

EXECUTIVE SUMMARY AND KEY RECOMMENDATIONS

EXECUTIVE SUMMARY

Since the previous in-depth review in 2004, Sweden has continued to perform strongly in most areas of energy policy. It is in constant compliance with IEA oil security requirements; it is likely to meet its target under the Kyoto Protocol thanks to its ambitious climate policy; and it is intensifying efforts to improve energy efficiency and increase the use of renewable energy, both from an already high level. As part of the Nordic electricity system, it continues to be one of the forerunners in electricity market liberalisation, and has several plans to develop the market further. By international comparison, Sweden's energy policy is sound and sustainable. The IEA congratulates the Swedish government for the continued outstanding progress during the last four years.

Sweden is steadily moving towards a low-carbon economy. Today, it already has the lowest level of CO₂ emissions per GDP of all IEA member countries and the second-lowest per capita. This follows on from having the lowest share of fossil fuels in its primary energy supply, as the country is in reality very energy-intensive. Energy use is generally efficient, largely owing to the wide use of electricity and district heat. Electricity use per capita is one of the highest in the world, and although demand growth has slowed as a result of greater end-use efficiency, investment in new capacity will be needed to maintain security of supply and competitive prices for end-users. New investment, however, is challenged by the uncertainties over the future regulatory framework in the sector, most notably the future form of the European Union Emissions Trading Scheme (EU-ETS), which is an EU-wide issue, and even more so, the future of nuclear power, which is a national issue.

The outlook for nuclear energy remains a major energy policy question, almost three decades after the 1980 popular vote to phase it out. The government may decide on closing down a nuclear power plant (NPP) at a certain point in time, provided it compensates the owner for the losses incurred. Two reactors have been permanently shut down but the current government, in office since October 2006, has decided not to take any decisions to close more nuclear reactors, or to permit constructing new ones. Uprates, however, are possible. A phase-out would be challenging, as around 45% of electricity in Sweden is generated by nuclear power, and in the post-Kyoto period, targets for reducing greenhouse gas (GHG) emissions are likely to be stricter than at present. Against this background, it is hard to see how phasing out nuclear energy could serve Sweden's broader energy policy goals.

The issue is also important for Sweden's neighbours, as developments in Sweden's nuclear power capacity would affect security of electricity supply and electricity prices in the whole Nordic electricity market. Increasing the capacity and extending the operational life of the plants is a cost-effective way to continue using nuclear energy, but the decision on how to renew the fleet of ageing reactors, whether by new nuclear units or alternative forms of power supply, should not be postponed. A firm long-term political decision about the future of nuclear power in the country is needed. Therefore, the government should intensify its efforts to clarify the role of nuclear power in the Swedish energy mix, paying due consideration to electricity prices, climate change mitigation and security of electricity supply.

Sweden's climate policy continues to be ambitious, and is delivering results, largely thanks to long-term policies to switch away from fossil fuels and improve energy efficiency. Under the EU burden-sharing agreement related to the Kyoto Protocol, Sweden is allowed to increase its GHG emissions by 4% from 1990 to 2008-2012. It is likely to meet this target by a wide margin. After 2012, however, more reductions will be needed. Energy-intensive industries will face a binding target under the EU-ETS. In the other sectors of the economy, transport accounts for more than four-fifths of CO₂ emissions, and these are increasing. Though the role of sinks and international flexible mechanisms remains to be defined, transport is also the logical focus for efforts to reduce emissions of CO₂ after 2012.

In road transport, Sweden's policy is to promote biofuels and diesel to replace gasoline. Fiscal incentives have been introduced recently for both fuels and vehicles, and the results are promising, as shown by registrations of low-emission cars rising at an impressive rate. In addition, emissions in Stockholm are expected to be reduced by the city's congestion charge system, which was launched in 2007. Initial results are promising and could provide valuable lessons to other metropolitan areas in Sweden and abroad.

In a country where electricity is generated practically without CO₂ emissions, electric rail transport is an attractive option on both energy and climate policy grounds. More could be done to support both passenger and freight transport. The IEA urges the Swedish government to continue its efforts to reduce oil use in transport, especially by encouraging more efficient vehicles and by promoting alternatives to oil-based road transport, including transport of freight.

Sweden is one of the leading IEA countries using renewable energy, and is sufficiently well endowed to further increase domestic supply. To promote electricity generation from renewable sources, Sweden has set up a quota system with certificate trading. The system is market-based, encourages cost-effective investment, and because it is delivering as planned, can be recommended as a model for other countries.

Sweden derives most of its renewable energy as biomass from its extensive forests, in the form of wood residues from the country's large wood-processing industry. Additional targets for bioenergy should be based on a full assessment of the optimum use of this resource, because reaching specified bioenergy targets could result in resource competition, disrupt the wood supply for other products, and adversely affect GDP and employment.

Increasing the use of biomass to produce biofuels for transport is under evaluation as it may not always provide the same climate and efficiency benefits that Sweden is already gaining in the heat and power sectors. On the basis of today's processing methods, a relatively large quantity of energy is required for producing some biofuels, so that current first-generation processes are unlikely to become very energy-efficient in the near future and GHG reductions may be limited. Setting and meeting additional biofuels targets, either national or imposed by the EU, should therefore be based on a life-cycle analysis of both first- and second-generation biofuels, their costs and benefits, especially for climate change mitigation weighed against those of other forms of renewable energy use. Where fuel supplies can be reliably and sustainably produced from biomass, car users should be encouraged to switch to biofuel blends.

KEY RECOMMENDATIONS

The government of Sweden should:

- ▶ *Clarify the conditions for the use of existing and future nuclear power capacity, with due consideration to electricity prices, climate change mitigation and security of energy supply.*
- ▶ *Continue efforts to reduce oil use in the transport sector, especially by encouraging more efficient fuel use and by promoting alternatives to oil-based road transport, including transport of freight.*
- ▶ *Focus efforts to increase the supply of renewable energy on sources that are deemed the most sustainable, based on an evaluation of their economic, environmental and social benefits.*