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Israel's Experience in Sustainable Energy

The foremost challenge facing Israel's decision makers is to ensure the availability, quantity and quality of energy supply, in the short and long ranges, at minimal economic, social and environmental cost. According to national forecasts, Israel will need to double its generating capacity from some 10,000 MW to 20,000 MW over the next decade in order to supply the expected requirements of a growing population with a rising GNP per capita.

The energy economy has been based almost entirely on imported fossil fuels, mainly coal and crude oil; however, the mix of energy sources is currently undergoing major changes. New trends will significantly reduce both the costs and the environmental damage of electricity generation, while enhancing reliability and supply.

The recent structural change using natural gas is possible following an agreement signed last year between Israel and Egypt that will enable Israel to purchase natural gas from Egypt, to be used by the Israel Electric Corporation (IEC) for a period of 15 years. In addition, natural gas reserves have been discovered off the coast of Israel.

Potential consumers of natural gas include existing and future power plants, industrial users, petrochemical industries, and the transportation sector. It is expected that the installed generating capacity based on natural gas will reach 50% within a decade. The National Master Plan for the distribution and transmission of natural gas includes an offshore and onshore route to maximize the possibility of supplying natural gas to major power plants and to industrial areas. The network has been designed taking optimal safety measures into consideration and with environmentally friendly technologies for protecting ecosystems.

Plans are in progress to increase the energy efficiency of power stations. Natural gas plants that use the combined combustion technology with the "joint heat and power" method (cogeneration), reaching 75%-80% energy efficiency, are to replace some of the old plants, which operate at 40% energy efficiency and the combined combustion-steam and turbine plants which operate at about 55% energy efficiency. It is anticipated that of the 50% generating capacity to be reached within a decade, 20% will be from cogeneration and 30% from combined cycle technology. To date, 100% of the produced coal ash (around 1.3 million tons a year) is utilized, mainly for production of cement and for road construction.

Three landfills have installed and operate facilities for landfill gas extraction and energy recovery, producing a total of 3 MW. In addition, there is an anaerobic digestion plant operating near a large transfer station that produces 0.75 MW and provides the electricity consumption for the entire transfer station. Plans have been finalized for an advanced bio-treatment method at the former Hiriya Landfill in the center of the country, which transforms the organic fraction of municipal waste into biogas. The gas is supplied to a nearby textile company for the production of steam and electricity, equivalent to 10 MW.

The lack of local energy resources led Israel to devote efforts to energy research and development especially in the area of solar energy. Developments in the field of alternative energy include flat solar collectors for domestic use, solar ponds and a parabolic trough technology. Regulations require that all new buildings be equipped with solar collectors for water heating. Household solar collectors save some 3 percent of overall energy consumption and, Israel, as a country, boasts one of the highest rates of domestic solar heating worldwide, used in about 75% of households.

Israeli companies have pioneered solar technologies that are used worldwide; one was the first to develop and install a large-scale solar-powered electricity generating plant in South California's Mojave Desert. Plans are now going forth in Israel to establish a 100 MW solar power plant in the northern part of the Negev desert. The technology is available but the cost is still too high to compete with alternatives, particularly when considering the low cost of natural gas.

In recent years, Israel has taken substantial steps towards advancing the use of alternative energy use. A 2002 Government Decision called for the introduction of renewable energy into the electricity sector so that by 2007 at least 2% of electricity consumption would be produced by renewable energy (beyond that of domestic solar heaters) and by 2016 at least 5% should be produced by renewable energy.

In addition, the Public Utility Authority (PUA) – Electricity, has issued guidelines and regulations providing premium payments to private electricity producers (non residential at this time), using renewable technologies. Payment of the premiums is based on external costs of the displaced air pollutants by type and quantity, which is the first step in the process of administering an environmental quality tariff. To date, ten private producers of electricity receive the premium for using renewable energy resources.

Increasing attention is being paid to energy conservation. Preparation of a long-term action plan for energy conservation, with special emphasis on increased energy efficiency and on demand management in the industrial, public and domestic sectors, is well underway.

Recent regulations will raise energy efficiency, including a new standard for fuel fed water-heating boilers that specifies the maximum combustion energy input that may be used in a defined water-heating boiler; and requirements for energy efficiency in air conditioners. Mandatory labeling for refrigerators, freezers, heaters and air-conditioning appliances (imported and locally manufactured) enables the public to consider energy efficiency in choosing between appliances.

Voluntary standards on energy efficiency in buildings and on “green buildings” include directives on building materials, building design, internal structure, and the technology used.

The changing energy pattern in Israel is moving toward sustainable energy. Long range plans for the energy sector call for increasing production capacity without increasing pollution levels, promoting natural gas as a clean source of energy supply, improving the efficiency of energy systems and reaching savings of 20-30% of the energy used in different sectors of the economy and giving higher priority to renewable energy sources.