

## Israel

### NATIONAL REPORT FOR CSD-14/15 THEMATIC AREAS

Government focal point:

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Responding Ministries/offices:

Ministry of the Environment; Ministry of Foreign Affairs;  
Ministry of National Infrastructure; Ministry of Industry  
Trade and Labor; The Israel Export and International  
Cooperation Institute.

## **B. ENERGY**

Israel is in the process of undergoing a market shift in its energy sector by partially replacing oil and coal with natural gas. Discovery of natural gas offshore and new agreements with Egypt concerning the purchase of natural gas by the Israel Electric Corporation, have changed the local energy market to a degree that in 2004 the natural gas use increased to 10% from 0.1% the year before (in total inputs to electricity generation). This is expected in the coming years to rise to 50% of total electricity generation. In addition, the electricity production market is being opened

up to competition, alongside a growing effort to build renewable energy power plants. Nonetheless, the total energy consumption in Israel is rapidly growing and additional steps must be taken to improve energy conservation.

**Decision-making: Strategies, policies, programmes and plans, legislation, policy instruments and the regulatory framework; involvement of Major Groups**

- **Efficient use of energy in the household and commercial sectors through, e.g., introduction of improved cook stoves or liquefied petroleum gas (LPG) for cooking, minimum energy performance standards for appliances and lighting, energy efficient building codes, and metering.**

**Commercial sector**

**Policies:**

- **Energy performance contracting.** Energy performance contracting (EPC) is a way to finance and implement capital energy improvements and services offered by a qualified energy service company (ESCO). The cost of energy saved by the project needs to be sufficient to cover all project costs (including financing and ongoing maintenance and monitoring services) over the contract term. The minimum contract term is 10 years or longer. Performance contracting is a simple procedure. The ESCO conducts an energy audit of selected facilities to determine the potential energy saving through high-efficiency equipment replacement or upgrades. Based on the results, the ESCO makes recommendations that, when implemented, will generate enough energy cutback to pay for the entire cost of the project over the term of the

contract.<sup>1</sup> The Israeli Ministry of National Infrastructures promotes programs of EPC. The first and important component in executing the EPC is assembling a list of ESCOs. During 2005, the Ministry of National Infrastructures composed a list of 14 ESCO's with a proven ability to provide energy improvements. The ESCOs offer energy improvements in the fields of air conditioning, cooling systems, boilers and water heating systems, indoor and outdoor lighting, electrical systems, building infrastructure, and general energy management.

- **Two-way metering.** Electricity production and consumption in Israel had changed its metering system to enable a two-way system. The energy benefit of a two-way metering system enhances the market flexibility in buying and selling electricity. For example, it may enable an industry with the ability to independently produce energy to alternate according to need from buying to selling its electrical production.

Regulation and standards:

- **Energy saving regulations.** In recent years the Ministry of National Infrastructure has established several regulations to encourage the efficient use of energy: A. energy standard for fuel fed water-heating boilers. This regulation specifies the maximum combustion energy input used in a defined water-heating boiler; in other words, boilers are required to heat better with less fuel. B. Electrical generator standard set the energy efficiency level of generator engines. C. An energy

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<sup>1</sup> Extracted from ULR:  
[http://www.energyusernews.com/CDA/Article\\_Information/Fundamentals\\_Item/0.2637.8260.00.html](http://www.energyusernews.com/CDA/Article_Information/Fundamentals_Item/0.2637.8260.00.html)

efficiency standard for pumping facilities has been established.

- **Standards and labeling.** The Ministry of Industry Trade and Labor coordinates the formation of voluntary and mandatory energy standards and labeling. Voluntary standards: in 2005 a new green building standard was introduced. The building standard includes a directive of building materials, building design, internal infrastructure, technology used, etc. that will encourage constructing more energy efficient buildings. Additionally, a new voluntary energy efficiency standard for buildings was issued by the standards institute (<http://www.sii.org.il>). Mandatory labeling: refrigerators, freezers, heaters and air-conditioning appliances (imported and locally manufactured) must be labeled and classified for their energy performance. The energy label enables the public to choose wisely between appliances and therefore influences the market trend.

- **Improved efficiency in energy supply (e.g. energy generation, transmission and distribution).**

In the past decade the discovery of natural gas off the Israeli shore induced a market shift in Israel's energy generation. Old oil-based power plants are being converted into gas-fueled energy efficient plants. Conventional power plants achieve 40% energy efficiency. Gas-fired combined-cycle power plants, which combine gas- and steam-turbine, reach about 55% energy efficiency. Newer cogeneration plants<sup>2</sup> are expected to achieve 75% to 80% total energy efficiency.

- **Policies to facilitate the transfer of modern energy technologies, such as export promotion policies or establishment of an enabling environment for investments, including their objectives, the types**

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<sup>2</sup> Cogeneration is a method where part of the waste heat remaining from the electrical production is captured and utilized for additional uses.

**of financing available and other incentives provided to facilitate technology transfer.**

Israel has a well-established scientific community, which is predominantly concentrated in the private sector's high-tech industry and in the various research institutes. The Israeli government facilitates transferring innovative ideas and technologies in several ways:

- **Export promotion of energy technologies - the Israel Export and International Cooperation Institute.** The Israel Export and International Cooperation Institute facilitates trade opportunities, joint ventures, and strategic alliances between international businesses and Israeli companies. The Institute introduces Israeli companies operating in energy conservation and renewable energy to international investors, institutions and countries. For example: an Israeli solar energy company erected the world's largest solar collector site at a hotel (near Heraklion city, Crete). The hotel was supplied with 900 collectors covering a surface area of 2.4 km<sup>2</sup>. The system efficiently provides the hotel with its hot water needs. The total investment amounted to 2,000,000 Euro.

For more information see: <http://www.export.gov.il/Eng/>

- **Joint research projects.** The Ministry of Science and Technology together with the Federal German Ministry of Environment facilitate joint research projects that focus on finding new ways of energy conservation, energy efficiency and new renewable energy resources. In recent years, much work has been done in regards to energy and housing. The yearly funding is about 0.5 million USD annually. For more information see:

<http://www.most.gov.il/index.php/en>

- **Energy seminars for developing countries.** The Ministry of Foreign Affairs and the Ministry of National

Infrastructures conduct energy-management and energy-saving seminars for highly qualified governmental officials. The seminars aim at enhancing the abilities of the developing world to deal with energy issues. The course tutors come from local universities, industry and government. The seminars include learning about: renewable energy, economy and energy, energy policies, energy resource management, project management and social relations. Since 1995 over 200 professionals from 40 different countries attended these programs.

- **Reform or restructuring of the energy sector within the last ten years to improve the functioning of energy markets.**

In 1999 the government decided to open the electricity market to competition. An inter-ministerial committee was established and in 2003 the inter-ministerial committee presented a comprehensive policy report with the following recommendations:

- The production of electricity will be decentralized' from one central producer to several smaller companies, while opening electricity production to free competition.
- The transmission of electricity will continue to be a monopoly under governmental supervision.
- A mechanism for free and competitive trade will be established, operating in full transparency.
- The distribution will be divided into several local companies under governmental supervision.
- The distribution (mainly infrastructure related) and generation (mainly service related) of electricity will be separated. Generation will be tradable and open for free competition.

Most electric energy production today comes from the Israel Electric Corporation with only a fraction being produced from alternative sources.

- **Legal and regulatory frameworks related to overall energy policies that have been adopted.**

No overall regulatory framework directing the national energy policy exists.

- **Regulations facilitating electricity market reform.**  
The Ministry of National Infrastructures and the Ministry of Finance published regulations specifying the conditions and the terms under which additional private electricity plants can be established.
- **The Public Utility Authority - Electricity provides price incentives** for two way metering and the use of renewable energy.
- **Regulations for greater energy efficiency.** The Ministry of National Infrastructures published in 2004 and 2005 a set of regulations that organize and formalize the erection of cogeneration power plants.
- **Natural Gas Distribution Law.** This law regulates the terms and conditions for distributing of natural gas while enabling market competition. Furthermore, the Natural Gas Law specifies the quality, reliability and availability of service.
- **The national planning and Building Board (NPBB) and the Committee for Planning and Building of National Infrastructure (PBNI).** The Board and the Committee head the Israeli planning hierarchy under the Ministry Interior. The planning of new power-stations and natural gas infrastructure has to be approved by one of them.

- **The National Master Plan for Power Stations** (NOP 10) deals with the location and operation of power stations for electricity production and supply throughout the country (e.g., coal, fuel oil and natural gas-powered stations, gas turbines and combined - cycle turbines, transmission network and small power plants). Environmental considerations are incorporated into the plan's regulations on location, construction and operation. Power plants that produce more than 50 MW of electricity require approval by the National Board or Committee. Additionally, NOP 10 specified a plan for small electrical generating units in industrial zones. The small units (up to 50MW) reduce the need of long distance infrastructure by decentralizing production. Additionally, all new plants are required to undergo Environmental Impact Assessment (EIA).

- **The use of economic instruments, including pricing and tariff reform.**

Despite recent reforms in the Israeli fuel and energy sector, the Israeli energy market remains highly centralized. Therefore, the majority of instruments in use are pricing mechanisms and not market mechanisms (such as quota trading). A widely used pricing mechanism is setting the maximum price of electricity, gas and oil distributed to the general public. The relevant governmental Ministry regularly monitors the prices and the quality of services given. The second widely used pricing mechanism is fines. Fines are imposed on power plants and energy facilities that pollute or dispose of waste in contradiction to set laws and regulations. The rationale is that the “polluter pays” for causing environmental damage done.



- **Participation of private companies in the electricity sector, their impact on electricity services and their involvement (e.g. generation, transmission, distribution).**

In Israel, more than 95 percent of the electricity sector is dominated by one company, the Israeli Electric Corporation. Its capacity is about 10,000 MW, and it is responsible for all stages of production, transmission and distribution. In recent years, a few small-scale private renewable power plants were built. For example, there are about 11 landfills where biogas is being collected and used to produce electricity. The overall capacity of these plants is about 4 MW. Additionally, in Israel's north there is a small windfarm having a capacity of 6 MW.

- **Major Groups participation in energy decision-making, whether at the national or community level.**

At the national level, Non Governmental Organizations (NGO) are represented on the National Planning and Building Committee and on the National Infrastructure Committee. These two committees approve plans for energy plants and facilities.

- **Women's participation in needs assessments or planning and policy formulation related to energy at the local and/or national levels; other means.**

In addition to female representatives as members in all planning committees, a designated female representative is required by law in the National Planning and Building Committee.

- **Programmes designed to increase the share of renewable energy in the national energy supply mix, including information on their goals and targets.**

It is expected that by 2025 the electricity demand in Israel will double. In a 2002 governmental decision it was set that by 2007 at least 2% of the energy production of Israel will be from renewable energy and 5% by 2016. Today renewable energy is produced in:

- **Windfarms.** The use of wind energy Israel is limited. However one windfarm operating in the north of Israel generates 6 MW. Two larger windfarms are under consideration by the Israel Electric Corporation..
- **Hydroelectric power.** Hydroelectric potential in Israel is limited. A few small hydroelectric plants in the Galilee generate less than 10 MW.
- **Plans for solar energy.** Plans for a solar energy power plant in the Negev (southern Israel) have been approved to generate 100 MW with the possibility of increasing its generation capacity to 500 MW.
- **Residential solar boilers.** The wide spread use of solar boilers for residential water heating is estimated to save some 3% of the national electricity demand.

- **Measures and programmes adopted to improve fuel efficiency for transport vehicles. Such as vehicle fuel efficiency standards; vehicle inspection and maintenance programmes; introduction of cleaner fuels; any other.**

See previous chapter on Air Pollution, 5<sup>th</sup> and 7<sup>th</sup> paragraph.

- **Existence of nuclear energy programme and information on nuclear materials transported within or across national boundaries; national programmes that ensure nuclear safety; arrangements in place for public review and hearings.**

No nuclear power plant is presently under consideration.

### **Capacity-Building, Information and Research & Technologies**

- **Efforts to establish new, or strengthen or reform existing national and local institutions responsible for national programmes on energy for sustainable development.**

On May 14, 2003, a Government decision on sustainable development decided that Israel's policy would be based on the principles of sustainable development. The Government decision stated that:

1. Each government ministry would draft a strategic plan for sustainable development covering to the period until 2020 and constantly update this plan.
2. The Director General of the Ministry of Environment will form a task force that includes the Directors General of all Ministries (or appointed senior officers); representatives of the business community; environmental and social non-governmental organizations; local government; and academia. The function of the task force shall among other things, oversee the drafting of Strategic Plans and to propose principles and ways of consolidating a joint strategy regarding issues relevant to more than one ministry or sector
3. The Strategic Plan for Sustainable Development shall relate to the following tasks, which ministers will be responsible for carrying out, as well as to the budgets at the disposal of each Ministry, with respect to an economic evaluation of the benefit of the plan to the national economy:<sup>3</sup>

The Minister of National Infrastructure - Energy production and consumption:

- Taking measures to improve efficiency and exploitation of various energy sources to reduce energy demand and to promote energy conservation in both the public and private sectors

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<sup>3</sup> A copy of the full government decision is available in English on the website of the Ministry of Environment: <http://www.environment.gov.il/english> in the Sustainable Development e-bulletin from October 2004

- Beginning in 2007, producing at least 2% of electricity production from renewable energy sources. As stated in Government decision no. 44, the Ministry shall take steps toward the integration of solar energy in new construction and as far as possible, conversion to solar energy in existing construction / activity
- Regulating entry of electricity from renewable sources into the national transmission grid according to conditions that encourage decentralization of electricity production and reduce transmission distances
- Encouraging research and development on the subject of renewable energy in order to achieve the goals set by the Government
- Taking into account external environmental, and social costs when evaluating infrastructure projects

The Ministry of National Infrastructure with conjunction with other Ministries, prepared an overall strategy for the energy marked in Israel, which recommended:

- Decreasing dependency on imported energy.
- Improving energy efficiency.
- Increasing energy security (economic and strategic).
- Encouraging the adoption of new technologies and energy methodologies.
- Reducing environmental impact.

The strategy estimated that energy conservation potential could achieve 30% annual savings (up to 500 million USD a year) without impairing supply. An interministerial team established by the Sustainable Development Committee is now promoting programs for energy conservation, First steps will concentrate on:

- The household sector: measures to encourage the replacement of electronic appliances.
- Encourage the public to buy energy saving light bulbs.

- The Ministry of Housing is checking the option of requiring developers and housing agencies to label the energy requirements of new residential buildings.
- The public sector: review of improving energy efficiency in street lighting.
- **Launching of public information campaigns and educational programmes to raise awareness of energy efficiency and environmentally sound energy systems.**

So far, energy issues have not enjoyed a high priority. Few energy conservation campaigns have taken place in Israel. The Israel Electric Corporation distributes information to customers on energy conservation with its bimonthly bills. In contrast, the Israeli public is highly aware of water conservation issues; water saving devices are regularly installed in public and private places and numerous policies have been set to enable water conservation.

- **Networking between centers of excellence on energy for sustainable development that has enhanced information sharing, capacity-building and technology transfer.**

Israel is a member of the following agreements of the International Energy Agency (IEA) that promote information sharing and technology transfer.

- Solar Power and Chemical Energy Systems (SolarPACES) – seeking advanced ways to utilize solar thermal energy. (<http://www.solarpaces.org/>)
- Photovoltaic Power Systems (PVPS). Israel is one of the 20 members in this program. The PVPS seeks to promote the research and use of photovoltaic power systems. (<http://www.iea-pvps.org/>)
- High Temperature Superconductors (HTS) - seeking ways to utilize this new technology to increase the efficiency of the electricity sector.

- **Internet websites related specifically to the issues contained in these Energy Guidelines. Provide homepage addresses (URL) where available referred to in the text above.**
- **Efforts to promote increased research and development of various energy technologies: renewable energy; energy efficiency; advanced energy technologies, including cleaner fossil fuel technologies; any other.**

Energy related research and development is promoted by governmental offices, the Ministry of Industry Trade and Labor, the Ministry of National Infrastructures, the Ministry of Environment, the Ministry of Science and Technology, the Israeli Export and International Cooperation Institute and more. The government ministries promote development of energy technologies by offering research grants, funding new policy research, and providing expertise advice.

**Examples of solar energy research:**

- The Weizmann Institute of Science (WIS) carries out a number of research projects in concentrated solar energy. A major feature at WIS is a Solar Tower containing a field of 64 large, multi-faceted mirrors (heliostats), each measuring 7 X 8 meters. Each heliostat tracks the movement of the sun independently and reflects its light onto a selected target on a 54-meter-high tower containing five separate experimental stations, each of which can conduct several experiments. Light can be reflected toward any or all of these stations, allowing a number of experiments to be carried out simultaneously. This is the only Solar Tower facility in the world located on a campus of a research or academic institute that is solely dedicated to scientific work.

<http://www.weizmann.ac.il/ESER/People/Karni/research.html>

- Through partnership between the private sector and research institutions, science and technology have been translated into commercial activities. A number of current projects concern the promoting of solar thermal collectors for large-scale industrial, commercial and residential buildings. This research includes: Solar thermal power generation; Solar powered process heating and air-conditioning systems; Residential hot water systems; and more. (for more info see following URL link)

<http://www.solel.com>

- Energy Towers. The Israel Institute of Technology, has developed a novel technology which produces renewable electric power from hot and dry desert air. Atomized water is sprayed at the top of a hollow tower and, as it cools, the air drops quickly to the base of the tower, rushes turbines surrounding its base which drive electric generators. The "Energy Towers" technology could provide a source of renewable clean electricity at low. In association with the "Energy Towers", a technology for sea water desalination was developed requiring less than half the investment associated with the best alternative method and about 2/3 of the energy outlay.

<http://www.ecn.nl/docs/library/report/2002/c02062.pdf> (page 26)

- An Israeli company, as part of a Consortium Agreement by the Commission for the European Community, developed an innovative solar water

distillation system. This system can distill up to 10,000 liter per day of any waste/sea water using solar energy. The company has completed the first solar powered water distillation system in Greece. The system is almost 70 sq. meters in size including the solar collectors and distillation device. This plant distills olive oil mill wastewater.

<http://www.export.gov.il/Eng/Articles/Article.asp?ArticleID=894&CategoryID=354>

**Alternative energy resources:**

- Alternative Fuel – an Israeli startup company has succeeded in producing a continuous flow of hydrogen and steam under full pressure, temperature and power control using a light metal wire (such as Aluminium or Magnesium), water and a special conversion unit. The spent product from the process is a light metal oxide that is eventually separated and sent back to the factory for electrochemical recycling.

<http://www.export.gov.il/Eng/Articles/Article.asp?ArticleID=535&CategoryID=354>

- **Biomass Fueled Power Unit.** The Biomass Fueled Power Unit is a new line of products designed to supply power to off-grid rural areas. The Biomass Fueled Power Unit can use various agricultural residue types, such as: coffee husks and pulp, rice husks, maize cobs, cacao husks, sugarcane tops, wood (trimmings and chips), and others for its main source of energy. The Biomass Fueled unit can generate electricity in two capacities: 4 and 6 kW and is meant to fulfill the large demand for small scale, distributed power units in those rural areas where fuel costs are high and logistics of fuel availability are difficult.



Applications include: remote community mini-grids, health clinics and schools, irrigation/water pumping, micro and small scale enterprises, telecommunications, etc.

<http://www.export.gov.il/Eng/Articles/Article.asp?ArticleID=2001&CategoryID=35>

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### **Financing**

- **Specific measures taken to establish an appropriate enabling environment conducive to attracting investments in the energy sector: pricing/subsidy reform; fiscal and financial incentives; power purchase agreements; other arrangements.**

**Renewable energy:** The Public Utility Authority (PUA) – Electricity, has issued guidelines and regulations providing premium payments to private electricity producers (non residential at present), using renewable technologies. Payment of the premiums will be based on calculations of the displaced pollution by type and quantity as identified by the PUA, 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.

**Clean Development Mechanism (CDM):** The rate of growth of electricity consumption in Israel is among the highest in the world, reaching some 6% per annum in the last decade. Based on a “business as usual” scenario, the Israel Electric Corporation anticipates the production of 74 million kWh in 2020, emitting nearly 60 million tons of CO<sub>2</sub> per year. Under the CDM of the Kyoto Protocol, Israel has the possibility to trade with green house gas emission reductions. This trade potential may attract large-scale investments (that otherwise would not be available) directed at moving toward a cleaner energy production.

Currently, eleven CDM projects are been formulated in Israel with the totaling of 1,857,051 ton per year of CO<sub>2</sub> emission. Most of the projects are related to the reduction of electrical production emissions. However, over 150,000 tons per year of Green House Gas (GHG) emissions are reduced by capture of CH<sub>4</sub> (Methane) emitted from landfills.

### **Cooperation**

- **Cooperation with neighboring countries in energy trade and/or interconnection of electricity or gas networks, including through transnational pipelines; nature of such cooperation.**

First steps of regional cooperation took place with Egypt during 2005. Israel Electric Company and Egypt Eastern Mediterranean Gas (EMG) that is a partnership with the Egyptian state oil company Egyptian General Petroleum Corporation (EGPC) signed an agreement in the Israel Electric can purchase 1.7- million cubic meters over period of 15 years.