

2015

The Electricity Sector in Israel



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Commercial Wing

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Overview

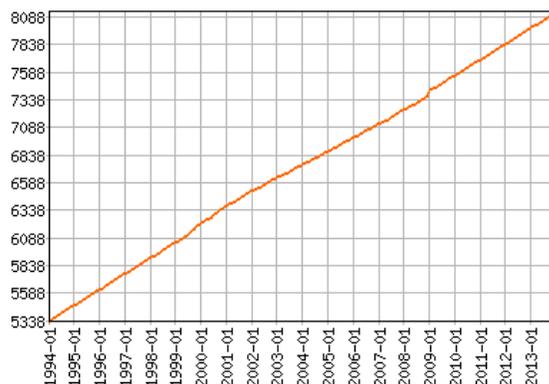
The national electricity sector is a bedrock for economic growth and commercial activity that influences every sector in the State of Israel. Over the years, relevant Israeli Ministries strove to strengthen/develop this sector and simultaneously to minimize adverse environmental side-effects. Government agencies have tried to increase the efficiency of the sector's undertakings, promote competition, break Israel Electric Corporation's (IEC) monopoly and prepare for the additional increase of expected demands. Government efforts, combined with technological advances are expected to reduce economies of scale in electricity generation segment and make competition economically viable from a national perspective.

Factors Contributing to the Increase in Demand for Electricity in Israel

According to the electricity demand forecast, rising demand in electricity is expected to continue, and consumption will double in the next 20 years, as a result of three key factors:

- **Population Growth:** Annual population growth in Israel surpasses other Western countries, due to relatively high birth rates and waves of immigration at various points in Israel's history. According to Israel's annual census, in 2015 total population exceeded eight million people.

Total Population in Israel (Thousands)





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Source: Israel Central Bureau of Statistics.

- **Rising Standard of Living:** As of 2012, Israel ranks 16th among 187 world nations on the UN's Human Development Index, which places it in the category of "Very Highly Developed". The rising standard of living in Israel manifests in the purchase of additional electrical appliances and increased electricity consumption.
- **Climatic Changes:** Israel has very hot and humid summers which last about five months, and winters that can be very cold. Peak consumption for electricity often occurs on the hottest/coldest days of the year. Since electricity is not an easily storable product, maintenance of excess power generation capacity is required to prevent the collapse of the electricity grid during peak demand.

The National Electricity Sector in Israel – Main Actors

1. The Electricity Administration

The Electricity Administration is in charge of planning Israel's electricity sector and regulating all relevant activities; to ensure a reliable, readily available and secure supply of electricity for the Israeli economy, while creating a competitive market, minimizing costs and environmental protection. The Electricity Administration's mandate is legislation, Government policy and directives issued by the Minister of Energy and Water Resources. The *Electricity Sector Law* is the main piece of legislation guiding the activity of the Electricity Administration.

The Electricity Administration is examining and promoting new technologies that might be integrated into electricity generation and transmission systems, such as conventional and supercritical steam power stations, use of natural gas, biomass, coal, IGSS clean coal technologies, combined cycle gas turbines, cutting-edge cooling methods, pumped storage, compressed air, wind turbines, solar and other renewable energy sources.

The Electricity Administration coordinates the handling of all electricity issues in Judea & Samaria (beyond the 1967 boundaries, with Palestine) through the Electricity Staff Officer who operates within the Civil Administration of Judea & Samaria, including approval of electricity plans; regulation of electricity infrastructure with the Israeli Defense Forces (IDF), local Israeli & Palestinian authorities; approval of electricity tariffs; processing public complaints; assistance to Palestinian municipalities in connecting to the electricity grid and updating of electric power line maps.

The Electricity Administration's proclaimed main objectives are:

- Securing a reliable electricity supply for the Israeli economy.



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- Shaping policy for the development of the sector, including renewable energy technologies.
- Reviewing and approving development plans for power generation and transmission systems.
- Removing obstacles hampering integration of independent power producers (e.g, monopolies or oligopolies).
- Seeking new sites for electricity generation.
- Establishing a system to control and supervise the implementation of IEC's development plan and enforcing the implementation of the regulations set in the Electricity Law.

Contact Info. The Electricity Administration

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2. Israel Electric Corporation (IEC)

The Israel Electric Corporation (IEC) is the sole integrated electric utility in the State of Israel and generates, transmits and distributes substantially all electricity used in the State. The State of Israel owns approximately 99.85% of IEC. The Company was incorporated in mandatory Palestine on March 29th, 1923, with its main object to produce, supply, distribute and sell electricity to the consumers. IEC was first registered under the name "The Palestine Electricity, Corporation Limited", which was changed in the year 1961 to its present name "The Israel Electric Corporation Limited". IEC is one of the largest industrial companies in Israel. For the year ended December 31, 2011, the Company had total revenues of U.S \$6.4 billion, net income (Loss) of U.S. \$205 million and total assets of U.S. \$21.6 billion.

As of December 31, 2011, the Company maintains and operates 17 power stations sites (including 5 sites for steam driven power stations) with an aggregate installed generating capacity of 13,133 MW. In 2011, the Company sold 53,062 GWh, of electricity. In the ten years from 2000 to 2011, the aggregate demand for electricity in the State of Israel grew at an average annual rate of 3.1%, while the average annual rate of growth of the



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State of Israel’s GDP rate during the same period was 3.2%. To meet increased electricity demands, IEC has made substantial expenditures for construction of new generation facilities and expansion of and improvements to its transmission and distribution system. To meet projected future electricity demand, IEC’s capital investment program provides for the addition of 1 new combined cycle unit with total capacity of 377 MW by the end of 2012 (Tsafit site). The Electricity Law encourages competition in the electricity sector, and Government decisions have set a target of increasing the generation of electricity by independent power producers to 20% of the country’s installed generating capacity.

Contact Info. Israel Electric Corporation (IEC)

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Position	Attorney
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3. Ministry of National Infrastructure, Energy & Water Resources

Overall responsibility for electricity, gas and oil-based fuel sectors, as well as water resources. All supervision of the gas sector operates from within the Ministry. For the electricity sector, the Ministry covers all dimensions not covered by the PUA (see below), notably the approval of investment programmes for generation, transmission and distribution. The various state-owned companies (notably the Israel Electric Corporation) also fall under the Ministry’s responsibility.

Contact Info. Ministry of National Infrastructure, Energy & Water Resources

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4. Public Utilities Authority-Electricity (PUA)

Established by the 1996 Israeli Electricity Market Law, independent by law and separate from the Ministry of National Infrastructures in terms of budget and staff. Responsible for setting electricity tariffs and standards for the quality of service; and, as of 2005, for the issuing licences to electricity-market participants (notably the independent power producers or IPPs). PUA also advises the Ministry of National Infrastructures on investment projects.

Contact Info. Public Utilities Authority - Electricity (PUA)

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IEC Consolidated Statement of Profit, 2013 (Million NIS)

IEC reported an annual revenue stream of 21.2 billion NIS (6.11 billion USD) in 2013. Fuel expenditures dropped by 45.92% from 16.3 billion NIS (4.72 billion USD) in 2012 to 8.85 billion NIS (2.55 billion US) in 2013.



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Note	For the Nine Months ended September 30		For the Three Months ended September 30		For the Year ended Dec 31	
	2013	2012*	2013	2012*	2012*	
Consolidated Statements of Profit (Loss):						
Revenues.....	9	21,209	21,669	8,495	8,538	28,320
Cost of operating the electricity system:						
Wages.....		1,415	1,915	458	456	2,366
Fuel.....		8,852	16,371	2,646	6,477	19,910
Transfer of regulatory asset to fuel (transfer of fuel to regulatory assets).....		2,777	(4,569)	1,534	(1,961)	(5,269)
Purchases of electricity		741	676	288	275	879
Transfer of regulatory asset to purchases of electricity (transfer purchases of electricity to regulatory asset)		311	(57)	174	27	-
Operation of the generation system		603	561	260	177	841
Operation of the transmission and distribution system		223	231	70	75	307
Depreciation and amortization		3,203	3,330	1,062	1,046	4,414
Provision (release) with respect to non-recognition of fixed asset construction costs.....		5	1	(1)	(7)	(6)
		18,130	18,459	6,491	6,565	23,442
Profit from operating the electricity system		3,079	3,210	2,004	1,973	4,878
Sales and marketing expenses		668	828	221	227	1,067
Administrative and general expenses		600	677	200	192	871
Expenses (income) for liabilities to pensioners, net		16	1,541	7	(2)	1,547
		1,284	3,046	428	417	3,485

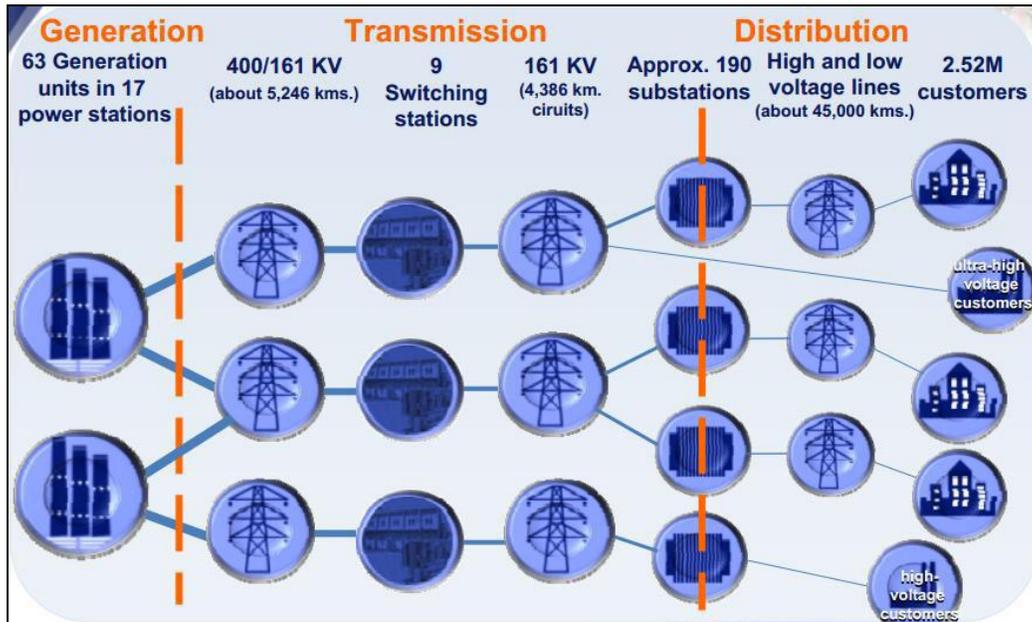
Source: Israel Electric Corporation Annual Report, 2013.

The Electricity Network in Israel

The IEC electricity network is based on three phases: (1) Generation. (2) Transmission. (3) Distribution. During the generation phase, 63 production units in 17 different powers stations produce the vast majority of power for the State of Israel. During transmission, the power is transmitted by an integrated system of high voltage power lines (5,246 km) to 9 switching stations and then through another system of 4386 km. During distribution, the power reaches 190-200 sub-stations and is distributed to consumers through an integrated system of high and low voltage lines (approx. 45,000 km.).



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Source: Israel Electric Corporation Strategic Aspects Overview, November 2012.

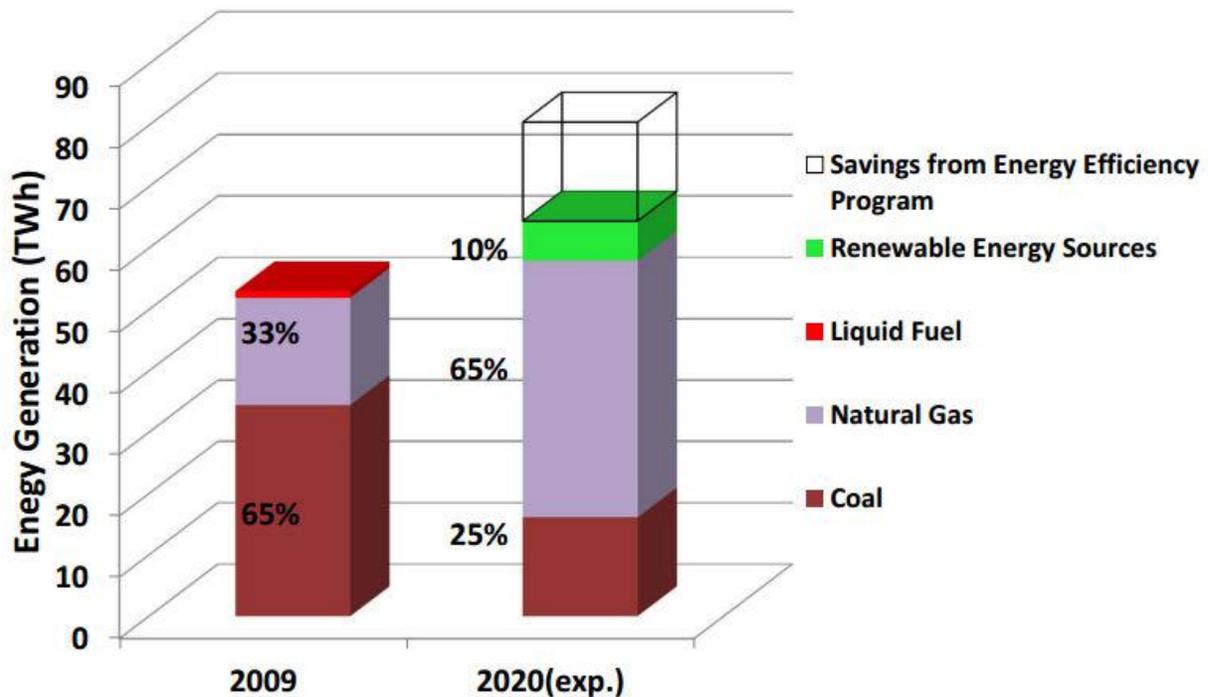
Prospects for Energy Generation in 2020

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 IEC have changed the local energy market entirely and have prompted new Government and commercial planning.

According to the Ministry of Energy & Water Sources, the electricity sector in Israel is expected to undergo a transformation in terms of energy generation. In 2009, the sector was almost solely dependent on coal (65%) and natural gas (33%). Due to a shift in policy by the Israeli Government, by 2020 the main sources for energy generation will fundamentally change: coal energy will be reduced to 25%; natural gas will become the primary source and generate 65% of Israel's energy. This is a direct result of the discovery of vast natural gas reserves in Israel's Exclusive Economic Zone (EEZ) and particularly in the *Dalit & Tamar* offshore drilling sites; renewable energy technologies such as solar, wind and pumped storage are expected to grow to 10% of overall energy generation.



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Source: Report on Israel's Electricity Sector & Renewable Energy, MoWE

Summary of Natural Gas Resources and Supplies (as of Nov. 2011)

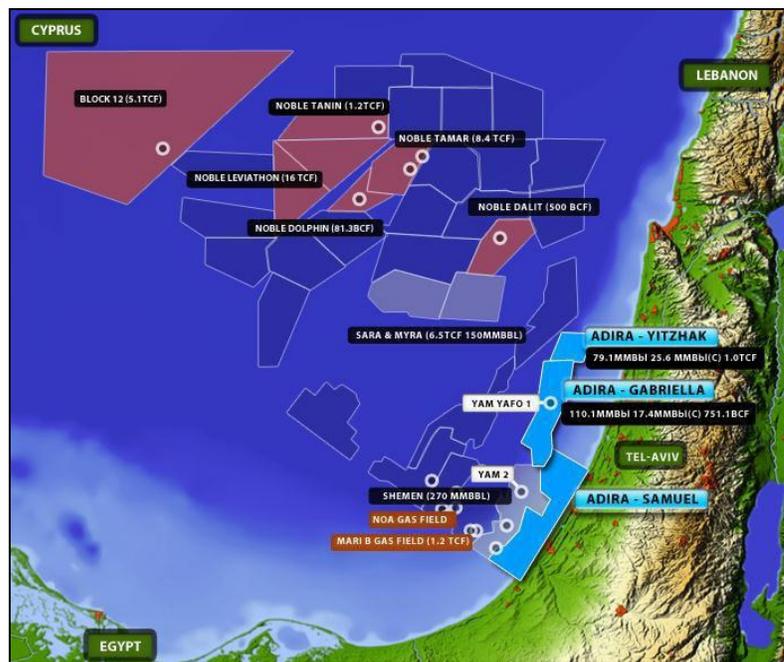
Offshore Fields

- 1. Yam Tethys:** Most production has been from the “Mari-B” deposit which has been supplying gas to the Israel Electricity Corporation (IEC) since 2004. As of 2010, approximately 17 bcm had been extracted and 10-15 bcm remained. The deposit is projected to be fully exhausted within the next few years.
- 2. Tamar:** Test drilling in 2008 confirmed reserves of around 250 bcm (184 bcm are classified as “proven” and the remainder as “proven and probable”). Production commenced in 2013.
- 3. Leviathan:** Exploratory drilling at the end of 2010 indicated approximately 450 bcm of producible gas, although this has yet to be confirmed as a “proven” reserve. According to media reports, production could commence as early as 2016.
- 4. Myra & Sarah:** A geological survey in June 2011 indicated a best estimate of reserves of 180 bcm, but there is a wide range between lower and upper estimates.



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5. **Other Possible Gas Reserves:** An analysis by the US Geological Survey estimated total recoverable resources in the Levant Basin of the eastern Mediterranean of approximately 3400 bcm of which approximately two-thirds lies within Israeli waters. Taking into account current reserves, this implies perhaps an additional 1500 bcm or more in total recoverable resources.



Source: Offshore Energy Today.

Other Sources

1. **Egyptian Pipeline:** Operational since February 2008, with supply under contracts with East Mediterranean Gas (EMG). During events related to the *Arab Spring*, the pipeline was attacked more than a dozen times. Prior to these recent disruptions the pipeline provided 2.1 bcm per year to the IEC and approximately 2 bcm to private-sector electricity generators and industry (the maximum operational capacity of the pipeline is 7 bcm per year).
2. **Hadera Deep Water LNG Terminal:** The Hadera deep water LNG terminal project was launched in January 2013. The terminal has an annual capacity of 1bcm. The terminal was built by Israel Natural Gas Lines (INGL), in order to find a way to bridge a temporary undersupply of natural gas created by the gap between the depletion of existing reservoirs, together with damage to the supply of gas from Egypt, and arrival of gas from “Tamar” reservoir.



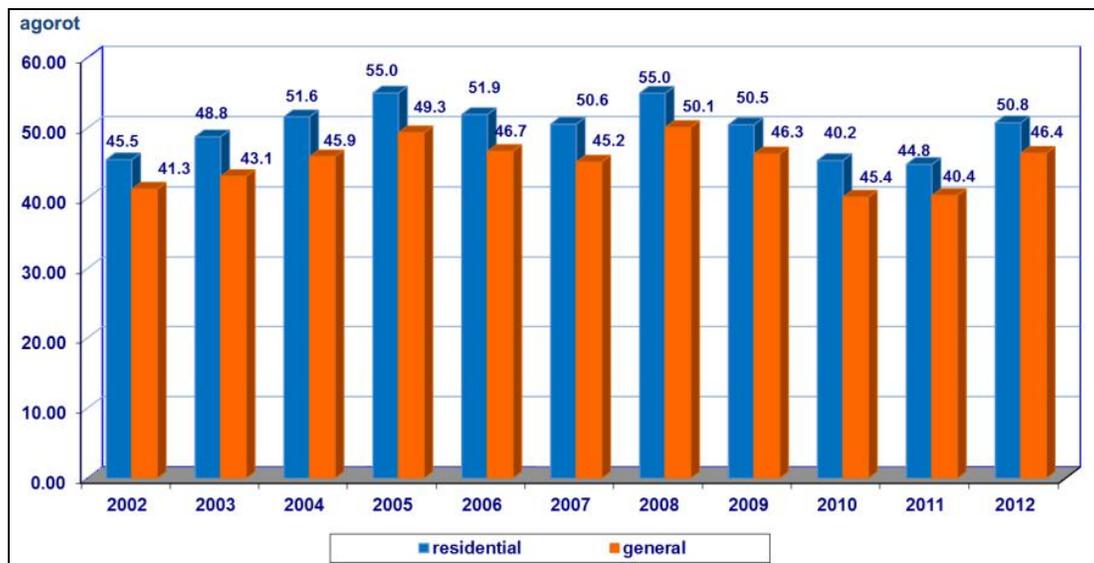
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Electricity Prices in Israel

Electricity Prices, 2002-2012 (in Agorot per unit, without VAT)

The price of 1 kilowatt/hour (hereinafter “unit”) has gradually gone up in the last decade for residential consumers in Israel.

- From 0.455 NIS per unit in 2002.
- Price went up to 0.55 NIS in 2005 and 2008.
- 0.508 NIS in 2012.
- That marks an 11.64% increase and in absolute terms, 0.053 NIS. The general price of electricity has also gone up in the last decade. From 0.413 NIS per unit in 2002.
- 0.501 NIS in 2008.
- 0.464 NIS in 2012.
- That marks a 12.34% increase and in absolute terms, 0.053 NIS. These prices do not include VAT, which stands at 18%.

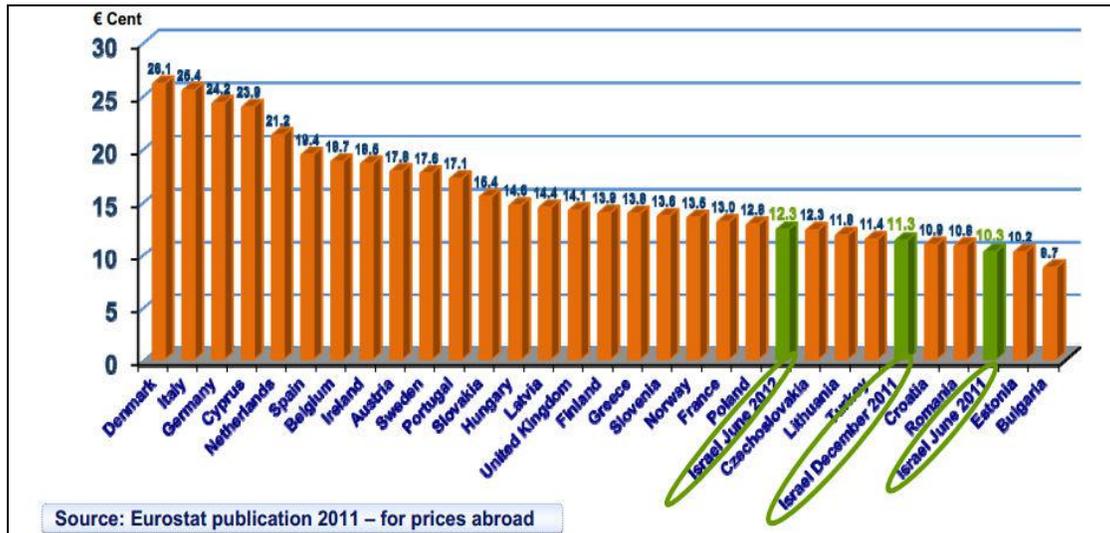


Source: Israel Electric Corporation Strategic Aspects Overview, November 2012.

Comparative Analysis: Average Price per KWh, per Residential Consumer Consuming between 5000-15000 KWh per Year (including VAT & Taxes)



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Source: Israel Electric Corporation Strategic Aspects Overview, November 2012.

Questions & Answers

1. Have the following companies been awarded contracts by the Israeli government (Dorad, OPC Rotem, Dalia)?

All three companies have been awarded contracts by the Israeli Government in the last 3-4 years. The investment-Megawatt (MW) ratio is approximately a million USD per MW:

- a. **Dorad:** Dorad Energy Ltd. was incorporated in 2002 with the intention of dealing with the production of electricity, and the construction of the infrastructure required for this activity. The company is building a combined cycle power station based on natural gas, with a production capacity of approximately 850 MW, on the premises of the Eilat-Ashkelon Pipeline Company (EAPC) located south of Ashkelon. The electricity produced will be sold to end-users throughout Israel at competitive tariffs, and to the National Electrical Grid. The transmission of electricity to the end-users shall be done via the existing transmission and distribution lines, in accordance with the provisions of the Electricity Sector Law and its Regulations, the Standards and the tariffs determined by the Public Utility Authority - Electricity. Dorad achieved Financial closure and signed a Facility Agreement together with several related documents on November 29, 2010 (the Financial Close Date), with Bank Hapoalim Ltd. as the Debt Arranger and with Clal Finance (from Clal Insurance Company Ltd.) as the coordinator for the consortium of financial institutions, for furnishing of debt



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financing in the amount of 80% of the capital investment for the project by a consortium of banks and financial institutions.

- **Investment:** Approximately 850 million USD.
- **Production Capacity:** 850 MW.
- **Website:** http://dorad.co.il/news_e16.htm

b. OPC Rotem: OPC commenced construction of the power plant at Mishor Rotem (Negev Desert) after winning a tender issued by the State of Israel for the supply of electricity to the Israel Electric Corporation (IEC) and other end users. OPC retained Daewoo International, a subsidiary of Posco of Korea, as EPC contractor to build the plant, and Mitsubishi Heavy Industries to provide the major equipment and long term maintenance services. Fueled by natural gas, the plant will be one of Israel's most efficient and cleanest power generation facilities. In the emerging private power market in Israel, OPC has a strong competitive position based on its international experience in power generation.

- **Investment:** Approximately 500 million USD (with other expenditures).
- **Production Capacity:** 440 MW.
- **Website:** <http://www.opcrotem.com/>

c. Dalia Power Energies: The project for setting up of the Dalia Power Energies power station at Tzafit was defined by the government of Israel as a National Infrastructure Project, by virtue of which definition it was submitted for statutory planning approval by the National Infrastructures Committee. The station is slated to supply 870 MW per hour (approximately 6% of the total national electrical production) in a combined cycle of two units. Dalia Power Energies offers business customers electricity at reduced rates relative to those of the Israel Electric Corporation's Ta'oz (Load and Time) program.

- **Investment:** Approximately 870 Million USD.
- **Production Capacity:** 870 MW.
- **Website:** <http://www.daliapower.darolite.com/>

2. What are the various components of the tariff? Are the transmission charges included in the tariff?

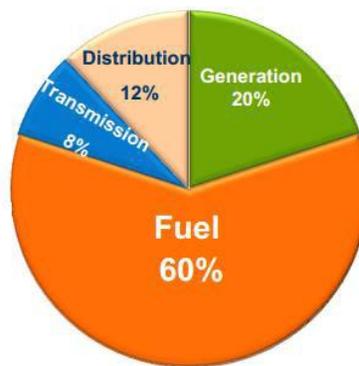
In accordance with the Electricity Sector Law, electricity tariffs are set by the Public Utilities Authority – Electricity (the Electricity Authority), in cooperation with Government agencies and by holding a dialogue with the public. The tariff policy maintains a balance between financial strength of IEC and the right of consumers to a decrease in tariffs as a result of reduction in the cost of fuel and the transition to natural gas. There are licensing fees that are paid to the state



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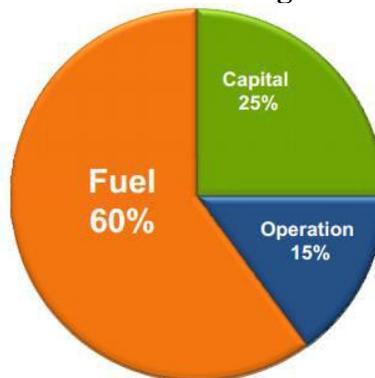
regulator – Public Utility Authority (Electricity). However, since the electricity sector in Israel is monopolized by the Israeli Electric Corporation, they are entitled to charge transmission fees as well. The Tariff is comprised of the following components (according to IEC): (1) Generation. (2) Transmission. (3) Distribution. (4) Fuel.

Distribution According to Sector



Source: Israel Electric Corporation Strategic Aspects Overview, November 2012.

Distribution According to Costs



Source: Israel Electric Corporation Strategic Aspects Overview, November 2012.

3. What is the gasoline price in the country? Is it expected to increase or decrease in the future?

Pump price for gasoline (US dollar per liter) in Israel was last measured at 1.85\$ in 2010, according to the World Bank. Fuel prices refer to the pump prices of the most widely sold grade of gasoline. Prices have been converted from the local currency to U.S. dollars.



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Pump Price for Gasoline (USD per Liter) in Israel



Source: Trading Economics Website.

The Israeli government monitors gas prices by a joint committee comprised of representatives from Ministry of Finance, Ministry of Energy, Ministry of Transportation, Ministry of Environmental Protection & Ministry of Interior. Gas prices in Israel are set by the committee and adjusted according to global commodity prices and a wide array of internal economic and social determinants. It is extremely difficult to forecast price changes due to the abundance of factors and the inherent uncertainty of the market.

4. Can an independent power plant sell power directly to consumers?

In theory, once a private plant receives a Power Production Certificate from the State (and authorized by the Minister of Energy), they can engage in direct deals with clients (private companies). However, they are required to pay transmission fees to the IEC. Furthermore, IEC monopolizes private consumption, thus a private plant would have to sell power to them.

5. Is the Government planning (in the next 2-3 years) to setup new gas-based power plants in the country? Is the Government looking for private investors' participation in creating this future capacity?



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The entire electricity market in Israel produces approximately 15,000MW, as 13,300MW out of the total is produced by IEC. The Israeli Government is planning to enlarge the market to approximately 22,000MW by 2020. Most of the expansion (5000MW) will come from private companies and the remainder from IEC (2000MW). This is a governmental effort to break IEC's monopoly. Consequently, the government is searching for new private investors.

The Ministry of Energy and Water Resources encourages independent entrepreneurs to become involved in electricity generation by constructing power generation facilities of various technologies in order to increase the generation capacity and strengthen competition. The construction of new stations will contribute to the stability of the national electricity sector, reduce electricity rates for business and private consumers, and assist in the development of the economy. The Government policy target is to achieve approximately 20% of electricity generation in Israel by independent entities.

- **Highlights of the Independent Electricity Generation Policy:** Increasing the electricity generation capacity and creating a suitable reserve in the national electricity sector. Creation of mechanisms that will encourage the construction of electricity generation installations by independent entities. Creation of conditions for fair competition while encouraging different producers to sell electricity to end consumers. Encouragement of electricity generation using efficient technologies or technologies of environmental value.
- **Licensing:** The Electricity Administration assists the Minister in the review and approval process of licenses granted by the Public Utility Authority – Electricity, to independent electricity producers using conventional installation technologies, cogeneration, pumped storage and renewable energy sources, subject to compliance with the conditions required under the relevant regulations and the criteria of the Public Utility Authority – Electricity. The submission of a license application is subject to the National Electricity Sector Regulations (Conditions and Procedures for Licensing and Obligations of Licensee) 1997. Regulations for transactions between an independent electricity producer and an essential service provider are stipulated in the National Electricity Sector Regulations (Transactions with an Essential Service Provider) 2000. Details about power generation licenses and conditions for selling of electricity by independent producers can be found in the National Electricity Sector Regulations (conventional independent electricity producer) 2005. Details on how to submit applications for licenses in the national electricity sector and a list of provisional and permanent licenses can be found on the website of the Public Utility Authority – Electricity.



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6. How can an international company go about setting up a gas power plant in the country? Does it require a partnership with a local firm or can we partner with an international company?

Ostensibly, it would be very difficult for a foreign company to enter the electricity market in Israel without a local partner or at least a high profile local consultant. The bureaucratic process is extremely complex, intricate and requires a lot of resources. Moreover, many Ministry officials assess that market entry may take 2-3 years.

7. Which Ministry comes out with tenders (energy regulator, Ministry of Energy, or distribution company)?

Government bids are usually issued by the Ministry of Energy or the Public Utility Authority (Electricity). However, suppliers/potential producers may submit applications for Power Production Certificates directly to PUA or the Electricity Administration. The licensing process is subject to government policy at a given time. After an application is processed and approved (guarantees, due diligence, financial robustness checks, technical survey, etc). A Temporary License is provided for the preliminary phase. Once the power plant is connected to the national grid, and meets State criteria, they will receive a Permanent License.

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Phone Interviews:

Senior Official – Ministry of Infrastructure, Energy & Water Resources.

Senior Official – Ministry of Finance.

Senior Official – Israel Electric Corporation.

Senior Official – Public Utilities Authority – Electricity.

Senior Official – The Electricity Administration.