

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

The Spanish energy sector has undergone many positive changes since the last review. These include an increase in the use of natural gas and renewables in power generation leading to increased security of supply and reduced environmental impacts, further liberalisation of its markets ahead of EU directives and the entrance of new players into the energy market competing with the incumbents. The energy industry has coped very well in satisfying the rapidly increasing demand for energy. Notwithstanding all these positive developments, the energy sector in Spain and the Spanish government will face a number of challenges over the next years.

One of the most pressing issues is that Spain's demand for energy has grown rapidly and that this growth shows no sign of abating. Spain's indigenous energy resources are limited and unlikely to increase significantly, with the exception of some form of renewable energy production, in particular wind. Furthermore, weak cross-border gas and electricity interconnections and low electricity trade compared to total demand lead to a situation not dissimilar to that of an island. This carries risks for Spain's security of supply that will become greater with increasing demand for energy. Increasing interconnection capacity between Spain and the rest of Europe could not only reduce these risks, but also contribute to general European security of supply, because Spain could provide an additional entry point for non-Russian and non-Algerian gas to the European Union (EU) through its regasification terminals, and Spanish electricity generators could contribute to supply in neighbouring countries. The introduction of the Iberian Energy Market MIBEL will also help to create a stronger base for the Spanish energy markets when it happens, and should be commended. The decision to delay the introduction of the Iberian Electricity Market MIBEL appears sensible at this stage, however, because it will allow necessary improvements to be made to the market framework.

In the area of environmental protection, major efforts will be required by Spain to initially stabilise and subsequently reduce CO₂ emission levels to achieve its EU burden-sharing agreement to limit its GHG emissions at 15% above the 1990 level by 2008-2012. However, greenhouse gas (GHG) emissions in 2002 had already increased by 39% over the 1990 level. This trend creates a risk that, despite the efforts by the government to reduce CO₂ emissions, these might continue to grow further, thereby widening the compliance gap. Energy-related CO₂ emission increases have been exceptionally high in the transport

sector, in the residential, commercial and institutional sectors and in waste treatment. While some policies have been developed to deal with these problems, the concrete implementation measures required to realise significant improvements of energy intensity in Spain still have to be designed and agreed upon. There is no national climate change strategy in place that could support the implementation of measures aimed to reduce CO₂ emissions by providing an overarching conceptual and legislative framework. Furthermore, comprehensive cost-effectiveness analysis and monitoring/evaluation processes remain to be developed. Also, Spain is not sufficiently considering action on reducing non-CO₂ GHG emissions, despite these being responsible for almost 25% of all GHG emissions in the country. There is likely to be considerable potential for emissions reductions from these gases, as other countries have found.

While Spain has developed the E4 Energy Efficiency Strategy with sectoral targets, its implementation has been delayed and detailed measures to achieve the targets have not yet been developed. The government is advised to develop a concrete package of such policies and measures with appropriate funding and strong interministerial co-ordination without delay. The industry sector could potentially achieve further increases beyond the targets of the strategy in energy efficiency. It is recommended to evaluate the role of energy audits by the Insititute for Energy Diversification (IDAE) in this context. It is also a challenge to curb the growing energy demand in household and tertiary sectors owing to its diffuse nature. The transposition of the EU directive on the energy performance of buildings offers the Spanish government the opportunity to take significant steps towards increasing energy efficiency in these sectors. It should, therefore, implement it rapidly and ensure its vigorous enforcement. Improved enforcement of energy labelling for appliances and the extension of advanced metering should also be pursued. Transport is another sector in which demand growth continues unabated. The Spanish government will have to address this with a comprehensive set of measures for urban mobility, modal shifts and fleet rejuvenation. For example, the effect of the existing vehicle renovation programme PREVER would be enhanced by linking the reduction in taxation with the purchase of fuel-efficient replacement cars making use of the EU fuel efficiency label.

The Spanish government has had great success in fostering the fastest growing natural gas market within the EU, at the same time as liberalising it well ahead of EU directives. The government forecasts a growth rate of 17% for 2005, mostly driven by consumption at new combined-cycle gas turbine (CCGT) power stations that deliver increased security of electricity supply and reduced CO₂ emissions at the same time. This will require substantial investments in gas infrastructure such as gas transmission networks, LNG terminals and storage facilities. The government is mandating investment in the gas infrastructure and all consumers are shouldering their risks. While this has been instrumental in expanding the gas infrastructure, care should be taken that the guaranteed rates of return allow focusing investment on the most needed facilities.

The government could also encourage market-funded development of the infrastructure with which Spain is well provided. At the same time, as witnessed in the supply cuts in December 2004 and February 2005, it is necessary to determine transparent procedures to deal with disconnection of interruptible consumers in case of a major supply disruption. The government will also have to accelerate the development of underground storage to ensure security of gas supply. The access tariff to gas infrastructure is the same across the system, with Spain treated as one zone, a system which could hamper removal of bottlenecks. It is recommended to consider the introduction of locational signals in the gas market.

The gas market has been fully open since January 2003, and in 2004, 80% of the gas was delivered in the competitive market, where almost all industrial consumers are supplied. On the other hand, only 1.2% of residential consumers have moved into the competitive market. With a view to strengthening consumer confidence in the gas market, the standardisation of contracts and market supervision need to be enhanced. For maximising the benefit of competition, the still considerable market power of Gas Natural needs to be continuously supervised by the regulator and the independence of the transmission system operator (TSO) needs to be enhanced through the publication of a network code.

Spain's traditional indigenous fossil fuel resource is coal, in the form of both hard coal and lignite. Quality problems and cost of production make Spanish coal less competitive, compared to imported coal. It is unlikely that recent price increases for coal on the world markets will change that situation. As a consequence, Spanish coal production was further reduced between 2000 and 2004, and there was significant investment expended to attempt to economically restructure the areas affected. Because of the importance of coal mining in the already economically depressed production areas, the Spanish government sees coal primarily in terms of a social and regional issue.

Spain has ambitious targets for renewable energy, another indigenous resource, of increasing the share of renewable energy sources in TPES and electricity generation to 12% and 29.4% respectively by 2010. To achieve this target, Spain has set up the 1999-2010 Renewables Promotion Plan. A fixed feed-in tariff that is differentiated by technology has been the primary tool to promote renewable electricity in the past, and has delivered impressive growth rates for wind generation, putting Spain in third place worldwide for wind generating capacity. In an attempt to increase cost-efficiency, the government introduced a new regime for selling renewable electricity in 2004, whereby renewable energy producers can directly sell their power to the market receiving the average market price plus differentiated premiums based on the market price. This is to be commended as a first step to incorporate a market-based element. However, care should be taken by the Spanish government to ensure that the whole system to promote renewable energy is cost-effective in achieving its goals. The premium will be reviewed every four years and the

technology learning curve should be appropriately incorporated. Allowing renewable energy producers to switch between the old feed-in tariff system and the new premium scheme to maximise their profits could increase the overall cost to the economy. Guaranteeing prices without a time limit could also result in over-subsidisation. In the mid- to longer-term perspective, the government is advised to study the potential of a more market-oriented approach such as a quota obligation with a green certificates trading system to achieve the national target in a more cost-effective manner. Overcoming supply bottlenecks is essential for the introduction of biomass, which lags far behind the target.

Spain embarked on the liberalisation of its electricity sector in the mid-1990s, ahead of the timetable set by the European internal market directives. The liberalisation process was very comprehensive and led to the establishment of all the necessary regulatory and market institutions. Spain is now among the IEA member countries with the longest experience in electricity market reform. Spain is still in a transitional phase where commitments made by companies ahead of liberalisation have been addressed, and where one aim has been to protect consumers from the effects of the uncertainties liberalisation may bring. With the many other energy policy challenges that have also been met during the transition, the electricity market has, however, evolved with a continuously high level of regulation and political involvement. This regulation has served a purpose but has also created many distortions in the market. The Spanish electricity market is now at a stage where the regulation that was meant to ease the transition has become a hindrance for its further development. Spain has an opportunity to revise the role that the market is given in the Spanish electricity sector to meet the objective of higher efficiency for the long-term benefit of all electricity consumers in Spain. Political and regulatory involvement should then be focused on establishing a regulatory framework for the areas where transparent regulation is crucial to maintain market efficiency, such as system reliability, market design, competition, regulation of networks and public service obligations.

Successful liberalisation with the objective of increasing efficiency in the sector is achieved by introducing competition among market players. Success will depend on the market concentration of incumbent utilities and whether there is regulation in place to enable newcomers to build new plants and to easily trade the electricity in the market. In this context, the Spanish electricity market could benefit from reducing the concentration of large electricity companies by encouraging further new entry into the market and improving the regulation of the electricity pool. It is important to ease the access for newcomers to lower the entry costs into the market. The number of generating companies is increasing and an important share of new and expected investment in CCGT is made by the smaller and newer entrants. CCGT plants are likely to set the market price most of the time in the future, so this may prove a particularly important development for market efficiency and

competition. There are still some important pieces of information that are not published broadly. Information about the status of production plants, such as their availability and technical status, is not submitted to the market place. Information that is fundamental for analysing the demand/supply balance should be made public to all market players without delay.

The transmission grid and the operators of the Spanish electricity system seem to be able to meet the challenges from the increasing share of intermittent resources and other generating capacity. The few problems in the delivery of electricity to Spanish electricity consumers that were observed in recent years seem to derive primarily from problems in the distribution grid. This could indicate a need for a revision of the regulation of distribution activities. It should be considered whether local grid companies have the right incentives to make efficient investments. The introduction of regulation with an element of financial responsibility for the failure to deliver is commended. Since Spain covers a large geographic area, strong and transparent locational signals in price formation could improve the system efficiency. This will reduce the potential risk that congestion management is used by incumbents for market abuse. This is also crucial for the development of the interconnection capacity, in particular in the Iberian market with interconnection bottlenecks.

Enabling active participation by the demand side in the form of direct demand response to prices could provide efficiency gains. In particular, large industrial consumers have the potential to play an active role in balancing supply and demand when the system is constrained. So far, large industrial consumers have not had the incentive to participate in the liberalised market or even to change supplier. All consumers have the opportunity to be supplied through an integrated regulated tariff. The regulated tariff is based on a calculation of costs and the outcome of the calculation makes it difficult for suppliers to compete with an offer based on real market prices. In particular, the integrated regulated tariff offered to large industrial consumers and households seems to deprive these consumer groups of the incentive to go to the liberalised market.

Nuclear power is the most important indigenous energy source playing a vital role in terms of security of supply and GHG emissions reduction. The nuclear industry in Spain offers services and products that largely cover the needs of its nuclear power plant operators. Yet the current government has publicly expressed its willingness to phase out nuclear energy at least in the mid-term. This could hamper the stable and predictable operating of the market, further development of the regulatory environment and discourage further investment. Even though construction of new nuclear power plants may be difficult in the competitive market owing to economic reasons, the regulatory uncertainties caused by the government should be minimised. It should also be borne in mind that a nuclear phase-out could have significant implications for Spain's future energy security and climate mitigation policies. It is essential for the government to develop a reliable estimate of short-, mid- and long-term consequences of the phase-out.

Spain has a wide-ranging R&D programme that is reflecting well the country's energy supply mix. Spain has some very unique research programmes, and a well-skilled research base. Nevertheless, the Spanish energy R&D budget per thousand units of GDP is significantly lower than that of other European countries. Budgetary support for energy R&D should be continued and further strengthened to close this gap. Research activities funded by the government should attempt to bring in private partners, where appropriate, in order to enhance the cost-effectiveness of public research spending.

RECOMMENDATIONS

The government of Spain should:

General Energy Policy

- ▶ *Devote more attention to the demand side in energy policy-making.*
- ▶ *Improve energy forecasting outside the infrastructure planning process and beyond the current 2010-2012 time horizon.*
- ▶ *Reinforce security of supply and competition through enhanced interconnections by making them priority items within the energy infrastructure planning.*
- ▶ *Enable speedier decision-making and policy development by enhancing co-ordination of energy policy measures between different ministries and other layers of government.*
- ▶ *Strengthen the responsibility and independence of the regulator, the National Energy Commission (CNE), by investing it with more decision- and rule-making power.*

Energy and the Environment

- ▶ *Develop a comprehensive set of measures (National Climate Change Strategy) specifically directed at decoupling GDP growth from energy use and CO₂ emissions, by investigating, identifying and quantifying the many promising fields for cost-effective reduction of CO₂ emissions.*
- ▶ *Closely monitor and annually evaluate the results and cost-effectiveness of this strategy.*
- ▶ *Closely monitor the availability of international carbon credits from Joint Implementation (JI) and the Clean Development Mechanism (CDM) and prepare necessary actions in case they are not available as planned.*

- ▶ *Look into additional cost-effective GHG reduction options in the field of non-CO₂ GHGs.*
- ▶ *Increase the use of fiscal instruments to internalise the environmental externalities of energy use. In particular, examine fuel taxation in relation to environmental externalities.*
- ▶ *Strengthen the dialogue among the central government, Autonomous Communities and town councils to achieve more sustainable energy systems.*

Energy Efficiency

- ▶ *Develop concrete and effective policies and measures to implement the E4 Strategy and review it in the following years in order to more fully exploit the energy efficiency potential.*
- ▶ *Consider a shift of IDAE's budget to more investment in energy efficiency, and in particular strengthen IDAE's industrial energy efficiency activities.*
- ▶ *Implement and enforce significantly strengthened building codes. Regularly review and further strengthen these codes and support follow-up action in building certification. Train sufficient numbers of building inspectors to ensure successful implementation of the directive.*
- ▶ *Extend individual metering and billing of energy consumption in dwellings to existing buildings.*
- ▶ *Ensure that statistical information required for the planning and evaluation of energy efficiency policies is collected.*
- ▶ *Investigate the potential of smart metering for the reduction of energy use.*
- ▶ *Raise awareness of the benefits of energy efficiency through information campaigns and improved enforcement of energy labelling.*
- ▶ *Adopt measures to decouple transport demand growth from economic growth and encourage modal shifts towards more energy-efficient transport modes, e.g. the railways. The role of pricing should be investigated in this area.*
- ▶ *Use the PREVER system to improve car fuel efficiency by linking the registration tax reduction to EU fuel efficiency labels. Evaluate the experience of other EU countries in this respect.*
- ▶ *Encourage energy retailers and distributors to offer energy services and audits to their customers.*
- ▶ *Restrict support for combined heat and power (CHP) to plants that achieve energy efficiency gains.*

Oil

- ▶ *Closely observe the market for oil products, including liquefied petroleum gas (LPG), and promote further competition by, for example, encouraging new entrants, such as hypermarkets, and by removing planning obstacles.*
- ▶ *Co-operate with the local authorities to avoid delays in licensing new filling stations.*
- ▶ *Encourage the use of gasoline hybrid and alternative fuel vehicles, including converting bus operation to natural gas.*
- ▶ *Ensure continuous fulfilment of IEA emergency stock requirements.*

Natural Gas

- ▶ *Closely monitor and encourage the development of interconnections and liquefied natural gas (LNG) terminals, wherever possible by market-funded developments outside the system of guaranteed returns. Investigate whether especially new regasification capacity can be developed outside the regulated system.*
- ▶ *Create an environment in which the development of new storage facilities will be encouraged by allowing market fundamentals to be reflected in the price of gas; by reviewing the rate of return allowable for storage facilities relative to that for transportation; and by addressing siting, NIMBY and permitting issues to speed up the planning process.*
- ▶ *Set up an emergency plan in line with the EU directive on security of gas supply (2004/67, article 8).*
- ▶ *Monitor closely the development of the competitive market for natural gas and ensure that Gas Natural does not abuse its market power.*
- ▶ *Increase the transparency and independence of the transmission system operator (TSO) to avoid any risk of discriminatory behaviour.*
- ▶ *Review the access tariffs to the gas network with a view to introducing locational signals and correct pricing of congested assets.*
- ▶ *Redesign the integrated regulated tariffs so that they only serve to guarantee service for small consumers.*
- ▶ *Finalise and adopt a network code to ensure fair and standardised technical and commercial decisions for connection and access of third parties to the gas infrastructure.*
- ▶ *Promote and facilitate the development of the Spanish gas hub, and a liquid spot and balancing market.*

- ▶ *Review the policy on security of gas supply (particularly the 60% quota) in light of new developments in LNG and pipeline and move the focus towards the density of supply.*
- ▶ *Facilitate the timely transfer of market information to all participants.*

Coal

- ▶ *Continue to reduce the subsidy to the coal sector, and at the same time accelerate investment into the regeneration and economic change of regions affected by reductions in mining in order to reduce the welfare and regional impacts.*

Renewable Energy

- ▶ *Increase the transparency of the costs and benefits of the current renewables support system.*
- ▶ *Review the current scheme in order to assure cost-effectiveness while ensuring investor confidence with a view to reflecting the technology learning curve. Consider limiting the duration of the subsidy.*
- ▶ *Avoid hopping back and forth between old and new schemes.*
- ▶ *Eliminate possible double counting of carbon value between the European Union Emissions Trading Scheme (EU-ETS) and renewable energy promotion schemes.*
- ▶ *Consider and investigate more market-oriented mechanisms different from feed-in tariffs, taking into account other countries' experiences.*
- ▶ *Investigate the requirements of reliability and stability of the electricity network, given the significant increase of wind power on the grid.*
- ▶ *Identify the barriers to the increased use of biomass and address them in close co-operation with local governments and relevant ministries, in particular the Ministry of Agriculture. Due attention should also be paid to the potential available for the use of biofuels in transport.*

Electricity

- ▶ *Consider removing the capacity payment or, as a temporary measure, replace it with a more efficient instrument.*

- ▶ *Redesign the cost of transition to competition system (CTC system) to remove its distortionary effect on the formation of electricity prices as soon as possible.*
- ▶ *Redesign the integrated regulated tariffs so that they only serve to guarantee service for small consumers.*
- ▶ *Ensure that all market players have equal access to all information that is fundamental to the demand-supply balance, including the status of generating plants.*
- ▶ *Encourage participation of particularly large-scale consumers in the wholesale market, e.g. through load-shifting.*
- ▶ *Review the regulation of distribution grids to ensure that the right incentives are given to allow for efficient investment and operation.*
- ▶ *Consider the introduction of transparent locational signals in price formation and tariffs. This is particularly important with the development of the Iberian market.*
- ▶ *Reinforce efforts to establish the Iberian market by agreeing on common rules.*
- ▶ *Improve trade across the Spanish-French border.*
- ▶ *Ensure transparent licensing procedures for electricity-related infrastructure.*

Nuclear Energy

- ▶ *Ensure a stable and predictable operating and regulatory framework for nuclear.*
- ▶ *Assess the implication of extending the operating lives and increasing the capacity of existing nuclear plants on the national energy policy objectives, while ensuring high safety levels.*
- ▶ *Develop a clear vision about the future of nuclear backed by a quantitative assessment of the consequences of the nuclear phase-out on energy security, environmental protection and economic growth. Make such analysis publicly available and understood before taking a national decision.*
- ▶ *Ensure transparent and immediate disclosure of information on nuclear safety-related events and close monitoring of safety performance by the Nuclear Safety Council (CSN).*
- ▶ *Continue to develop high-level radioactive waste management solutions and take all the necessary steps to facilitate the decision-making by 2010 as planned.*

Energy Technology and R&D

- ▶ *Continue and further strengthen a sustained support to energy RD&D*
- ▶ *Ensure close co-ordination between the Ministry of Education and Science and the Ministry of Industry, Tourism and Trade in the implementation of the national energy RD&D programme.*
- ▶ *Further enhance public-private co-operation.*
- ▶ *Continue and deepen the evaluation of the performance of the energy R&D programme.*