currently, a proposal to change the law on the environmental quality of electricity production (*Milieukwaliteit Elektriciteitsproductie*, MEP) is under discussion in Parliament.

Apart from the EU energy savings directive, the Netherlands has set a higher energy savings target (for more information, see the later sub-section on energy efficiency goals and targets). New additional policies, particularly in the transport, industrial and housing sectors, should help achieve this higher target.

Recently, the government has taken steps to ensure a stable policy approach to encourage investments in the energy sector and streamline the licensing procedures for new infrastructure, particular with respect to mining activities. The government now participates in hydrocarbon exploration and production (E&P) conferences, has made an inventory of promising new companies and has made an inventory of hindrances in mining law for potential new entrants. Furthermore, there is improved

access to information for mining companies, including the start of a new website in May 2006, and fact sheets of stranded fields. The government is also developing a digital licensing procedure. Finally, the government is working to improve its policies related to E&P licensing of fallow fields, which may require changes to the existing mining law.

Administrative hurdles are not only encountered in onshore E&P projects, but increasingly in offshore projects as well. It frequently takes years before a project can be realised, a delay that in many cases the government considers unnecessary, contributing to an uncertain investment climate. As a result, the Dutch Cabinet has begun to focus on these hurdles. One outcome is the Dutch Cabinet's recent efforts to speed up the decision-making process with regard to some gas fields. For projects that fall within strict boundary conditions in sensitive areas, such as the Wadden Sea, *rijksprojectenprocedure* is applied. This procedure streamlines the licensing procedures for projects that meet certain criteria, including that the project be of national interest. In new legislation, the criterion that there must be an urgent concern is dropped. Example projects that could fall under *rijksprojectenprocedure* include the construction of a pipeline for the national gas grid, the construction of a power plant of considerable size or projects in sensitive areas. *Rijksprojectenprocedure* takes between six months and one year excluding any appeals, which can take up to a year.

As a result of, among other things, discussions held at the Wadden Sea, a project that includes national, provincial and municipal governments was started in October 2005 to review all existing licensing procedures and to screen them with a view to decreasing overall administrative burdens. In April 2006 it was found that a substantial number of licences (42%) and licensing procedures (20%) required by the national government could be scrapped. A large reduction in license requirements is also foreseen in the Mining Act of 2003 (50% reduction in the number of licences per year). National, provincial and municipal governments are now in the process of implementing these findings. Furthermore, the project is now looking into possibilities to simplify procedures or use *lex silencio positivo*, a principle whereby if an administrative body does not take an explicit decision within a given time period regarding a formal request from a citizen or company, the request will be considered automatically granted. In addition, a proposal is under discussion that would streamline regulatory procedures related to several environment and spatial planning licences. The proposal is aimed at combining these procedures into one procedure.

The Bureau for Energy Projects, which was recently established, will co-ordinate licensing procedures for energy projects that make use of the so-called "state projects" procedure. This procedure gives a co-ordinating minister the right to streamline all environmental and spatial planning procedures necessary for a given project. Such projects can range from gas recovery to windmills and power plants. In 2006, this office started work on co-ordinating procedures for the recovery of gas deposits in the Wadden Sea area. The office is also involved in the preparation of other projects, such as windmill park projects and new coal-fired electricity plants, advising on the most efficient way to organise the licensing process. Also in 2005, preparations were made to present a legal proposal to Parliament entitling several future energy projects to use the state projects procedure. The proposal will amend several energy acts.

To enhance public understanding of national energy policy challenges and objectives, a subsidy scheme has been in effect since 2003 to finance local authorities' efforts aimed at energy reduction and sustainable energy within the local communities. Over half of all local communities and all

provinces have participated in the scheme. They were supported with a comprehensive government-funded programme that offered knowledge and tools.

The Netherlands has also started a pilot programme to increase awareness of energy efficiency among households. This programme aims to involve households in energy efficiency issues through marketing. The pilot programme is aimed at young families with children. As one example of marketing tools used in the pilot, a TV programme supported with an internet site and school programme is being used (www.energysurvival.nl). If successful, other groups will be involved. An expanded programme is expected to start in 2007.

To ensure that the regulator has adequate powers and means to effectively carry out its tasks, two orders were issued in January 2005, outlining a framework for the conditions under which the electricity and gas grids can be used – so-called grid codes. Grid codes are proposed by the grid operators and require the approval of the Office of Energy Regulation.

To increase the involvement of consumers in the design of liberalised energy markets, both the Electricity Act and the Gas Act contain rules outlining consultation procedures. Representative organisations have the possibility to take part in consultations concerning the adaptation of market rules, though the largest consumer organisation, *Consumentenbond*, decided not to take part in the consultations. However, there are consultations on a regular basis with *Consumentenbond* concerning matters on energy policy.

Government energy organisation

Since 1 January 2006 the directorates for energy and telecom have merged. The new Directorate-General for Energy and Telecom consists of five directorates plus an interdepartmental programme directorate: the telecom market directorate; the energy market directorate; the co-ordination, strategy and international affairs directorate; the information and communication technology and application directorate, the energy and sustainability directorate; and the interdepartmental energy transition programme directorate.

To make the *Energy Transition* programme a success – meaning that a sustainable energy economy is realised – six government ministries are joining forces through an interdepartmental administrative body. These ministries are Economic Affairs; Housing, Spatial Planning and the Environment; Agriculture, Nature Management and Food Safety; Transport, Public Works and Water Management; Finance; and Foreign Affairs. The Dutch government seeks co-operation with other European countries moving towards more liberalised energy markets, including with governments, research institutions and business.

On 7 December 2004, the Dutch Parliament approved a bill that transformed the Netherlands Competition Authority (*Nederlandse Mededingingsautoriteit*, NMa) into an autonomous administrative authority. As of 1 July 2005, NMa has a management board with the status of an independent administrative authority. The board of NMa consists of three members. The legislation also provides for the full integration of the Office of Energy Regulation (*Directie Toezicht Energie*, DTe) into NMa. The statutory powers of the director of DTe have been transferred to the board of NMa. DTe will remain a part of NMa, focusing on the implementation of sector-specific energy regulations.

The most significant amendment to the Competition Act is that the Minister of Economic Affairs no longer has the power to issue directives in individual competition cases. However, the minister will remain responsible for competition policy and may issue general directives.

Energy efficiency goals and targets

In 2006, the Energy Transition Task Force set overall energy efficiency targets for the Netherlands to meet by 2050, including to:

- Reduce energy use by one-third as compared with the reference scenario.
- Cut greenhouse gas (GHG) emissions by at least half, compared with 1990 levels.
- Reduce oil use by 75% as compared with 2000.
- Increase the amount of primary energy supplied from bioenergy to one-third.

More specific targets have also been set according to four themes: "new" gas (*e.g.* efficient use of gas, substitution of gas use by heat pumps and waste heat use, biogas, hydrogen), sustainable electricity, sustainable mobility and green energy. The goals under the new gas theme are to:

- Cut energy use and GHG emissions in the built environment (*e.g.* houses, buildings, greenhouses) by half by 2030 compared with 2000.
- Establish projects to spur development of micro-combined heat and power (CHP), heat pump technology, heat storage, use of waste heat and geothermal resources.
- Establish a plan for the Rotterdam Heat Company to deliver industrial waste heat to distribution companies.
- Create an energy-neutral horticulture industry by 2020 (the horticulture industry currently makes up 10% of Dutch gas use).

Under the theme of sustainable electricity, the goals are to:

- Develop zero-emission power production facilities by 2012 through carbon capture and storage at new power plants.
- Support large-scale North Sea wind parks of 200 to 500 megawatts (MW) each.
- Comply with EU targets for solar photovoltaics in power generation.
- Develop "smart" electricity grids, including new components, storage, etc.

Under the theme of sustainable mobility, the goals are to:

- Meet a factor-of-two reduction in GHG emissions from new cars by 2015 and factor-of-three reduction from all cars by 2035.

- Put in place infrastructure for hybrid vehicles, as a stepping stone towards fuel cell/hydrogen cars.

- Replace fossil fuels with biofuels; a target of 30% of primary energy use by 2030 has been set.

- Introduce information and communication systems to improve fuel and transport efficiency (*e.g.* so-called "smart cars" and "smart roads", in which information on driving speed, distance to other cars, fuel use and other parameters is used to optimise transport efficiency.

Under the theme of green energy, the government has set goals to:

- Substitute 30% of fossil energy with bioenergy sources by 2030, 60% to 80% of which is to be imported, with the remainder from indigenous production, including waste and energy crops.

- Establish co-production sites (production of chemicals, transportation fuels, power and heat) in industrial areas.

- Substitute natural gas with synthetic natural gas (SNG) from biomass, coal, etc.

- Replace 25% of feed stocks for industry with bio-based feed stocks by 2030.

To improve pan-European co-operation, the Netherlands is a member of the Pentalateral Energy Forum, created by the energy ministers of five north-western European countries (Belgium, the Netherlands, Luxembourg, Germany and France). The goals of the forum, which began in June 2005 and became operational in December 2005, are to improve co-operation in the field of cross-border electricity exchange and to encourage the development of regional markets in Europe. To achieve these goals, three support groups have been set up: on the optimisation and the allocation of cross border capacity, on security of electricity supply and on reduction of legal barriers. The forum aims to put in place by early 2007 harmonised cross-border capacity auctioning rules.

ENERGY SUPPLY AND DEMAND

Total primary energy supply (TPES) in the Netherlands was 82 million tonnes of oil equivalent (Mtoe) in 2004, a 1% rise over 2003 and an 8% rise over 2000. Since 2000, the largest absolute increase came from oil, which grew by 3.4 Mtoe since 2000, a 12% increase. Natural gas also showed a significant rise, increasing by over 2 Mtoe, 6%, since 2000. The largest percentage increase in TPES came from renewables, though the absolute increase was quite small. Energy supply from solar and wind more than doubled between 2000 and 2004, but grew by less than 0.1 Mtoe in absolute terms. Combustible renewables grew by 26% since 2000, an absolute increase of 0.4 Mtoe. In 2004, TPES by fuel broke down to 45% from natural gas, 39% from oil, 11% from coal, 3% from renewables and 1% from nuclear.

Total final consumption (TFC) of energy in the Netherlands was 63.3 Mtoe in 2004, a rise of 1.6% over 2003 and 6.3% above 2000. The largest absolute increase since 2004 came from the industrial sector, which increased consumption by 2.3 Mtoe, a 21% rise. Transport consumption grew by 7% over the period whereas residential consumption grew by just over 1%. As a share of total TFC, in

2004, 40% of consumption was in the industrial sector, 25% in the transport sector, 18% in the residential sector and the remainder was in other sectors, including the commercial sector.

ENERGY AND ENVIRONMENT

In order to take advantage of international best practices with respect to environmental policy, the Netherlands has enhanced its analysis of other countries' experience. In addition to attendance of the formal international energy committees, the government has informal bilateral contacts with relevant foreign ministries and energy bodies. Furthermore, embassies in major countries invest structurally in monitoring new developments on energy policies. One example of the benefits of these efforts is the government's re-evaluation of its offshore wind programme. Economic analysis of foreign programmes led to a change in policy, moving from large-scale implementation towards rewarding only a few projects in order to have greater learning effects. Additionally, the government co-finances the EU-wide AID-EE project (Active Implementation of the proposed Directive on Energy Efficiency), which investigates several energy efficiency programmes in Europe. Project results, which will be disseminated in 2007, will be used to make Dutch energy efficiency policy more effective.

The Netherlands remains active on the joint implementation (JI) and clean development mechanism (CDM) market as a buyer in order to meet part of its Kyoto target. By spring 2005, the Netherlands had purchased about half of its JI/CDM target in specific project contracts. The Netherlands uses these mechanisms in addition to actions carried out by the industry and energy sectors in the EU emissions trading scheme (EU-ETS). Companies in the EU-ETS may also use JI and CDM credits for compliance.

The government has also taken action on biofuels. In consultation with the government, the industry has set up an action plan and discussions are currently taking place with the Ministry of Finance on the question of excise tax levels. From 1 January 2007, suppliers of gasoline and diesel are required to supply 2% of their sales in the form of biofuels.

ENERGY DEMAND AND END-USE EFFICIENCY

Energy efficiency has been given high priority in the energy policy of the Netherlands. The Dutch government has formulated a higher energy savings target than the target under the EU energy savings directive. New policies, particularly in the transport, industrial and housing sectors, should contribute to this new ambition.

To improve transport efficiency, the government has recently lowered the speed limit in several locations to 80 kilometres per hour (km/h). Furthermore, road pricing will be implemented starting in 2012. The sale of energy-efficient vehicles is being stimulated through a sales tax reduction for hybrid cars and a differentiation of sales tax depending on the energy efficiency label of the car.

Additional government-funded programmes have been implemented, including programmes aimed at teaching more efficient driving techniques and energy-efficient tyre pressure levels. The government is also providing financing for the development of innovative biofuels. Several programmes for energy-efficient transport of goods are being developed.

The government is considering enhancing its building standards, including imposing an obligation on energy suppliers to help consumers and businesses with energy conservation in existing buildings. A decision on this obligation was expected before the summer of 2006, but has not yet been issued.

RENEWABLE AND NON-CONVENTIONAL FUELS

A law on the environmental quality of electricity production (*Milieukwaliteit Elektriciteitsproductie*, MEP) came into force 1 July 2003. The MEP subsidy scheme has led to an increase in the share of renewable electricity from 3.3% in 2003 to approximately 6% in 2005. The MEP aims to increase investors' confidence and improve the cost-effectiveness of renewable electricity support. The MEP provides for operating support through subsidised feed-in tariffs. Under MEP, Dutch renewable electricity generators receive subsidies that depend on the difference in costs (including investment, operation and maintenance costs) between their facilities and conventional (non-renewable) units. The maximum level of the subsidy is set at EUR 0.10 per kilowatt-hour. The sources eligible for subsidies are wind, photovoltaics, bio-electricity (including waste incineration), hydropower, wave and tidal energy. The feed-in tariffs are reviewed annually and will decline due to cost reductions stemming from learning effects.

Under the objective of maximising MEP budgets starting in of January 2007, a proposal to change the MEP law is currently under discussion in Parliament. The likely result is that not every renewable electricity generator will receive subsidies. Starting in 2007, subsidies will be allocated on a first come, first served basis, or through tendering. For some renewable energy options, tendering could be a more cost-effective method of allocating MEP financing than the first come, first served method, but both methods are currently under review. Annually, the government sets the budget maximum and determines how subsidies will be allocated. Allocation can vary between the various renewable options and will depend on the market structure. The budget maximum will be set as high as necessary to ensure that the target of 9% renewable electricity in 2010 is met. The subsidy per kilowatt-hour remains the same for the whole subsidy period, which is crucial for investor confidence. The size of the subsidy per kilowatt-hour will still depend on the costs and benefits of the renewable electricity option compared to non-renewable options. The size of the subsidy for new investors is calculated on an annual basis. As soon as the different positive and negative externalities of renewables and other energy forms have been internalised – which is not the case currently – the size of the subsidy per kilowatt-hour will be set taking this into account. When this is the case, the longer-term subsidies can be phased out.

The government is currently working on criteria for the sustainability of biomass, in close co-operation with both non-governmental organisations and industry. It hopes to have the first steps of this policy in place by 2007, with regard to both domestically produced biomass as well as imported biomass. One of the obstacles is the application of these criteria in international trade. To help alleviate these problems, the Netherlands has asked the European Commission to elaborate, within the framework of the European biomass action plan, conditions for a well-functioning market for biomass.

Given the Netherlands' goal of connecting large amounts of wind power to the grid, large-scale grid integration of offshore wind energy has been investigated in two separate studies by the Ministry of Economic Affairs. The first study, *Connect 6000*, concentrated on costs, the most favourable locations for offshore wind farms, the most favourable locations and cable routings for connecting these farms

to the main onshore electricity grid, technical implications for the national electricity grid and the physical planning implications of establishing offshore wind farms.

In the second study, *Connect II*, the findings from the *Connect 6000* study were addressed in more detail. Several designs for technical configurations presented in the first study were analysed as to their technical and financial implications. In addition, a number of spatial considerations were analysed in more detail, including the regulatory framework for specific locations and cable routings, and the possibilities for shorter decision-making procedures. The legal framework and the responsibilities of the different stakeholders (*e.g.* government, regulator, transmission system operator, project developer) were also described. A key recommendation in the report focused on the requirement for consistent and transparent decisions by the central government as to its ambitions with large-scale development of offshore wind energy, including market volume, locations and procedures.

The recommendations of the two studies will serve as input to the activities of the energy transition group for renewable energy, which started in mid-2006.

The government is currently investigating possibilities to increase production and use of heat derived from renewable sources. The government took part in an IEA workshop on renewable heating and cooling in the spring of 2006. In addition, the government has discussed the issue with the European Commission and EU member states during an Amsterdam forum on sustainable energy in April 2006. An internal working paper is currently being prepared that will be used to decide whether a focussed policy on renewable heating and cooling is useful.

NATURAL GAS

With the aim of replacing the cap on national gas production with a direct cap on the Groningen field, in 2004 the Netherlands changed the cap mechanism on national gas production in the Gas Act. This change should help secure production from smaller fields. The limit is set to 425 billion cubic metres (bcm) over ten years.

The government is currently working to restructure the gas sector, *Gasgebouw*. In particular, the government is working to promptly establish a legally independent transmission system operator. In July 2005, Gasunie unbundled into two separate companies. The first company is Gasunie, a transport company that is 100% owned by the state. The second company is a trading company, Gasunie Trade & Supply, which is half owned by the state. Shell and ExxonMobil each own 25% of the company.

In March 2006, the Minister of Economic Affairs sent to Parliament a framework for the future of the Dutch gas market that would facilitate the development of a secondary market for gas trading. The Dutch title-transfer facility (TTF) has shown growing liquidity, but the aim is to further improve it. Therefore, the Netherlands is working on a plan for how to create better boundary conditions in order to boost trading on the Dutch TTF. The Netherlands seeks a fruitful dialogue with neighbouring countries to promote market integration, including dialogue with EuroHub. The framework plan sent to Parliament also includes aspects to tackle gas market bottlenecks, facilitating new market entry and helping avoid excessive market power.

ELECTRICITY

The Netherlands' electricity market has been fully liberalised since 1 July 2004.

The June 2005 and 2006 monitoring surveys by TenneT, the system operator, show that security of electricity supply in the Netherlands has improved significantly. The surveys show that the market is initiating sufficient investment initiatives to guarantee security of supply in the Netherlands over the long term. The market reports a substantial number of confirmed investments in new power plants and in extensions of existing plants' operating lives. As a consequence, the volume of domestic supply will increase sharply.

Despite this progress, after evaluation of different market mechanisms for ensuring security of supply, the Netherlands concluded that market design changes were needed to further enhance security of supply. In co-operation with TenneT, DTe and the Netherlands Bureau for Economic Policy Analysis (*Centraal Planbureau*, CPB), and in consultation with market parties, the Ministry of Economic Affairs had designed a market-based safety net mechanism in case the market does not realise required investments in time. The essence of the safety net is that TenneT would contract additional reserve capacity (including contracts for demand reductions) through long-term contracts of up to six years. The contracted capacity would be exclusively at TenneT's disposal and only used outside the market – only on the basis of technical needs to prevent power cuts in regions, not to lower high prices. However, as the government found that new generation investments are being made, it decided that the safety net mechanism would not be implemented and would be shelved. The government will decide on a yearly basis on advice of TenneT and DTe whether the safety net is needed in future.

As a result of the implementation of EU requirements, monitoring of production data has improved. TenneT has been given a broader base of production data from generators, which has led to a more reliable yearly report on security of supply. This mechanism began in 2005.

The government has recently initiated a project to increase competition in the country's electricity sector, particularly focused on enhanced transparency. The government is currently considering an obligation on producers to make public real-time production data and information on outages, and hopes to make a decision by the end of 2006. Increased transparency would also help underpin efforts to create a north-western European market.

In co-operation with Belgium and France, work to couple the three national electricity markets is ongoing. The regulators have set out a roadmap for the process. The expected operational start of the integrated market with one power exchange and implicit cross-border transmission auctions is the end of 2006.

With a goal of ensuring a stable and predictable policy framework for nuclear power, as well as enhancing security of supply, the Dutch government has decided to extend the operational life of the Borssele nuclear power plant. Initially it was scheduled to be shut down in 2013; decommissioning has been extended until 2033.

An amendment to the nuclear law was sent to Parliament in 2005 and is still under discussion. The amendment includes provisions to make a clearer separation of responsibilities between the Ministry for the Environment and the Ministry of Economic Affairs. The Minister for Environment becomes primarily responsible for nuclear regulation and inspection. The Minister for Economic Affairs will be

responsible for nuclear energy policy and nuclear research. The amendment will also clarify the legal position of future licence holders. For example, the change should give more certainty in advance to prospective builders of nuclear power plants with regard to the licence process and timing, as well as the handling of radioactive waste and the financial costs for final decommissioning.

RESEARCH, DEVELOPMENT AND DEMONSTRATION

Dutch energy research, development and demonstration (RD&D) policy is organised around themes, with the aim of ensuring clear communication about RD&D programmes and policy priorities across ministries. The energy transition theme involves many sectors organised across six ministries. Under the R&D theme, energy R&D is one of a basket of 12 themes that all relevant ministries together define, before determining spending by theme. Both RD&D mechanisms are works in progress.

To improve discussion between all relevant stakeholders on the development of RD&D programmes two actions have been taken. First, an “interface” has been established between the RD&D programmes that are linked to the Ministry of Economic Affairs and the RD&D programmes of the energy transition group that are linked to the recently created interdepartmental energy transition programme directorate. Secondly, at the end of 2006 there will be a mid-term review of the research strategy and the accompanying portfolio for long-term RD&D.

To improve international co-operation in energy RD&D efforts, international network participation has been increased through the SenterNovem RD&D programme in 2006 compared with prior years.

Netherlands

Energy Balances and Key Statistical Data

Unit: Mtoe

SUPPLY		1973	1990	2003	2004	2010	2020	2030
TOTAL PRODUCTION		**56.8**	**60.5**	**58.5**	**67.9**	**57.3**	**48.4**	**36.2**
Coal[1]		1.1	-	-	-	-	-	-
Oil		1.6	4.1	3.2	3.0	1.7	1.3	0.3
Gas		53.7	54.6	52.2	61.6	51.4	40.1	32.5
Comb. Renewables & Waste[2]		-	0.9	1.9	2.2	2.7	3.8	1.9
Nuclear		0.3	0.9	1.0	1.0	1.0	1.0	0.5
Hydro		-	0.0	0.0	0.0	0.0	0.0	0.0
Geothermal		-	-	-	-	-	-	-
Solar/Wind/Other[3]		-	0.0	0.1	0.2	0.6	2.2	1.1
TOTAL NET IMPORTS[4]		**6.0**	**6.4**	**22.2**	**15.0**	**24.4**	**43.5**	**68.8**
Coal[1]	Exports	1.4	2.3	4.9	6.0	5.9	4.9	7.4
	Imports	2.9	11.7	14.1	14.6	15.1	16.3	26.4
	Net Imports	1.5	9.5	9.2	8.6	9.3	11.4	19.0
Oil	Exports	42.4	60.2	69.2	74.1	117.5	123.0	83.0
	Imports	83.8	91.1	110.5	118.7	162.2	176.7	144.7
	Bunkers	11.6	10.9	13.5	14.7	16.2	18.6	21.4
	Net Imports	29.8	19.9	27.7	29.8	28.6	35.1	40.3
Gas	Exports	25.3	25.8	34.5	38.4	45.2	43.7	37.7
	Imports	-	2.0	18.3	13.5	30.4	40.5	47.3
	Net Imports	-25.3	-23.8	-16.2	-24.9	-14.8	-3.2	9.6
Electricity	Exports	0.1	0.0	0.3	0.4	0.7	1.2	0.8
	Imports	0.0	0.8	1.8	1.8	2.0	1.5	0.8
	Net Imports	-0.1	0.8	1.5	1.4	1.3	0.3	-0.1
TOTAL STOCK CHANGES		**-0.3**	**-0.2**	**0.2**	**-0.7**	**-**	**-**	**-**
TOTAL SUPPLY (TPES)		**62.4**	**66.7**	**80.9**	**82.1**	**81.7**	**91.9**	**105.0**
Coal[1]		2.9	8.9	8.8	8.7	9.3	11.4	19.0
Oil		30.9	24.3	31.5	32.0	30.3	36.4	40.6
Gas		28.5	30.8	36.0	36.7	36.6	36.8	42.1
Comb. Renewables & Waste[2]		-	0.9	1.9	2.2	2.7	3.8	1.9
Nuclear		0.3	0.9	1.0	1.0	1.0	1.0	0.5
Hydro		-	0.0	0.0	0.0	0.0	0.0	0.0
Geothermal		-	-	-	-	-	-	-
Solar/Wind/Other[3]		-	0.0	0.1	0.2	0.6	2.2	1.1
Electricity Trade[5]		-0.1	0.8	1.5	1.4	1.3	0.3	-0.1
Shares (%)								
Coal		*4.6*	*13.4*	*10.9*	*10.6*	*11.4*	*12.4*	*18.1*
Oil		*49.5*	*36.5*	*39.0*	*38.9*	*37.1*	*39.6*	*38.6*
Gas		*45.6*	*46.2*	*44.5*	*44.7*	*44.8*	*40.1*	*40.1*
Comb. Renewables & Waste		*-*	*1.4*	*2.4*	*2.6*	*3.3*	*4.1*	*1.8*
Nuclear		*0.5*	*1.4*	*1.3*	*1.2*	*1.2*	*1.1*	*0.4*
Hydro		*-*	*-*	*-*	*-*	*-*	*-*	*-*
Geothermal		*-*	*-*	*-*	*-*	*-*	*-*	*-*
Solar/Wind/Other		*-*	*-*	*0.2*	*0.2*	*0.7*	*2.4*	*1.0*
Electricity Trade		*-0.2*	*1.2*	*1.8*	*1.7*	*1.6*	*0.3*	*-0.1*

0 is negligible, - is nil, .. is not available

Please note: Forecasts for 2030 have no official status. All forecasts are based on the 2004 submission.

Distribution: 01-06-06

Unit: Mtoe

DEMAND							
FINAL CONSUMPTION BY SECTOR	**1973**	**1990**	**2003**	**2004**	**2010**	**2020**	**2030**
TFC	**48.8**	**51.3**	**62.3**	**63.3**	**62.8**	**70.2**	**79.4**
Coal[1]	1.1	1.4	0.9	1.0	1.0	1.2	1.4
Oil	24.7	19.9	26.8	27.2	25.8	31.0	33.2
Gas	19.3	23.0	23.3	23.3	21.9	21.7	27.3
Comb. Renewables & Waste[2]	-	0.4	0.4	0.4	0.2	0.2	0.2
Geothermal	-	-	-	-	-	-	-
Solar/Wind/Other	-	0.0	0.0	0.0	0.0	0.1	0.0
Electricity	3.8	6.3	8.6	8.9	10.0	12.0	13.5
Heat	-	0.3	2.3	2.6	3.8	4.0	3.6
Shares (%)							
Coal	*2.2*	*2.7*	*1.4*	*1.5*	*1.6*	*1.6*	*1.8*
Oil	*50.5*	*38.8*	*43.0*	*43.0*	*41.1*	*44.2*	*41.8*
Gas	*39.5*	*44.8*	*37.5*	*36.8*	*34.8*	*30.9*	*34.4*
Comb. Renewables & Waste	-	*0.7*	*0.6*	*0.6*	*0.4*	*0.4*	*0.3*
Geothermal	-	-	-	-	-	-	-
Solar/Wind/Other	-	-	-	-	-	*0.1*	*0.1*
Electricity	*7.8*	*12.3*	*13.9*	*14.0*	*15.9*	*17.1*	*17.0*
Heat	-	*0.6*	*3.7*	*4.0*	*6.1*	*5.8*	*4.6*
TOTAL INDUSTRY[6]	**21.2**	**21.3**	**24.7**	**25.2**	**27.8**	**31.5**	**36.0**
Coal[1]	0.8	1.3	0.8	0.9	1.0	1.2	1.4
Oil	10.4	8.2	11.0	11.0	12.9	15.4	17.8
Gas	8.1	8.8	8.0	8.1	7.1	7.4	9.4
Comb. Renewables & Waste[2]	-	0.1	0.1	0.1	0.0	0.0	0.0
Geothermal	-	-	-	-	-	-	-
Solar/Wind/Other	-	-	-	-	-	-	-
Electricity	2.0	2.9	3.5	3.6	3.6	4.1	4.7
Heat	-	-	1.2	1.4	3.2	3.4	2.6
Shares (%)							
Coal	*3.6*	*6.2*	*3.4*	*3.7*	*3.7*	*3.7*	*3.9*
Oil	*48.8*	*38.7*	*44.6*	*43.7*	*46.4*	*49.0*	*49.5*
Gas	*38.4*	*41.3*	*32.6*	*32.3*	*25.6*	*23.6*	*26.2*
Comb. Renewables & Waste	-	*0.3*	*0.4*	*0.5*	*0.1*	*0.1*	*0.1*
Geothermal	-	-	-	-	-	-	-
Solar/Wind/Other	-	-	-	-	-	-	-
Electricity	*9.2*	*13.4*	*14.2*	*14.1*	*12.7*	*12.9*	*13.0*
Heat	-	-	*4.9*	*5.7*	*11.5*	*10.8*	*7.3*
TRANSPORT[7]	**7.5**	**10.6**	**15.0**	**15.4**	**12.0**	**14.6**	**14.3**
TOTAL OTHER SECTORS[8]	**20.2**	**19.4**	**22.6**	**22.6**	**22.9**	**24.1**	**29.1**
Coal[1]	0.3	0.1	0.0	0.0	-	-	-
Oil	6.9	1.2	0.9	0.9	1.0	1.1	1.2
Gas	11.1	14.2	15.3	15.2	14.7	14.2	17.9
Comb. Renewables & Waste[2]	-	0.3	0.3	0.3	0.2	0.2	0.2
Geothermal	-	-	-	-	-	-	-
Solar/Wind/Other	-	0.0	0.0	0.0	0.0	0.1	0.0
Electricity	1.8	3.4	5.0	5.2	6.3	7.8	8.7
Heat	-	0.3	1.1	1.1	0.6	0.6	1.0
Shares (%)							
Coal	*1.6*	*0.3*	*0.1*	*0.1*	-	-	-
Oil	*34.2*	*6.2*	*3.9*	*3.9*	*4.3*	*4.6*	*4.2*
Gas	*55.3*	*73.1*	*67.7*	*66.9*	*64.3*	*59.2*	*61.6*
Comb. Renewables & Waste	-	*1.6*	*1.2*	*1.2*	*1.0*	*0.9*	*0.8*
Geothermal	-	-	-	-	-	-	-
Solar/Wind/Other	-	-	*0.1*	*0.1*	*0.1*	*0.3*	*0.1*
Electricity	*8.8*	*17.3*	*22.1*	*22.8*	*27.5*	*32.4*	*29.8*
Heat	-	*1.6*	*4.9*	*5.0*	*2.8*	*2.6*	*3.5*

Unit: Mtoe

DEMAND							
ENERGY TRANSFORMATION AND LOSSES	**1973**	**1990**	**2003**	**2004**	**2010**	**2020**	**2030**
ELECTRICITY GENERATION[9]							
INPUT (Mtoe)	**12.0**	**15.4**	**21.2**	**21.6**	**25.1**	**30.6**	**34.2**
OUTPUT (Mtoe)	**4.5**	**6.2**	**8.3**	**8.7**	**9.8**	**13.2**	**15.2**
(TWh gross)	52.6	71.9	96.8	100.8	114.1	153.7	177.3
Output Shares (%)							
Coal	*6.0*	*38.3*	*28.4*	*26.0*	*25.2*	*24.9*	*43.9*
Oil	*12.3*	*4.3*	*3.0*	*2.8*	*3.2*	*1.8*	*4.0*
Gas	*79.5*	*50.9*	*58.7*	*60.5*	*56.2*	*45.9*	*42.2*
Comb. Renewables & Waste	*-*	*1.5*	*4.1*	*4.6*	*6.6*	*8.5*	*2.2*
Nuclear	*2.1*	*4.9*	*4.2*	*3.8*	*3.3*	*2.4*	*1.0*
Hydro	*-*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Geothermal	*-*	*-*	*-*	*-*	*-*	*-*	*-*
Solar/Wind/Other	*-*	*0.1*	*1.6*	*2.1*	*5.4*	*16.5*	*6.6*
TOTAL LOSSES	**14.3**	**15.6**	**18.6**	**18.7**	**18.9**	**21.7**	**25.6**
of which:							
Electricity and Heat Generation[10]	7.5	8.9	10.1	9.9	10.9	12.5	14.5
Other Transformation	1.6	0.8	1.7	1.7	2.1	2.3	2.6
Own Use and Losses[11]	5.2	6.0	6.8	7.1	5.8	6.9	8.5
Statistical Differences	**-0.7**	**-0.2**	**-0.0**	**0.1**	**-**	**-**	**-**
INDICATORS	**1973**	**1990**	**2003**	**2004**	**2010**	**2020**	**2030**
GDP (billion 2000 USD)	196.20	290.20	391.80	398.50	473.61	623.21	774.96
Population (millions)	13.44	14.95	16.22	16.27	16.83	17.88	18.89
TPES/GDP[12]	0.32	0.23	0.21	0.21	0.17	0.15	0.14
Energy Production/TPES	0.91	0.91	0.72	0.83	0.70	0.53	0.34
Per Capita TPES[13]	4.65	4.47	4.99	5.05	4.86	5.14	5.56
Oil Supply/GDP[12]	0.16	0.08	0.08	0.08	0.06	0.06	0.05
TFC/GDP[12]	0.25	0.18	0.16	0.16	0.13	0.11	0.10
Per Capita TFC[13]	3.64	3.43	3.84	3.89	3.73	3.93	4.20
Energy-related CO_2 Emissions (Mt CO_2)[14]	153.8	158.1	185.1	185.8	185.8	206.7	255.7
CO_2 Emissions from Bunkers (Mt CO_2)	39.3	39.0	53.1	57.4	64.2	75.8	89.0
GROWTH RATES (% per year)	**73-79**	**79-90**	**90-03**	**03-04**	**04-10**	**10-20**	**20-30**
TPES	1.7	-0.3	1.5	1.5	-0.1	1.2	1.3
Coal	2.4	9.5	-0.1	-1.5	1.1	2.0	5.3
Oil	0.4	-2.4	2.0	1.4	-0.9	1.8	1.1
Gas	2.4	-0.6	1.2	2.1	-0.1	0.1	1.4
Comb. Renewables & Waste	-	13.0	5.7	12.2	3.5	3.6	-6.8
Nuclear	21.0	0.0	1.1	-4.9	-0.4	-	-7.2
Hydro	-	-	-1.2	33.3	8.4	-	-
Geothermal	-	-	-	-	-	-	-
Solar/Wind/Other	-	-	25.3	37.1	20.4	15.1	-7.3
TFC	2.0	-0.6	1.5	1.6	-0.1	1.1	1.2
Electricity Consumption	4.4	2.3	2.4	2.6	2.0	1.8	1.2
Energy Production	4.4	-1.8	-0.3	16.1	-2.8	-1.7	-2.9
Net Oil Imports	1.0	-4.1	2.6	7.6	-0.7	2.1	1.4
GDP	2.6	2.2	2.3	1.7	2.9	2.8	2.2
Growth in the TPES/GDP Ratio	-0.9	-2.4	-0.8	-0.2	-2.9	-1.6	-0.8
Growth in the TFC/GDP Ratio	-0.6	-2.8	-0.8	-0.1	-3.0	-1.6	-0.9

Please note: Rounding may cause totals to differ from the sum of the elements.

Footnotes to Energy Balances and Key Statistical Data

[1] Includes lignite and peat, except for Finland, Ireland and Sweden. In these three cases, peat is shown separately.

[2] Comprises solid biomass, liquid biomass, biogas, industrial waste and municipal waste. Data are often based on partial surveys and may not be comparable between countries.

[3] Other includes tide, wave and ambient heat used in heat pumps.

[4] Total net imports include combustible renewables and waste.

[5] Total supply of electricity represents net trade. A negative number indicates that exports are greater than imports.

[6] Includes non-energy use.

[7] Includes less than 1% non-oil fuels.

[8] Includes residential, commercial, public service and agricultural sectors.

[9] Inputs to electricity generation include inputs to electricity, CHP and heat plants. Output refers only to electricity generation.

[10] Losses arising in the production of electricity and heat at main activity producer utilities (formerly known as public) and autoproducers. For non-fossil-fuel electricity generation, theoretical losses are shown based on plant efficiencies of approximately 33% for nuclear, 10% for geothermal and 100% for hydro.

[11] Data on "losses" for forecast years often include large statistical differences covering differences between expected supply and demand and mostly do not reflect real expectations on transformation gains and losses.

[12] Toe per thousand US dollars at 2000 prices and exchange rates.

[13] Toe per person.

[14] "Energy-related CO_2 emissions" have been estimated using the IPCC Tier I Sectoral Approach. In accordance with the IPCC methodology, emissions from international marine and aviation bunkers are not included in national totals. Projected emissions for oil and gas are derived by calculating the ratio of emissions to energy use for 2004 and applying this factor to forecast energy supply. Future coal emissions are based on product-specific supply projections and are calculated using the IPCC/OECD emission factors and methodology.