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More Than Security of Supply: Finland's Energy Policy and Lessons for Poland

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For Finland—a country with a scarcity of oil, gas and coal—the reliability of the import of supplies is essential to its energy security. The state is also developing domestic production of nuclear energy and biomass from wood and peat. It also aims to reduce energy consumption through the deployment of energy efficiency technologies. The liberalization and integration of the electricity and gas markets are seen as solutions to its single-supplier dependence. These models of better deployment of indigenous resources and the development and export of new technologies can be applied in Poland.

Energy Mix and Government Policy. The primary energy sources in Finland are oil (25%), nuclear (17%), coal (13%), gas (10%) and renewable energy sources (RES) in the form of wood (21%), peat (6%) and hydro (3%). Energy consumption per capita is twice as high as in the EU, due to the structure of the country's industry (the wood and paper sector accounts for a quarter of the energy used) and its cool climate. According to the government, without state intervention, domestic consumption in 2020 may increase by 17% compared to 2005.

All fossil fuels are imported with a minuscule degree of diversification among suppliers. All gas and a majority of crude oil and coal are imported from Russia (10% of coal is imported from Poland). Electricity imports from Scandinavia, Estonia and Russia range from 5% to 20%. Its consumption is growing by 1.5%–2% annually. The aging nuclear power plants (NPP) that currently cover 25% of the country's electricity demand, will need to be substituted in approx. 20 years.

The government seeks to decrease its energy dependence on foreign sources. The Long-term Climate and Energy Strategy from 2008 sets out priorities for development of the sector by 2020. It assumes further development of NPPs and an increase in the share of RES in energy mix by 10% while also decreasing total energy consumption. In practice, this would mean a vast increase in energy efficiency and a reduction in oil and coal imports. The policy has not been adversely affected by the entrance of the Greens into the government this year since the party suspended its pre-election call for a phase-out of nuclear sources.

Biomass and Atom Power. High energy consumption and the need to purchase CO₂ allowances are the drivers of investments towards "zero-carbon" technologies. The potential for hydroelectric power has been almost entirely used up. Due to geological conditions, carbon capture and storage technology (CCS) is considered to be economically nonviable since large scale deployment would require CO₂ exports.

In line with the EU 20/20/20 strategy, the state goal is to increase the RES share to 38% of total final energy consumption in 2020. According to government forecasts, market mechanisms will help achieve only 31%, therefore state subsidies are necessary. However, they need to be approved by the European Commission to be in compliance with EU competition law. The EC is examining whether they could indirectly support the domestic industry for wood and paper (by 2020, almost all of the RES is planned to come from sector by-products, e.g., bark, peat, wood chips or black liquor).

The development of NPPs also would help decrease energy dependence. The four existing reactors have a total capacity of 2,700 MW, and a fifth reactor capable of producing 1,600 MW is due to start production by the end of 2013. Increased project costs and a dispute between Finnish TVO and French Areva have delayed the project by four years. Areva's weak financial performance may result in further delays. In May 2010, the parliament of Finland gave its decision in principle for the construction of two new NPPs, each with a capacity of 1,000 MW–1,800 MW.

Fortum and TVO are the operators of the existing NPPs. A new consortium, Fennovoima Oy, is planning to operate the sixth reactor. The construction of the NPPs is covered by shareholders who are entitled to receive electricity at the cost of production. The state has a 50.7% share in Fortum and the rest is divided among more than 100,000 shareholders. Several Finnish industrial and energy companies (including Fortum) own TVO. Fennovoima Oy belongs to Finnish industries, local governments and German company E.ON (34%).

The state role in the NPPs' operations is limited. The distribution and sale of electricity is the exclusive right of the operators. Still, the parliament approves each project on the basis of the "overall interests of the society", and local authorities have a veto right. State authorities carry out inspections and the national Nuclear Waste Management Fund collects charges from the utility companies for future decommissioning and waste management.

Despite the accident in Japan's Fukushima Daiichi NPP, both government and public support in Finland for nuclear energy has remained high. The Office for Radiation and Nuclear Safety published a report on Finland's NPP preparedness for floods and earthquakes, EC stress tests have been conducted and the operators were asked to develop measures to increase safety standards.

Additionally, the development of mining and the training of national staff have increased energy security. A revision of the Mining Act, in force from July 2011, has simplified the licensing and concession procedure for exploration of uranium. Nuclear-related research programs are funded by the state budget (€13.8 million) as well as from private and EU funds (an additional €60 million in 2011).

Technology Development and Market Integration. In Finland, support for a "cleantech" sector (primarily, energy efficiency and RES) ranges from R&D to export and marketing through a network of public-private institutions. It takes the form of direct funding for R&D projects (Tekes) or the providing of information about funds available and opportunities for networking with private investors (Cleantech Cluster Finland). Companies may work in science and technology parks in Oulu, Lahti, Kuopio and Uusima. Finnpro and Cleantech Finland support the promotion of exports, primarily to emerging markets. China is the main non-European partner in the development of energy projects. Tekes' offices are located in Shanghai, Beijing, Tokyo, Silicon Valley, Washington and Brussels.

State support delivers tangible results. Exports of energy technology doubled between 2003–2008 to €5 billion (mainly in the field of transmission, distributed co-generation and electrical machines). In 2010, the trade in the cleantech sector increased by 10%, with €12 billion in export volume, whereas Tekes financing of energy and environmental projects amounted to €245 million. Public funding helps to reduce the investment risks, thus increasing innovation investments, especially by small and medium enterprises. As a result, the Finnish economy is the third most-innovative in Europe and the fourth most-competitive in the world.

In both the EU and Nordic-Baltic forums, Finland supports the integration and liberalisation of the electricity and gas markets, also through the construction of interconnectors to the Baltic states. The national electricity market has been deregulated since 1997, and electricity is purchased on stock exchanges—national EL-EX and Nordic Nord Pool, which is linked with Russia and Estonia. In this system, as the importance of the origin of the supplier decreases, energy security increases.

Conclusions and Recommendations. Poland and Finland face similar challenges to energy security, such as an increase in consumption and a strong dependence on imported Russian oil and gas. Both countries wish to develop domestic exploration and production. Unlike Germany, Switzerland, and Belgium, they both plan to develop nuclear energy.

Energy cooperation can be used as a platform to strengthen the underdeveloped bilateral cooperation. Consultations between the ministers of economies and experts should address issues of security, investments and training of personnel in the nuclear energy sector. Furthermore, they could cover the possibility of using biomass for energy production and offer joint support for EU funding for projects that link the Baltic states with Western European gas and electricity networks. Polish universities should make efforts to carry out joint research projects with Finnish counterparts in technologies of energy efficiency and in seeking alternatives to CCS. Poland could also develop cleantech R&D and exports alongside the Finnish model.