



State of Israel
Ministry of Energy

Energy Economy Objectives for the Year 2030

Executive Summary

October 2018

Rescuing Israel from Polluting Energy

Minister of Energy

The State of Israel is about to become the most populated country in the West. Will we suffocate in the future due to the pollution we create? From the pollution emitted daily and hourly from the dozens of power production plants, from the millions of cars on the roads and streets, from the plants and factories? As a result of supposedly positive developments, such as demographic and economic growth and an improvement in quality of life – will our lives in this country turn into hell? Twenty years from now, will we be forced to live in our homes behind air filters, and on our streets, wear paper masks on our faces as they do in Beijing?

Upon my entry to the Ministry of Energy, I realized that we face a crossroads: we either continue with the power of inertia on the path we have been on until now, ending with a health and environmental catastrophe; or we change direction and work to reduce air pollution and save our children and grandchildren from an impending environmental disaster.

If we continue in the same direction, with a planned increase of coal-fired power plants, and an addition of hundreds of thousands of new cars each year, we will certainly come to a catastrophe. According to OECD data, in 2015, approximately 2,200 people were killed in Israel due to air pollution. 2,200 people killed in a year! Seven times more than the number of casualties from road accidents. With a population increase to thirteen million, this number may grow to 3,500 killed per annum, and circa 62,000 deaths by the year 2040! Experts explain that the meaning of this horrific data is that in addition, millions of Israelis have health issues to some or other extent. In short: some of us die – yet all of us are harmed!

However, it is still possible to change direction and march on a different path. If we could only bring the economy to a weaning from coal and pollutant fuels – we would be saved. Using the Natural Gas Outline, if we could only finally complete the development of gas reservoirs that remain stranded at sea – we could utilize natural gas resources that the Almighty has supplied us with, as well as renewable energy that is developing right in front of our very eyes, to march toward a cleaner, healthier and better future.

The recently published UN report (IPCC) continues to warn about the global catastrophe expected as a result of global warming. In Israel, we must make an enormous effort in order to save our

citizens as much as possible from local dangers, whilst using the opportunity to contribute our modest part to the Paris Agreement and to halting global disaster.

The rescue plan I have devised in the past year for the energy economy in 2030 is not just a vision. It is a difficult and challenging yet applicable plan. The plan specifies concrete steps and measurable goals with set timetables to revolutionize the Israeli energy sector within 12 years. Part of the change has already been implemented – since I became Minister of Energy, I instructed an increase in the use of natural gas in order to decrease the use of polluting coal in our power plants from circa 60% in 2015 to 30% this year. As a result, a preliminary reduction in air pollution was recorded in Israel in the last two years.

The current plan poses ambitious yet realistic goals, beginning with a total weaning from polluting fuels within the next twelve years. This, while continuously improving energy security. In the electricity sector, the goal is use of 80% natural gas and 20% or more of renewable gas in 2030, while completely shutting down coal-fired plants in Hadera and Ashkelon. The goal in the industrial sector is to achieve circa 95% use of natural gas for the production of energy and steam, as of 2030. In transportation, the goal is a gradual shift to electric vehicles and natural gas-powered trucks, and a total ban on the import of vehicles powered by polluting fuels, as of 2030.

Alongside describing the required steps to achieve the aforementioned goals by 2030, the document also measures the economic benefits, as well as costs, of all these changes in the electricity production sector, transportation sector and the industrial sector. The bottom line is clear and unambiguous: great economic, environmental and health benefits of tens of millions of Israeli shekels in the following decades.

However, what the financial calculation does not include is, in fact, the main point: the entire rescue plan is meant to prevent an environmental and health catastrophe. It is meant to ensure that despite a growth in population density, in the next decade, Israel will become one of the greenest countries in the West – a country that is good and pleasant to live and breathe in. A country that allows its citizens to enjoy the air, which is the only commodity we all consume dozens of times a minute, with a quality of “mountain air as clear as wine”.

Dr. Yuval Steinitz

Minister of Energy

Executive Summary

In the beginning of 2018, the Minister of Energy announced the energy economy objectives for the year 2030. The objectives instruct a reduction in the use of polluting fossil fuels, specifically, totally terminating the use of coal and mostly terminating use of distillate fuels, whilst maintaining the reliability and continuity of energy supply.

The realization of the energy economy objectives for the year 2030 is expected to greatly contribute to reducing the environmental and health damages caused by air pollution and the emission of greenhouse gases, as well as to economic advantages manifested in the exploitation of local natural gas resources. Additionally, reducing dependency on imported fuels contributes to the energy independence of the State of Israel.

These objectives are made possible due to trends that are currently changing the face of the global energy map. Among these trends, one may note solar energy being made more available and inexpensive for the production of electricity, following technological advancements and significant cost reductions. Furthermore, the world automotive industry is entering a new age, in which vehicles employing electricity are also becoming more available and similar, in terms of both vehicle cost and travel distance, to motor vehicles with internal combustion engines utilizing gasoline or diesel fuel. Moreover, global regulations for the reduction of polluting and greenhouse emissions (which are bound within the Paris Convention) prompt energy and transportation economies around the world to adopt the use of renewable energy, natural gas and electric vehicles. These world trends, coupled with the discovery of natural gas in Israel's economic waters, which has made it one of the leading countries in the world using natural gas for the purpose of electricity production, introduces the State of Israel to an energy world that is cleaner, more efficient and based on local energy sources. Using natural gas in the State of Israel has great environmental advantages compared to other fossil fuels (coal and petroleum), and utilizing it has positive economic and strategic ramifications. The development and connection of Leviathan and Karish-Tanin gas fields to the coast, which will end in about two and a half years, as well as Tamar gas field that is connected today – will allow the Israeli economy to depend on natural gas as a substitute for imported fuels.

The Energy Economy Objectives Plan for 2030 specifies the desirable energy mix in the year 2030 and all policy measures required to achieve it, whilst determining the external factors necessary to implement the plan. The program serves as a meaningful step toward reducing the State of Israel's

dependency on coal and distillate fuels, and is expected to bring about broad changes in the Israeli energy economy. The policy will be applied in the electricity production sector, and transportation and industrial economies. Simultaneously, measures will be taken to safeguard the reliability and availability of energy supply in both everyday and emergency scenarios. In addition, the plan for the reduction of polluting fuels will be supplemented with additional steps to achieve the energy efficiency goals.

After authorizing the aforementioned policy principles in this document, the Electricity Economy Roadmap for the Year 2030, which has been published by the public utility authority, will deduce the implications derived from it for the electricity production sector, separately. At the same time, a National Outline Plan for Energy Economy (*Tama 41*) is promoted by the Ministry, serving as the statutory measure for the policy's realization, and includes safeguarding of the land strips and areas needed to achieve the Ministry objectives for the energy economy.

Transition to Electricity Production Using Natural Gas & Renewable Energy

A reduction in the use of polluting fuels in the electricity production sector and replacement using more efficient and clean energy sources is based on shutting down coal-produced electricity, and switching to electricity production using natural gas and renewable energy only. For this, all coal-based electricity production units, including coal-fired Rotenberg Power Plant in Ashkelon and Units 5-6 of coal-fired Orot Rabin Power Plant in Hadera, will be shut down. In addition, shutting down Production Units 1-4 at Orot Rabin Power Plant, which the Government has formerly already decided upon.

This coal-based power generation capacity of 3,400 MW will be matched by natural gas production based on one of the following main alternatives, or a combination of several:

- A. Conversion of existing coal-fired units to a dual-fuel power station running on natural gas (coal backup). Dual fuel units utilizing natural gas as their main source of fuel would be for everyday use and coal would serve as secondary fuel for emergencies.
- B. Shutting down existing coal-fired units and establishing production facilities using natural gas in their stead. Along with the establishment of these production facilities, the preservation of coal-fired power plants for backup purposes should be examined.

To implement this policy, the three existing natural gas fields (Tamar, Leviathan and Karish-Tanin) must provide gas continuously whilst ensuring independent function abilities of the gas receipt systems. An examination of the hourly gas supply capacity limit to the coast shows that by the year 2030, the hourly capacity meets the expected demand for natural gas, while reinforcement of supply abilities during peak hours, which will be required beginning from the year 2028, is made possible by employing a regasification vessel that unloads liquid natural gas (LNG) to a submerged buoy, and using existing gas residuals in the line pack. However, due to an expected increase in energy consumption in the following years, solutions must be found to increase the energy capacity; these will be examined at a closer date. Furthermore, to ensure a backup for the electricity supply in emergency situations and situations of natural gas shortage, the option of producing electricity using diesel fuel must remain available (as secondary fuel in natural gas production facilities) or coal (as secondary fuel in the conversion alternative), as well as examining solutions to increase the redundancy of natural gas supply, including establishing an overland gas reservoir in Israeli territory, establishing an additional liquid natural gas buoy and more.

Along with shutting down coal-fired units, actions to prompt the integration of renewable energy in the electricity production sector will be taken. Meeting the objective of 17% production from renewable energy in 2030 requires addressing many challenges concerning management of a very decentralized electricity network with a high level of reliability in both everyday and emergency situations, and a growing difficulty in finding available land of the required scale in densely populated Israel. The greater part of renewable energy in Israel is expected to be produced by solar systems based on solar energy. On their own, these systems do not provide stable energy 24 hours a day, thus becoming an obstacle in implementing renewable energy with a capacity that considerably exceeds 17%. This hindrance may be resolved as a result of technological advancement, mainly in the field of energy storage. Therefore, given the expected technological developments in the field of energy storage, efficiency level of renewable energy and network management capacities, the ability to expand the usage capacity of renewable energy even beyond 17% will be explored.

Objectives for the Year 2030

Terminating use of coal: By the year 2030, terminating use of coal in electricity production in all coal-fired power plants and a transition to electricity production using natural gas.

Integration of renewable energy: A target of 17% production from renewable energy by the year 2030 with an interim target of 10% by the year 2020 (Government Resolution 542 of 2015), in accordance with the plan published by the Electric Corporation in the summer of 2017. In 2022, the option of raising this target will be examined, according to technological developments and the rate of integration in practice.

Preliminary Analysis of Alternatives for Termination of Coal Use in Rotenberg and Orot

Rabin 5-6 Power Plants

1. The analysis was conducted for three alternatives to terminate use of coal and transition to natural gas use: converting coal-fired stations to natural gas (coal backup), establishing new production units for natural gas of the combined cycle type (hereinafter: CC) whilst preserving existing coal units, and establishing new production units for combined cycle natural gas whilst scrapping existing coal-fired units.

2. Following preliminary assessments, the conversion alternative may be prioritized in terms of meeting the market demand in case of damage to the natural gas fields during emergencies, due to the option of returning to consecutive use of coal (subject to proof of applicability).
3. On the other hand, the alternative of establishing CCs has the advantage of working at higher efficiency, which has environmental, economic and operational benefits. However, improving the efficiency will require a considerable capital investment of circa 13 billion NIS (compared to the cost of converting the coal units, estimated at circa 1 billion NIS only).
4. The economic benefit analysis of the plan, which is based on preliminary estimations, shows that all alternatives have positive economic benefits in relation to the current situation. The cumulative value by the year 2040 will amount to 5-11 billion NIS, depending on the chosen alternative.
5. After completing the transition, the economy will save between 0.7-1.2 billion NIS annually, depending on the chosen alternative.
6. The main benefit is environmental cost savings (pollutant emissions and greenhouse gas emissions), with a cumulative value by the year 2040 ranging between 11-14 billion NIS, depending on the chosen alternative.
7. The cost of change for the electricity production sector depends on the different fuel costs . Consolidation in the natural gas economy, while continuing the downward trend in gas prices (as observed in contracts signed in the past year), will enable implementation of the transition at no additional cost to the electricity production sector.

Main Policy Measures

Steps to promote termination of coal-based production:

1. Evaluating applicability of converting a coal-fired unit to a natural gas unit and preserving a coal-fired unit in order to better comprehend the engineering, operational and economic implications of these procedures.
 - Examining the feasibility of conversion for one of the coal-fired units.
 - Examining the feasibility of preserving a coal-fired unit, executed with Coal-Fired Units 1-4 at Orot Rabin in Hadera, about which a decision has already been made.
2. Promoting the planning of alternative natural gas production units.
3. Progressing in accordance with the following timetables:

- 2022: Closing Units 1-4 of coal-fired Orot Rabin Power Plant in Hadera.
- 2023: Completing the conversion of a coal-fired production unit in Ashkelon to natural gas, as a pilot project.
- 2023: Choosing an alternative to shutting down the remainder of production units of coal-fired Rotenberg Power Plant in Ashkelon and Units 5-6 of coal-fired Orot Rabin Power Plant in Hadera.
- 2025-2028: Gradual cessation of coal-based electricity production.
- 2028-2030: Total termination of coal-based electricity production in all coal-fired power plants and a transition to electricity production using natural gas and renewable energy sources only.

Steps to promote renewable energy:

1. Promote planning to implement renewable energy potential in medium-sized areas and large sites.
2. Submission of a supplementary investment plan for the Electric Corporation's development program, including all required network investments for the absorption of renewable energy. The plan will be submitted for the Minister's approval no later than January 1, 2019.
3. Implementation of renewable energy potential on the roofs of government housing and roofs of state-budgeted or -subsidized groups.
4. Development of solutions to backup the electricity economy, such as self-production in emergency situations and development of local electricity storage abilities for emergencies (batteries and fuel cells).
5. Measures to promote the elimination of hindrances to the integration of large-scale renewable energy:
 - Promotion of regulation for the integration of battery-based storage systems in the electricity production sector.
 - Re-examination of land destined for energy storage within statutory plans for the establishment of power plants.
 - Publication of all necessary regulations and tariffs for the implementation of this policy.

Summary

There are both technical and economic feasibilities of switching from coal-based to gas-based electricity production, which have been examined by relevant professional factors. However, in order to formulate final recommendations regarding the implementation method for shutting down the coal-based units, continuous work must proceed in order to decide between the alternatives, including a technical examination, economic examination and, given the gas prices, an analysis of the ramifications of stopping electricity production on electricity costs. Furthermore, measures must be promoted in order to reach the 17% target for renewable energy, including completing the authorization of Tama 41 – the National Outline Plan for Energy Economy, which focuses on safeguarding land for renewable energy in both the short- and long-terms, the addition of transportation pipes, and plans at the district and national levels for the production of electricity using renewable energy. In addition, the option of increasing the target for renewable energy capacity, in accordance with technological advancements, particularly in the electricity storage field, should be examined.

Transition to Alternative Transportation: Electricity and Natural Gas

A reduction in the consumption of fossil distillates in land transportation is based on a transition to electric transportation and compressed natural gas (CNG) use. Accordingly, as of the year 2030, entry of gasoline- or diesel-fueled automobiles into Israel will be prohibited.

Objectives for the Year 2030

Electric vehicles are destined to be fully integrated into the private automobile sector and partially integrated into the heavy vehicle sector, particularly in the category of trucks up to 3.5 tons (commercial vehicles) and buses. Compressed natural gas-based (CNG) vehicles are destined to be integrated in the heavy vehicle sector, mainly in the category of trucks over 3.5 tons.

Private vehicles: Based on the expected integration of electric vehicles in world markets, while continuing current technological and economic improvements in the battery field, the energy economy objective for the year 2030 is that 100% of new private vehicles sold in Israel will be electric. Furthermore, the following interim objectives have been defined: 5% of sales in 2022,

23% of sales in 2025, and 61% of sales in 2028. Meeting these objectives requires a directive government policy, as described in this document.

Heavy vehicles: Due to uncertainty regarding technological advancements in the alternative heavy transportation sector, the assumption is that heavy transport will operate using compressed natural gas (CNG) and electric sources, together with the continued use of diesel fuel in the heaviest trucks and heavy-duty vehicles. The alternative technology integration objectives for 2030 are: 60% of truck sales are to be CNG-fueled trucks weighing over 3.5 tons, and 20% of all trucks weighing under 3.5 tons. Remaining lighter trucks will be operated using electricity. For buses, the CNG integration objective is 25% of all bus sales, while the remainder will be electrically operated. Due to existing uncertainty concerning the future of alternative transportation technologies for heavy transportation, these objectives will be examined and updated in accordance with future developments.

Analysis of Market Value

1. The cumulative market value of a transition from gasoline- and diesel-fueled vehicles to electric and CNG-fueled vehicles by the year 2040 is circa 33 billion NIS, of which 28 billion NIS is due to a transition to electric transportation and circa 5 billion NIS is due to a transition to CNG-fueled transportation.
2. Once the transition is complete, the market will be saving circa 3.5 billion NIS annually due to transitioning to electric vehicles, and circa 0.6 billion NIS due to transitioning to CNG-fueled vehicles. The total annual value due to the general transition in transportation economy will be 4.1 billion NIS.
3. The main component in the cumulative value by the year 2040 will be the savings in fuel costs of circa 26.5 billion NIS, of which 22 billion NIS will be due to transitioning to electric transportation and circa 4.4 billion NIS will be due to transitioning to CNG-fueled transportation (including revenues of 4.7 billion NIS from natural gas taxation). Upon completion of the transition, the economy will be saving circa 3.2 billion NIS annually as a result of fuel cost reduction.
4. The cumulative environmental value by the year 2040 from meeting the transportation objectives is estimated to be circa 7.6 billion NIS, of which 4.3 billion NIS is due to a transition

to electric transportation, which mainly reduces gashouse emissions, and 3.2 billion NIS due to a transition to CNG-fueled transportation, which reduces pollutant emissions.

Required Policy Measures

To implement the policy, measures are required to form a layout for electric charging and CNG-fueling infrastructures, as well as measures to promote the integration of electric and CNG-fueled vehicles.

Measures to promote a layout for charging/fueling infrastructures:

1. Arranging regulation and removing hindrances to laying out electric car charging infrastructure in residential buildings and public areas, including planning regulations.
2. Completing the necessary statutory procedures to simplify the establishment of CNG fueling stations.
3. Provision of financial incentives for the establishment of charging posts and CNG stations.

Measures to promote the integration of electric/CNG-fueled vehicles:

1. Gradual implementation of sale prohibition of passenger vehicles fueled by gasoline or diesel fuel, in accordance with the conditions specified in this document.
2. Implementation of international standardization of electric transportation, including all vehicle and loading systems.
3. Taxation policy that encourages and accelerates acquisition of electric vehicles. In following with the suggested outline, the tax rate for electric vehicles will remain at 10% until the year 2025, after which it will be gradually raised to the appropriate value in accordance with the vehicle's pollutant grade. As for fuel taxation, the assumption is that the taxation system in Israel will adjust itself to a liquid fuel-free world and tax, in one way or another, continuous use of the vehicle. Thus, over time, the electric vehicle will not enjoy a tax benefit with continuous use.
4. Integration of electric/CNG-fueled vehicles in government/government corporation vehicle fleets.
5. Targeted information among relevant target audiences in the public on the option of transitioning to alternative transportation and the advantages involved in it.

Summary

Transitioning the transportation economy to electric and CNG-fueled vehicles has the technical feasibility and both economic and environmental advantages, which are reflected in fuel cost savings, a reduction in gashouse emissions and pollutants and a reduction in the dependency on petroleum. However, for the transition to succeed, there is a need to combine incentives and regulatory measures described in this document. Implementing the suggested plan will make the State of Israel one of the leading countries in the world in the adoption of alternative transportation. The execution of these changes in the transportation sector alongside meeting the energy economy objectives for the year 2030 are expected to cause a reduction in the volume of fuel distillate consumption in the State of Israel (mainly gasoline and diesel fuel), a reduction that shall begin in 2030 and continue to grow in the following decade. Therefore, given that these objectives are met and appropriate preparations are made, a reduction in the scope of necessary fuel market infrastructure, particularly in the distillation sector, will be made possible.

Transition to Clean Energy in the Industrial Sector

Ceasing the use of polluting fuels in industry and replacing them with more efficient and clean energy sources is primarily based on connecting light industry and commerce to the natural gas distribution network. Moreover, in order to minimize the use of polluting fuels by consumers whose market benefit from a distribution network connection would be low, additional solutions will be explored, such as employing electricity or compressed natural gas supply.

Thus, a policy is required to ensure the distribution network layout, including support via investments for the network layout and solving issues in the planning area, coordinating infrastructures, and increasing the economic profitability of the network layout. Furthermore, the existence of market conditions that create financial profitability for consumer transition to the use of natural gas is necessary.

Objectives for the Year 2030

The total expected consumption of natural gas from connecting circa 450 potential industrial consumers to the distribution network by the year 2030 is circa 0.72 BCM, and is circa 80% of the light industry consumption potential of 0.9 BCM.

In an ordinary course of business – that is, with no additional policy measures, circa 150-200 consumers with a total consumption of circa 0.45 BCM, which is about half of the total connection potential of the light industry consumers, are expected to connect to the distribution network by the year 2025. The term “ordinary course of business” in this context refers to the current situation, with the implementation of policy measures that have been executed in recent years, specifically Stage A of the acceleration program for the distribution network layout, which was published in the summer of 2018.

An additional consumption of circa 0.27 BCM, resulting from the connection of circa 250-300 additional smaller factories, is expected to occur due to the implementation of the additional policy measures detailed in this document. This group includes medium and small industry consumers, commerce and agriculture.

Market Value Analysis

1. The market value resulting from connecting 450 potential industrial consumers to the natural gas distribution network by the year 2040 (with a total consumption of 0.72 BCM) is estimated at 10.6 billion NIS. Upon completion of the entire transition, the economy will be saving circa 900 billion NIS annually.
2. The market value resulting from implementing the policy measures described in this document, which are expected to bring about the connection of an additional 250 consumers by the year 2040 (whose total consumption is 0.27 BCM), is estimated at 5.3 billion NIS. This benefit mainly results from savings in fuel costs estimated at circa 3.2 billion NIS (which includes revenues of circa 2.6 billion NIS from natural gas taxation) and environmental benefits, mainly pollutant emission reduction, estimated at circa 2.6 billion NIS. Upon completing connection of these consumers, the economy will save circa 500 million NIS annually.

Recommendations and Suggested Policy

The plan includes a series of policy tools in the distribution sector and consumer sector. The main tools are:

Tools in the distribution sector:

1. Budgetary support in accelerating the distribution network layout with additional cycles of calls for tenders, of a total of circa 650 million NIS.

2. Incentivization to establish small power stations in the distribution network.
3. Formulation of supplementary arrangements, based on CNG supply or liquid natural gas (LNG), which will serve as alternatives to the distribution network.
4. Connection of the Arava region and Eilat to natural gas.
5. Enforcement against license holders that do not comply with the requirements and conditions of the network's distribution.

Tools in the consumer sector:

1. Encouragement of consumers to transition to natural gas use:
 - Improvement of system providing grants to consumers who convert their consumption facilities to use of natural gas.
 - Planning facilitations for power station constructors on the consumers' sites.
 - Assistance in construction of cogeneration facilities in the agriculture sector.
 - Provision of financing tools to consumption that has become detached due to the disappearance of potential consumers who were between them and the distribution network's end.
2. Enforcement measures:
 - Prohibition of the use of polluting fuels in the industrial sector beginning from the year 2030.
 - Demand that all plants with a minimal consumption of fuels connect to the distribution network.
 - Cancellation/Seizing of conversion grants from the Ministry of Economy for consumers who have been connected to the network and are late with completing the conversion.

Summary

Transitioning the industrial sector to use of natural gas as its nearly exclusive energy source has the technical feasibility and economic and environmental profitability. Alongside executing measures that have begun in the year 2018, decisive action must continue, both with incentivization and defining compulsory plans and increased enforcement in order to complete connecting the industrial sector to the natural gas network.

Promotion of Energy Efficiency

Efficient use of energy minimizes the demand for energy, thus contributing to a decline in energy source consumption and a reduction of necessary investments for electricity and fuel infrastructures. Israel has committed to meet a national electricity consumption reduction objective of at least 17% by the year 2030, in comparison with expected electricity consumption in “business as usual” scenario. To achieve this goal, further policy measures will be necessary in addition to those in use today. The following are the primary recommended measures for a reduction in electricity consumption:

1. Tariff systems for energy efficiency – used to encourage a reduction in electricity production (spared Kwh – NEGAWATT) among electricity providers, electricity producers, electricity consumers and other license-holders in the electricity production sector. In this, several alternatives will be examined:
 - Energy efficiency system via purchasing KWh that was not consumed (spared).
 - Trade systems for energy efficiency certificates, according to which the State will obligate electricity producers and/or providers to buy saved KWh, as a result of energy efficiency projects.
 - Imposition of legal obligations on electricity producers and providers to act to save energy as part of their license conditions.
2. Steps to obligate zero-energy building – in following with the State of Israel’s commitment to the Paris Agreement and the implementation of the Israeli Green Building Standard, it is suggested to obligate 10%-20% of structures, depending on their type (residential, education buildings, public buildings and offices), to adhere to zero-energy building principles.
3. An energy-sustainable city – promoting a model city for efficient and smart use of energy.
4. Efficiency in government branches – meeting a target of 17% by 2023.
5. Implementation of energy ranking goals based on actual consumption in existing buildings in Israel.

Energy Security

Due to the fact that the Israeli energy economy is not connected to continuous infrastructures in other countries and is based on the import of primary energy sources by sea, the State of Israel is defined as an “energy island”. During emergencies, in which import options are threatened, the State of Israel will have to rely on capabilities that have been prepared beforehand. The economy’s preparation and activity in Israel, in both everyday and emergency situations, are dependent, among others, on the continuous supply of electricity, various fuels, natural gas and water – all essential commodities for any market activity.

Changes in the energy market, derived from the energy market objectives for the year 2030, have significant consequences for the functional continuity of the State of Israel during emergencies. An examination of the consequences of change in energy sources has been conducted considering four types of emergency scenarios: a war scenario, an earthquake scenario, a cyber attack scenario and an operational malfunction scenario.

The main measures required to ensure proper function of the energy economy while implementing the vision are:

1. Redundancy of the economy’s natural gas supply, including: ensuring independent function abilities of natural gas receipt systems, increasing the redundancy of natural gas transportation pipe systems, and establishing an overland gas reservoir.
2. Energy security in the transportation sector, including: ensuring charging abilities during electricity supply malfunctions, definition of a system ensuring natural gas supply for CNG-fueled vehicles during emergencies, and defining systems for the installation of electric backups in quick-charge stations and CNG fueling stations.
3. Energy security in the industrial sector, including: definition of a system ensuring prioritization of natural gas supply for essential industry during emergencies, and examining the need to obligate or incentivize dual capabilities for factories defined as essential factories.
4. Ensuring energy security in the electricity production sector, which includes a diesel fuel surplus supply for emergency situations in a scenario of the natural gas supply being jeopardized, obligating the connection of new power stations to diesel fuel reservoirs during emergencies using pipes, recommending a preferred alternative to terminating coal use, in accordance with the examination of various aspects of energy security, and additional solutions

to increase redundancy in the electricity production sector, such as an undersea cable connection to Europe, integrating storage in the electricity production sector and more.

5. Planning the necessary connections and facilities for the establishment of systems that would provide redundancy for a functioning economy, even in states of emergency.

Economic Benefit : Implementation of Energy Economy Objectives for 2030

Implementing the policy in this document holds considerable financial value for the market. This value is reflected in saving fuel costs, enhancing efficiency of its use, reducing the scope of poisonous gas and greenhouse gas emissions, and revenues for the Israeli economy due to the taxation of natural resources. Implementing the policy will even considerably reduce the economy's exposure to risks involved in oil-based fuel supply and its prices. The main components of quantifiable benefits are presented in the following table:

For 2020-2040 (in Millions of NIS)	Transportation		Industrial Sector	Electricity Production Sector			All Three Sectors (Coal Conversion)
	Private Electric Transporta tion	CNG- Fueled Heavy Transporta tion	Factory Connection to Distribution Network	Coal Unit Conversion	CC Establishment and Preservation	CC Establishment and Scrapping	
Cumulative Savings (Cost)	24,031	1,658	2,594	(131)	(9,993)	(7,228)	28,152
Cumulative Savings (Cost) with Addition of Cost Savings in Pollutant and Greenhouse Gas Emissions	28,408	4,853	5,250	10,797	4,509	7,274	49,308

As of 2030, the annual benefit from the implementation of the fuel mix in this policy document (with no benefit due to energy efficiency) will be circa 5.8 billion NIS. It is noteworthy to mention that given the expected growth in population in the State of Israel during the next decades, the calculated environmental benefit may be much higher. Moreover, many beneficial factors exist that are not numerically reflected in this document, among them strengthening the energy independency of the State of Israel, reducing the need for infrastructure in the fuel sector, including storage infrastructure and distillation facilities, as well as additional indirect benefits.