Israel Natural Gas Demand Forecast 2017-2040

July 2nd, 2017

BDO Consulting Group

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Prepared by Chen Herzog, Norden Shalabna and Guy Maor

Preface

The State of Israel is marking the 13th year since the beginning of domestic natural gas production. In the ensuing years, Israel's energy sector has taken merely the first steps in the adaptation to the new era of energy self-sufficiency. Israel's oil based power units were converted from oil to gas, and 30 of the largest industrial plants were connected to the gas pipeline. In addition, first steps have been taken in reducing coal use. However, during this entire period Israel has faced supply-side constraints that prevented broader gas utilization.

According to our analysis, there remains a significant potential for continued transformation of the energy sector. Israel is currently ranked fourth in the OECD in terms of gas and oil reserves per capita. This creates a comparative advantage for the development of advanced, capital and energy intensive, as well as environmentally friendly industries. In addition, compared to other OECD countries Israel should benefit from an economic advantage for increased use of electric vehicles, gas based transportation and other energy intensive applications.

Our assessment shows that the demand for natural gas and electricity in Israel is still far from the saturation point. The climatic conditions in Israel, which is the warmest of all OECD countries, along with the gaps in per capita GDP combined with the low capital intensity level of the industrial and service sectors in Israel compared to other developed countries, lead to the conclusion that a simple comparison with other OECD countries is not relevant.

According to BDO's forecast, the demand for natural gas in Israel is expected to double in less than a decade and reach 20.5 BCM in 2025. The main growth drivers are the continued structural change of the energy sector, further reduction in coal based power generation, and a continued 3.5% annual growth rate in demand for electricity.

BDO's electricity and natural gas demand forecast is based on an econometric model using the bottom-up approach. The forecast is based on a proprietary model developed by BDO over the past three years. It also relies on knowledge and experience that I acquired during my joint work with Dr. Yacov Sheinin as vice president at Economic Models Ltd. The model is based on the Long Range Energy Planning (LEAP) system—a leading international economic model used for simulation in the energy sector. The macro economic forecasts are based on the Macro-Analytics model for the Israeli economy.

The undersigned has over 20 years of experience in conducting forecasts and assessing trends in the Israeli energy sector and is a member of BDO's global forum of energy experts. This professional experience includes demand forecast and market analysis for Israel Electric Corp.,Yam Tethys, Tamar and Leviathan partners, independent power producers, cogeneration producers and government authorities.

According to BDO estimates the energy sector in Israel (expressed in value added terms) will more than double by 2025 and reach NIS 57 billion. This is equivalent to the entire value added of the Israeli high-tech sector in 2017. The trend will lead to a real structural change and comprises significant advantages for the Israeli economy: stimulating economic growth; increasing government tax receipts; contributing to the environment; increasing energy independence and realizing the geopolitical benefits of increased trade with neighboring countries.

Chen Herzog

Chief Economist, Partner
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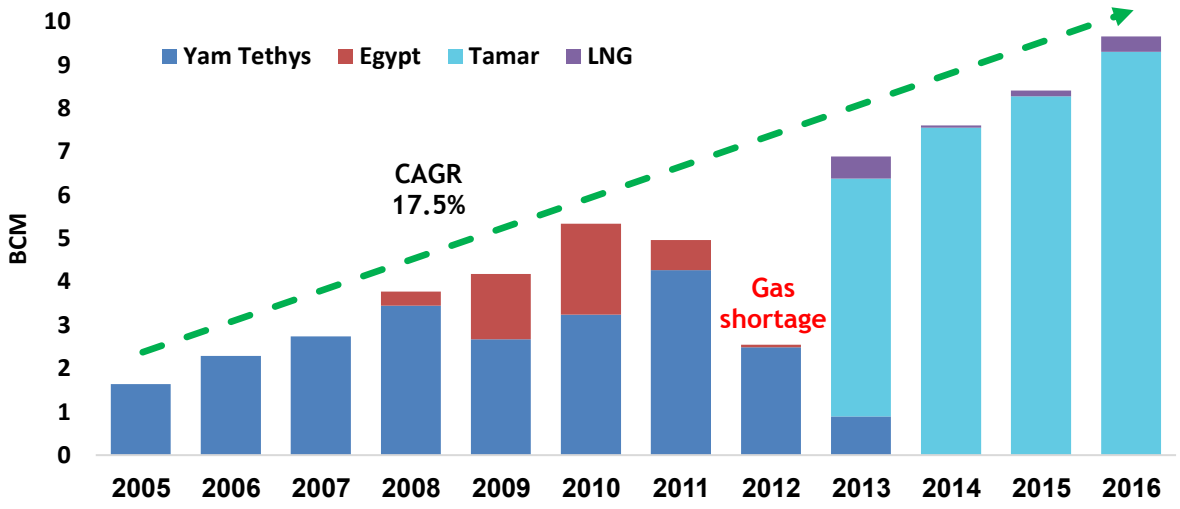
1. Executive Summary

1.1. Introduction

Thirteen years after natural gas started flowing into the Israeli market, the economy is still only in the initial stages of the structural change to the energy sector. Until 2004, Israel was totally dependent on imported oil and coal for its entire energy supply. The development of the Yam Tethys and Tamar reservoirs, in 2004 and 2013 respectively, has resulted merely in the conversion of Israel's oil based power units to gas. The first step of coal reduction in the electricity sector took place in 2016. Further gas utilization in the Israeli economy was held back due to supply side constraints. These constraints included the termination of Egyptian gas exports to Israel in 2012, the depletion of the Yam Tethys reservoir, hourly capacity limitations of Tamar, as well as the delay in the development of Leviathan until the resolving of regulatory issues in 2016.

Israel Natural Gas Consumption by Gas Supplier, 2005-2016



Source: Natural Gas Authority and BDO analysis

By 2020, with Leviathan's entry into the market, Israel's standing will change. For the first time, Israel will become a significant gas exporter, as it will have more than adequate gas resources to meet local consumption. This will enable the Israeli economy to fully utilize the economic and environmental benefits of domestically produced natural gas.

The availability of sufficient local gas resources will enable Israel to transition into the second phase of the structural change of its energy market. According to our forecast, the share of natural gas in Israel's electricity generation fuel mix will increase from 60% today, to 73% in 2020 and 82% in 2025. The Israeli Ministry of Energy , with the support of the Environmental Protection and Health Ministries, is already committed to the reduction of coal usage in

conjunction with the increased availability of gas. In November 2016, the Minister of Energy publicly declared a target to reach over 80% of the power generation fueled by gas. Accordingly, we believe that further coal reduction is highly likely due to the economic benefits to the economy of using local gas instead of imported coal. Additionally, coal reduction is the most cost-effective means for Israel to fulfill its COP21 obligations for GHG emission reductions.

Furthermore, the increased availability of natural gas is expected to lead to structural changes in Israel's energy sources for transportation. Today, diesel and gasoline constitute the only fuels used for transportation in Israel. Israel Railways, the state owned national railway system, has begun a process of conversion of its entire network from diesel to electric trains. A new electric light rail system in Tel Aviv is also under construction, with the first line (the red line) planned to begin operation in 2021. Additionally, the Israeli government has adopted a policy aimed to promote CNG and electric vehicles. The government is providing incentives and subsidies to build CNG based fueling stations and to adopt CNG based vehicles, mainly in urban truck and bus fleets. For that purpose, the government allocated NIS 65 million (19 million USD) in the recent 2017-2018 budget in the form of direct grants to CNG stations in order to create a nation-wide spread of stations and to target massive commercial flees in particular.

Electric vehicles also enjoy significant tax incentives. The adoption in July 2016 of a new standard that will allow charging of electric vehicles using standard power outlets, rather than dedicated charging stations, has removed a significant barrier that prevented the adoption of electric and plug-in vehicles in Israel.

There are several major development plans for cogeneration plants currently underway in the industrial sector. Many of these projects were postponed in recent years due to a shortage of gas and the inability to complete financial closure without a long-term firm gas contract. Leviathan entrance to the market will thus facilitate continued expansion of the Israeli industry, which without gas suffers from deficiency due to the requirement to use oil while its competitors abroad use gas.

The Israeli government is also taking steps to expand the gas distribution network, which will enable small and medium size industrial and commercial customers to shift to gas. In September 2016, the government declared its intension to provide 300 million NIS (85 Million USD) in funds to assist the private sector in financing the gas transmission network.

Chemical industries using natural gas as feedstock are also expected to emerge in conjunction with Leviathan's entry to the market. The first such plant was planned to be an ammonia production facility in southern Israel, which we believe will eventually materialize despite current uncertainty. In addition to the ammonia plant, there are plans for the development of methane based chemical industries including production of methanol, Dimethyl Oxide (DME) and urea.

The developments cited in the electricity, industrial, transportation and chemicals sectors clearly show that the increase in gas supply will enable the Israeli energy market to enter a new era in terms of its energy consumption. Even with the expected structural changes, electricity demand will remain the key driver for increased gas consumption. Nearly all the additional electricity demand in the coming years will be met by gas (except for a relatively small share of renewables). Currently only 60% of electricity is generated by gas. Hence, in the coming years every 10% increase in electricity demand will result in a 17% increase in the demand for gas.

1.2. Methodology

The report is based on BDO's model of the Israeli energy sector which includes a dynamic economic forecast and simulation of the Israel electricity and natural gas markets. The demand forecast is based on a proprietary multi-factor model, including an electricity demand model, a supply model, and an economic dispatch model based on a forecasted load duration curve. In addition to Tamar Petroleum, BDO's energy sector consulting clients, who receive services based on BDO's energy sector forecasting model include government authorities, electricity producers, co-generation projects, gas distribution companies and industrial clients.

The report and forecasts are based on our team's broad experience in analysis of market demand and trends in the Israeli economy, and in the energy sector. BDO's team of energy experts is led by *Chen Herzog*, partner and chief economist at BDO Israel, and a member of BDO international's global energy experts forum. The team has extensive experience in energy sector forecasting services for the past 20 years, and has provided market review and forecast services to most large scale financing transactions in the energy sector for the Israel Electric Corp. (IEC), as well as the Delek & Avner Yam Tethys bond issue in 2005, the Leviathan-Woodside negotiations in 2012/3, the Tamar bond issue in 2014 and the Leviathan financing in 2017.

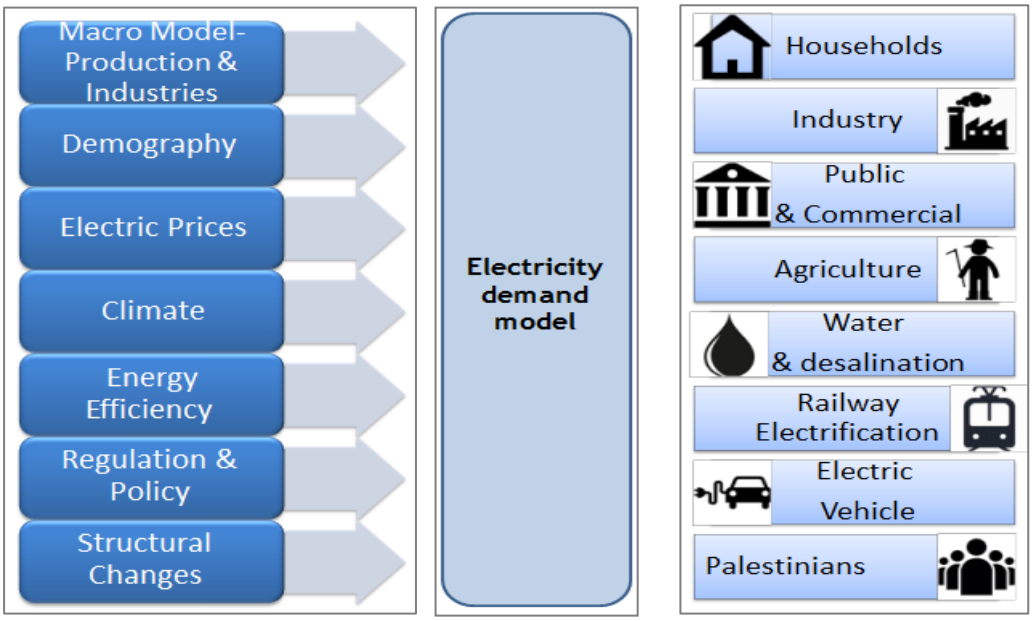
The demand model was developed by BDO's economic experts using the LEAP - Long-range Energy Alternatives Planning System technology. LEAP is being widely used worldwide by government agencies, consulting companies, energy utilities and academics.

The charts below illustrate our methodology. Our demand model includes several main demand components:

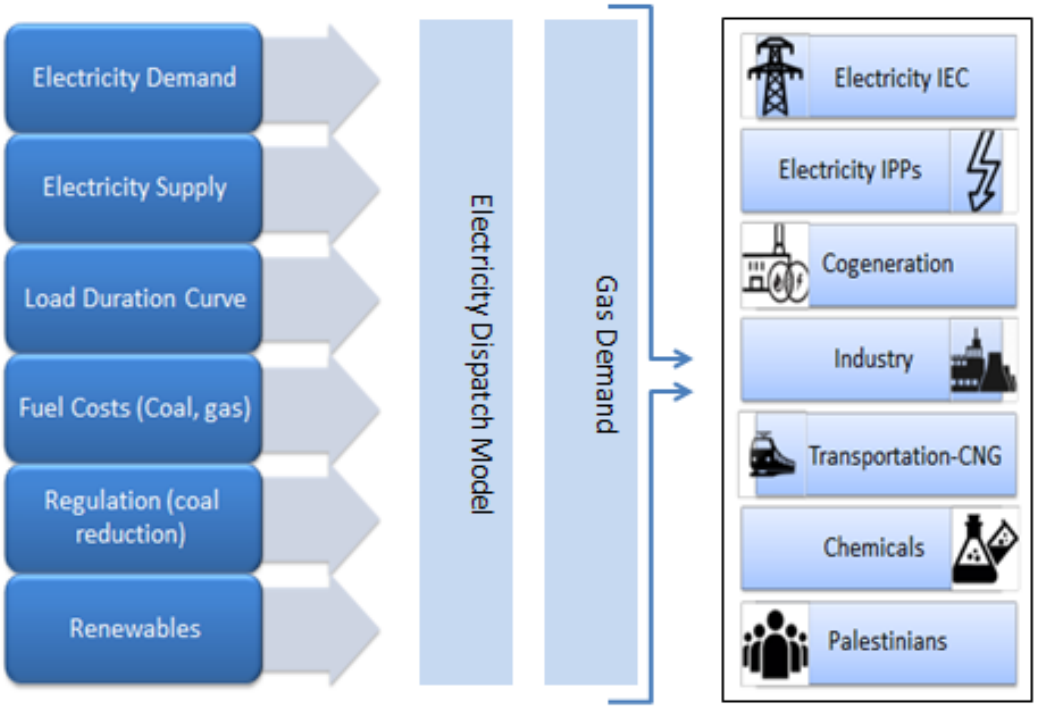
1. Residential demand for electricity based on demand models for main appliances, factoring penetration rates, usage intensity and energy efficiency.
2. Demand by the government sectors, commerce and services, based on the Israel macro-economic model.
3. Demand by the industry, based on the macro-economic model, factoring in the relative energy intensity of various industries.
4. Demand for desalination and water pumping – based on our macroeconomic and demand for water forecasts.
5. Palestinian demand, including demand in West Bank and Gaza

The electricity demand model is based on a bottom-up approach, which includes the effect of energy efficiency improvement, along with the effect of increased penetration rates and usage of household appliance and energy intensity in the various sectors.

BDO Electricity Demand Model Methodology



BDO Natural Gas Demand Model Methodology

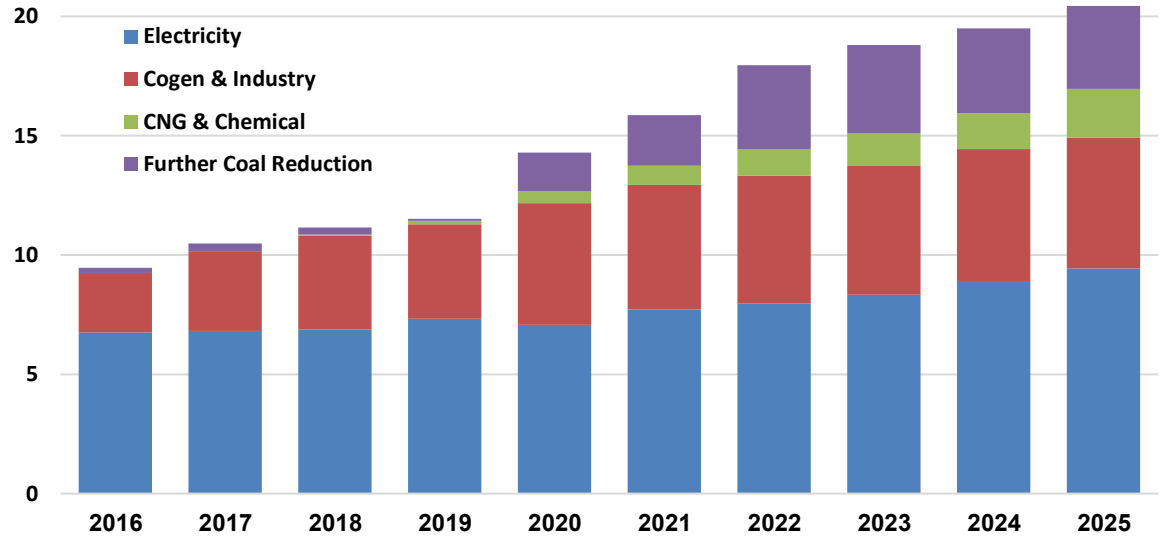


1.3. Gas Demand Forecast Summary

In the past decade, gas demand in Israel increased at an average annual rate of 17.5% per year, reaching 9.7 BCM in 2016. Gas demand for 2017 is estimated at 10.5 BCM. We forecast local gas demand to increase by an average annual rate of 8% over the next decade, reaching 14.3 BCM by 2020 and 20.5 BCM by 2025. It should be noted that our gas demand forecast is based on potential demand, and does not account for supply side limitations. However, as Leviathan enters the market there should be adequate supply for the entire local demand. In the shorter term, in case of limited gas resources, local gas supply shortage may be supplemented by imported LNG or diesel. Electricity demand in Israel is highly sensitive to weather conditions. Hence it is important to note that our forecast is conducted based on average expected weather conditions. In any particular year, weather conditions may of course differ from the average, yielding possible variations (in both directions) in gas demand.

Gas Demand Forecast 2016-2025

In BCM



Source: BDO Forecast

Based on our estimates, Israel electricity demand will increase by about 3.8% per year in the next decade, which translates to about an 7% annual increase in gas demand for electricity generation, with all other factors being constant. Total gas demand growth expected to reach 9.5% per year through 2025. This growth mainly driven by the government's recent decision to shut down 1,440MW of coal units and increased usage of gas for industrial and transportation purposes.

Demand Forecast Summary

Demand by type of Gas Consumer, in BCM

Year	Electricity	Cogen & Industry	CNG and Chemical Industry	Further gas due to coal reduction	Total Demand	Out of which, Palestinian Self - Generation
2015	5.8	2.6	0		**8.4**	
2016	6.7	3.0	0		**9.7**	
2017	6.8	3.3	0	0.3	**10.4**	
2018	6.9	3.9	0.1	0.3	**11.2**	
2019	7.0	4.0	0.2	0.3	**11.5**	
2020	7.1	5.1	0.5	1.6	**14.3**	
2021	7.5	5.2	0.9	2.3	**15.9**	0.2
2022	8.0	5.4	1.1	3.5	**18.0**	0.6
2023	8.3	5.4	1.4	3.6	**18.7**	0.9
2024	8.8	5.5	1.6	3.6	**19.5**	1.2
2025	9.3	5.7	1.9	3.6	**20.5**	1.7
2026	9.8	5.8	2.1	3.6	**21.3**	2.1
2027	10.5	5.9	2.3	3.6	**22.3**	2.3
2028	11.3	6.0	2.5	3.6	**23.4**	2.5
2029	11.9	6.1	2.6	3.6	**24.2**	2.6
2030	12.5	6.2	2.7	3.6	**25.0**	2.8
2031	13.3	6.3	2.8	3.6	**26.0**	3.1
2032	14.0	6.4	2.9	3.6	**26.9**	3.3
2033	14.7	6.5	3.0	3.6	**27.8**	3.6
2034	15.5	6.6	3.3	3.6	**29.0**	3.9
2035	16.2	6.6	3.5	3.6	**29.9**	4.2
2036	17.0	6.7	3.6	3.6	**30.9**	4.5
2037	18.1	6.8	3.7	3.6	**32.2**	4.9
2038	18.9	6.9	3.8	3.6	**33.2**	5.3
2039	19.8	7.0	3.9	3.6	**34.3**	5.7
2040	20.6	7.1	4.0	3.6	**35.3**	6.2

*including Palestinians

Source: BDO Forecast

1.4. Israel Gas Supply and Demand Balance

Tamar, which began commercial production in 2013, is currently the only operational gas field in Israel. Hence Tamar is still the sole source of gas supply to the domestic market, with any shortage during peak demand or infrastructure limitations being met by imported LNG. The later accounts for only marginal quantities.

In 2020 with the expected entry of Leviathan and later-on Karish/Tanin to the local market, the gas market will enter a new phase with multiple suppliers. The entry of new suppliers will not only lift limitations that currently exist, but also lead to increasing demand in the local market and the expanding of the use of gas in various sectors of the economy (see chapter 5 below).

Our gas demand analysis shows that Tamar, Leviathan, and Karish/Tanin fields are expected to face significant demand from local and as well as regional markets. An analysis of the projected supply and demand for gas in the Israeli market in 2025 (taking into account existing export agreements) shows that the pace of development of the reservoirs in the coming years is in line with the expected increase in demand.

Israel Gas Supply-Demand Balance 2025

By Source and Target, in BCM

Gas Source	Target Market			
	Israel	Jordan	Egypt	Total
Tamar	9.5	0.15	1.0	**10.7**
Leviathan	7.0	3.5	0.7	**11.2**
Karish/Tanin	3.0	0.0	0.0	**3.0**
LNG import	1.0	-	-	**1.0**
Total	**20.5**	**3.7**	**1.7**	**25.9**

Source: BDO forecast

One should note that advanced commercial contacts are underway for a possible marine pipeline to Turkey and/or export to two LNG facilities in Egypt, also via pipeline. If realized, these projects will be undertaken in parallel with an expansion of the current producing fields in Israel, and therefore should not have a substantial impact on the domestic supply and demand balance.

We assume that any further large-scale gas discoveries will only be developed unless there is an assured export potential market (such as an export agreement with Egyptian LNG facilities' owners and/or a pipeline to Turkey), or when local demand exceeds supply.

Financing natural gas projects in Israel is at present based on the project finance model, which inherently balances the growth in local demand to the development of the reservoirs. This

guarantees that the building and financing of new gas reservoirs is correlated with the demand in the relevant markets.

The expected market share of the various reservoirs in the local market is a result of the structure of the supply agreements, the regulatory conditions and the export quotas that were allocated to the reservoirs by the government in June 2013. Export quotas were determined according to the size of the reservoir in order to encourage the development of smaller fields.

Tamar's current infrastructures are 90% designated for the domestic market with the remaining 10% for export to Jordan's Arab Potash Company (APC) and to the Egyptian domestic market. The export to these Jordanian plants had commenced in 2016 and currently stands at about 0.15 BCM per year. Tamar may be expanded in the future in the event of an export agreement to the UFG LNG facility in Egypt.

The Leviathan field's ultimate primary market will mainly be neighboring countries, as part of the effort to encourage multiple suppliers to the domestic market. Nevertheless, the development of Phase-1 will be modular, and will consist of two stages, with a larger percentage (65%) of the first stage (1A) earmarked for the domestic market and the remainder (35%) for export to Jordan and Egypt via Jordan using existing infrastructures. Leviathan's second stage (1B), is designated for export to Turkey, LNG facilities in Egypt or to Europe.

Analysis of the existing discoveries and potential regional demand shows that the entire local demand can be met through existing fields at least until 2040. The following table illustrates a possible scenario for the allocation of the demand among the various suppliers.

Domestic* Gas Supply Forecast By Source
In BCM

		Supplier				
	Total Local Demand	Tamar Local Market	Leviathan Local Market	Karish/Tanin	LNG import/ others	Tamar Market Share of local demand
2013	6.9	5.5	0	0	0.9+0.5**	80%
2014	7.6	7.6	0	0	0.1	100%
2015	8.4	8.3	0	0	0.1	99%
2016	9.7	9.4	0	0	0.3	97%
2017	10.5	9.8	0	0	0.7	94%
2018	11.2	10.1	0	0	1.1	90%
2019	11.5	10.1	0	0	1.4	88%
2020	14.3	9.5	4.8	0	0	66%
2021	15.9	9.5	3.8	2.6	0	60%
2022	18.0	9.5	5.5	3.0	0	53%
2023	18.8	9.5	6.3	3.0	0	51%
2024	19.5	9.5	7.0	3.0	0	49%
2025	20.5	9.5	7.0	3.0	1.0	46%
2026	21.4	9.5	7.1	3.0	1.8	44%
2027	22.3	9.5	7.1	3.0	2.7	43%
2028	23.3	9.5	7.2	3.0	3.6	41%
2029	24.2	9.5	7.2	3.0	4.5	39%
2030	25.0	9.5	7.3	3.0	5.2	38%
2031	26.0	9.5	7.3	3.0	6.2	37%
2032	26.9	9.5	7.3	3.0	7.1	35%
2033	27.8	9.5	7.3	3.0	8.0	34%
2034	29.0	9.5	7.3	3.0	9.2	33%
2035	30.0	9.5	7.3	3.0	10.2	32%
2036	31.0	9.5	7.3	3.0	11.2	31%
2037	32.1	9.5	7.3	3.0	12.3	30%
2038	33.2	9.5	7.3	3.0	13.4	29%
2039	34.3	9.5	7.3	3.0	14.5	28%
2040	35.3	9.5	7.3	3.0	15.5	27%
Total	**594.6**	**260.3**	**143.3**	**59.6**	**131.5**	**44%**

*Israel and Palestinians
**In 2013, Yam Tethys supplied 0.9 BCM, with additional 0.5 BCM LNG import.
BDO Scenario for Domestic Gas Supply Forecast by Source in BCM

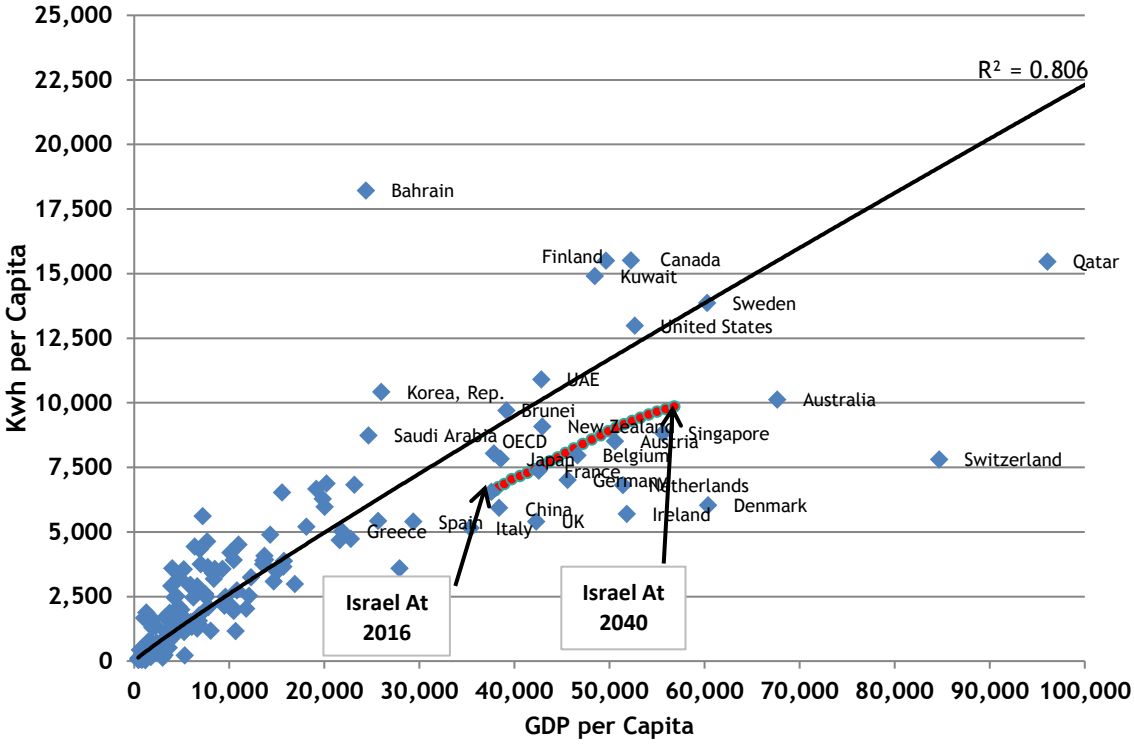
1.5. Electricity Demand Forecast Summary

Electricity demand for Israel is experiencing high growth rates, as the electricity demand level is still not on par with comparable high-income regions with similar weather conditions. In the past twenty years, electricity demand in Israel rose by an average annual rate of 4%. This represents an average annual increase in per capita electricity consumption of 2.2%.

Israel's relatively low level of electricity consumption is a result of a standard of living that is 30% lower than other comparable developed countries. In line with this, we expect that in the coming years as the standard of living rises, it will be accompanied by an increase in the consumption of electricity and a reduction in the gap between Israel and other developed warm weather regions with high-income levels.

Income Effect on Electricity Demand - International Comparison

Electricity consumption per capita relative to GDP per capita globally (in blue) compared to Israel's Electricity and GDP growth forecast (in red)



Source: World Bank data, OECD, CBS and BDO analysis

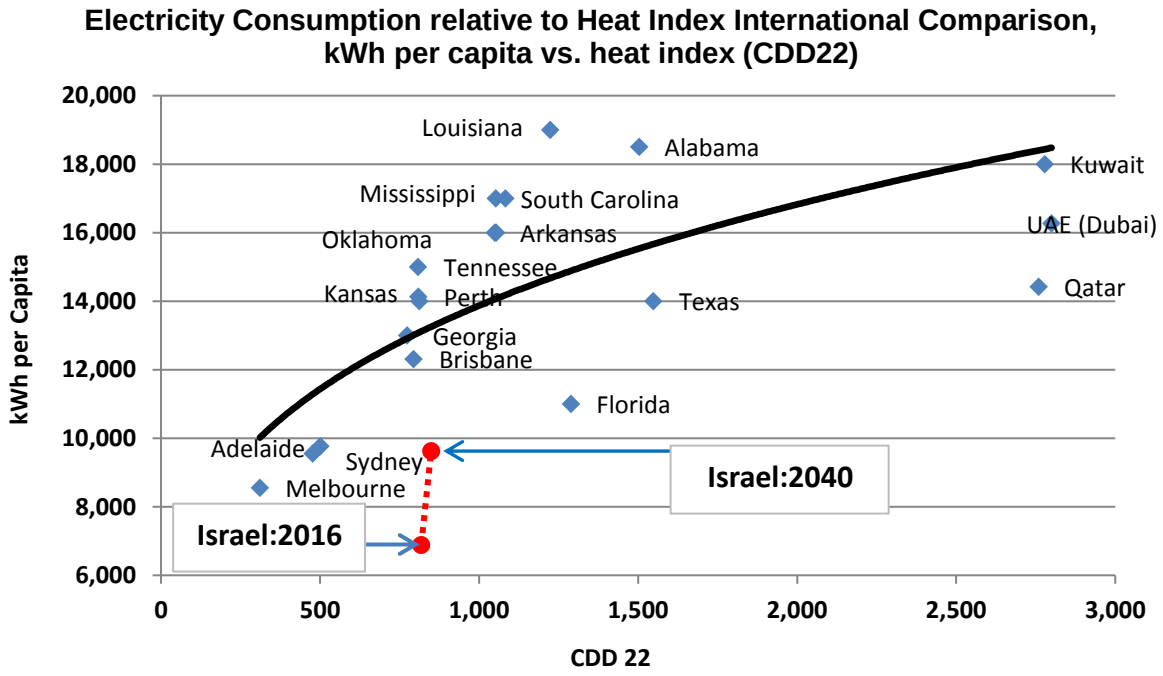
In many economic analyses, OECD countries are used as a benchmark to evaluate the long-term potential of the Israeli economy. In the case of electricity consumption, the unique climatic and economic conditions in Israel, as opposed to other OECD countries lead to an over

simplified comparison of electricity consumption between Israel and the other member states and is therefore not relevant.

Israel is the warmest country in the OECD. The heat index in Israel, in terms of cooling degree-days (CDD beyond 22 degrees centigrade[1]), is more than four times higher than the OECD average. In fact, there is no other OECD country that is characterized by such a high heat index as Israel.

Hence, the potential level of electricity consumption in Israel cannot be based on a direct comparison with OECD countries, and should rather be based on comparison with other warm regions.

A comparative study of per capita electricity consumption, which takes into account the climatic conditions in warm regions and countries, shows that per capita consumption in Israel is 50% lower than the trend line of countries with a warm climate.



Source: World Bank data, BDO analysis

The high growth rate in Israel's electricity demand is a result of a combination of multiple long-term characteristics of the Israeli economy: high population growth rate, relatively fast

[1] "*Cooling degree days* 22", or "*CDD* 22", are a measure of how much (in degrees), and for how long (in days), outside air temperature was *higher* than 22 degrees centigrade.

economic growth, and hot weather conditions. As Israel's economy continues to grow, both penetration rate and usage intensity of household electric appliances will continue to increase, contributing to increased electricity demand.

BDO's forecast for electricity demand is based on a long-term bottom-up disaggregated demand model. The model is integrated with the Macro Analytics macroeconomic model of the Israeli economy.

The demand for electricity in the economic sectors is dependent on several economic variables. These include income growth, penetration of electrical appliances, the price of electricity, demographic variables (i.e. population composition, growth rate, household size etc.) climate conditions as well as efficiency and energy intensity in the various sectors.

The major factors likely to impact growth are an increase in disposable income, an increase in real wage, growth in the use of electrical appliances (primarily air conditioners for heating and cooling), and the increased penetration and usage of home appliances. The effect of energy efficient lighting and appliances as well as energy intensity of the industry are also factors that have been taken into account.

We predict Israel demand for electricity will grow at an average rate of 3.5% per annum, reaching 131 billion kWh by 2040. This growth rate represents about a 1.7% annual increase in electricity consumption per capita. With the additional Palestinian market total demand is expected to reach 161 billion kWh in 2040.

The demand growth is mainly due to an expected increase in the standard of living, increase in air-conditioner penetration and usage, increased water desalination, electrification of the Israeli railway system and increased Palestinian demand.

Electricity Demand Forecast Summary
In bil. kWh per year*

	2015	2020	2025	2030	2035	2040	CAGR 2015-2040
Residential	17.6	20.6	24.9	30.7	36.8	42.7	**3.6%**
Commercial & Public	17.6	20.7	25.0	30.4	36.4	42.9	**3.6%**
Industry	14.3	16.4	18.6	21.3	24.0	26.7	**2.5%**
Agriculture	1.7	1.9	2.1	2.3	2.7	3.0	**2.3%**
Water & Desalination	4.0	5.1	6.4	7.7	9.0	10.2	**3.8%**
Rail & electric vehicles		0.7	1.9	3.6	4.6	5.6	**-**
Israel Total	**55.2**	**65.4**	**79.0**	**96.1**	**113.5**	**131.1**	**3.5%**
Palestinians	5.2	6.7	8.9	13.4	20.1	30.2	**7.3%**
Total Israel & Palestinians	**60.4**	**72.1**	**87.9**	**109.4**	**133.6**	**161.3**	**4.0%**
Israel mWh Per Capita	6.5	7.0	7.7	8.6	9.3	9.9	**1.7%**
Palestinians mWh per Capita	1.1	1.3	1.5	1.9	2.6	3.4	**4.6%**

*Demand excludes losses
Source: BDO forecast

Electricity Demand Forecast Summary
Average Annual Growth Rates

	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040
Residential	3.2%	3.9%	4.2%	3.7%	3.0%
Commercial & Public	3.3%	3.8%	3.9%	3.7%	3.3%
Industry	2.8%	2.6%	2.7%	2.4%	2.1%
Agriculture	2.0%	2.1%	2.4%	2.6%	2.6%
Water & Desal.	4.7%	4.9%	3.9%	3.0%	2.5%
Rail Electrification		16.8%	7.0%	4.6%	4.0%
Electric Car		19.4%	19.0%	5.6%	3.5%
Israel Total	3.5%	3.8%	4.0%	3.4%	2.9%
Palestinian	5.2%	5.8%	8.5%	8.5%	8.5%
Total Including Palestinians	3.6%	4.0%	4.5%	4.1%	3.8%
Israel Per Capita	**1.6%**	**1.9%**	**2.1%**	**1.6%**	**1.2%**
Palestinians per Capita	3.2%	5.8%	5.8%	5.8%	4.6%

Source: BDO forecast

1.6. Coal Reduction

Israel's current electricity capacity includes 4,840MW of coal units, 11,800MW of gas based units and 920MW of renewable solar based energy. In 2016, gas based units constituted 67% of the Israeli generation capacity (70% accounting for the renewable units' reduced availability) but generated only 62% of Israel's electricity production.

Israel's coal units were planned and built in the 1980's and 1990's, long before the discovery of Israel's gas reservoirs. At that time, coal usage for baseload production provided an economical viable alternative to fuel oil.

The availability of local gas, along with current environmental policy and regulation, call for a shift in Israel's electricity energy fuel mix. From the point of view of the national economy, natural gas is a cheaper alternative, generates less pollution (SOX and NOX) and reduces GHG emissions, thus allowing Israel to fulfill its international commitments under the COP21 framework. Hence, from an economic and environmental point of view, the optimal operational regime for Israel's electricity sector is to shutdown coal production and shift to domestic and more environmentally friendly gas. We believe that lack of adequate gas supply is the main constraining factor that currently prevents further coal reduction.

In December 2015, the Ministry of Energy directed the utility to reduce coal usage by 15% in order to reduce emissions, increasing generation by gas accordingly. Later on, the coal reduction requirement was increased to 19% from 2017 onwards. In August 2016, after the regulatory uncertainty that delayed Leviathan's development was resolved, the ministry decided to shut down 4 coal units (Rabin A) with a total capacity of 1,440MW, comprising 30% of Israel's coal production capacity, no later than June 2022. It was further decided that private power producers will build the replacement power supply. Our forecast is based on the assumption that the next stage of coal reduction will take place after Leviathan's entry into the market in 2020, when adequate gas resources will be available.

As Israel's gas supply will further increase after Karish/Tanin begin production, we believe that the Israeli government will continue its policy of reducing coal usage and instruct the IEC to further reduce the utilization of its coal units. In the longer term, there is strong economic and environmental logic to completely shutting down the coal units, and maintaining them as strategic backup units. However, for the purpose of this report, we applied a more conservative assumption that the coal units (other than Rabin A for which a decision has already been made), will be kept operational during peak months (summer and winter), and will be shut down during off-peak periods.

Electricity Capacity and Generation Forecast by Fuel
In MW*

	Coal	Gas	Renewables	Total Capacity	Gas % of total Capacity**	Gas % of Generation
2016	4,840	11,828	917	17,585	**67%**	62%
2020	3,400	15,250	1,550	20,200	**80%**	73%
2025	3,400	18,600	3,800	25,800	**82%**	82%
2030	3,400	23,900	6,100	33,400	**83%**	83%
2040	3,400	36,300	10,600	50,300	**86%**	84%

* Israel and Palestinian self-generation.
** Effective total capacity, with renewable capacity adjusted by a factor of 1:5 to reflect effective maximum availability

Source: IEC, PUA and BDO analysis

Such an operational regime is equivalent to a 70% effective reduction in Israel's coal based electricity generation relative to 2015 levels – and amounts to reducing coal based generation from 30 billion kWh per year to 9 billion kWh per year. This operation regime will enable Israel to meet its target to reduce GHG emissions per capita by 17% in 2030. The resulting increase in electricity generation by gas, is equivalent to a 4.5 BCM increase in gas demand, 3.6 BCM beyond current consumption levels.

Coal Reduction Forecast Summary

	Coal Based Generation (bil. kWh)	Coal reduction %	Further Gas* due to coal reduction in BCM
2015	30.0	-	
2016	24.8	15%	
2017	24.3	19%	0.3
2018	24.3	19%	0.3
2019	24.3	19%	0.3
2020	18.1	40%	1.6
2021	15.1	50%	2.3
2022	10.4	65%	3.5
2023	9.0	70%	3.6
2024	9.0	70%	3.6
2025	9.0	70%	3.6

*Further gas beyond the 2016 reduction
Source: BDO forecast

2. Electricity Demand in International Perspective

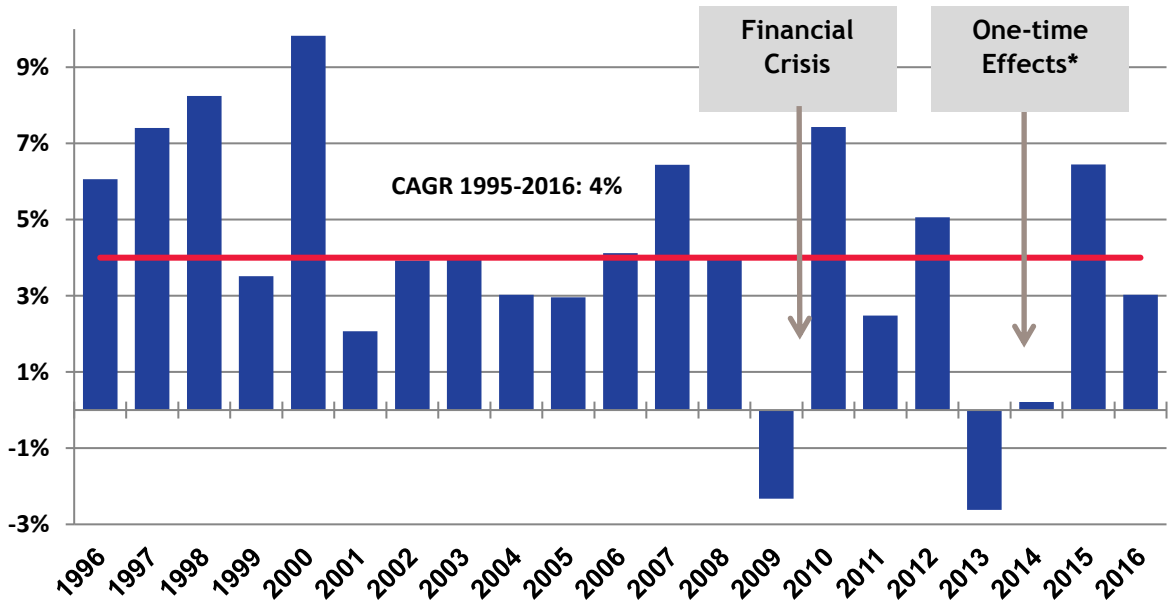
2.1. Overview

Our analysis shows that the Israeli demand for electricity has not reached saturation levels. On the contrary, it is in the process of rapid growth. In the past twenty years, electricity consumption in Israel rose by an average annual rate of about 4%, which corresponds with a 2.2% per capita annual increase in demand.

The high growth rate in Israel's electricity demand is a result of a combination of multiple long-term characteristics of the Israeli economy: high population growth rate, relatively fast economic growth, and hot weather conditions. As Israel's economy continues to grow, both penetration rate and usage intensity of household electric appliances will continue to increase, contributing to increased electricity demand.

It should be noted that the decline in electricity demand in 2013 and 2014 was due to the influences of one-time factors such as unusually moderate climatic conditions and temporary changes in the economic environment and do not represent a change in the overall trend of electricity growth. Indeed, in 2015 and 2016 electricity demand growth picked up with 6.4% and 3% annual growth (respectively).

Israel Electricity Demand Growth Rate
(The annual percentage increase in the production of electricity expressed in kWh**)**



* In 2013-14: one-time combination of: moderate weather, high electricity prices, regulatory light bulb replacement and economic slowdown
Source: IEC, CBS and BDO analysis

Our analysis shows that the rapid growth in demand for electricity in Israel is due to the fact that consumption has not reached the saturation point.

The annual electricity consumption per capita in Israel stands at 6,500 kWh, which by comparison represents only 50% of the level in regions of the world with similar climatic conditions to Israel but with higher income levels. These gaps are expected to diminish gradually along with an increase in Israel's standard of living (GDP/capita).

The annual growth rate in electricity consumption in Israel is inherently higher compared to other OECD nations. It is due to a number of unique characteristics of the Israeli economy: a high demographic growth; a high rate of growth in per capita GDP; a lower level of penetration of electrical appliances; and climatic conditions.

Due to the unique characteristics of the Israeli economy, a direct comparison with the stagnation in electricity demand that is apparent in some other OECD member states in Europe and in the U.S is inappropriate. Population growth in Europe is close to zero and the penetration rate of air conditioners in most European countries is very low, due to the cold climatic conditions. In addition, the heating of homes in Europe is usually by natural gas or diesel rather than electricity. Because of these characteristics, the level of electricity consumption in Europe is inherently lower on a relative basis to warm regions where there is a high level use of air conditioning. High air-conditioning penetration in Israel, along with lack of residential natural gas infrastructure, result in typical usage of air-conditioners in Israel also for heating in the winter. Therefore, Israel's electricity demand potential differs when compared to other OECD countries, not only in summer but also in winter.

The U.S. characterized by a GDP per capita level that is 50% higher than that of Israel and per capita electricity consumption that is about 100% higher than the level in Israel.

Israel is still a long way from a level of income where the growth in electricity consumption levels off. The penetration level in Israel of electric appliances such as air conditioners, dishwashers, dryers and similar products is still rising. With the rise in the standard of living, there is also an increase in the intensity of usage of many of these electrical appliances. Therefore, the rise in electricity consumption is not just the result of increased penetration but also greater usage intensity. These usage patterns are gradually changing in Israel as income levels continue to rise.

In addition, population growth in Israel is the highest of OECD nations, and this alone means that about a 2% annual increase in electricity production is needed just to meet the annual growth in the number of households. In terms of demographic growth, Israel is the fastest

growing country in the OECD. Israel's annual population growth rate stood at 2% in 2016, which is more than three times the OECD average which is around 0.6%. This is due to high fertility rates and a net migration level of Jews from abroad.

Israel has the highest fertility rate in the OECD by a considerable margin. The Israeli average is 3 children per woman compared to the OECD average of 1.7.

Over the long term, our electricity demand forecast is based on the assumption that population growth rate will decline slightly. Recent trends point to a drop in fertility rates in the Israeli Arab population that represents 20% of the total. Over the past decade, the annual population growth in the Israeli Arab population has declined from around 3% to less than 2.2% in 2016. The growth rate among Jews has actually increased over the same period from 1.4% to 1.9%, largely due to the higher birth rate among ultra-Orthodox (Haredi) Jews.

According to Israel's Central Bureau of Statistics (CBS) latest projections, published in May 2017, Israel's population is projected to reach 13.2 million by 2040, compared to 8.6 million today. This translates into a 56% increase in 24 years, an average annual growth rate of 1.8%. The high population growth rate ensures a substantial minimal level of growth in the demand for electricity which is required just to maintain the current standard of living level, before accounting for additional growth drivers, such as the projected increase in standard of living.

2.2. Influence of Standard of Living

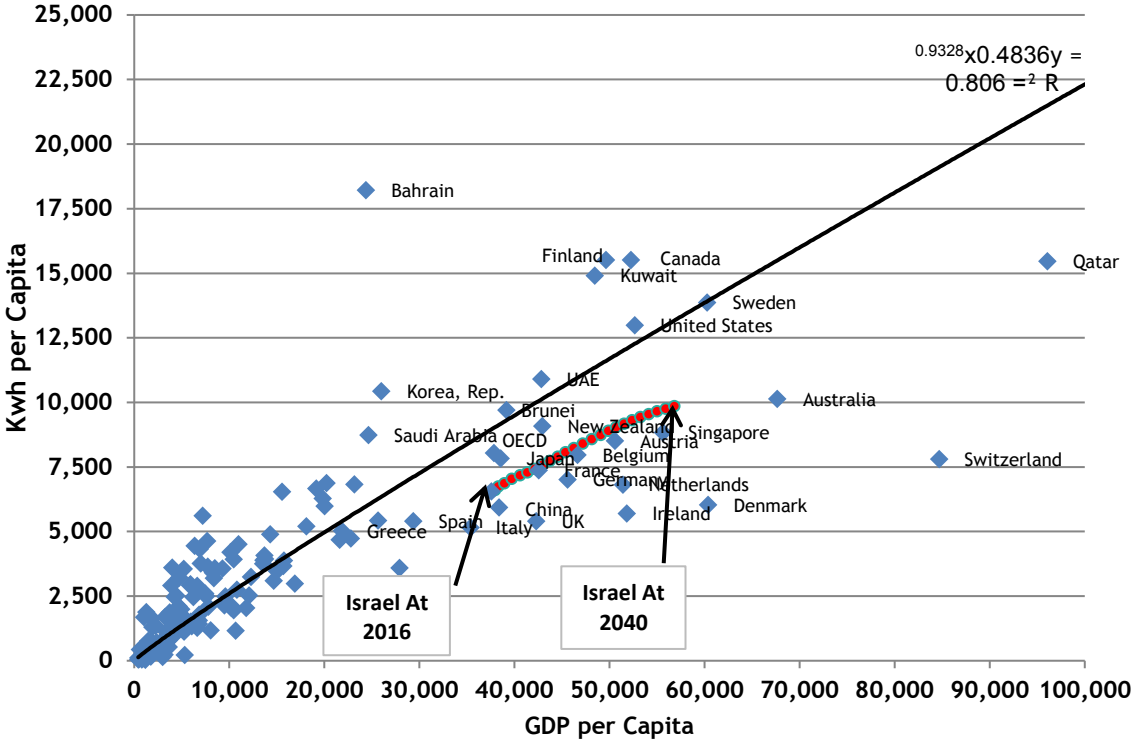
The demand for electricity is influenced by the economic activity in the various sectors of the economy, and is effected by the level of investment and activity in the economy, by disposable household income and by public sector expenditure. Hence, economic growth or slowdown has a significant effect on electricity demand.

Electricity is characterized by high income-elasticity. The analysis of comparative international data shows that a 10% increase in the GDP per capita correlated with a 10% rise in demand for electricity. This means that the elasticity of demand in relation to income is almost one.

The following chart presents an international comparison of electricity consumption in relation to GDP per capita. It shows the correlation between electricity consumption and the standard of living and underscores that the level of consumption in Israel is far from reaching the saturation point. According to the projection based on the Macro Analytics macro-economic model of the Israeli economy, GDP per capita is expected to reach $57,000 in real terms by 2040. Based on international comparison, the appropriate per capita consumption of electricity that corresponds with this income level is 13,200 kWh as illustrated in the chart below. The red line in the chart illustrates Israel's electricity demand forecast through 2040 relative to the GDP/capita forecast. The chart shows that an increased electricity demand forecast in Israel is consistent with the global demand trend line.

Income Effect on Electricity Demand - International Comparison

Electricity consumption per capita relative to GDP per capita globally (in blue) compared to Israel's Electricity and GDP growth forecast (in red)



Source: World Bank data, OECD and BDO analysis

It is important to note that the above chart presents the average consumption without adjustment to climate conditions. In general, warm countries are expected to have electricity consumption that is above average and to be above the curve, while countries with moderate climates would be expected to be below the curve. It should be noted that our forecast reflects a conservative assumption, that Israel's positioning relative to the global trend line will not improve over the years.

In comparison to the U.S., there is substantial potential for growth in Israel for the penetration of many household appliances. For example, the rate of households in the U.S. with dishwashers and dryers is two times higher than in Israel, ownership of deep freezers is 50% higher and the number of households with two television sets or more 40% higher in the U.S. These examples underscore the lower standard of living in Israel, due to lower income levels. Consequently, the gradual increase in the standard of living in Israel will lead to increased ownership of these appliances.

In Europe, the level of ownership of some of these household appliances is lower than in the U.S. However, we believe this is mainly the result of smaller households and lower fertility

rates. The fertility rate in Israel is the highest of developed nations and therefore the need and effectiveness in the use of appliances like dishwashers and dryers is much higher. Hence, we believe that the US represents a more relevant benchmark to assess the potential penetration and usage patterns of household appliances in Israel. The growth in ownership and use of household appliances is expected to continue the upward trend..

Home Appliances Penetrations Rates – Israel vs. USA*

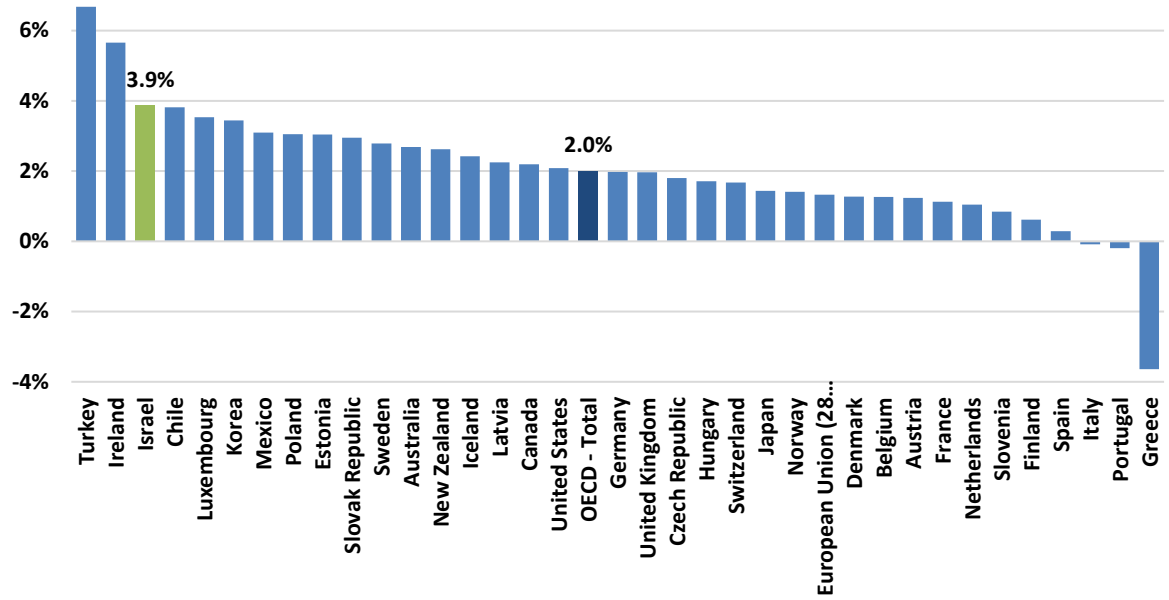
	Israel	USA
Dishwasher	**40%**	**78%**
Dryer	**41%**	**79%**
Air conditioner	**89%**	**96%****
Deep freezer	**22%**	**31%**
More than one TV set	**55%**	**78%**
Gaming consoles	**14%**	**80%**

*Sources: Israel – 2015 CBS, US – Freedonia 2016, and DOE 2009
**Southern States

Israel is among the fastest growing countries among developed nations and consistently has one of the highest growth rates in the OECD. Israel's annual growth rate since 2004 has averaged around 4% (about 2% per capita) and we believe this is in line with the country's medium term growth potential.

Israel's growth rate was adversely impacted in the last three years by the international slowdown along with the strengthening of the Shekel. Despite these factors, Israel has managed to maintain relatively high growth rates compared to most OECD nations. The Bank of Israel has declared its intentions to keep interest rates low at near zero levels while the U.S. Federal Reserve has gradually begun to raise interest rates. The expected gap between US and Israeli interest rates should yield a devaluation of the Shekel against foreign currencies, thus stimulating the Israeli economy by increasing the competitiveness of Israeli exports while reducing competitiveness of imports to Israel compared to local production.

Average GDP Real Annual Growth 2010-2016

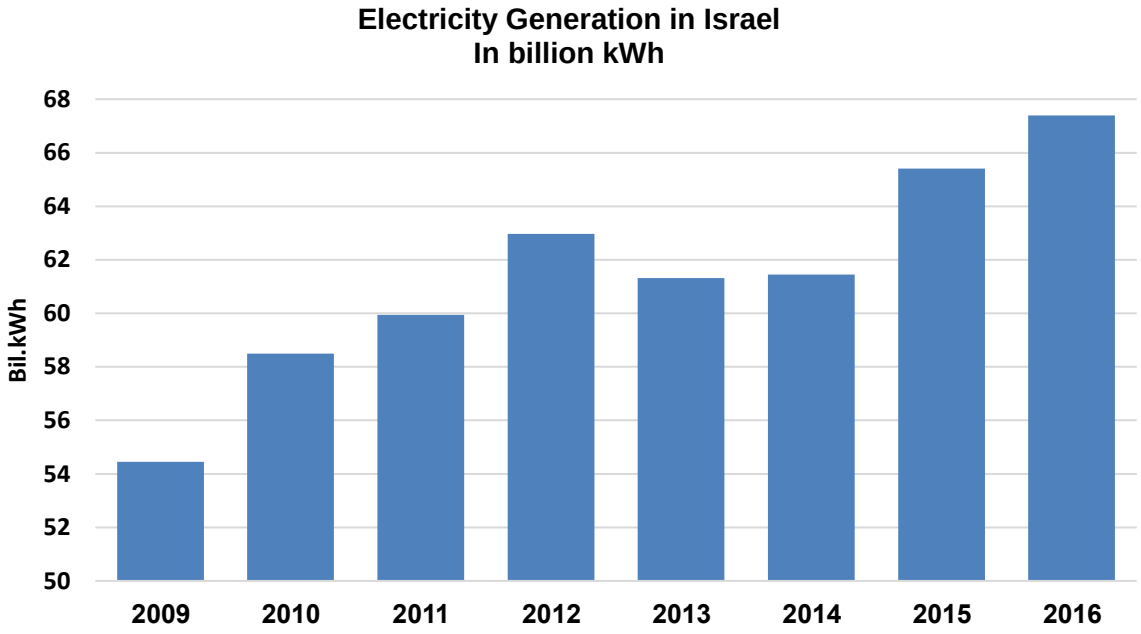


Source: OECD and BDO Analysis

2.3. Irrelevance of the Temporary Demand Effect in 2013-14

In the decade between 2002 and 2012, the demand for electricity in Israel rose on average by 3.8% annually. This represents a per capita annual growth rate of 1.9%, similar to our long-term growth forecast.

In the years 2013 and 2014, the trend reversed itself and demand for electricity actually fell. Our analysis shows that the decline in those two years was a result of one-time factors that do not reflect a change in the upward trend of electricity consumption in Israel. Appropriately, it should be noted that in 2015 demand for electricity rose rapidly, by 6.4%. Subsequently, in 2016, the demand for electricity continued growing by 3.0%.



Source: CBS, IEC and BDO Analysis

Based on our estimates, the slowdown in the demand for electricity in the years 2013-2014 is due to a series of one-time events, and does not represent a change in the trend. These events included:

A. A sharp rise in electricity rates due to a shortage of natural gas in 2012 which required a temporary shift back to oil (before a rate cut that went into effect in January 2015)
B. Mild weather conditions in both years
C. Regulations that required the rapid switchover to energy efficient lighting
D. A slowdown in economic activity

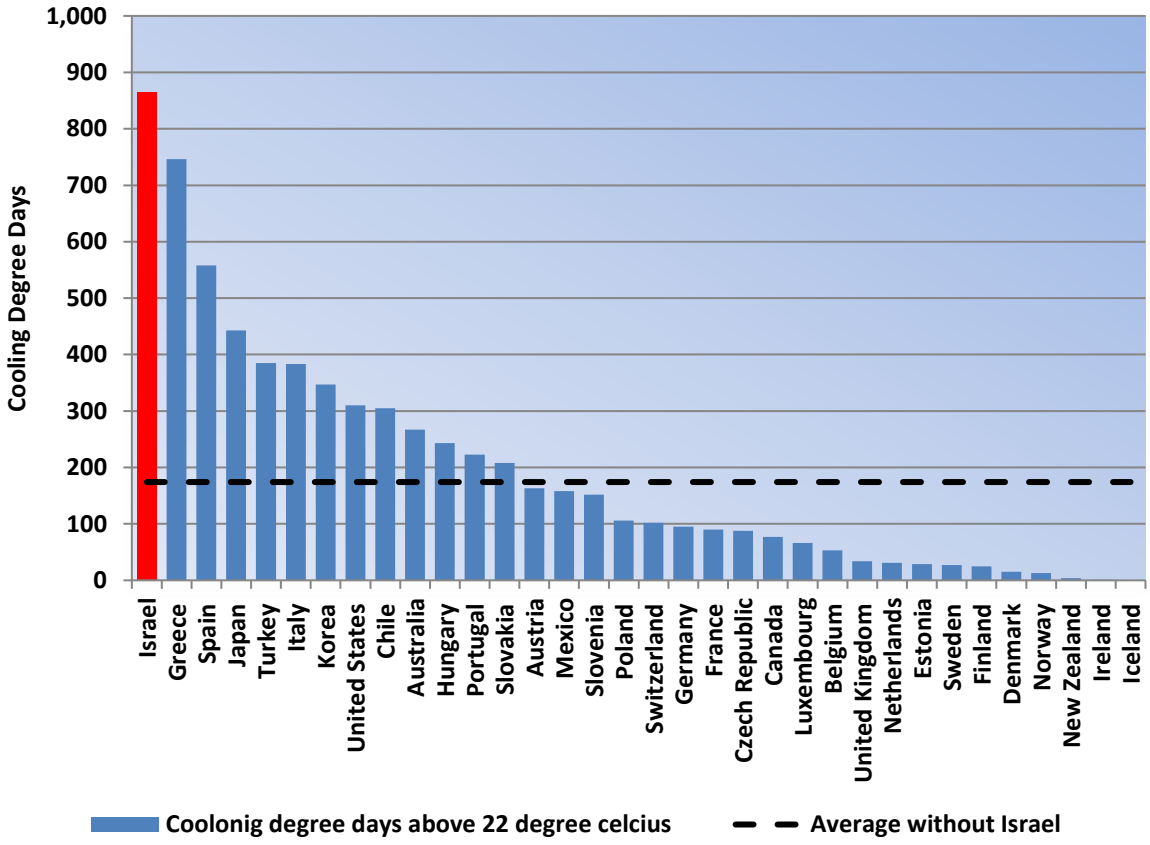
Our analysis shows that with these four one-time factors being neutralized, the growth in electricity demand in 2013 and 2014 would have been within the range of 3.8% to 4%, similar to the multi-year growth rate.

2.4. The Impact of Weather Conditions

In many economic analyses, OECD countries are used as a point of reference to evaluate the long-term potential of the Israeli economy. In the case of electricity consumption, however, due to the unique weather conditions in Israel compared to other OECD countries, a comparison of electricity consumption between Israel and the other member states is not relevant.

Indeed, Israel is the warmest country in the OECD. The heat index in Israel, in terms of cooling degree-days (beyond 22 degrees centigrade), is more than four times higher than the OECD average. In fact, there is no other OECD country that is characterized by such a high heat index as Israel.

The irrelevance of comparison with OECD countries
Heat index in OECD countries and Israel
(Cooling degree-days - CDD22, average over the past five years)



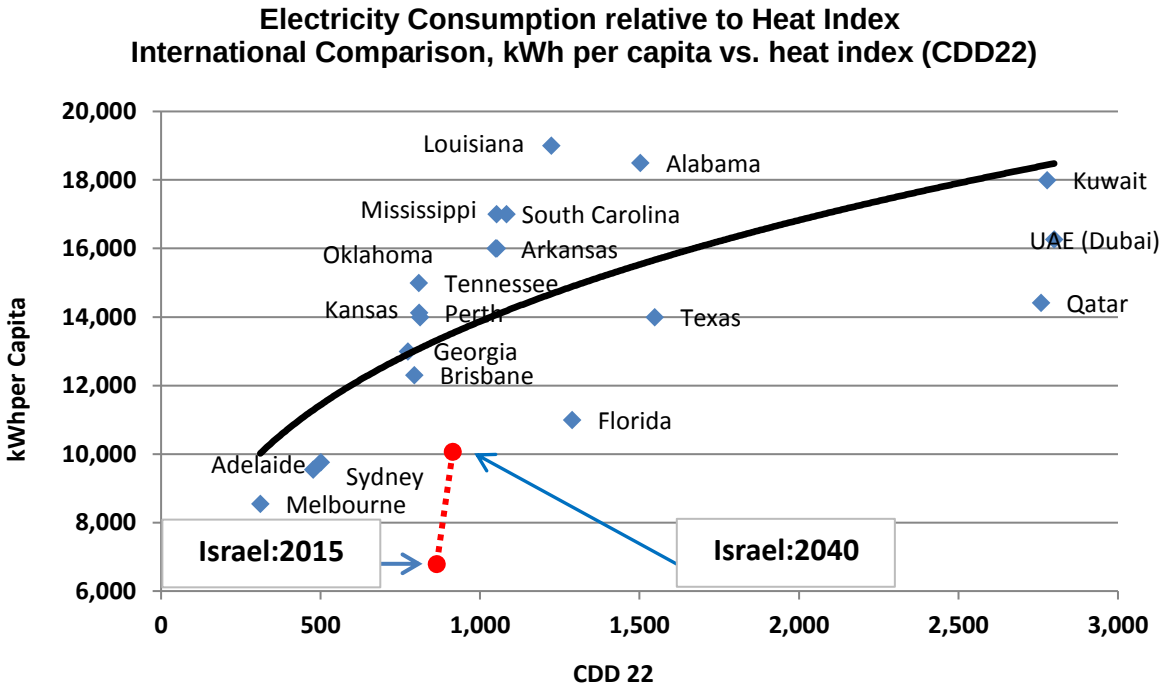
Source: BDO Analysis and Degree Days.net

The only country where the heat index approaches that of Israel is Greece. However, Israel's per capital GDP is 40% higher than that of Greece, and ownership of air conditioners in Greece is substantially lower than in Israel – 87% in Israel compared to less than 40% in Greece. Therefore, none of the OECD countries represents a relevant comparison benchmark for Israel's potential electricity demand.

Hence, it is not possible to base the potential level of electricity consumption in Israel on a direct comparison with OECD countries. Appropriate examination of the Israeli potential electricity demand should be carried out by comparison to other hot regions around the world.

A comparative study of per capita electricity consumption, which takes into account the climatic conditions in warm regions and countries, shows that per capita consumption in Israel is 50% lower than the trend line of countries with a warm climate.

The chart below presents the inter-dependence between the climatic conditions (as expressed in cooling degree-days) and per capita electricity consumption in warm regions worldwide. The comparison includes regions with an average per capita income level above $50,000 a year.



Source: World Bank and BDO analysis

Note that we have not included a similar comparison for heating degree-days, as such a comparison would not account for the fact that in most developed countries residential winter heating is based predominantly on boilers running on gas or diesel. In contrast, Israel has no residential gas distribution system. Therefore, in contrast with other developed countries, air-conditioners in Israel provide the main source for both heating and cooling.

This relatively low level of electricity consumption in Israel is a result of a standard of living that is 50% lower than other comparable warm countries. In line with this, we expect that in the coming years the standard of living in Israel will rise and be accompanied by an increase in the consumption of electricity as well as by closing of the gap between Israel and other developed warm weather countries with high-income levels.

The effect of weather conditions on electricity consumption is evident when analyzing electricity demand levels in various U.S. states. There is a high variability in climatic conditions in different regions in the United States. This high variance leads to large differences in electricity consumption patterns. In the south, where the climate is hot and humid, and similar to Israel, per capita electricity consumption is nearly twice the level of Israel. We believe that the main reason for the low per capita consumption in Israel is the result of the gap in the standard of living. The consumption gap is expected to be reduced as the per capita income level rises.

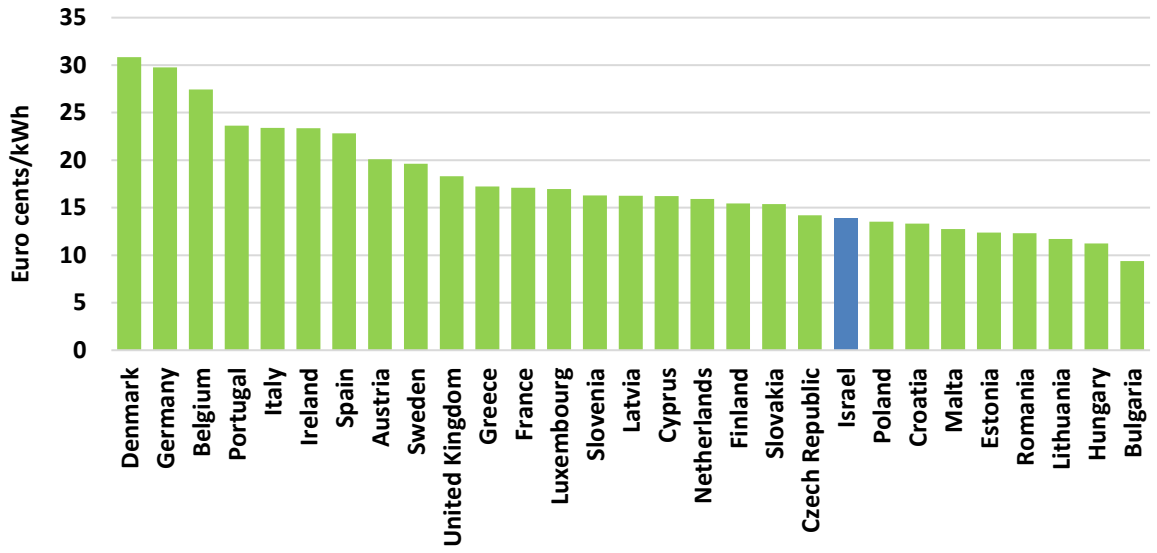
According to this analysis, and assuming Israeli electricity tariffs are in line with the average, Israeli per capita consumption of electricity is expected to reach the level of 12,500 kWh when per capita income levels reach $60,000 annually. Our more conservative forecast assumes that Israel's demand per capita will reach 10,000 kWh when GDP reaches $57,000 in 2040.

2.5. Electricity Prices Impact on Demand

According to our econometric analysis of past years trend, the elasticity of demand for electricity in relation to price in Israel stands at approximately 0.35[2]. This means that a 10% increase in price will lead to a 3.5% drop in demand and vice versa, a 10% drop in rates will lead to a 3.5% increase in demand with all other variables being equal. The process of adjustment of demand to a change in price is gradual over a period of around three years.

Electricity prices in Israel are below average compared to EU countries. The low electricity prices are mainly a result of the dense and urban nature of Israel, which results in lower transmission network costs, as well as lack of carbon taxes.

Residential Electricity Prices – International Comparison, 2016



Source: Eurostat and BDO Analysis (Including VAT)

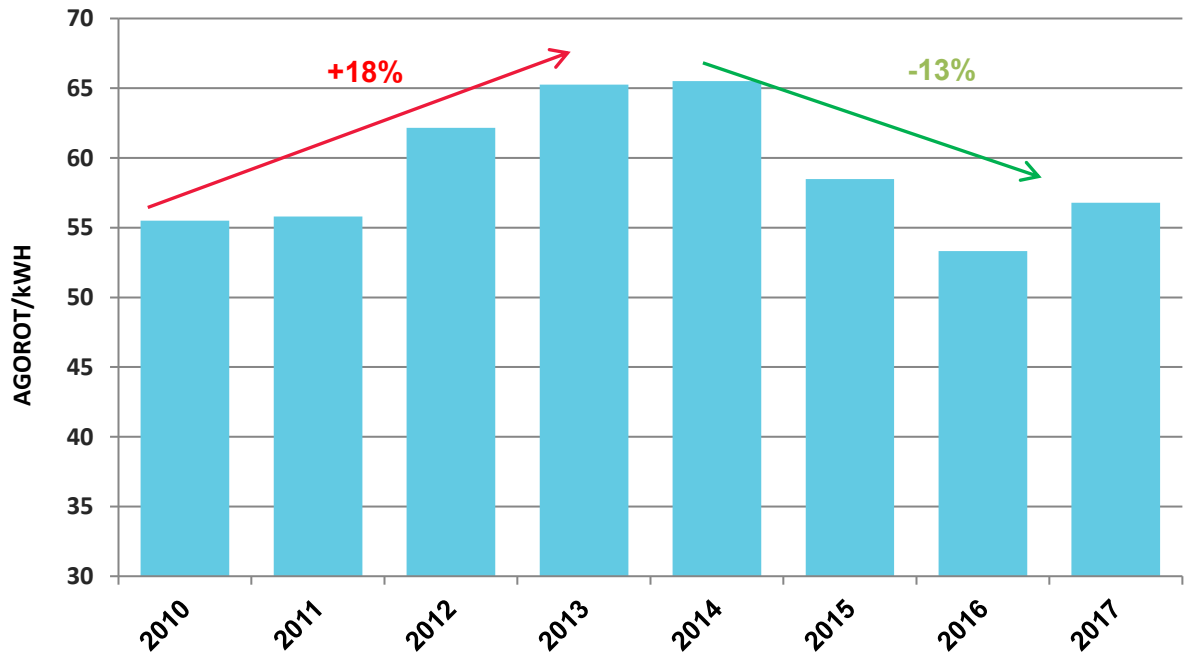
In the years 2010-2013, the electricity tariff in Israel rose by about 18%, due to the temporary shortage of natural gas and the use of more expensive fuels. The impact of the elasticity of demand in relation to price in this case led to about a 5.5% decline in demand during those years.

The conclusion is that the slowing of the trend in the demand over those three years was partially due to the influence of rate hikes caused by a shortage of natural gas, and not from a change in consumption patterns for electricity.

[2] Similar price elasticity coefficients were estimated by Milken Institute Research, 2012.

Electricity rates today in 2017 are 13% below those of 2014. The reduction is expected to lead to an additional 5% increase in demand for electricity over the following three years, over and above the normal growth in demand.

Household Electricity Rates
(2016 prices, including VAT)



Source: IEC Reports and BDO analysis

It should be noted that the above electricity prices represent IEC's regulated tariffs. In recent years, the share of private producers (IPPs) in the electricity market is increasing, and has already reached 28% this year. IPPs typically offer a 7% price discount relative to IEC prices, and therefore create additional price based stimulus to increased electricity demand.

3. Electricity Demand Forecast

3.1. Methodology

BDO's forecast for electricity demand is based on a long-term bottom-up disaggregated demand model. The Israel economy macro-economic forecast is based on the Macro Analytics model of the Israeli economy.

The demand for electricity in the economic sectors is dependent on several economic variables. These include income growth, penetration of electrical appliances, price of electricity, demographic variables (i.e. population composition, growth rate, household size etc.) and weather conditions.

The major factors likely to impact growth are an increase in disposable income, an increase in real wages, growth in the use of electrical appliances (primarily air conditioners for heating and cooling), and the increased penetration and usage of appliances. The effect of energy efficient lighting and appliances is also a factor that has been taken into account.

BDO's demand model includes several main demand components:

1. Household demand for electricity (private consumption), which is based on demand models for major appliances, that factoring in penetration rates, the intensity of usage, and energy efficiency.
2. Demand by the public, commercial and service sectors of the economy, based on the macro-model for the Israeli economy.
3. Industrial demand, based on our model, which factors in the relative weight of energy intensity in various sectors.
4. Demand for desalination in the water sector, based on our model for water demand.
5. Palestinian demand which is currently part of Israeli demand. We assume that in the coming decade the Palestinians will generate a large part of their electricity.

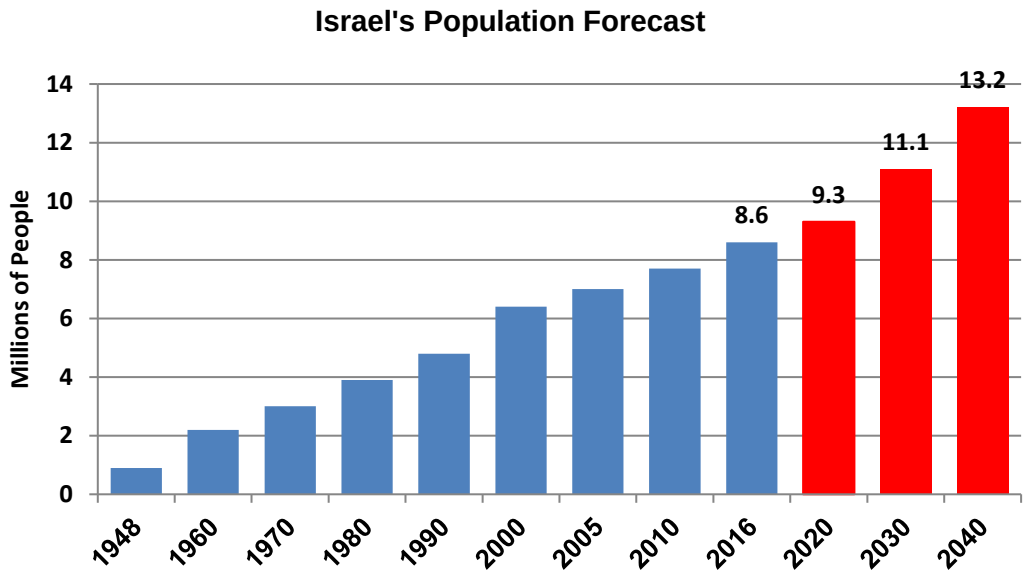
As mentioned, the electricity demand model is based on a bottom-up approach. This includes the effect of improved energy efficiency and of increased penetration rates of usage of household appliances. The results indicate similar demand levels to regions with comparable weather.

Our analysis indicates that standard of living and climate are the main factors influencing electricity consumption. In cold countries, consumption tends to be lower due to the low penetration of air conditioning and usage rates as well as the usage of other energy sources other than electricity for heating (natural gas or other fossil fuels).

3.2. Demographic growth

Israel's demographic growth averaged 1.9% per year in the last decade, with a similar 1.9% increase in 2016. The fast population growth is due to high fertility rates, especially in the ultra-Orthodox and Arab communities, along with increasing life expectancy.

Our forecast is based on the latest demographic projection forecast issued by the Israeli Central Bureau of Statistics (CBS) in May 2017. This updated forecast predicts a continued annual increase of 1.8% in Israel's population through to 2040. According to this forecast, Israel's population is projected to reach 13.2 million by 2040.



Source: CBS May 2017 and BDO Analysis

It is important to note that for the purpose of electricity and gas demand forecasts, the relevant demographic growth for the next 20 years has already been pre-determined. Electricity demand is dependent mostly on the number of households and the number of participants in the labor force. Babies born today will create their own households and join the labor force only in about 20 years. Therefore, the effect of slowdown in fertility rates in the next decade has only marginal impact on the electricity and gas demand over that period.

3.3. Residential Demand for Electricity

The residential demand for electricity accounts for 30% of total demand, and is still far from the saturation point. By comparison, the per residential capita demand in Israel stands at 2,000 kWh annually, compared to 5,500 kWh in states in the U.S. with a warm climate. Even if the size of the average house or apartment is taken into consideration, there is still a 100% difference.

Residential Electricity Demand Forecast Summary

	2015	2020	2025	2030	2040	CAGR 2040-2015
Population (millions)	8.5	9.3	10.2	11.1	13.2	**1.8%**
GDP per Capita (thousands of US$, 2016 prices)	37.2	39.7	43.7	48.1	56.8	**1.7%**
Heat index (cooling degree days, 22C)	865	911	957	1,003	1,095	**0.95%**
Coldness index (cooling degree days, 18C)	526	497	468	439	381	**-1.2%**
Residential electricity demand per capita (Thousands kWh)	2.0	2.2	2.4	2.7	3.2	**1.8%**
Total Residential Electricity Demand (bil. kWh)	6.5	7.0	7.7	8.6	9.9	**1.7%**

Source: BDO forecast

The results of our demand model predict a 3.5% annual increase in household demand during the years 2017-2040, representing a per capita annual growth rate of 1.7%. The rise in household demand in Israel stems not only from the rising penetration level of electric appliances but also from the greater intensity of usage.

The rise in the standard of living leads to a greater intensity of usage of household electric appliances over and above the level of penetration. This translates, for example, into the gradual use of air conditioners by ever-larger segments of the population in all rooms of their homes along with their use during day and night hours, increased penetration and use of dishwashers, and of clothes dryers.

The increased participation in the work force, particularly of the Ultra-Orthodox and the Arab sectors, is expected to lead to the increased use of household electric appliances among those segments of the population over and above the rise in their standard of living (the elasticity of

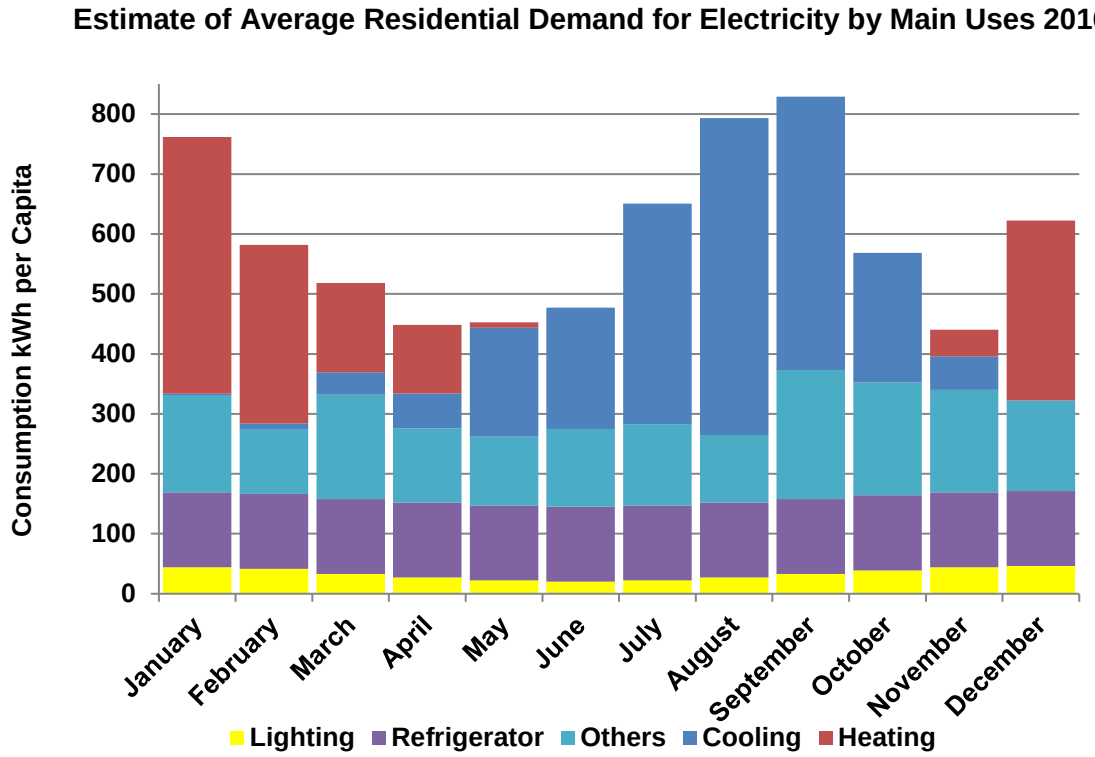
demand in those segments of the population in relation to income is greater than one). The increase in the participation of women in the work force is directly related to the rise in the use of dryers, dishwashers, microwave ovens and other related appliances. This is especially the case with those appliances whose usage rises due to time constraints. In addition, we also assume that by 2030 residents of the Bedouin community living in communities not officially recognized by the state and not currently linked to the grid, will be connected.

Our forecast assumes a continued improvement of energy efficiency in household electric appliances on average of 2% annually. It should be noted that Israeli households have completed the full-scale, regulatory driven, switchover to energy efficient lighting, and in the coming years the penetration of UltraHD television sets, with 30% higher energy consumption, is expected to take place.

However, It is important to stress that energy efficiency does not always mean a reduction in overall energy consumption, as the trend is often accompanied by larger appliances and greater usage (due to a drop in the effective price). Moreover, in the Israeli economy one finds that in many cases the switchover to new more efficient appliances often means the older ones make their way to the weaker segments of the population and are continued to be used.

The trend of climatic warming occurring in Israel (0.5 degrees centigrade every decade according to the World Bank and in line with past trends) will also lead to a growth in electricity consumption by households, over and above the growth in income levels. The 13% drop in the price of electricity over the past three years has yet to completely express itself in the behavior patterns of households. We predict this will lead to an increase in the intensity of use because of the impact of the lower price (beyond the income influence) and that in turn will lead to an additional 5% growth in demand for electricity during the next three years.

Penetration rates for many home appliances in Israel, like air conditioners, dryers and dishwashers, are still on the rise. The high penetration rate of air conditioners in Israeli households is a result of the warm climate and they account for a large percentage of demand. Air conditioners used for climate control, cooling in the summer and heating in the winter. Another factor is the need for heating water in the winter months, which is also done using electricity, as Israel has no residential natural gas distribution infrastructure. The following diagram illustrates residential electricity consumption division by main appliances.



Source: Public Utility Authority data and BDO analysis

The growth in electricity consumption in Israel stems from a combination of a continued growth in the penetration of household appliances along with the growth in the intensity of usage. The rise in the standard of living and of disposable income brings with it an increase in ownership of appliances and their use.

Based on these factors our model takes into account a number of assumptions:

1. Average annual energy efficiency rate of 2% in major appliances.
2. An increase in the penetration rate of household electrical appliances.
3. A rise in the usage rate of appliances, based on the influence of the increase in the standard of living and the price of electricity.

3.4. Industrial Sector Electricity Demand

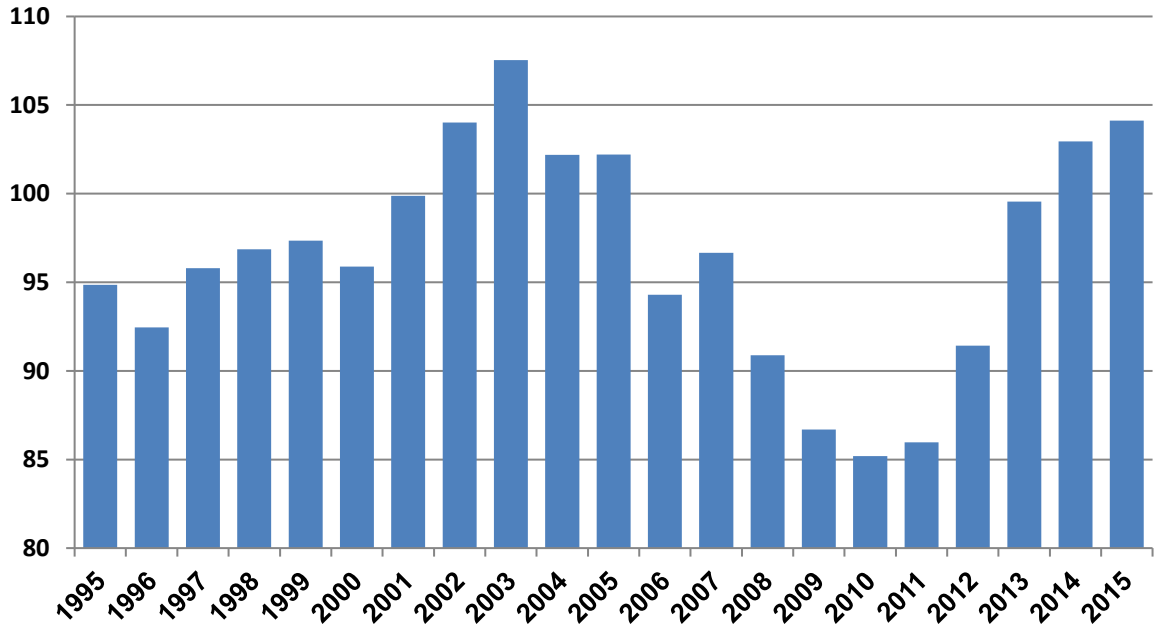
Industrial demand for electricity accounts for about 30% of total demand in Israel. Per capita demand for electricity currently stands at around 1,800 kWh compared to 3,500 kWh on a per capita basis in the U.S. We estimate a 2.5% annual increase in consumption of electricity by industry in Israel, which is equivalent to a 0.7% per capita annual increase. This means that even in 2040 the per capita demand for electricity will still be 50% lower than in the U.S today. This is largely due to the lower percentage of high-energy intensive industry in Israel versus the U.S.

The demand for electricity in industry includes the demand from the Israel Electric Corp and IPPs, as well as in-house production and cogeneration by industrial plants. In recent years, with the entry of natural gas, a process of electricity self-generation and combined heat-and-power (CHP) generation by large industrial plants has gotten off the ground. This trend has led to a reduction in the effective cost of electricity to industry as well as a contribution to the competitiveness of energy intensive industries in Israel.

There was a 10% decline in energy intensity in Israeli industry between 2007 until 2011. This trend reversed itself in the past five years with energy intensity in industry rising by about 20% in relation to industrial production. In our estimation, the drop in the intensity in electricity usage at the beginning of the decade was due to a shortage of gas supplies, a direct result of a halt in supplies from Egypt and Yam Tethys depletion. The shortage of gas and rise in electricity prices that accompanied these developments, led to a delay in implementing energy intensive investment plans by Israeli industry. The coming on-line of the Tamar gas field, the lifting of the uncertainty regarding the development of the Leviathan field, and the drop in the price of electricity led to a reversal of this trend and Israeli industry increased the intensity of electricity consumption (see chart below). This was due in large part to the comparative advantage of Israel resulting from low electricity prices relative to other western countries.

Electricity Intensity in Israel's Industry Sector

Index of industrial electricity demand (including consumption from the IEC, own production and IPP'S) relative to industrial production (2001=100)



Source: CBS data, BDO Analysis

A detailed examination of the expected trends in Israel's industrial sector strengthens the assessment that a drop in the intensity of electricity use in industry is not expected. In the next few years, Israel Chemicals Ltd. (ICL) is expected to bring on line the Dead Sea salt harvesting project, a process that is extremely electricity intensive. Intel, which also operates in an electricity intensive environment, is expected to complete the $6 billion upgrading of its Fab 28 facility in 2018. The availability of gas is expected to support the development of electricity intensive plants for the production of ammonia, urea, methanol and GTL. The future development of the refining industry in Israel expected to be accompanied by an increased level of complexity and a transition to complex cracking, which involve energy intensive processes.

The level of productivity in traditional and low-tech industry in Israel is low by international comparisons, largely due to low capital intensity. Over time, we predict that Israeli industry will reduce the productivity gaps with western countries by increasing capital intensity and investment in automation and robotics. An increase in capital intensity in industry translates into greater energy intensity. Therefore, this process will lead to a closing of the gaps with western countries and an increase of productivity in industry, which will also mean an increase in electricity use intensity of the industry sector.

3.5. Railway Electrification

Today all the public transport in Israel runs on diesel (with the exception of a single light rail line in Jerusalem). That is in contrast to many other developed countries, where extensive networks of electric rail and metropolitan transit already exist.

In the coming years, the government and municipalities plan huge investments, which will substantially change Israel's public transport network. These changes include complete shifting of the entire Israel Railways network from diesel to electricity, as well as expanding the Israel Railways network and the doubling of its passenger traffic.

By 2025, Israel Railways will transport 75 million passengers per year on electric lines, while the Tel Aviv light rail metro will transport more than 165 million passengers per year. Demand for electricity for this railway traffic is forecast to reach 0.8 billion kWh by 2025 and 1.2 bil. kWh by 2030.

Israel Railways is going through a major overhaul in the next few years, including a conversion to electric engines and the building of new stations. In 2016 the transportation minister approved a landmark 28.3 billion NIS (7.5 billion USD), four-year budget for the project – the largest amount ever allocated to Israel Railways. A major part of this program includes

converting the entire rail system to run on electricity. This will entail the need for new rail cars, tracks and infrastructure, for which a budget of 12 billion NIS (3.2 billion USD) has been allocated. The electrified trains are essential for Israel Railways' development plan in order to double the number of trains in daily operation and provide service to twice the number of passengers within the next decade. According to the plan the number of trains running on a daily basis would increase from 450 to 860 and bring the system to its goal of transporting 70 million passengers per year.

The Spanish company SEMI (Sociedad Española de Montajes Industriales) has won the Israel Railways infrastructure tender, and will be responsible for the electrification of 420 kilometers of existing and planned railway tracks, as well as building transformer stations and command and control systems.

Israel Railways has also ordered 330 double-decker passenger rail cars for the electric system, as well as 60 electric engines. The new cars will have the capacity to seat about 33,000 passengers. The first new electric trains are expected to arrive in Israel in 2019, towards the commencement of operation of the electric rail system in 2020.

In addition to the national railway system, electric light rail projects are in progress in Tel Aviv and Jerusalem.

The Tel Aviv Metropolitan Area Mass-Transit System's blueprint includes eight lines: of which one is under construction, two are under approval, one is in planning stages and four more planned for the future. The first four lines will cover 100 km around the Tel Aviv metropolitan area, with future plans for BRT lines and additional feeder lines.

The Red Line is planned to be completed by 2021 and is expected to serve 70 million passengers annually. The second line planned for 2024 is the Green Line that will serve 65 million passengers per year.

In Jerusalem, the second light rail line, the Blue Line, was approved by the municipality and is planned to be completed by 2021. The 23-kilometer-long Blue Line is expected to serve 145,000 passengers per day, and will double the passenger light trail traffic compared to the current Red Line. A third line, the Green-Line is also set to be approved.

3.6. Electricity Demand in the Commercial and Public Sectors

Per capita electricity consumption in Israel’s private and public services sectors amounts to 2,100 kWh, half the level in states in the U.S. with similar climatic conditions. We expect 3.6% annual growth in demand in these sectors, which represents per capita growth of 1.8%. The

rise in the standard of living is likely to be accompanied by a rise in the weight of energy intensive services like the health sector, hotels and airports.

The demand for electricity in the commercial and services sector, as is the case in the household sector, is greatly influenced by climatic conditions and consumption levels remain far from the saturation point. Like industry, the service sector is characterized by a low level of capital intensity in comparison with other developed countries, which is expressed by lower productivity than in other sectors of the economy. With the rise in per capita GDP, we project an increase in capital intensity in these sectors accompanied by a similar rise in electricity use intensity.

The transfer of large electricity consumers in the commercial and services sectors to private power producers has been accompanied by about a 7% drop in rates for these customers. The decline in rates has impacted all segments of the economy but economic growth has served as an additional factor that has contributed to electricity use intensity.

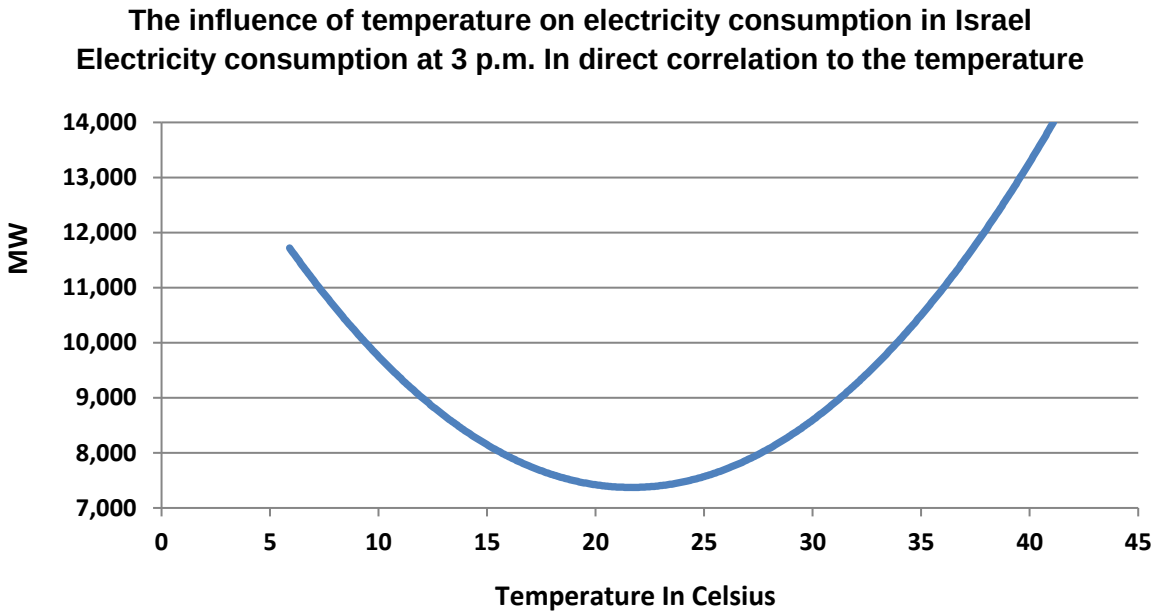
Among the factors that are expected to lead to an increase in the rate of growth in electricity consumption in the public sector are the lack of widespread use of air conditioning in the educational system and public institutions, the extensive transfer of IDF (Israeli Defense Force) bases to the south of Israel and the implementation of the government's five-year program to promote economic development in the Arab and Bedouin sectors. In addition, for years now there has been an expectation that stricter environmental standards will be imposed, that will lead to an increase in the percentage of waste being recycled rather than landfilled. This would also lead to an increase in electricity use by municipalities.

3.7. Electricity Use for Water Pumping and Desalination

Over time the sole source of supplying increased demand for water in Israel is through desalination of seawater, a process that is energy intensive. Electricity consumption for pumping water and desalination currently stands at 4 billion kWh annually. The demand forecast for electricity to produce desalinated water is a function of the future demand for water in Israel along with the assumption of an improvement in the energy efficiency in desalination technology. We predict that the annual demand for desalinated water in 2030 will be around 3 billion cubic meters, which translates into 7.8 billion kWh of electricity consumption.

3.8. The Impact of Climate Change - Global Warming

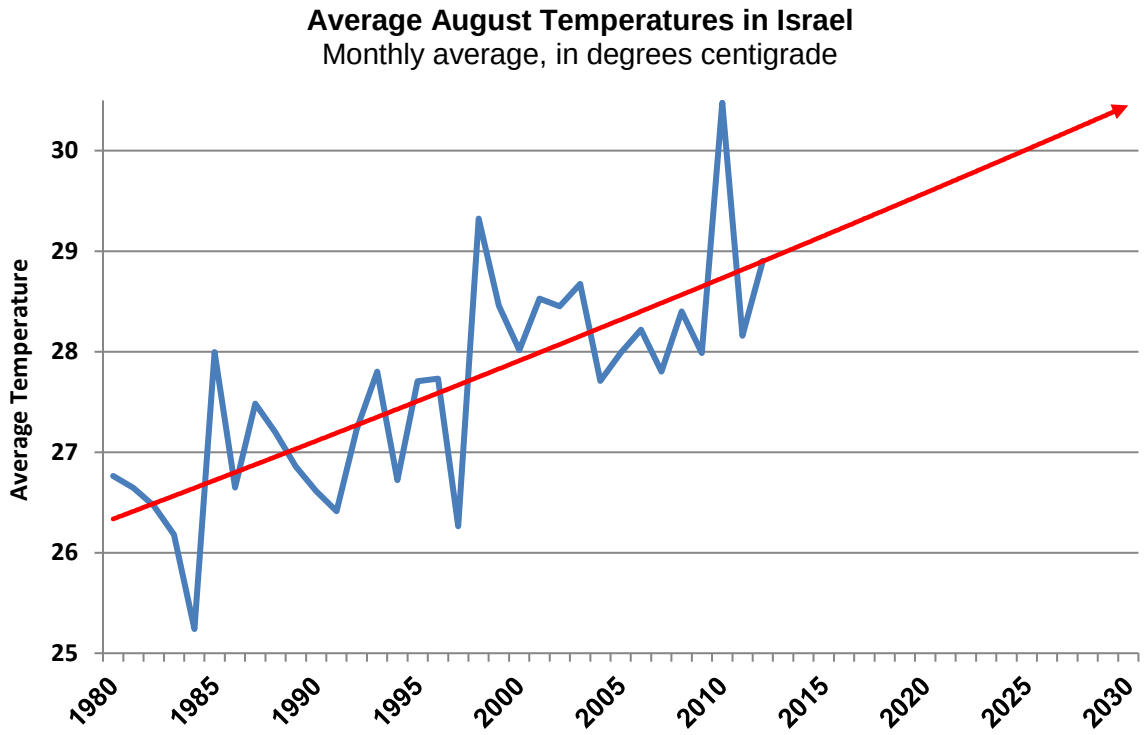
A substantial portion of electricity consumption in Israel is related to the use of air conditioning in the summer and heating and hot water in the winter. The changes in the weather (a hot summer or cold winter as opposed to an average one) can lead to up to a 10% deviation in demand for electricity in comparison to other years. Therefore, an analysis of the trends in demand require adjustments to be made for the climatic influences.



Source: Israel Meteorological Service, IEC, and BDO analysis

The graph above presents average electricity consumption in Israel at the peak time of the day (3 P.M.) in direct correlation to the temperature at that hour. The so-called comfort zone in Israel is considered 18-22 degrees Celsius. When temperatures rise above 22 degrees there is a sharp increase in electricity consumption, to the point where demand doubles at 40 degrees. When temperatures drop below 18 degrees there is a similar increase in consumption for heating purposes.

The experience of the past 30 years in Israel points to a clear warming trend, at an average rate of 0.5 degree Celsius every decade. According to the forecasts published by the World Bank, this trend is expected to continue and by 2030 the average summer temperature Israel will be 1.5 degrees higher than present. The forecast for electricity demand is based on normal average weather conditions, but as the data shows the average is is gradually increasing, and therefore future changes in climatic conditions must be taken into account in long term planning.



Source: World Bank Data BDO analysis

Most researchers believe that the cause of climate change is the impact from global warming and the development of warm air pockets in urban areas. Studies also show that the warming process is accompanied by an increased number of extreme weather (very hot or cold) days. This in effect means there is a greater chance for an extreme increase in electricity demand. This will require a suitable forecast regarding electricity production to enable the sector to deal with extreme weather conditions that are likely to increase in the coming years. However, for our forecast we did not take into account the influence of extreme weather conditions, but only the predicted rise in average temperatures.

The expected rise of 0.5 degree every decade, will according to our analysis lead to an increase of 10 cooling days annually. This will lead to a 0.15% increase in electricity consumption annually over and above the base curve.

3.9. Electric Vehicles

Israel was among the pioneers of electric vehicles in the world. The Israeli electric vehicle startup *Better Place* began operations in Israel in 2008 and at its peak in 2013 there were 1800 charging stations throughout the country. The failure of the company has led to distrust and resistance in the Israeli auto market to electric vehicle initiatives. While the past three

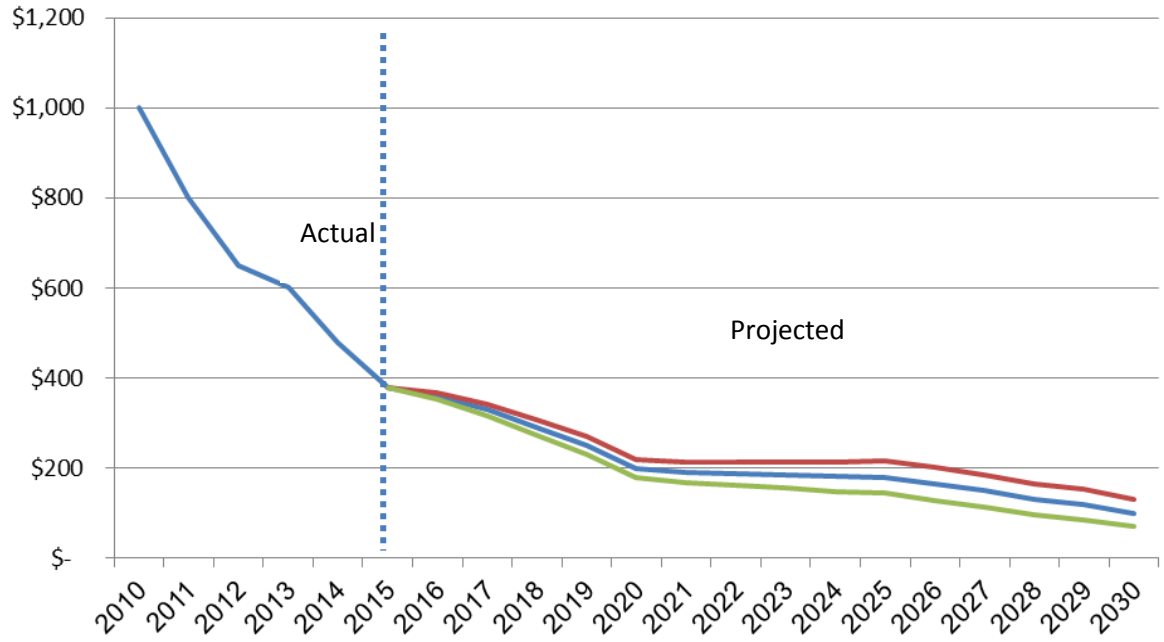
years have witnessed a rapid change in demand for electric vehicles abroad, only a few have been sold in Israel.

However, the success of Tesla Motors, which currently trades in the U.S. at a $60 billion market valuation, represents an indication that the failure of Better Place was only an isolated event, and that the electric vehicle sector has huge long-term potential.

The major change in the electric vehicle industry has been brought about by technological improvements that have led to a drop in the cost of batteries. The cost of a battery for an electric vehicle has dropped by 50% in the past four years, and estimates are for a similar decline within the next three years

The Projected Decline in Cost of Lithium-Ion Battery Packs

Three scenarios, 2015-2030



Source: Bloomberg

The decline in the cost of batteries, along with the environmental advantages of electric vehicles, and the introduction of self-drive and smart vehicles, are expected to lead to a structural change in the global and Israeli auto markets.

The basic economic conditions that led Better Place to choose Israel as one of its first test markets still exist. Israel holds a relative advantage in the adoption of electric vehicles, due to a combination of unique demographic and geographic factors. The Israeli economy is small

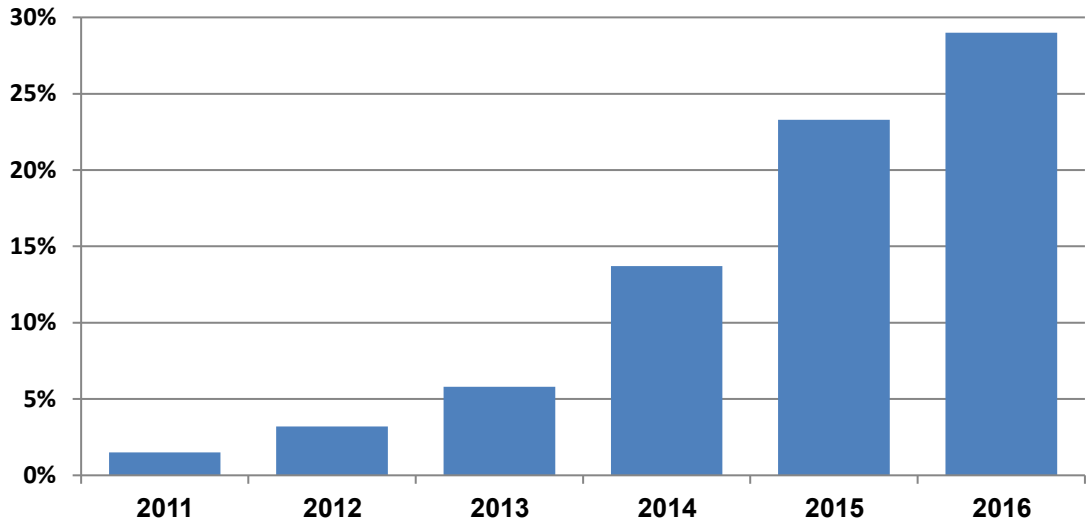
with closed borders. Therefore, the cost of establishing a network of charging stations throughout the country would be relatively low.

The distance limitation for travel by electric vehicles is less significant in a small country like Israel since the average travel distance is much shorter. Israeli roads are among the most crowded in the western world. The Israeli consumer is also characterized by being an early adopter of new technologies.

Electricity rates in Israel are among the lowest in the world, while gasoline prices are among the highest, due to high taxes. The high rate of taxation on cars in Israel combined with the tax incentives for electric vehicles underscore the high profitability of switching in comparison to other countries.

In the past years, Norway took the global lead as the pioneer of electric vehicles. A combination of tax incentives and supportive regulation led to the adoption of electric and plug-in charged vehicles in Norway. In the 2016 29% of all vehicles sold in Norway were electric or plug-in hybrid vehicles.

Market share of electric vehicles in Norway



Source: Norwegian Road Federation

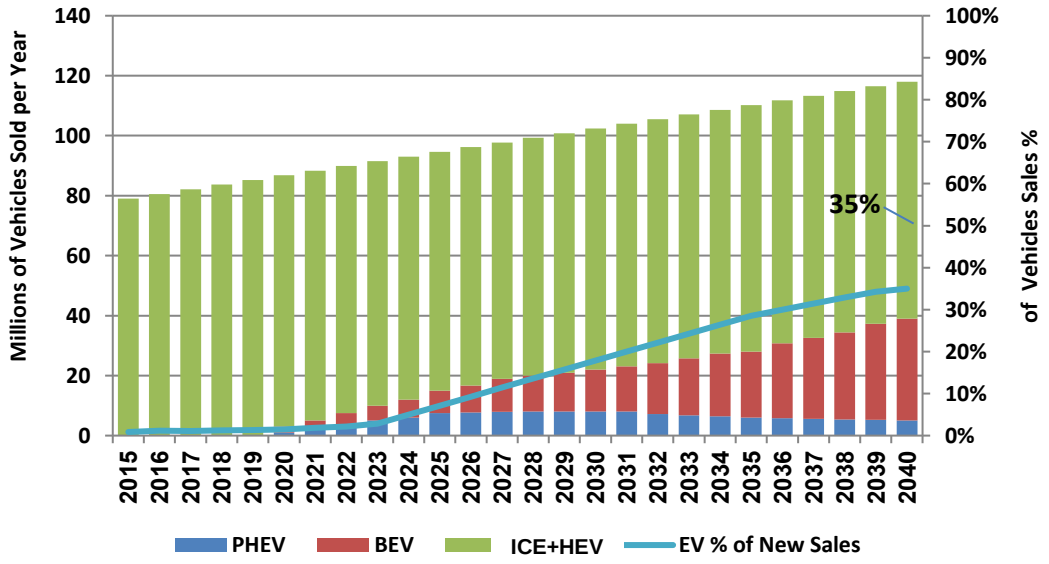
Recently, there has been an initiative in the Norwegian Parliament to require the complete switchover to electric vehicles by 2020. This would be accomplished by a ban on the sale of non-electric vehicles. The environmental advantages for Norway would be huge as 99% of the country's electricity is produced by hydro-electric plants.

The Norwegian example, along with the financial success of Tesla, clearly show that the electric vehicle has passed the experimental stage and is expected to become a substantial

force in the global auto market in the medium and long terms. Estimates are that by 2030, 15% of the new vehicles sold in the world will be electrically charged and that by 2040 their number will rise to 35% of all vehicles sold worldwide. Technological developments in battery technology along with the development of autonomous electric vehicles and taxis are the key demand drivers.

Forecast of Global Sales of Electric Vehicles

(Plug-in Hybrid Electric Vehicle, Battery Electric Vehicle, Internal Combustion Engine+ Hybrid Electric Vehicle)



Source: Bloomberg

The Israeli market appears to be on its way to the renewed entry of electric vehicles. One of the main barriers that prevented the entry of electric vehicles was the requirement for expensive standalone charging stations. This model suited Better Place, which offered a full service package. In contrary, one of the elements that has led to the success of the electric vehicle market in Norway is the possibility to charge vehicles at any electric outlet.

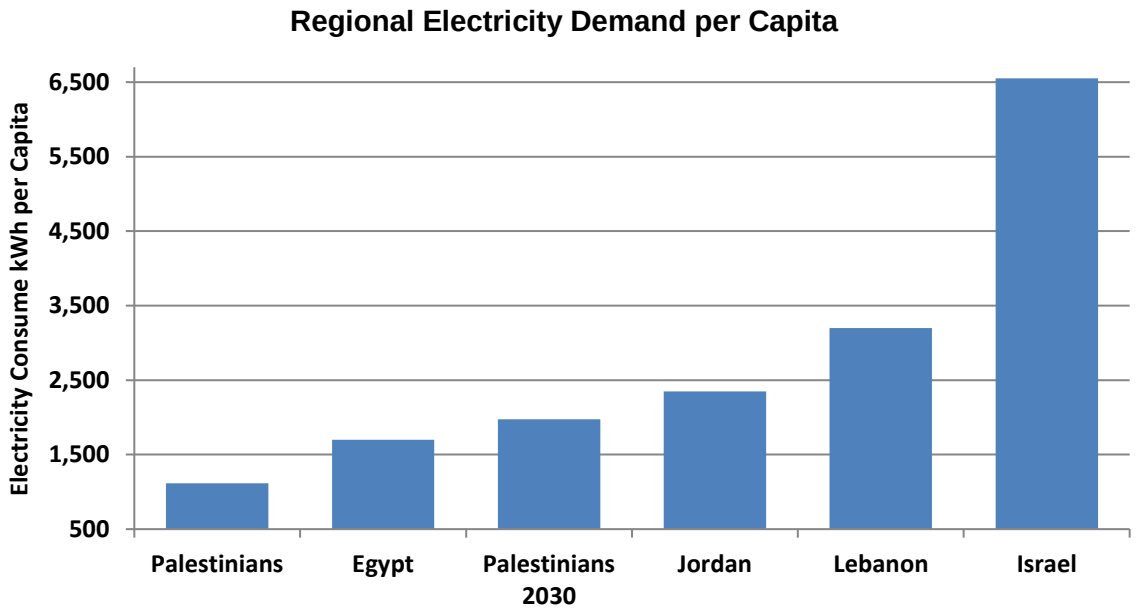
In July 2016 a new Israeli standard for charging cables for electric vehicles was approved and it will sharply reduce the barrier preventing the switchover to electric vehicles. In addition, in June 2016 the Knesset Economics Committee approved a NIS 220 million ($60 million) budget to encourage the use of electric vehicles. The Environmental Protection Ministry is financially encouraging municipalities to initiate shared urban electric car initiatives, similar to the French Autolib' initiative.

Our forecast for the Israeli market is based on the assumption that penetration rates of electric (including plug-in) vehicles in Israel will be similar to the Bloomberg global forecasts.

Accordingly, we assume that penetration of electric cars, and plug-in electric cars, will reach 15% of new cars sold by 2030. Total electricity demand for charging electric vehicle is estimated at 2% of electricity demand in 2030.

3.10. Palestinian Demand

The Palestinians in the West Bank and Gaza currently rely on electricity generated in Israel for most of their electricity demand, except for a 200MW diesel turbine in Gaza that operates on a limited basis. Palestinian electricity demand stands at about 1,110 kWh per capita per year, the lowest consumption level in the region. The low electricity intensity of the Palestinian economy is mainly a result of the economic conditions, along with supply side limitations in the Gaza Strip.



Source: World Bank, BDO Analysis

The international community, led by the *Quartet*, has declared increasing electricity availability in the Palestinian territories as a major policy target. The *Quartet* is currently leading the *Gas for Gaza* project, with the support of the Israeli government. It aims to develop a gas pipeline connecting the Israeli gas network and the Gaza Strip. The forthcoming connection of Gaza to the Israeli gas grid will enable the development of power generation units in Gaza, increasing supply and electricity consumption.

In the West Bank, a first 450MW power plant in Jenin is in initial planning stages, with the support of the Palestinian Investment Fund. In 2014, an MOU to purchase gas for the Jenin power station was signed between the Leviathan consortium and the Palestinian Power Generation Company. This agreement was cancelled due to the delay in the development of Leviathan. We expect negotiations to resume now that the development of Leviathan is progressing.

From the point of view of overall gas demand, Palestinian electricity production can be viewed as a "zero-sum-game", as any increase in Palestinian self-generation will lead to a reduction in Palestinian electricity purchases from Israel. However, we believe that the potential of lower electricity costs through self-generation, along with increased supply reliability in Gaza, will stimulate growth in Palestinian electricity demand. We project that by 2030, Palestinian electricity demand levels will reach 2,000 kWh per capita, 20% less than current consumption levels in Jordan.

In the longer term, the Shell owned Gaza Marine offshore field (32 BCM of reserves) may supply some of the Palestinian gas demand. However, we believe that the development of Gaza Marine is not feasible under the current geo-political conditions and is unlikely to take place so long as the Hamas continues to control the Gaza Strip.

Palestinian Demand Forecast Summary

	2015	2020	2025	2030	2040	CAGR 2015-2040
Population (millions)	4.7	5.3	6.1	6.9	8.9	2.6%
GDP (Billions, USD)	11.2	13.6	17.0	22.1	43.5	5.6%
GDP/Capita (USD)	2,408	2,557	2,807	3,211	4,887	2.9%
Electricity (Bil. kWh)	5.2	6.7	8.9	13.4	30.2	7.3%
Electricity per capita (kWh)	1,113	1,255	1,466	1,939	3,392	4.6%
Electricity (kWh) / $ GDP	0.46	0.49	0.52	0.60	0.69	1.6%
Palestinian Self-Generation	5%	5%	85%	100%	100%	-

Source: CBS, BDO Analysis

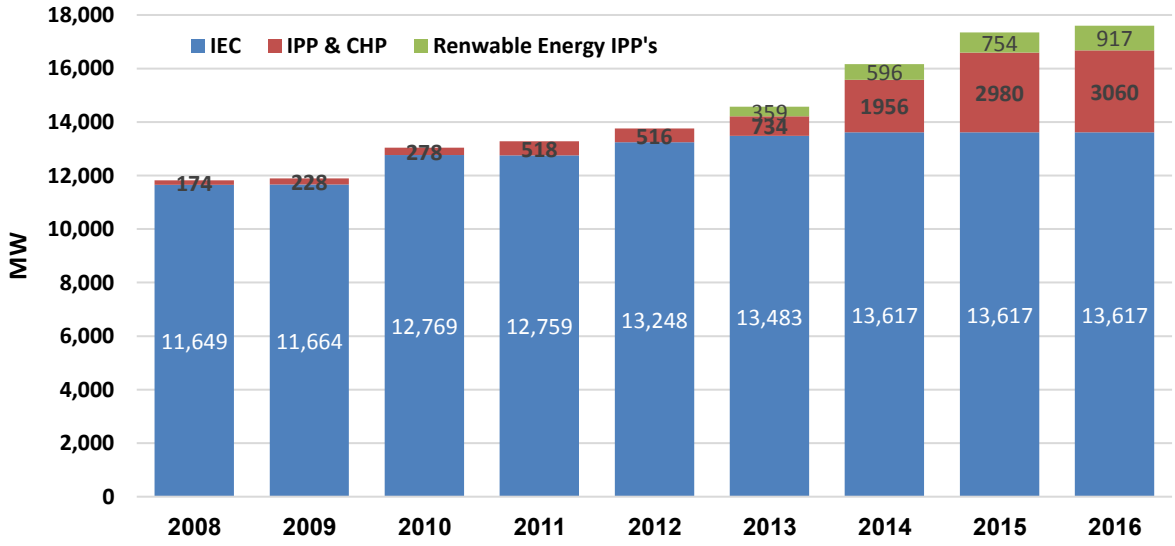
4. Electricity Supply Forecast

4.1. Background

The Israeli electricity market is totally isolated ("electricity island") and thus fully dependent on domestic production. Therefore, self-sufficiency is required at all times. Until 2013, the Israeli electricity generation market was dominated by the state-owned utility, the Israel Electric Corp ("IEC").

In 2005 the market was opened up for competition with the introduction of new regulations by the Public Utilities Authority (PUA). This opened the way for Independent Private Power producers (IPPs) to enter the electricity generation segment. The beginning of competition was facilitated to a large degree by the entry of natural gas into the domestic market, which enabled private power producers to produce electricity at a competitive price. In order to promote competition, the government policy is that in the future all additional generation capacity is to be built only by private producers

Israeli Electricity Generation Capacity (MW).



Source: IEC Investor Presentation

In 2016, out of a total generation capacity of about 17,600MW, 4,840MW (28%) was based on coal, and 11,828MW (67%) on natural gas units. However, in terms of production, 62% of electricity was produced using gas. Currently, IEC runs the coal units as base load units, at high utilization rates. We estimate that as more gas is available to the market, coal units will be run at lower utilization rates, to reflect the advantage of natural gas to the national economy both from economic and environmental point of view.

Israeli Electricity Generation Capacity by Fuel, 2016 (MW)

	Coal	Gas	Renewables	Total
Israel Electric (IEC)	4,840	8,777	-	13,617
IPPs	-	2,476	917	3,393
Cogeneration & industrial	-	575	-	575
Total	**4,840**	**11,828**	**917**	**17,586**
% of capacity	**28%**	**67%**	**5%**	**100%**
% of electricity generation	**35%**	**62%**	**3%**	**100%**

Source: PUA, IEC and BDO analysis

Prior to the discovery of natural gas in Israel's offshore waters, electricity production was based on coal for baseload production, and fuel oil and diesel for intermediate and peak production.

In the past 12 years, natural gas has largely replaced fuel oil and diesel for the production of electricity in Israel. All additional production capacity since 2004 has been with natural gas power plants due to the economic and environmental advantages of using domestic gas over imported coal. (The only exception has been with a limited amount of production from renewable energy sources.)

In 2016 only 35% of the electricity produced in Israel was from coal and 62% from natural gas. Over time, no further coal based electricity capacity will be built. Consequently, a 1% increase in the demand for electricity translates into a 2% rise in the demand for natural gas. This is even before the implementation of the decision taken in August 2016 by the Energy and Water Minister to shut down 4 coal units at Hadera and its replacement by gas power plants after Leviathan starts production.

From a strategic point of view, all of the gas run power plants are dual-fuel units, and can be operated also on diesel or fuel oil. Therefore, the dependence on gas as the main fuel does not create a strategic risk for the supply of electricity to the economy, but rather economic and environmental risks. In the event of a shortage or a lack of gas supplies, production units will have to switch over to diesel and fuel oil, as was the case in 2012.

Recent policies implemented by the government are aimed at reducing the dependence on fossil fuels in general and on coal imports in particular for electricity generation. This is largely the result of environmental concerns and the low efficiency associated with these fuels and the economic advantages of utilizing local gas rather than imported coal. The Tamar and

Leviathan offshore gas fields have the potential to provide sufficient natural gas for the production of all electricity beyond 2040. This would of course reduce the reliance on the import of fossil fuels and further enhance Israel's self-sufficiency.

4.2. Private Producers

The electricity market in Israel is comprised of the state-owned Israel Electric Corp (IEC), a government owned integrated monopoly, which supplies about 72% of demand and private power producers that currently supply the remaining 28% of demand for electricity.

The electricity market is regulated by the Public Utilities Authority (PUA), which grants licenses to power producers and regulates IEC's prices.

There are currently 4 large conventional IPP's operating in Israel, with a total of 2,332MW installed capacity of gas based CCGTs: Dalia (912MW), Dorad (840MW), OPC (440MW) and IPP Delek Sorek (140MW). All four IPPs have declared their intension to build additional power plants in Israel, pending regulatory approval. In addition, there are 14 operational cogeneration (CHP) plants, with a total installed capacity of 575MW that generate electricity primarily for self-consumption.

Main Independent Power Producers, 2017

	Capacity (MW)	Startup Date	Operation Regime
Dalia	912	2015 Q3	70% Grid 30% Bilateral
Dorad	840	2014 Q2	Bilateral & Variable Availability
OPC	440	2013 Q3	Bilateral
IPP Delek Sorek	140	2016 Q3	Bilateral

Source: BDO analysis

According to government policy and regulation, IEC will not be able to increase its generation capacity, hence all incremental power supply will be built by private producers.

The existing structure of the electricity market in Israel includes two options for private power producers: the sale of electricity through bilateral agreements to end users and the sale of electricity to IEC. This structure designed to ensure the financial stability of the private power producers and at the same time encourage a competitive market by combining the possibility of electricity sales by private power producers to the IEC and the potential of higher returns through the sale to end users.

The prices of bilateral deals are not subject to regulation. Nevertheless, the common practice is for bilateral agreements to be linked to the regulated IEC price, along with an agreed upon discount between the parties.

Therefore, all prices in the electricity sector are directly influenced by PUA price regulation. In addition, private power producers have the option, in accordance with their licenses of operation, to allocate a certain percentage of their capacity to IEC, in line with the tariffs pre-determined in their licenses.

In general, the sale of electricity by private power producers to IEC is considered relatively low risk, since they receive a set rate for availability, which is designed to cover capital and fixed costs, as well as a variable payment that is designed to cover energy and variable costs. The rate structure for electricity sales to the IEC ensures a low level of risk for private power producers but the potential of profitability is limited. By contrast, bilateral sales to private end users have a potential for much higher return, though the private power producers are open to higher risk.

All private power plants in Israel are financed using project finance arrangements. Therefore, the construction of a private power plant is subject to the meeting of financial standards that fulfill the demands of the banks and financial institutions that finance the project. This creates an inherent system of checks and balances that serves to safeguard the financial strength of the private power plants.

The IEC is not permitted to offer customers discounts as the company is considered a monopoly in the production segment. Under existing market conditions, with private power producers representing only about 25% of capacity, real price competition in the bilateral segment of the market does not exist. This is largely the result of surplus demand.

Therefore, under existing conditions the risk of price erosion in bilateral deals involving private power producers and end users is relatively low. The major risk for IPPs, beyond operational ones, is the exposure to the regulated price of the IEC.

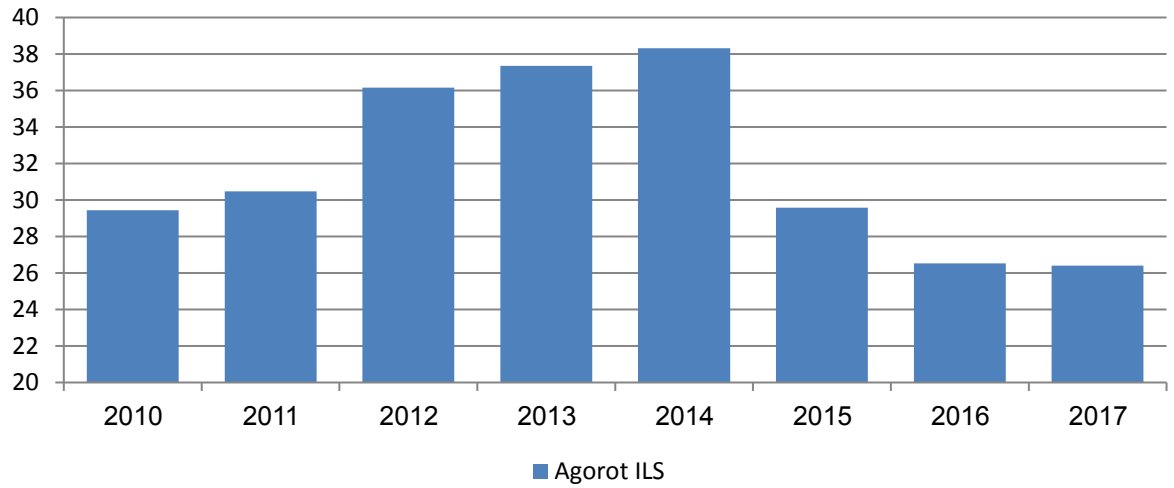
IPPs enter into long-term gas supply and purchase agreements to remove risks associated with fuel supply. The private producers purchase natural gas at a price that is linked to the IEC production tariff as determined by the regulator (PUA). This in effect allows them to hedge their risk, which results from the exposure to the regulated tariffs. However, the linkage formula of private power producers to the PUA rates includes a price floor. A drop below that floor does not trigger a further decline in natural gas prices.

Currently, the regulated PUA tariff is below the price floor which applies to gas purchases. Despite this decline in PUA tariff, private power producers on a whole retained their financial stability. It should be noted that all IPPs have an option, according to the terms of their license and PPA, to revert from the bilateral operation mode to IEC sales mode. This provides a fallback position that provides the IPPs the ability to maintain financial stability even in case of a sharp drop in the production tariff.

4.3. Electricity Tariffs

Electricity prices are regulated by the PUA. Price regulation is based on a price-cap system and linked to normative prices determined in 2010 that reflect actual economic production, generation and distribution costs. Prices are indexed to relevant indices (fuel, labor and equipment costs). Since 2010, the normative tariff base has not been updated, and all price updates were based only on incremental changes.

PUA Production Tariff



Source: PUA

The PUA is currently in the process of a periodic re-evaluation of the normative price base methodology, which is expected to be revised in 2018. Although, the methodology for the updated price base has not been determined, we believe that the normative base will have to be increased to reflect IEC's inadequate capital structure and increased environmental costs.

The regulated price of electricity, which is most commonly referred to as the 'time of use' (TOU) price is comprised of 4 main components:

1. Production Cost Tariff
2. System Management Tariff
3. Transmission Tariff
4. Distribution Tariff

Commercial customers pay the TOU tariff, while most residential customers pay a fixed average tariff without a time of use differentiation. The cost of transmission and distribution reflects the cost of transporting the electricity from the power plant to the end user, along with the losses. The system management tariff reflects regulated system management fees to the IEC, which currently holds sole responsibility for backup and system management services for the whole sector.

Private producers in bilateral sales regime, typically charge the end customers the TOU tariff with an agreed upon discount.

From the point of view of the independent power producers that focus on bilateral sales, transmission, distribution and system management tariffs are merely pass-through tariffs that are transferred directly to the IEC without any exposure for them.

The PUA regulated "**Production Cost Tariff**" includes the recognized costs of the IEC that are used in the production of electricity. These are generally divided into capital costs, depreciation, operation and maintenance costs, fuel, and if applicable one time offsets. The tariff is based on numerous factors, though the underlying economic principle is the IEC's total cost plus a normative rate of return.

In the last approved tariff update, the fuel component comprised 60% of the cost of production. The adjustment in tariffs is indexed to actual IEC fuel costs, including IEC's coal prices, which are directly correlated to market prices. Operation and capital costs reduced from about 50% to 31% of the production tariff.

IEC is designated as the "essential service provider" to the Israeli power sector. As such, the company supplies system management service and system wide backup for all power producers.

As of August 2015, system management tariff were imposed on private power producers to cover the cost of services provided by the IEC to all producers

The breakdown of the different production cost tariff components and their respective contribution per the most recent PUA decision (December 19, 2016) are presented in the table below.

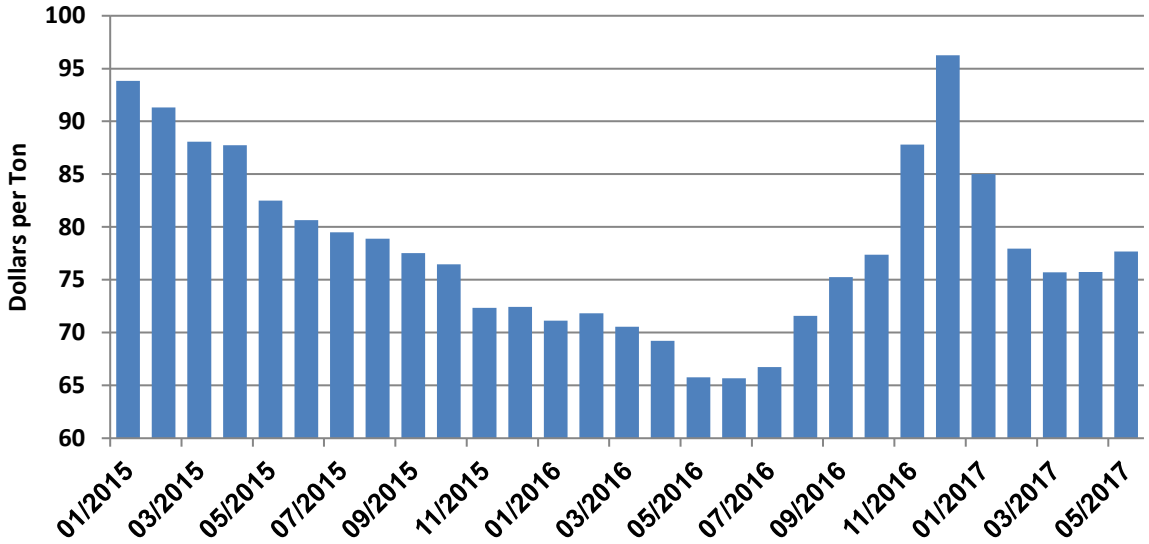
Production Cost Tariff Components, 2017

Components	Agorot/kWh	% of GT
Fuel (coal, natural gas and oil)	15.7	60%
Depreciation	4.0	15%
Capital Costs	2.3	9%
O&M Costs	5.9	22%
Purchase from IPP's	3.7	14%
One -Time Adjustment	(1.8)	(7%)
System Management Cost	(3.4)	(13%)
Total	**26.4**	**100%**

Source: PUA and BDO Analysis

IEC's regulated tariff and recognized capital costs are based on a credit rating of AA+ (the normative rating). However, in practice, IEC's current credit rating is "il AA/Stable" as per S&P Maalot, which has resulted in higher interest costs. Therefore, eventually the PUA will need to either recognize the higher cost of debt to reflect the company's lower credit rating, or allow IEC to improve its equity to debt ratio, to regain its AA+ rating.

IEC Coal Price, 01/2015-05/2017



Source: 01/2015-12/2016 PUA and BDO analysis, 01/2017-05/2017 BDO estimates based on steam coal forward contracts

It should be noted that the current system tariff reflects a temporary situation of surplus in backup that is the result of milder than average weather conditions in 2016, which led to higher actual reserves, along with new power plants that came on line that led to even a higher reserve level.

We expect the surplus reserves to be gradually reduced over the next 5 to 7 years back to the normative level of 20%, as the demand for electricity in Israel is continuing to increase rapidly. Therefore, over time we predict that the system management tariff should decline while the production tariff will increase.

4.4. Future Market Reform

The policy of the Energy Ministry and the Electricity Authority is that any increase in electricity production capacity will be filled by private power producers. The ministry is in the process of formulating a master plan and a new framework for the electricity sector that will regulate the granting of licenses to private power producers.

Even though the new regulations have not yet been announced, it appears that they will be based on the economic dispatch based operation of private power plants, encouraging the sale of electricity to end users, as well as guaranteeing a safety net to enable the financing of projects. The Ministry is also considering an option to sell off IEC's gas based generation

assets. Based on past experience we believe that the likelihood of such divesture materializing is very low.

It is important to note that an increase in private power plant licenses is not directly linked to the overall demand for natural gas. Israel has surplus production capacity that is expected to last until 2022. A delay in the entry of private power producers would only lead to the IEC increasing its own use of natural gas, at its backup plants that operate on gas. Moreover, since the IEC power plants are less efficient than those of private power producers, gas demand could actually slightly increase, due to the operation of less efficient units.

Therefore, we believe that the gas demand forecast presented here will not be substantially impacted by the future IPP regulation scheme or by the rate of entry of private power producers.

4.5. Electricity Generation Capacity Forecast

According to our forecast, by 2020 generation capacity is expected to reach 20,150 MW. This represents a 2,600 MW addition to current levels. The added capacity will be realized through 1000 MW gas based power units built by IPPs, 1,000 MW from cogeneration, and 600 MW of renewable energy. It is important to note that renewable energy in Israel is primarily solar which has a low 20% utilization factor and additionally cannot contribute to reserves for peak production in the winter months that occur on nighttime, when PV has no availability. Thus, 600MW of solar energy is equivalent to about 120MW of gas based units in terms of effective availability.

Over time we assume that the production level of IEC will remain stable and that all of the additional capacity, over and above the contribution of renewables, will come from gas fueled private power producers (either IPPs or cogeneration). This means that the share of gas in the electricity production will rise from 62% in 2016 to 73% in 2020 and reach 83% in 2030. By 2025, we expect the share of gas in generation to match its share in effective production capacity, about 82%. This assumption is consistent with Israel's Minister of Energy's public declaration that government policy is that the share of gas in electricity production will reach over 80%, and with the government's policy in practice to restrict coal usage. This government policy has already led to an increase in the share of gas in electricity production to about 60% in 2017. For effective capacity calculation, we have adjusted renewable capacity to reflect the fact that in Israel it is based primarily on solar energy and has an inherent maximum availability factor of about 20%.

Forecast of Generation Capacity by Fuel
In MW*

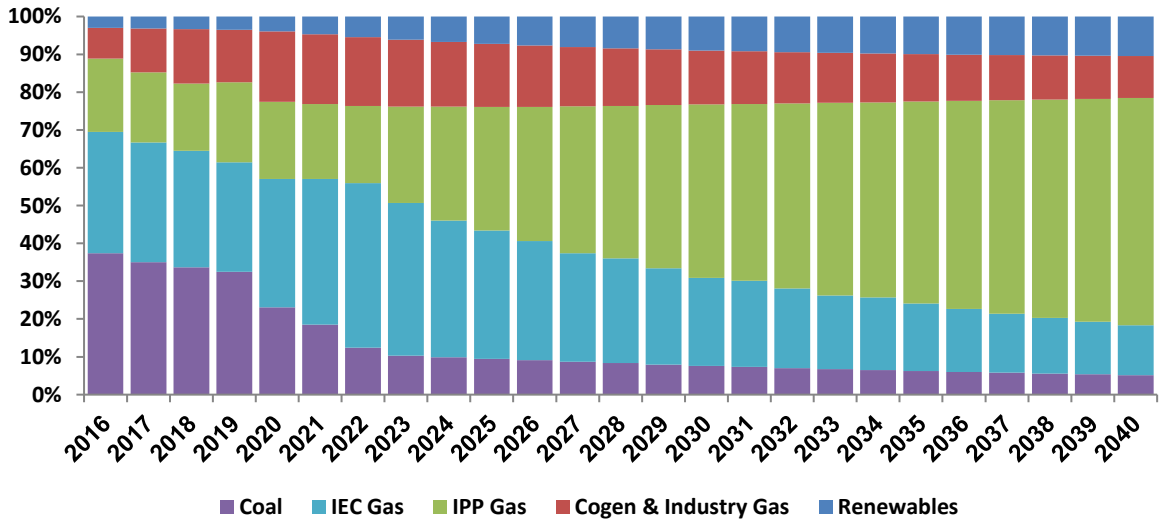
	Coal	Gas	Renewables	Total Capacity	Gas % of total Capacity **	Gas % of Generation
2016	4,840	11,828	917	17,585	**67%**	**62%**
2020	3,400	15,250	1,550	20,200	**80%**	**73%**
2025	3,400	18,600	3,800	25,800	**82%**	**82%**
2030	3,400	23,900	6,100	33,400	**83%**	**83%**
2040	3,400	36,300	10,600	50,300	**86%**	**84%**

*Israel and Palestinian self-generation.
**Effective total capacity, with renewable capacity adjusted by a factor of 1:5 to reflect effective maximum availability
Source: PUA, IEC and BDO Analysis

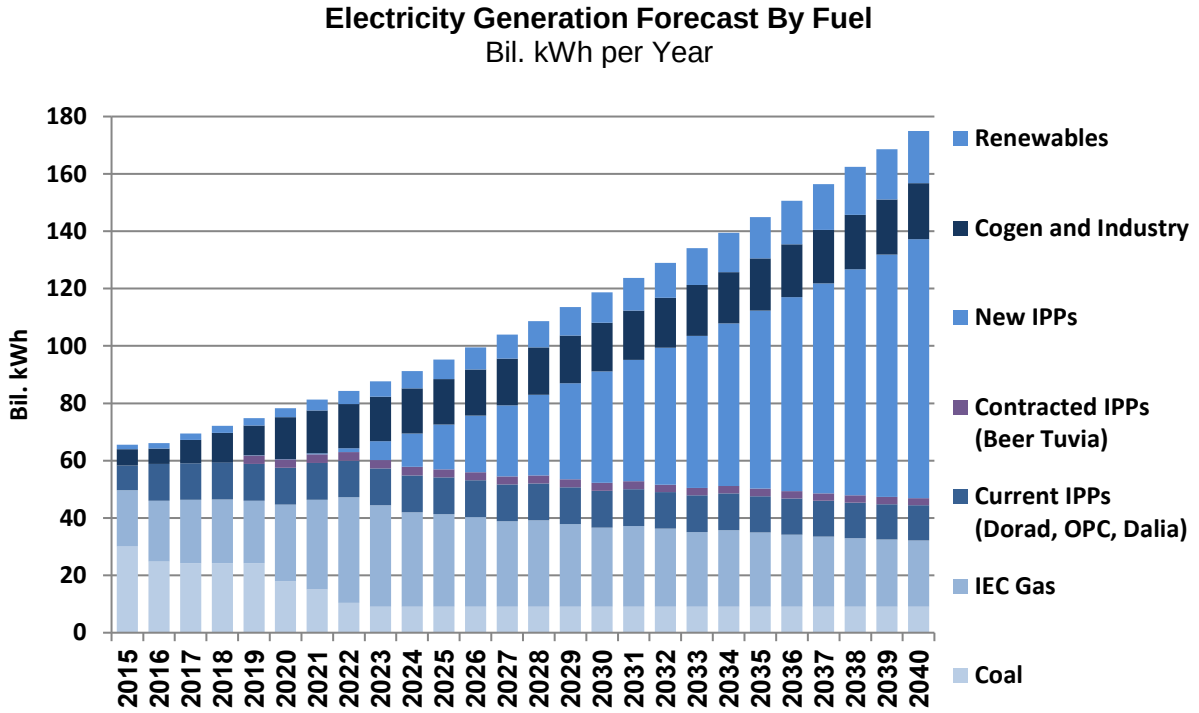
The fuel mix forecast is projected using our bottom-up national electricity dispatch model, based on economic merit order and technical constraints. This model simulates the system manager's dynamic dispatch regime. Accordingly, renewable units are dispatched based on availability factors, accounting for relative availability by time of day and month of solar generation. It was assumed that coal units will be fully dispatched on an annual basis, subject to the coal reduction constraints assumptions as outlined in this document. It was further assumed that the monthly coal reduction will be in reverse proportion to peak demand, so that in peak months the coal units are highly dispatched, while in off-peak months they will be shut down. This operation regime has economic advantage as it allows coal reduction to take place without any decrease in the available capacity in peak months.

The growth in electricity production from gas will come from private producers including IPPs that will primarily produce electricity for end-users, and cogeneration plants that will produce electricity for their own use, or sell to the network or sell surplus electricity to end users.

Electricity Generation Forecast By Fuel
% of total generation



Source: BDO Analysis



Source: BDO Analysis

4.6. Independent Power Producers (IPPs)

Israel's energy sector regulation in recent years has been aimed at increasing competiveness and efficiency in the electricity market, through the introduction of independent power producers (IPPs). All IPPs in Israel are based on natural gas as their primary generation fuel. Current government policy requires that all further capacity additions in the Israeli market will be made through the private sector – by IPPs, cogeneration and renewables. In May 2017, the Ministry of Energy decided that the Rabin 1-4 Coal units (1,440MW) which are required to be shut down no later than June 2022 will be replaced by gas powered units built by private producers.

Beyond this planned coal reduction, our electricity supply forecast is based on the assumption of a fixed generation capacity for IEC, with IPPs supplying all the additional required capacity that is unmet by cogeneration and renewables.

Existing generation capacity together with generation licenses which have already been granted to IPPs and cogeneration projects are expected to enable Israel to meet its electricity demand by 2022. Beyond that year, additional capacity will be required to meet demand at peak hours.

The regulatory framework for further IPP licenses is currently re-evaluated by the public utility authority (PUA). However, we expect that the fundamental policy which provides IPPs with a regulatory backed financial safety net to ensure financial closure, along with incentives for bilateral sales to end users, will remain intact.

New IPP's Capacity Planned by 2022

	Capacity Additions (MW)	Expected Startup	Conditional License/ Permanent license*	GSPA	Financial closing
Etgal	120	2018	Conditional	✗	✗
Tzomet	360	2019	Conditional	✗	✗
IPM	428	2019	Conditional	✓	✗
Total	**908**				

* A Power producer with a conditioned license receives a permanent production license after meeting certain standards and milestones defined by the PUA.

Source: BDO Analysis

It should be noted that the overall gas demand forecast is not sensitive to government policy in regards to IPPs. Government policy requires to maintain a 20% electricity generation reserve beyond peak demand. Therefore, even if IPP projects are delayed, the Israel Electric Corp. which supplies the national reserve backup services, is required to ensure adequate supply of electricity to all customers, including IPP customers.

4.7. Cogeneration Producers

Cogeneration plants are electricity production plants that use thermal heat and produce both steam as well as electricity. These types of plants enjoy a much higher energy efficiency level, produce less air pollution, lower the cost of energy for industry and conserve network resources.

Over the next five years cogeneration plants with a capacity of over 1,000 MW are expected to be completed at a number of large companies including Israel Chemicals, Makhteshim-Agan, Oil Refineries Ltd., America-Israel Paper Mills, Tnuva, Nilit etc. The large heavy industry manufacturing plants in Israel are expected to complete the switch over to cogeneration by 2020.

The large consumers of steam (the cogeneration producers) have an advantage through the combined production of steam and electricity. This however is a very specialized niche as there is no demand for steam heating purposes due to Israel's climatic conditions. Therefore, the future growth of cogeneration is dependent totally on industrial demand.

This means that the potential for this niche market depends solely on large producers in heavy industry. Growth potential at many cogeneration plants is limited (no new energy intensive manufacturing plants such as Israel Chemicals or Israeli refiner Oil Refineries Ltd. are on the horizon). Over time, the importance of heavy industry in the overall economy is expected to decline. We estimate that the growth in electricity production for internal use will be only half the rate of the expected increase in industry in general and will account for about 10% of electricity production in Israel in 2040.

Industry Demand - New Cogeneration Capacity Planned by 2022

	Capacity Additions (MW)	Expected Startup	Conditional License/ Permanent license*	GSPA	Financial closing
ICL Dead Sea Works	220	2017	Permanent	✓	✓ (Corporate)
Alon Tavor (Tnuva)	73	2018	Conditional	✓	✓
Ramat Gabriel (Nilit)	73	2018	Conditional	✓	✓
Sugat	60	2019	Conditional	✓	✓
CHS (Edeltech)	77	2019	Conditional	✓	✘
Hadera Paper (by OPC)	130	2019	Permanent	✓	✓
Tamar-Haifa Chemicals (Edeltech)	160	2020	Conditional	✓	✘
Oil Refineries Ltd.	140	2021	-	✘	✘
Total	**933**				

* A Power producer with a conditioned license receives a permanent production license after meeting certain standards and milestones defined by the PUA.

Source: BDO Analysis

Analysis of the projects that are in the planning or completion stages points to 1,000MW in potential growth in cogeneration in the coming 5 years. Beyond that, we expect the growth rate will be in line with that of heavy industry in Israel in general.

4.8. Renewable Energy

We have based our electricity supply forecast on the assumption of environmental regulation that combines increased renewable capacity along with coal reduction, in order to meet the GHG reduction targets that Israel has committed to.

Forecast of Renewable Generation Capacity
In MW*

	Renewables	Total Capacity	Renewable share of Installed Capacity
2016	917	17,585	5%
2020	1,550	20,200	8%
2025	3,800	25,800	15%
2030	6,100	33,400	18%
2040	10,600	50,300	21%

Source: BDO forecast

Israel's location and geography do not support significant usage of hydro or wind based electricity generations, which are currently the only renewable generation technologies that are economically viable without government subsidy. Therefore, solar photovoltaic energy constitutes Israel's main potential source of renewable energy.

The current cost of production of electricity using solar technologies is still high in relation to coal or natural gas based production. However technological advances in the field of photovoltaic cells are bringing down the cost of PV production. It is expected that within the next few years it will be on par with the average cost of electricity production in Israel.

The problem is that peak winter demand in Israel occurs at 9 P.M. while in summer peak demand is at 3 P.M. Solar based electricity technologies have zero availability at night. Therefore, they cannot be taken into account for peak winter capacity without some form of electricity storage.

Electricity storage technologies are still not economically viable without government subsidy. This is the main reason that utilities and electricity producers worldwide are investing in low energy efficient, open cycle power plants for production at off peak hours. This holds true of renewable sources of energy as well where production costs are even higher.

Therefore, our estimation is that grid-parity for solar energy in the Israeli market will only be achieved when solar production costs will be on par with the energy component cost of conventional energy sources. This takes into account the fixed and capital costs of

conventional energy sources associated with peak winter demand which cannot currently be met by solar, and therefore constitute unavoidable costs.

The main rationale for increased renewable energy remains its environmental benefits. Nevertheless in Israel's case, with half of the electricity produced at coal plants, the most cost-effective means to reduce pollution and GHG emissions is by switching from imported coal to domestic natural gas. A complete shift from coal to gas will reduce GHG emissions from electricity production by 20%, without any cost to the national economy. Achieving a similar goal using renewable energy would involve considerable economic costs.

The Israeli government has adopted a target of 17% reduction in GHG emissions on a per capita basis by 2030. In order to reach this target, the government has set a goal of generating 17% of electricity demand using renewables in 2030. However, this goal was set prior to the recent government decision to reduce coal use in electricity generation. The shutting down of 1,440 MW of coal generation capacity of the Rabin A units alone is equivalent in terms of GHG reduction to 3,500 MW of solar energy production capacity.

Reduction of coal usage is the most cost-effective means for Israel to reduce emissions and meet GHG reduction targets. By contrast to achieve the same target with renewable energy based on solar energy would require large government subsidies. Despite the improvements in PV technology and reduced production costs in recent years, the effective generation cost is still twice as high as gas, when the lack of availability of PV at night to meet peak winter demand is taken into account.

The Israeli Ministry of Infrastructures and Energy is currently in the process of developing its long-term Master Plan for the Israeli Energy Sector. Our analysis shows (see table below), that adopting a 70% coal reduction target, along with 10% renewable target, will allow a 17% reduction in GHG emissions in the electricity generation sector, thus meeting the official government target. Our assessment shows that such emission reduction policy is the most cost-effective way for the Israeli economy to achieve GHG reduction targets, while maintaining energy security as the coal units will continue to serve as backup units on off-peak months, and provide electricity reserves by being operation at peak months (summer and winter).

Electricity GHG Reduction Alternatives, 2030

BDO Forecast Coal Reduction and 10% renewables (Bil. kWh)	
Coal	9
Gas	85
Renewables	10.6
Total Israel Generation at 2030	104
GHG Emissions tons	3.7
CO_2 / capita	-17%

17% renewables No further coal reduction (Bil. kWh)	
Coal	24
Gas	63
Renewables	17
Total Israel Generation at 2030	104
GHG Emissions tons	4.1
tons CO_2 / capita	-7%

*Excluding Palestinians
Source: BDO analysis

4.9. Coal Reduction

The production of electricity in Israel has been traditionally based on the use of coal for baseload production. The decisions to build coal power plants were taken in the 1980's throughout the 90s, long before the discovery of natural gas in Israel. Prior to the discovery of offshore gas, there was a distinct economic advantage for the use of coal over fuel oil or gasoil.

Israel's Coal Power Units

Israel's Coal Power Generation Units

Location	Stage	Turbines	MW	Vintage
Orot Rabin	A	4X360	1,440	1981-1984
	B	2X575	1,150	1995-1996
Rotenberg	A	2X575	1,150	1990-1991
	B	2X550	1,100	2000-2001
Total		**10**	**4,840**	

Source: IEC

The discovery of natural gas led to an essential change in the economic viability of coal use in Israel. Israel has no domestic coal reserves. Coal is imported primarily from South Africa, Australia and Colombia, at a substantial transport cost. The use of domestic natural gas has substantial economic, environmental and strategic advantages for the Israeli economy.

In light of the discovery of gas, plans for building another coal plant (Project D) in Ashkelon, were cancelled. In addition, the Energy and Water Ministry, with the support of the Environmental Protection and Health Ministries, has adopted a policy of reducing the use of coal.

At the beginning of 2016, the Energy and Water Ministry instructed the IEC to reduce its use of coal for electricity production by 15% increasing to 19% in 2017. Further coal reduction is not currently possible to due lack of gas supply until the Leviathan gas field comes on line.

The development of Leviathan, along with that of the Karish-Tanin offshore gas field, will enable further reductions in coal use. Accordingly, in August 2016, the Ministry of Energy canceled IEC's plan to invest in FGD technology for the Orot Rabin coal based plants, and decided that they will be shut-down upon gas availability after Leviathan's entry to the market. As additional gas resources are developed, we believe that the coal power plants will be primarily used as a strategic backup. It should be noted that there is a similar process of

reducing coal use taking place in the U.S. and Europe, including countries where there is domestic production.

The reduction of coal use translates into a drop in CO2 emissions by about 20% at no cost to the economy. From our perspective this is the best economic alternative and is preferable to any kind of subsidy for the use of renewable energy.

The recent increase in coal prices has brought-up the cost of energy of coal based electricity generation to be on par with the cost of energy of new efficient gas based units. From the point of view of the national economy, even if coal prices drop by 30%, gas is more cost effective than coal even before accounting to the increased efficiency of coal units vs. gas.

Economic Cost of Gas vs. Coal
Cost of Marginal Production to the Israeli National Economy

	Coal	Gas
Coal Price $/ton	$77	
Energy Price $/MMBtu	$3.2	$4.9 ($4.7 + $0.2 INGL)
BLO (excise tax)	$0.5	$0.1
Cost to Electricity Producer	$3.7	$5.0
GT (government take)**		-$3.0
Cost to national economy (exc. GT and BLO)	$3.2	$1.9
Efficiency	39%	58%
Energy Cost to Electricity Producer Cent/kWh	**3.3 ¢/kWh**	**3.2 ¢/kWh**
Energy Cost to National Economy Cent/kWh ***Excluding environmental costs***	**2.9 ¢/kWh**	**1.2 ¢/kWh**

Source: BDO analysis

*Coal price based on CIF ARA ARGUS-McCloskey quote as of June 2017. A conservative assumption as in practice IEC's coal price is typically higher than the quoted price due to additional local handling costs. Gas Price based on IPP prices based on gas framework agreement. Coal calorific value 24.4 MMBTU/ton based on MNI data.
** GT (government take) includes royalties, petroleum levy and corporate taxes.

Hence, our analysis shows that Israel has a significant advantage to convert its baseload coal production units from imported coal to natural gas, with coal used as a backup fuel only.

Even though no formal decision has yet been taken for further coal to gas conversion (beyond the 4 units at the Rabin power plant in Hadera), we believe that the strong economic incentives will lead policymakers to do so. The cost of domestic gas to the national economy is lower than coal since 50-60% of the local price of gas returns to the government in the form of taxes.

We predict further reduction in coal use in 2020-2023 due to economic advantages to the Israeli economy. This will coincide with the startup of production at the Leviathan and Karish-Tanin offshore gas fields.

Coal Reduction Forecast Summary

	Coal Based Generation (bil. kWh)	Coal reduction %	Further Gas due to coal reduction in BCM*
2015	30.0	-	
2016	24.8	**15%**	
2017	24.3	**19%**	0.3
2018	24.3	**19%**	0.3
2019	24.3	**19%**	0.3
2020	18.1	**40%**	1.6
2021	15.1	**50%**	2.3
2022	10.4	**65%**	3.5
2023	9.0	**70%**	3.6
2024	9.0	**70%**	3.6
2025	9.0	**70%**	3.6

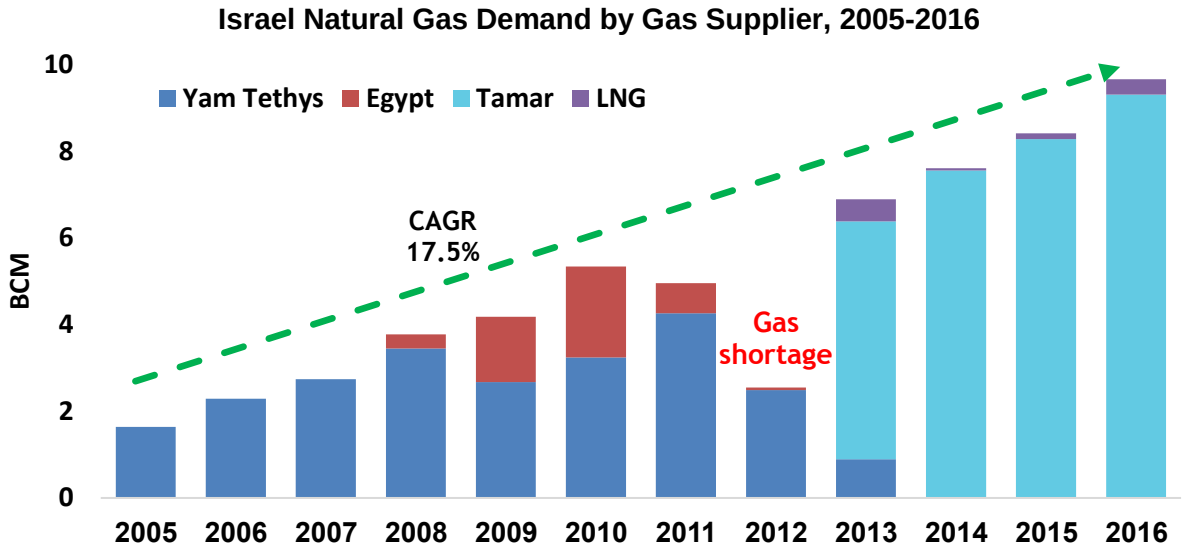
Source: BDO forecast

*Further gas reduction beyond 2016 levels. The effect of coal reduction on gas demand is shown based on the comparison of the electricity system dispatch simulation with and without coal reduction. It is assumed that the coal units will be fully dispatched on peak months; therefore the total required national generation capacity is not affected by coal reduction. Consequently, reduced coal results in the dispatch of the next available gas unit based on economic merit order.

5. Gas Demand Forecast

5.1. Overview

Israeli gas demand totaled 9.7 BCM in 2016 and we estimate demand to reach 10.5 BCM in 2017. Current gas consumption levels do not represent the potential for domestic gas demand. In recent years, supply constraints have held back the growth in demand. These constraints include both gas shortages as well as a lack of transmission and distribution infrastructure.



Source: Natural Gas Authority and BDO analysis

Regulatory uncertainty led to delays in the development of the Leviathan gas reservoir, and consequently delayed gas conversion projects by the Israeli industrial and electricity sectors.

The completion of the Leviathan project, along with the expansion of Israel's gas distribution infrastructure will enable the economy to realize the full potential demand for gas.

The current level of gas consumption represents only the initial stage of Israel's shift from an energy importer to an energy exporting country. The Israeli economy has so far only completed the preliminary shift from oil to gas in the electricity sector and among large industrial customers.

The availability of large domestic reserves of environmentally friendly gas, along with the expected growth of the Israeli economy, will pave the way for further structural changes in the country's energy sector.

The Israeli government is committed to the COP21 environmental targets, and is well aware of the economic and strategic advantages of local gas production over imported fossil fuels. Consequently, the government is adopting an active policy that encourages a further shift to natural gas.

Recent policy decisions to encourage the shift to gas include:

- A requirement for the IEC to reduce coal usage by 19% from 2017
- A decision to shut down 1,440MW of coal production units (30% of coal capacity) after Leviathan begins production
- Subsidizing of small and medium industrial customers to switch from oil to gas
- Subsidizing CNG stations in order to support massive transportation flees to shift to CNG instead of diesel
- Government funding of NIS300 millions for deployment of gas distribution system
- A government decision to promote an ammonia plant, including a grant and a safety net
- The full scale electrification of the rail network
- Tax incentives and subsidies for electric vehicles
- Fuel tax incentives aimed at encouraging the transport sector to switch to CNG

5.2. Gas Demand Forecast Summary

BDO's natural gas demand forecast for Israel based on a proprietary, multi-factor, econometric bottom-up model. It utilizes electricity demand and supply models along with an economic dispatch model based on a load-duration curve forecast. BDO's senior experts have been providing customers with the long-term electricity demand model for over 20 years.

Based on the assumptions in this report, we forecast that the demand for natural gas in Israel will increase from 9.7 BCM in 2016 to 14.3 BCM in 2020 and 25 BCM in 2030.

Gas Demand Forecast Summary*

Demand by Gas Consumer in BCM

	Electricity	Cogen & Industry	CNG and Chemical Industry	Further coal reduction	Total Demand	Out of which, Palestinian self-generation
2016	6.7	3.0	0		**9.7**	
2020	7.1	5.1	0.5	1.6	**14.3**	
2025	9.3	5.7	1.9	3.6	**20.5**	1.7
2030	12.5	6.2	2.7	3.6	**25.0**	2.8
2035	16.2	6.6	3.5	3.6	**29.9**	4.2
2040	20.6	7.1	4.0	3.6	**35.3**	6.2

*including Palestinians
Source: BDO forecast

Our demand forecast does not take into account long-term supply side constraints or capacity limitations. In the case of short-term supply constraints, Israel may either import LNG, reduce exports, and/or use more oil based products (as was the case in 2011-2012).

We estimate that the entire increase in electricity demand in Israel through 2040 will be met with natural gas (with the exception of renewable energies that may reach 8% of total supply).

In addition, strong economic and environmental driving forces will lead to a gradual reduction in the use of Israel's coal based power units which are currently dispatched with higher utilization rates compared to gas fired units.

The Energy and Water Ministry has decided that beginning in 2020 the 4 Orot Rabin coal units (1,440 MW) will be shut down. We believe that the reduced operation of the other coal units (3,400 MW) is likely to coincide with the entry of the Karish-Tanin gas fields to the domestic market, although no formal decision has yet been taken.

The availability of natural gas is expected to facilitate increased gas usage in the transport sector in Israel. Israel's railway network currently runs on expensive diesel fuel and a major part is due to be electrified by 2020.

The transportation sector can also benefit from the availability of domestic gas. We expect CNG powered vehicles to penetrate into niche markets. Electric vehicles and plug-in hybrids are also expected to enter the Israeli market, following a similar global trend.

Experience from outside Israel shows that countries with a gas surplus, develop a profitable methane-based petrochemical industry in parallel with LNG exports. Therefore, we foresee the potential for the development of additional applications for natural gas based chemical industries in Israel.

5.3. Gas Demand Growth by 2020

The main drivers for the 4.6 BCM expected increase in gas consumption by 2020 are:

- Increased demand for electricity, most of which will be supplied by new cogeneration projects which are already in construction or planning process
- Shut down of the 4 Rabin A coal units with total capacity of 1,440MW

Gas Demand Growth Drivers
2020 vs. 2016

	BCM	Growth Driver
Gas Demand in 2016	**9.7**	
Increased demand for electricity and cogeneration	2.7	Increased electricity demand and planned cogent projects of about 1,000MW
Further Coal reduction	1.3	Rabin A shut down based on August 2016 MNI decision
Chemicals and CNG	0.3	Tax incentives and grants for CNG for transport.
Medium & small industrial fuel replacement	0.3	Government grants for distribution network
Gas demand 2020	**14.3**	deployment and conversions

Source: BDO analysis

The factors that will support these demand growth drivers are mostly in place, hence we believe that there is relatively high certainty associated with the materialization of this forecast along with Leviathan's scheduled start up in production in 2020.

By 2025, we forecast gas demand to reach 20.5 BCM, mainly due to continued growth in demand for electricity (see electricity demand forecast chapter), additional reduction in coal usage as Karish/Tanin begins production (see discussion below) and increased usage of gas for transportation, industrial and chemical uses.

5.4. Chemical Industry Gas Demand

The discovery of substantial offshore gas has given the Israeli economy new opportunities specifically for the chemical industry and the transport sector. It presents the economy with the possibility to reduce the need for importing crude oil, refined products and organic chemical products. Natural gas also opens up new opportunities for the local chemical industry, which are the natural outcome of the discovery of substantial offshore reserves. A decision to take advantage of this development will lead to renewed R&D in the chemical industry, which has sharply declined in the past two decades.

Experience from abroad shows that in most countries with surplus gas, a large chemical and petrochemical industry emerges, based on the inherent economic potential of the availability of energy sources.

Natural gas (methane) can be a basis for producing a range of traditional downstream products (ammonia, methanol), synthetic fuels (GTL), fuel substitutes (methanol and DME) and for olefins using innovative technologies (MTO-methanol to olefins).

In the first decade following the entry of gas into the economy, the major use by industry was as a replacement for oil based fuels. With the increase in the supply of gas and the onset of Israel becoming an exporter, the comparative advantage of a clean and domestic source of supply will come into play and is expected to lead to the development of chemical industries based on the use of gas as a feedstock.

Production options in Israel include

- Ammonia, a major raw material for the fertilizer industry
- Methanol (a chemical and a fuel substitute)
- Olefins from methanol (MTO)
- Extraction of liquid distillates from methane (GTL technology)

One of the first plants that expected to be established on the basis of domestic gas is for the production of ammonia, which is encouraged by the government. In June 2016, the Israeli government issued a tender for the establishment of a new ammonia plant to supply the domestic market. Local demand currently stands at 120,000 mt/year. The state views the establishment of the plant as a national, strategic project and has committed to a grant of up to US $60 million for setting it up. In addition, the plant will be granted a safety net of US $120 million that will serve as a guarantee to deal with any eventuality.

The ammonia plant was scheduled to begin operations in 2020, and will have an annual gas consumption of about 0.3 BCM. Although the tender has not been successful, we believe that there is economic rationale for a local ammonia production plant to supply the ammonia in Israel (120,000 tons per year) and Jordan (200,000 tons per year) although we assume construction to be delayed to 2023. Further potential exists to export ammonia through the existing ammonia storage tanks in Aqaba to the eastern markets. From an economic standpoint, the expansion of the plant for the production of downstream products like urea, makes sense. Therefore, we expect a further increase in demand for gas.

We expect the new ammonia plant will lead to the establishment of other gas based chemical plants.

Dor Chemicals is planning to build a methanol plant at Neot Hovav at an investment of 400$ million. The plant will produce methanol to be used as a replacement or additive in gasoline. The plant is expected to produce 500,000 tons of methanol per year, and consume 0.4 BCM of gas annually. The production would be for a wide range of uses as well as for export of methanol or its derivatives. Annual methanol consumption in Israel currently stands at 60,000 metric tons. Global demand is 51 million metric tons and is constantly on the rise, primarily the result of the growth in demand for methanol as a fuel.

In addition to Dor, DME Israel is planning to establish a facility for the production of DME (dimethyl ether), a clean fuel produced from natural gas. The planned investment is $100 million and the plant is expected to be built on a 45-acre plot in the Neot Hovav regional council.

The economic incentive for the establishment of the production plants stems from the government's tax policy on fuels, which is designed to give preference through lower excise taxes on replacement fuels like methanol.

Israel's petrochemical and refining industries may also benefit from increased usage of natural gas as a feedstock.

We estimate gas demand for chemical usage at 0.2 BCM in 2020, increasing gradually to 1 BCM by 2030.

5.5. Gas Demand Forecast Table

Demand Forecast Summary

Demand by type of Gas Consumer, in BCM

Year	Electricity	Cogen & Industry	CNG and Chemical Industry	Further gas due to coal reduction	Total Demand	Out of which, Palestinian Self - Generation
2015	5.8	2.6	0		**8.4**	
2016	6.7	3.0	0		**9.7**	
2017	6.8	3.3	0	0.3	**10.4**	
2018	6.9	3.9	0.1	0.3	**11.2**	
2019	7.0	4.0	0.2	0.3	**11.5**	
2020	7.1	5.1	0.5	1.6	**14.3**	
2021	7.5	5.2	0.9	2.3	**15.9**	0.2
2022	8.0	5.4	1.1	3.5	**18.0**	0.6
2023	8.3	5.4	1.4	3.6	**18.7**	0.9
2024	8.8	5.5	1.6	3.6	**19.5**	1.2
2025	9.3	5.7	1.9	3.6	**20.5**	1.7
2026	9.8	5.8	2.1	3.6	**21.3**	2.1
2027	10.5	5.9	2.3	3.6	**22.3**	2.3
2028	11.3	6.0	2.5	3.6	**23.4**	2.5
2029	11.9	6.1	2.6	3.6	**24.2**	2.6
2030	12.5	6.2	2.7	3.6	**25.0**	2.8
2031	13.3	6.3	2.8	3.6	**26.0**	3.1
2032	14.0	6.4	2.9	3.6	**26.9**	3.3
2033	14.7	6.5	3.0	3.6	**27.8**	3.6
2034	15.5	6.6	3.3	3.6	**29.0**	3.9
2035	16.2	6.6	3.5	3.6	**29.9**	4.2
2036	17.0	6.7	3.6	3.6	**30.9**	4.5
2037	18.1	6.8	3.7	3.6	**32.2**	4.9
2038	18.9	6.9	3.8	3.6	**33.2**	5.3
2039	19.8	7.0	3.9	3.6	**34.3**	5.7
2040	20.6	7.1	4.0	3.6	**35.3**	6.2

*including Palestinians

Source: BDO Forecast

5.6. Electricity Production Forecast Table

Electricity Production Forecast by Fuel

In Bil. kWh

	Coal	IEC Gas	IPP Gas	Cogen and Industry	Renew-ables	Total Generation
2016	21.6	24.0	14.1	6.0	1.6	67.4
2017	24.3	22.0	13.7	7.0	2.2	69.4
2018	24.3	22.1	13.8	9.5	2.4	72.1
2019	24.3	21.7	15.9	10.3	2.7	74.9
2020	18.1	26.6	15.9	14.6	3.1	78.2
2021	15.1	31.3	16.1	15.0	3.8	81.3
2022	10.4	36.7	17.1	15.4	4.6	84.2
2023	9.0	35.4	22.4	15.5	5.3	87.6
2024	9.0	33.0	27.5	15.6	6.1	91.2
2025	9.0	32.3	31.2	15.9	6.9	95.3
2026	9.0	31.3	35.3	16.1	7.6	99.4
2027	9.0	29.8	40.4	16.3	8.4	104.0
2028	9.0	30.2	43.8	16.5	9.1	108.7
2029	9.0	28.9	49.0	16.7	9.9	113.6
2030	9.0	27.6	54.4	17.0	10.6	118.7
2031	9.0	28.2	57.9	17.2	11.4	123.8
2032	9.0	27.2	63.1	17.4	12.2	128.9
2033	9.0	26.1	68.4	17.7	12.9	134.1
2034	9.0	26.8	72.0	18.0	13.7	139.5
2035	9.0	25.9	77.4	18.2	14.4	144.9
2036	9.0	25.1	82.8	18.4	15.2	150.6
2037	9.0	24.4	88.3	18.7	16.0	156.4
2038	9.0	23.9	93.8	18.9	16.7	162.4
2039	9.0	23.4	99.4	19.2	17.5	168.6
2040	9.0	23.1	105.1	19.5	18.2	175.0

*including Palestinians
Source: BDO forecast

6. Regional Gas Supply Dynamics

6.1. Israel Gas Reserves

In the past two decades, the state of Israel has gone through a transformation from a country without any independent energy sources to a producer of natural gas for its entire domestic gas consumption. The next stage of the energy revolution involves the development of the Leviathan gas reservoir, expected by 2020, which will enable Israel to become a substantial exporter of gas in the Eastern Mediterranean region.

At present, Israel's gas reserves are estimated at 980 BCM, more than 90 times expected consumption in 2017 and 70 times the projected domestic demand in 2020. This level of reserves will be sufficient to supply all domestic consumption as well as for exports in line with the Israeli government's policy.

Israel's proven gas reserves include the Tamar gas field, which began production in March 2013, the Leviathan and Karish/Tanin fields, which are currently in various stages of development. The two fields are expected to begin production in 2020 and 2021, respectively.

Israel Gas Resources Estimate

	Resources (BCM)	Remaining Reserves	Discovered	First Gas	Water Depth (meter)	Category	Operator
Tamar	310	275	2009	2013	1,700	2P	Noble
Leviathan	621	621	2010	2020	1,650	2C+2P	Noble
Karish /Tanin	67	67	2012-2013	2020	1,750	2C	Energean
Noa / Mari B	25	<3	1999-2000	2004	250	2P	Noble
Dalit	15	15	2009	-	1,500	2C	Noble
Shimshon	5	5	2012	-	1,110	2C	AGR/ Isramco
Total	**1,046**	**983**					

Source: NSAI, Energean and BDO Analysis
Tamar remaining

To date six gas fields have been discovered in Israeli offshore waters. A seventh (Ishai/Aphrodite) straddles the maritime border with Cyprus and data regarding its size is still being assessed.

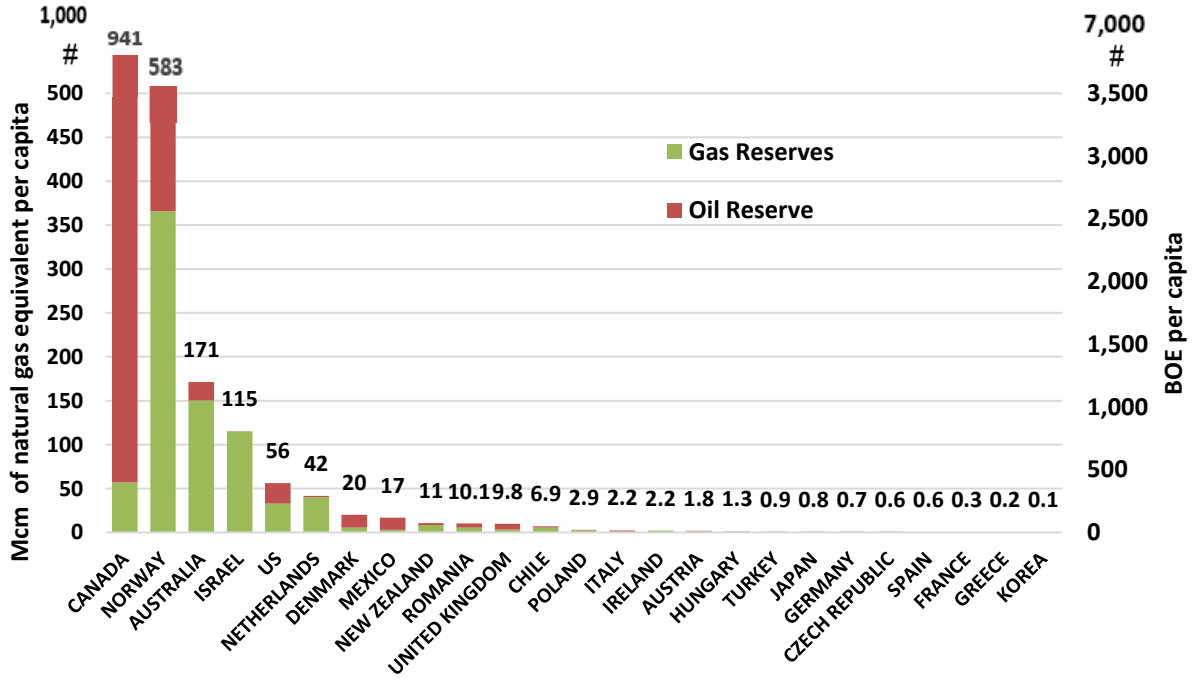
The regional supply also includes Gaza-Marine with estimated reserves of 32 BCM. The field was discovered by Israel and transferred to the Palestinian Authority. Gaza-Marine is jointly

owned by Shell, the Palestinian Investment Fund (PIF) and the Consolidated Contractors Limited (CCC). However, the field's location, off the Mediterranean coast of the Hamas controlled Gaza Strip, makes its probable development in the near-term unlikely. In the long-term, we expect that, pending appropriate political conditions, the reservoir will be developed and will serve as a source of supply to the Palestinian market to complement future gas imports from Israel.

The gas reservoirs in Israel are very significant in relation to the size of the Israeli economy and are expected to lead to a comparative advantage. At present, Israel ranks fourth in the OECD in per capita oil and gas reserves. The significant quantities of gas discovered in the Tamar and Leviathan fields, and the potential for future gas and oil finds, guarantee that domestic electricity production, industry, transport and other economic sectors will have sufficient gas supply for many years to come. It is important to note that the use of local and relatively environmentally friendly domestic gas represents a significant advantage for further development of local energy-intensive industries.

Energy Reserves per Capita in OECD

BBOE/Mcm, OECD* countries



*Rest of OECD countries has no proven gas reserves
Source: BP Statistical Review of World Energy, CIA Factbook, NSAI and BDO Analysis

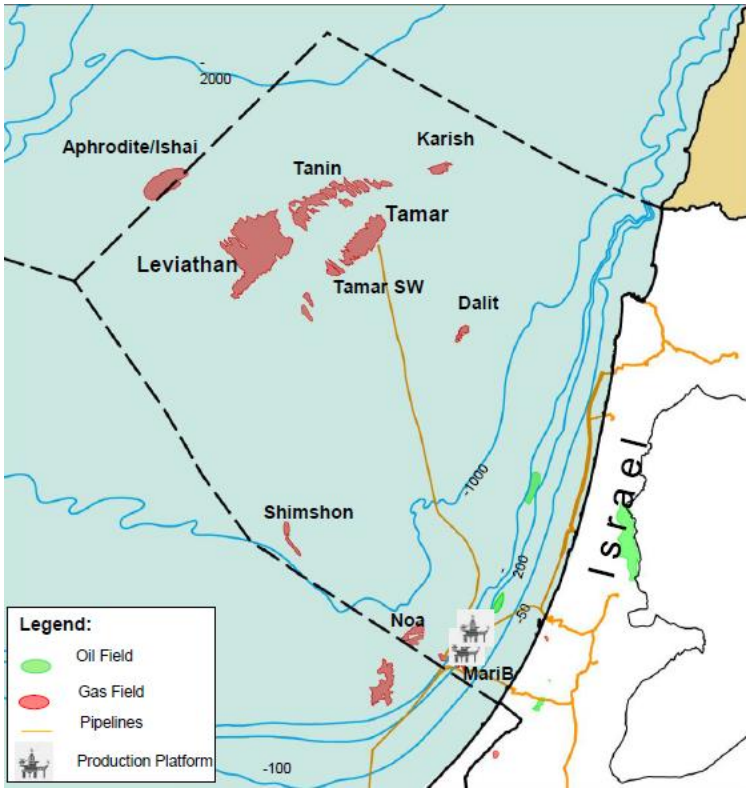
An independent report by Beicip-Franlab estimated the potential for undiscovered reserves in the Mesozoic and Tertiary reservoirs at around 2,000 BCM of natural gas and 6.6 billion barrels of oil.

The Israeli Ministry of Energy is currently in the process of its first international tender for 24 offshore blocks for exploration. This is part of the ministry's efforts to promote further gas development. Holding a licensing tender through a bidding process is a new approach for Israel. Until 2012, there was no bidding process and the Energy and Water Resources Ministry basically awarded exploration licenses to applicants based on various criteria. The latest tender is designed to reopen exploration in Israel's offshore waters after four years of little if any activity.

The realization of this potential for additional gas discoveries is important for Israel for both economic and strategic reasons. However, there must be a viable market for the gas if exploration is to continue at an acceptable pace.

We believe that it is unlikely that additional large gas fields, if discovered, will be developed before 2025-2030 when local demand begins to exceed supply.

Map of Israel's Gas Discoveries



Source: Ministry of Energy

6.2. Israel Gas Supply and Demand Dynamics

Tamar, which began commercial production in 2013, is currently the only operational gas field in Israel. Hence Tamar is still the sole source of gas supply to the domestic market, with any shortage during peak demand or infrastructure limitations being met by imported LNG. The later accounts for only marginal quantities. The Yam Tethys project, which have previously supplied the domestic market, is currently practically depleted and produces insignificant volumes (less than 0.04 BCM in 2016).

In 2020 with the expected entry of Leviathan and later-on Karish/Tanin to the local market, the gas market will enter a new phase with multiple suppliers. The entry of new suppliers will not only lift limitations that currently exist, but also lead to increasing demand in the local market and the expanding of the use of gas in various sectors of the economy (see chapter 5 above).

Our gas demand analysis shows that Tamar, Leviathan, and Karish/Tanin fields are expected to face significant demand from local and as well as regional markets. An analysis of the projected supply and demand for gas in the Israeli market in 2025 (taking into account existing export agreements) shows that the pace of development of the reservoirs in the coming years is in line with the expected increase in demand.

Israel Gas Supply-Demand Balance – 2025
By Source and Target, in BCM

Gas Source	Target Market			
	Israel	Jordan	Egypt	Total
Tamar	9.5	0.15	1.0	**10.7**
Leviathan	7.0	3.5	0.7	**11.2**
Karish/Tanin	3.0	0.0	0.0	**3.0**
LNG import	1.0	-	-	**1.0**
Total	**20.5**	**3.7**	**1.7**	**25.9**

Source: BDO forecast

One should note that advanced commercial contacts are underway for a possible marine pipeline to Turkey and/or export to two LNG facilities in Egypt, also via pipeline. If realized, these projects will be undertaken in parallel with an expansion of the current producing fields in Israel, and therefore should not have a substantial impact on the domestic supply and demand balance.

We assume that any further large-scale gas discoveries will only be developed if there is an assured export potential market (such as an export agreement with Egyptian LNG facilities' owners and/or a pipeline to Turkey), or when local demand exceeds supply.

Financing natural gas projects in Israel is at present based on the project finance model, which inherently balances the growth in local demand to the development of the reservoirs. This guarantees that the building and financing of new gas reservoirs is correlated with the demand in the relevant markets.

The expected market share of the various reservoirs in the local market is a result of the structure of the supply agreements, the regulatory conditions and the export quotas that were allocated to the reservoirs by the government in June 2013. Export quotas were determined according to the size of the reservoir in order to encourage the development of smaller fields.

Israel's Gas Export Quotas

Field Size	Minimum supply requirement to the local market
≥ 200	50%
100≤X<200	40%
25≤X<100	25%
<25	no minimum requirement

Tamar's current infrastructures are 90% designated for the domestic market with the remaining 10% for export to Jordan's Arab Potash Company and to the Egyptian domestic market. The export to these Jordanian plants had commenced in 2016 and currently stands at about 0.15BCM per year. Tamar may be expanded in the future in the event of an export agreement to the UFG LNG facility in Egypt.

The Leviathan field's ultimate primary market will mainly be neighboring countries, as part of the effort to encourage multiple suppliers to the domestic market. Nevertheless, the development of Phase-1 will be modular, and will consist of two stages, with a larger percentage (65%) of the first stage (1A) earmarked for the domestic market and the remainder (35%) for export to Jordan and Egypt via Jordan using existing infrastructures. Leviathan's second stage (1B), is designated for export to Turkey, the LNG facilities in Egypt or to Europe.

Analysis of the existing discoveries and potential regional demand shows that the entire local demand can be met through existing fields at least until 2040. The following table illustrates a possible scenario for the allocation of the demand among the various suppliers.

Domestic* Gas Supply Forecast By Source

In BCM

		Supplier				Tamar Market Share of local demand
	Total Local Demand	Tamar Local Market	Leviathan Local Market	Karish/Tanin	LNG import/ others	
2013	6.9	5.5	0	0	0.9+0.5**	80%
2014	7.6	7.6	0	0	0.1	100%
2015	8.4	8.3	0	0	0.1	99%
2016	9.7	9.4	0	0	0.3	97%
2017	10.5	9.8	0	0	0.7	94%
2018	11.2	10.1	0	0	1.1	90%
2019	11.5	10.1	0	0	1.4	88%
2020	14.3	9.5	4.8	0	0	66%
2021	15.9	9.5	3.8	2.6	0	60%
2022	18.0	9.5	5.5	3.0	0	53%
2023	18.8	9.5	6.3	3.0	0	51%
2024	19.5	9.5	7.0	3.0	0	49%
2025	20.5	9.5	7.0	3.0	1.0	46%
2026	21.4	9.5	7.1	3.0	1.8	44%
2027	22.3	9.5	7.1	3.0	2.7	43%
2028	23.3	9.5	7.2	3.0	3.6	41%
2029	24.2	9.5	7.2	3.0	4.5	39%
2030	25.0	9.5	7.3	3.0	5.2	38%
2031	26.0	9.5	7.3	3.0	6.2	37%
2032	26.9	9.5	7.3	3.0	7.1	35%
2033	27.8	9.5	7.3	3.0	8.0	34%
2034	29.0	9.5	7.3	3.0	9.2	33%
2035	30.0	9.5	7.3	3.0	10.2	32%
2036	31.0	9.5	7.3	3.0	11.2	31%
2037	32.1	9.5	7.3	3.0	12.3	30%
2038	33.2	9.5	7.3	3.0	13.4	29%
2039	34.3	9.5	7.3	3.0	14.5	28%
2040	35.3	9.5	7.3	3.0	15.5	27%
Total	**594.6**	**260.3**	**143.3**	**59.6**	**131.5**	**44%**

*Israel and Palestinians

**In 2013, Yam Tethys supplied 0.9 BCM, with additional 0.5 BCM LNG import.

BDO Scenario for Domestic Gas Supply Forecast by Source in BCM

6.3. Regional Export Potential

The natural gas discoveries in Israel have a tremendous significance for the Israeli economy. They stimulate economic growth, reduce air pollution, lower electricity costs and create a comparative advantage for energy intensive industries. However, beyond the direct economic impact the discoveries also have a significant strategic and geo-political importance.

Israel is currently the only country among its neighbors with sufficient supplies over the long run to meet domestic demand and for possible export. An analysis of the supply side of the regional energy equation shows that among the regional countries, Israel has the highest per capita gas reserves.

Israel currently imports limited quantities of LNG to meet peak demand and due to infrastructure limitations (a single transmission pipeline). This will change in the future with multiple suppliers to the domestic market and additional infrastructure will eliminate the need for imports. However, exports from Israel to neighboring countries is economically viable alternative to LNG imports. This has led to negotiations to conclude commercial supply agreements for the export of gas from Israel to Jordan and Egypt.

Regional Gas Supply Per Capita

	Population (mil.)	Gas Reserves (BCM)	Gas Reserves Per Capita (Mil. CM)
Israel	8.6	983	115
Egypt	92	1800 (existing) + 600 (Zohr)	26
Jordan	8.9	0.5	0.05
Turkey	79	6	0.08

Source: BDO analysis

Advanced commercial contacts are underway for a possible marine pipeline to Turkey and/or export to two LNG facilities in Egypt, also via pipeline.

Turkey consumes almost 50 BCM of gas annually, without any local gas production. It is therefore entirely dependent on imports of natural gas (85%) and LNG (15%). Currently, the country's import infrastructures are in full capacity. A further examination of Turkey's supply sources reveals that 55% of the imported gas come from Russia and additional 29% from Iran and Azerbaijan. Hence, Turkey has both economic and strategic incentives to import gas from Israel in order to diversify its gas supply sources.

6.4. Export Potential to Jordan

Jordan, which borders Israel on the east, is Israel's closest export market. Jordan's population stands at around 9 million, and includes over 1.25 million Syrian refugees. Unlike its immediate neighbors, Jordan does not have significant energy resources. Therefore, the kingdom relies exclusively on imports of LNG, crude oil and petroleum products to meet domestic demand. Until 2011 Egypt was the main source of supply for natural gas to Jordan.

The Arab Gas Pipeline (AGP) was initiated in 2003 to deliver gas from Egypt to Jordan, Syria and Lebanon with a capacity of 12 BCM/year. The development of AGP led to a massive investment in Jordan's electricity sector with the construction of gas operated power plants. Gas imports to Jordan were based on a supply contract with Egypt using AGP. In 2009 Jordanian gas imports from Egypt reached 3.4 BCM.

Like Israel, Jordan also witnessed a cut-off of gas supplies from Egypt due to the sabotaging of the pipeline that began in February 2011. This created lengthy supply interruptions. Jordan as well as Israel were forced to switch to more expensive fuels at power stations. The import volumes from Egypt dropped to 0.2 BCM in 2014.

Jordan – Economic and Energy Forecast

	Population (millions)	Gas Demand (BCM)	Electricity Capacity (MW)	GDP per capita (PPP $)
2009	6.3	3.5	3,000	5,543
2017	8.9	4.4	5,700	5,340
2020	10.7	5.2	6,300	5,644
2025	11.9	6.0	7,700	6,262
2030	13.3	7.3	9,600	6,780
2035	14.8	8.0	11,600	7,232
2040	16.5	8.8	13,700	7,714

Source: The World Bank, IHS and BDO analysis

Under the current economic conditions, we believe that the resumption of Egyptian gas exports to Jordan is highly unlikely. Despite the prospects for resumption of gas production in Egypt, growing domestic demand is expected to absorb all of the new production from the BP development in the West Nile Delta field and the large Zohr discovery. The additional volumes are expected to meet the unsatisfied needs of the domestic gas market for power production and industrial/feedstock which are currently being met by oil and LNG imports via two FRSUs instillations in the Red Sea.

Substantial volumes of gas for export from Egypt are unlikely to materialize as long as the country still faces a gas shortage in the domestic market. Therefore, Israel is expected to be Jordan's primary source of natural gas.

The Tamar consortium is already exporting gas to Jordan's Arab Potash Company. The agreement calls for the annual supply of 0.15 BCM/year via a extension of the existing Israeli gas pipeline to the Dead Sea Works on the Israeli side of the Dead Sea. In addition, The Jordanian National Electric Power Company (NEPCO) has signed an agreement with the Leviathan consortium for the purchase of 45 BCM of gas. The supply of gas from Israel has economic and strategic benefits for both countries. Israel's peace agreement with Jordan was signed in 1994, though informal relations existed prior to that. Both governments have strong political incentive to strengthen the strategic relationship between them. In economic terms, Israel is Jordan's most cost-effective supplier since purchasing LNG that is delivered to Aqaba port is much more expensive, and building pipelines from either Iraq or Saudi Arabia is not economically feasible due to the long distance and relatively small volumes.

The forecast for exports to Jordan is based on a conservative assumption of 4 BCM/year, which includes 3.5 – 3.8 BCM from Leviathan and the remainder from Tamar. However, the gas demand in Jordan is expected to rise and reach 6 BCM or more in 2025. Jordan has no competitive alternative for natural gas (with the exception of very limited local production at the Risha field). Therefore, over time Jordan is likely to meet the excess demand from LNG imports as it currently does. This in effect means that any significant surplus of gas in Israel is likely to find a ready market in Jordan.

6.5. Export Potential to Egypt

Egypt utilizes natural gas as a major source of energy from the 1970s onwards. From 2000, the demand for gas rose sharply by 7% annually. This increase was supported by rapid economic growth, increased private consumption by households, and a high level of investments. The successful development of gas reservoirs led to the establishment of an export infrastructure for gas exports from Egypt, which began exporting gas by pipeline to neighboring countries and via LNG to more distant destinations. A halt in investments in the sector combined with the growth in domestic demand led to a shortage of gas in the Egyptian market. The disruption in gas supplies to Israel and Jordan which began in 2011 and a total cut off in supplies the following year was the result of the sabotage of the pipelines which followed the overthrow of Egyptian President Hosni Mubarak. Though the action was political

in nature, Egypt was already experiencing a severe gas shortage in the domestic market. This in fact led to the total cessation of LNG shipments from Egypt in 2015.

That same year Egypt started importing LNG in order to deal with the shortage of gas in the domestic market and became a net importer. In 2016 Egypt became the largest importer of LNG in the region. Despite gas imports, capacity was still not meeting local demand, failing to supply the entire market. The situation is likely to change again in the next few years with the development of BP's West Nile Delta and Atoll fields and ENI's Nooros and Zohr fields. Gas production in Egypt is expected to rise this year for the first time since 2009.

The majority of the gas in Egypt is used for electricity production or by large industrial plants, while smaller factories, the transport sector and households are not consumers of gas. An examination of the Egyptian long-term supply/demand curve for gas reveals that Egypt will continue to face a shortage of supply even under the assumption that power generation and large industrials are the two main sources of gas demand. The deficit will only grow if and when Egypt will return to export LNG.

It is important to note that Egypt's population is 10 times that of Israel, while its gas reserves are only three times as large as those of Israel. In the long-term Egypt will need its gas for domestic consumption, and is not expected to have surplus gas for export.

At present Egypt produces 70% of its electricity from oil. The switch of the entire electricity sector from oil to gas would require an additional 20 BCM of gas annually for the upcoming years until local production could meet demand level. This of course does not take into account the impact that future economic growth might have on the Egyptian energy sector in general and on local gas demand in particular. The expected local demand growth, coupled with the limited supply creates a substantial potential for future gas imports from Israel.

Egypt – gas supply-demand balance, BCM

	Domestic Gas Demand	UFG+Shell Demand for LNG Export	Local Gas Production	Egypt Gas Import Requirements*
2017	55.0	19	53.8	20.2
2020	64.0	19	67.0	16.0
2025	72.5	19	78.0	13.5
2030	76.0	19	71.0	24.0
2035	83.0	19	58.0	44.0
2040	90.6	19	47.4	62.3

*Import for LNG export is contingent on dedicated contracts
Source: BDO, Wood Mackenzie Energy Service

The Egyptian government of Hosni Mubarak had a policy that favored gas exports at the expense of limited supplies to the domestic market. This policy led to huge investments in ELNG and SEGAS LNG facilities with a capacity of 9.9 BCM and 6.8 BCM respectively. Gas supply to the SEGAS LNG facility was halted at the end of 2012 due to shortage of gas for local consumption and has yet to be resumed. The gas earmarked for the ELNG facility was halted from 2014-2015 and diverted to local use instead. In 2016 there was a limited resumption of the gas supply to ELNG and the facility is now operating at a fraction of its full capacity. Past investment in the both LNG facilities and the inability of Egypt to export gas, substantially increased the chances of Israeli exports to Europe via the Egyptian LNG trains.

In light of the overthrow of Mubarak and Morsi, the Egyptian government is expected to be far more sensitive to the needs of the domestic market. As a result of Egypt's new policy to give priority to local consumption over the export market, the country's LNG liquefaction plants operate at a very low utilization rates.

In contrast to the situation in Egypt, Israel has surplus gas that the government has given authorization to export though it currently has no LNG option. A gas pipeline already exists between Israel and Egypt (the 100-kilometer EMG EL Arish-Ashkelon pipeline) which could be used to export gas to Egypt's domestic market. In addition, AGP pipeline can operate in a reverse direction to enable the import of gas for domestic use or to ship to the Egyptian LNG facilities for export.

The Tamar consortium has initiated an agreement with Egypt's Dolphinus for pipeline exports from Israel to Egypt utilizing the EMG pipeline. There is currently an international arbitration involving the EMG pipeline, which could delay its use until a settlement is reached.

28 September 2017

To:

Delek Group
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Herzelia 4672537
Israel

The enclosed demand forecast review was prepared for Delek Group and is based on BDO's market report, prepared in July 2017.

BDO Ziv Haft Consulting and Management Ltd. hereby grants permission to Delek Group Ltd. to use our summary and market report for the Delek Group website.

Sincerely,