

EXECUTIVE SUMMARY AND KEY RECOMMENDATIONS

EXECUTIVE SUMMARY

Since the last IEA in-depth review in 2004, the French government has enacted several laws and introduced a plethora of policies and measures aimed at reducing energy consumption, enhancing energy security and combating climate change. The four key principles of France's energy policy have not changed since the last review; they are: *i)* security of energy supply, *ii)* competitive energy supply, *iii)* sustainable energy development and *iv)* equal level of energy service to all territories and all citizens. Energy policy in France is increasingly adapting to global energy and climate challenges, the EU-driven introduction of competition in the electricity and natural gas sectors, and the growing regionalisation of the energy sector in Europe. Energy security remains a key priority, and France continues to fulfil its IEA emergency stockholding obligations.

In 2008, nuclear power accounted for nearly 80% of France's electricity generation and over 40% of total primary energy supply (TPES). France imports nearly all of its oil, gas and coal requirements, but its fossil fuel imports are well diversified. Recent developments have enhanced awareness in EU27 countries that security of supply is increasingly becoming a regional issue, and France's geographical location enables it to support and benefit from the growing interconnections between markets.

The French government faces several challenges in fulfilling its energy policy objectives. Its goals and targets aimed at combating climate change are very ambitious: a 75% reduction in CO₂ emissions by 2050 and a reduction in GHG emissions in the transport sector to 1990 levels by 2020. The government needs to address the coexistence of regulated tariffs and market prices in the electricity sector which may impede investment in new capacity and prove to be an obstacle to market liberalisation. Interregional connection points are currently saturated and the domestic electricity transmission system has recently shown its fragility, potentially hampering the development of an integrated European market and increased competition.

STRONG COMMITMENT TO COMBATING CLIMATE CHANGE

France is one of the least CO₂-intensive industrialised economies, thanks to the substantial role of nuclear. Greenhouse gas emissions have been declining since 2005 from an already relatively low base. By 2007, France had reduced its total

GHG emissions below the level of its Kyoto target. Energy-related CO₂ emissions started declining in 2006 after several years of slow but stable growth.

The Energy Law of July 2005 set a target to cut France's CO₂ emissions by 75% between 1990 and 2050, at the same time setting specific targets for energy efficiency and renewable energy sources. In addition, the French government has developed an environmental programme, *Grenelle de l'Environnement*, which puts forward a framework of policies and measures, setting ambitious targets for specific sectors and energy sources, and guidelines for strengthening R&D on clean energy technologies. Priority areas outlined in the Grenelle laws include reducing emissions in the buildings and transport sectors, and reducing the CO₂ footprint of energy production and consumption. For example, GHG emissions in the transport sector must be reduced to 1990 levels in 2020. Grenelle also introduces measures to support renewable energy sources and, encouragingly, it puts emphasis on supporting renewables-based heating.

The French government should be commended for prioritising the transport and buildings sectors in its energy and environment strategy. In particular, the transport sector emits the highest share of CO₂ emissions in France, more than one-third of all emissions in 2008. Reducing energy intensity and energy-related emissions in this sector is very challenging for all IEA countries. Thanks to its low-cost and low-carbon electricity supply, France has the opportunity to reduce transport sector emissions by focusing on electricity-based technologies, such as high-speed rail and electric vehicles.

In 2007, the French government created the Ministry of Ecology, Energy, Sustainable Development and the Sea (*Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer*, MEEDDM) to address energy, environment, land-use and transport issues. The new institution represents an opportunity to develop and implement policies in an integrated and coherent manner. Given the complex structure of the new ministry, however, it is very important to ensure close co-operation between its different directorates, specifically for analysis, including data collection.

The French government should implement its planned policies and measures in a timely and comprehensive manner. Specifically, it should carefully monitor the implementation of the measures outlined in the Grenelle laws. The low, regulated electricity prices in France carry the risk of insufficient incentives for energy savings. Thus, an evaluation of the cost-effectiveness of proposed measures is necessary given the ambitious targets in place in France.

THE ROLE OF NUCLEAR IN A LIBERALISED MARKET

France, like the whole of Europe, has experienced a period of high electricity wholesale market prices, partly due to the introduction of the European Union Emissions Trading Scheme (EU-ETS) for carbon emissions. This resulted in

substantial profits for electric utilities, in particular those based on nuclear and hydropower. The real or perceived difference between the full costs of the nuclear park and current market prices has fanned a debate about the correct distribution of the "nuclear rent" in the context of liberalised electricity markets. Current costs of nuclear power in France are significantly below European wholesale market prices and have the ability to generate substantial profits. So far, the French government managed the issue by requiring Electricité de France (EDF) to offer electricity to retail customers at a regulated tariff, covering full costs, which for most of the past years was substantially below prices in neighbouring countries.

The transition to a more competitive market in France has been challenging because of the regulated tariffs and the dominant role of the incumbent utility. While the generation and retail sectors are fully open to competition, in line with EU directives, competition is rather limited. The situation on the French electricity market is further complicated by the existence of the so-called transitional regulated market adjustment tariff (TaRTAM) for industrial customers, which is set below the wholesale market price.

It is questionable whether the current tariff structure is sustainable. It may pose a threat to organising the substantial medium-term investments needed for maintenance and life extensions of the nuclear park, and the substantial long-term investments needed for the renewal and expansion of France's reactor fleet.

In September 2009, the government announced proposed legislation to essentially implement the main recommendation of the Champsaur report¹: allowing all electricity suppliers in France to have access to EDF's "historic" nuclear power capacity at a regulated tariff. The report also recommended that the TaRTAM be phased out in 2010. The proposed reform constitutes a significant step for more competition in French electricity markets. The Champsaur Commission stresses that the volumes are for national use only. This is expected to enhance competition on the retail market, so the regulated tariffs can be eliminated for large consumers. It is not certain, however, that the proposals of the Champsaur Commission will enable the healthy development of both France's electricity sector and its nuclear industry.

Effective market reform requires that cost-reflective pricing is implemented so that markets can provide effective price signals regarding production and investment. France and its major industrial champions have committed themselves irreversibly to a market-oriented organisation of the power sector in a European context. Developing adequate nuclear capacity is therefore dependent on electricity prices reflecting the full costs of nuclear power production, including its development cost.

1. The French government asked the former president of the telecommunications regulatory office, Paul Champsaur, to resolve the issue of regulated tariffs. A commission was established in November 2008 which provided recommendations to the government.

The French government's decisions regarding future market reform in the electricity sector could provide a valuable lesson for other countries. Although nuclear development is not without challenges, there has been a renewed interest in nuclear among IEA member countries, and globally as well. Nuclear technology is currently, apart from hydropower, the only large-scale, baseload, electricity source with a low carbon footprint. France's massive production of nuclear baseload electricity and its historic overcapacity have made it a natural exporter of baseload energy to its European neighbours in the past. The French government, however, should clarify its position on the contribution of nuclear power exports to the emerging European electricity market. This would allow its neighbours to take investment decisions which optimise their future energy demand and supply balances. The French government should also continue to strengthen efforts in international co-operation, both at the European and at the global levels, with special attention to countries that are considering or reconsidering the nuclear option, to enable nuclear power to be part of a global diversification of energy sources and long-term actions to limit GHG emissions.

Nuclear power is expected to play a key role in efforts to reduce CO₂ emissions in many countries, and public concerns over waste management need to be taken seriously. France's vast experience and expertise with nuclear power provides an opportunity for the government to take the lead on setting sound and sustainable policies for radioactive waste management. In this regard, the issue of waste management was addressed by the French government in the 2006 Planning Act. The act defines a national policy for the management of waste and asserts that the responsibility for nuclear wastes rests upon waste producers, who are liable for financing the costs of disposal. This act should be strictly enforced and regularly updated. Public debate concerning the construction of a disposal facility for high-level radioactive waste in the north-east of France is expected to commence in 2012.

INTERCONNECTION AND INFRASTRUCTURE DEVELOPMENT NEEDS

For both electricity and gas, the growing interconnections between markets in Europe are contributing to regional security of supply. France's situation as a large country in the centre of Europe makes it well positioned to support and benefit from this trend. The Pentilateral Energy Forum between France, Germany and the Benelux countries provides political backing for regional integration of electricity markets towards complying with EC directives for a European energy market. Cross-border trade and further market integration through interconnections increase both efficiency and security of energy supply for all countries involved and as such should be encouraged and facilitated. However, several gas interconnection points are currently commercially saturated, hindering the development of an integrated European market and increased competition.

The French electricity system also faces issues related to meeting peak demand, which has increased faster than energy demand in recent years. The system has surplus baseload capacity that enables France to play a significant role in the European electricity export market. Electricity demand, however, is increasingly “peakier” because of growing heating loads. This structural imbalance between strong baseload generating capacity and peakier demand may be amplified by low availability factors of nuclear reactors, increasing risks of supply disruptions in some regions more than others.

In addressing these challenges, France’s involvement in several regional initiatives is to be lauded. In the framework of these initiatives, open seasons (or tenders) have been or are about to be launched in order to increase cross-border interconnection capacity. Notwithstanding the importance of domestic interconnections, continued participation in regional initiatives and co-ordinated regional transmission planning should be pursued by the French government. In addressing the structural imbalance between surplus baseload capacity and increasingly peakier demand, the French government should boost investments in peaking capacity and in demand-side measures, and enhance the flexibility of the power grids.

Investments in cross-border transmission systems increase the potential for reserve sharing, enhance grid flexibility to cope with wider fluctuations in supply and demand, and provide greater access to competitive generation sources. In France, the Energy Regulatory Commission (CRE), the transmission system operator (RTE), and government entities should closely monitor and facilitate the development of multijurisdictional transmission projects to ensure that they are implemented in a timely manner and are cost-effective. Significant progress has been achieved regarding the Spain-France interconnection.

From a broader policy perspective, transmission should be considered as a critical part of the mix of solutions to facilitate the transition to a more secure, competitive and sustainable power sector. Power systems are evolving and there are key emerging trends that will shape the power system of the future: increasing share of variable renewable electricity, distributed generation, demand participation, hybrid and electric vehicles, and smart grid technologies. In this context, there is a need to develop a vision of sustainable power systems and how the transmission system can be effectively developed to contribute to sustainability.

ENSURING GAS MARKET SECURITY AMID RISING DEMAND

France should be commended for having implemented various measures to secure gas supply since the last in-depth review. It has diversified sources and routes, including liquefied natural gas (LNG) terminals. Except for Norway, no country accounts for more than 20% of total supply. Gas security has been improved through long-term contracts with producing countries, infrastructure

development, last-resort supplier for specific customers and a comprehensive emergency plan for potential gas supply disruptions.

The share of gas in the energy mix in France is expected to increase, especially in the electricity generation sector. It is essential to increase interconnection capacity and create an attractive environment for the necessary related investments, given the usefulness of gas-fired plants in meeting peak demand and extreme peak loads.

The merger in January 2009 of three balancing zones in the north of France into the sole northern GRTgaz zone represents a key first step in reducing congestion in gas infrastructure. However, additional investments are needed to further reduce congestion and to allow gas to flow efficiently from Northern to Southern Europe and vice versa.

KEY RECOMMENDATIONS

The government of France should:

- ▶ *Strive for timely implementation of policies and measures established by the Grenelle de l'Environnement process; monitor their effectiveness; and ensure that the Ministry of Ecology, Energy, Sustainable Development and the Sea capitalises on the opportunity to implement coherent and integrated strategies for the transport and buildings sectors.*
- ▶ *Implement as quickly as possible measures to enhance competition in the electricity generation and retail sectors and promote investment; consider abolishing the regulated tariffs for non-residential customers as a first step and then work towards market pricing for all customers; and clarify its position on the contribution of nuclear power exports to the emerging European electricity market.*
- ▶ *Promote the development of transmission networks, both at cross-border interconnection points and within France, as soon as possible, in order to facilitate trade and improve reliability with neighbouring countries; enhance security of electricity and gas supply; and boost the flexibility of electricity networks and expand investment in order to achieve a structural balance between baseload generation and "peakier" demand.*
- ▶ *Develop a strategic vision for electricity network infrastructures taking into account key emerging trends such as demand-side management, electric vehicles and the increasing share of renewables-based and distributed generation, making full use of the potential of smart metering and smart grid capabilities.*