

A small, somewhat isolated country, Finland takes a balanced view of its energy policy, taking advantage of its situation wherever possible. Where it can leverage its location and small size it does so. For example, it makes straightforward use of European Union directives and policies, without adding too many extra layers of regulations that could undermine the effectiveness of continent-wide policies. A small electricity market by itself, the country makes extensive use of gains from trade with its neighbours, not only as part of the well-functioning Nordic electricity market, but also with connections to Russia and the Baltics.

Its small size and isolation bring challenges as well, and the government works to address them in a balanced and cost-effective manner. The greatest of these challenges may be energy supply security – its very high import dependence in general and its strong reliance on one import source in particular. To balance the lack of import diversity, the country has high domestic diversity, drawing its supply from many different sources, including domestic sources – namely nuclear, biomass and hydro. Finland, like most IEA countries, also faces the challenge of rising greenhouse gas emissions, the level of which is much above its Kyoto Protocol target for the coming compliance period, and the country will struggle to meet its commitment. Here, again, the country has taken a pragmatic approach. It has taken as much advantage of domestic and international trading as possible, allowing it to lower its own cost of compliance, as well as driving international development of a market for carbon emissions. This helps lay the foundation for a global price for carbon and a cost-effective and comprehensive means for addressing climate change.

While Finland's energy policies are generally advanced, balanced and sound, scope exists for further improvement – as in all countries. Three areas can be given particular attention. The first is supply security. Continued government policies are needed to address this challenge, and we urge a somewhat more diverse and long-term approach. The remaining two key areas are energy efficiency and R&D, the two recurring themes of this report – arenas where longer-term policies can benefit the country's energy situation. Investments and policy enhancements in both of these areas help to improve energy security as well. While they are discussed in separate sections, these topics should all be viewed as intertwined and integrated parts of sound energy policy. Overall, the main theme of the recommendations of this report is that while the government generally has both a balanced perspective and balanced policies, a longer-term approach would be beneficial, bringing

sustainable gains in energy policy. While the report addresses energy policies comprehensively, the following sections highlight these three topics.

## **SECURITY OF SUPPLY**

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Finland's vulnerability due to its heavy reliance on imports from a narrow set of sources is well understood. The government is working on all fronts to reduce this vulnerability. With respect to natural gas, supply security is based on alternative fuels. Large natural gas users need to have ready access to an alternative energy source, usually fuel oil, and domestic customers without the ability to switch fuels have their supply secured by a propane-air production plant. This is a sound first-order security measure.

The market is currently considering alternative supply sources and routes, in particular a natural gas pipeline from the Baltics that, in addition to linking Finland to the pan-European gas network, would also give Finland access to storage. Furthermore, small-scale liquefied natural gas import options exist. We urge the government to continue to investigate these and other possibilities. The government should ensure that there are no undue domestic regulatory barriers to developing cost-effective gas import options.

Another means of reducing supply vulnerabilities is to enhance domestic sources of energy. The government is actively working to do this. Most notably, a new nuclear unit is under construction at Olkiluoto, scheduled to come on line in 2011 – the first new nuclear plant in a European IEA country in eight years and the first one to be built in a liberalised market. The plant is being built without distortionary Finnish government subsidies and will greatly enhance supply security. Its financing can also be a model for projects in other countries, especially countries with large energy-intensive industries. Further enhancing the framework for nuclear power in Finland is that the government has already made a decision on a high-level radioactive waste repository – a unique and very positive situation. The long-term planning and commitment to keeping to the government-approved plan is commendable, underpinning long-term support for nuclear power in the country. Finland was able to reach this conclusion through a transparent process that involved consulting with and involving the public and other stakeholders, and then took a clear decision and carried it through.

One cause for some concern with respect to the new nuclear plant is the stopgap peak power supply arrangement in place until 2011. While we understand the concern about delays at Olkiluoto negatively impacting electricity supply security – as well as the difficulty in developing a comprehensive market-based measure within Nord Pool – the measure in place may undermine long-term security as it could discourage stable investment by the private sector.

Finland's biomass resources contribute significantly to the country's supply security in a cost-effective manner, particularly as they are typically used in the context of very efficient combined heat and power. Enhanced demand for biomass raw material will place pressure on this industry; the government should continue to maintain a balanced and realistic vision for the country's biomass resources. Biomass has traditionally been the focus of Finland's renewable energy portfolio. New research suggests that greater scope exists for cost-effective deployment of other renewables such as wind power. We urge the country to develop cost-effective, market-based means to ensure that these technologies can make a sustainable contribution to Finland's energy supply mix and energy security.

Turning to another domestic resource, peat, the new premium tariff that is provided raises concerns. While peat does diversify the country's domestic energy supply, it works at cross-purposes with another of the country's goals, namely environmental sustainability. The premium tariff is designed to directly counter the effect of the European Union's emissions trading scheme (EU-ETS), a policy designed to create a price signal for carbon. The premium tariff removes the incentive to move away from carbon-intensive fuels. Given the negative consequences of the tariff, we are pleased to see that it is only a temporary measure and urge the government to ensure that it is not extended past its scheduled end date.

## **ENERGY EFFICIENCY**

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While supply-side measures are often the first-order response to supply vulnerabilities, energy efficiency provides more sustainable and less costly supply security by eliminating the demand itself. Furthermore, it has the added benefit of reducing greenhouse gas emissions, thereby enhancing environmental protection. Finland already has many positive attributes with respect to energy efficiency, and the government has put in place many sound policies. For example, in addition to making good use of combined heat and power (CHP) – a very efficient energy technology – voluntary agreements are in place to further improve the already good efficiency levels of Finland's industry, and other sectors of its economy. Nonetheless, there are measures Finland can take to improve its energy efficiency that will enhance its commitment to the "three Es" of good energy policy: energy security, environmental sustainability and economic efficiency.

One key area where gains in efficiency can be made is the building sector. Finland's building codes are already quite high compared to other IEA countries, but there is further room for improvement. Not only can the standards be raised, but the building code mechanism can also be enhanced, creating room for higher standards, but also greater flexibility for builders. While the country already has a building envelope standard in place, Finland

might look to Sweden, where component requirements are complemented by a comprehensive energy performance standard that exceeds the component standards. This performance standard sets an absolute maximum for a building's energy consumption, but leaves it up to the market to decide how to achieve the standard. In the longer term, efforts to move the market towards so-called passive houses should be considered as they have energy requirements 50% to 70% below those of traditional houses but still provide the same level of comfort.

The transport sector also gives an opportunity for sustainable reductions in energy demand and in this arena the government is taking strong action. While the European Union is currently developing a comprehensive approach to transport efficiency, Finland has recently acted to improve its domestic policies, particularly important as the average carbon dioxide emissions from Finland's transport fleet are higher than Europe's average. The new taxation regime will not only create greater incentives for customers to purchase more fuel-efficient vehicles, but will also stimulate faster turnover of the vehicle stock. This will help reduce emissions of regional air pollutants. This flexible, market-based policy, to begin implementation in early 2008, is a model for other countries. To complement it, the government should continue to pursue other policies that encourage mode shifting, more efficient driving behaviour and more fuel-efficient vehicles.

While it takes longer to see the benefits of policies in the transport and building sectors than other actions to reduce CO<sub>2</sub> emissions and improve efficiency – not to mention that the results are more complex to achieve and harder to monitor because of the diverse set of factors and actors involved in the process – the significant and sustainable benefits they provide are worth the long-term commitment.

## **ENERGY R&D**

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Though a small country, Finland is a leader in energy R&D, leveraging its small size as it does in other energy arenas. The country has stable funding for R&D, strong national and regional funding organisations – particularly Tekes, the Technical Research Centre of Finland (VTT) and the Academy of Finland – and strong collaboration with industry. Perhaps most critical is its high level of funding on a per-GDP basis. When nuclear R&D is excluded, Finland's government R&D spending is higher than that of Japan and the United States on a per-GDP basis. Because of its small funding portfolio, the country rarely invests in research without matching funds from the private sector. It also places greater attention on late-stage development in order to avoid the "valley of death" that makes it difficult to bring technologies the last step – to market. Finally, the government makes ample use of international

collaboration, one of the best means of increasing the value of smaller levels of research funding.

Opportunity exists for marginal improvements in Finland's R&D, the most important of which is to provide clearer guidance to the R&D community about its priorities. The government gives the R&D community great scope to determine the energy R&D agenda. While this is a good approach in practice and over the short term, there is room for a greater government role. Without sacrificing research independence and flexibility, the government might provide clearer top-down guidance for long-term research priorities that are explicitly linked to overall energy priorities. This would be a good complement to the research priorities of the private sector, which are those technologies that are likely to develop more quickly and be competitive in the market.

We also urge continued action to maintain expertise in the nuclear industry. As nuclear power has stalled recently in some neighbouring countries, expertise has diminished. Finland should draw on its new construction of Olkiluoto, collaborating with universities and academia, to maintain and possibly strengthen comprehensive education and training in the field. Finland is already a leader in biomass research; the government should keep focus on maintaining this expertise, particularly for Finland-specific research areas, in light of the growing international focus.

## KEY RECOMMENDATIONS

*The government of Finland should:*

- ▶ *Continue to address energy security concerns in a comprehensive and sustainable manner, placing focus not only on import security, but also on domestic supply diversity, new renewables and energy efficiency.*
- ▶ *Continue building on efforts to enhance longer-term policies that encourage energy efficiency.*
- ▶ *Give more top-down, strategic guidance to the energy R&D community on long-term energy policy priorities.*