NZO

A National Plan for Renewable Energy

95% in 2050

Electricity from renewable sources

About NZO

The NZO team (Net ZerO Emissions) was established by the Heschel Center for Sustainability, through bringing together volunteer experts from a variety of fields recruited to develop a plan to transition to renewable energies that may accommodate the enormous challenge posed by the climate crisis.

The Heschel Center sponsors a wide range of local activities, demonstrating that lifestyles may improve when they become sustainable, and that networking and collaboration can include people from across Israeli society working together for renewal and repair. Without public/peer pressure and demand from the field, policy changes will simply not occur.

Regarding the climate crisis, the Heschel Center has great impact on policymakers thanks to its research in the field of just transitions to low carbon economies.

Executive Summary

What objective should be set for the ratio of renewable energies in the Israeli electricity sector?

The Minister of Energy, Knesset member Dr. Yuval Steinitz, announced in July 2020 that he set a target to reach 30% renewable energy resources by 2030. In other words, according to government policy, as of 2030 and beyond, approximately 70% or more of the electricity consumed in Israel will be generated through polluting fossil fuel resources, while the remainder will be generated from renewable energy sources.

This announcement by the Minister Steinitz is a welcome improvement compared with government policy to date, yet is 30% by 2030 an appropriate target, or should we be aiming for more?

This study offers the theoretical foundation necessary to set a baseline for a suitable ratio of renewable energy resources for power generation in Israel. First, in recognizing that processes of change in the power and electricity sectors extend across several years, the timeframe is yet to be determined. The questions we pose regard suitable long-term targets.

Second, this study aims to challenge some false fundamental beliefs and preconceptions regarding renewable energy, especially wrong assumptions that renewable energy resources cannot fully meet Israel's demand for electricity.

This study indicates that it's possible to meet approximately 95% of the expected annual demand for electricity in 2050 by means of renewable resources. This scenario, which we call the **"NZO 2050 Scenario,"** will bring about a reduction of over 90% of greenhouse gas (GHG) emissions that contribute to the climate crisis in comparison to the "Business as Usual" (BAU) scenario, per the government's current policy.

The **"NZO 2050 Scenario"** is not only cleaner and healthier, but is also economically justifiable. Realization of this scenario does not require additional investments during the given timeframe from 2021-2050, beyond those required by the BAU scenario. In order to determine the correct target ratio for the generation of renewable energy resource consumption in Israel, we posed a

simple question: What is the optimal use of energy resources for generating electricity in Israel from 2021-2050?

To answer this question, we took three parameters into consideration: fulfillment of the demand for electricity; reduction of emissions harmful to the environment and the population; and assurance that the economic cost does not exceed that of the BAU scenario.

In **Chapter 1** we will review the energy resources available for generation of electricity. These resources include fossil fuels, with a focus on gas; and renewable energy resources, with a focus on solar energy. As we will explain, in order to optimally harness renewable resources, it is also critical to develop a capacity for energy and electricity storage.

In **Chapter 2** we will project the magnitude of the demand for electricity in Israel from 2021-20150, both in hourly and annual terms, using estimations and analyses of data from authorized Israeli sources.

In **Chapter 3** we will detail the thousands of different combinations of energy resources that may produce electricity. The scenarios we propose were composed using a computerized model designed especially for this study. Each scenario was tested against the three parameters put forth in our research thesis: fulfillment of energy demand, environmental impact, and economic efficiency.

In **Chapter 4** we will present the optimal scenario that arose from our research. The scenario will be compared to the BAU scenario, in other words, the scenario that would come about should the current government policy continue "as is." We note that the globally recognized accounting firm Deloitte carried out an external evaluation/audit of the economic aspects of the model and fundamental principles underlying the study. The external evaluation validated the model, basic principles, and conclusions derived from the study.

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The execution of the NZO scenario in Israel aligns with the transition taking place in the energy sector around the world, namely a shift to electricity generation from renewable energy resources. In 2019, 72% of the global capacity to generate new power, came from renewable sources, the majority of which was solar energy.

In the scenario we devised, over 90% of the power to be produced in Israel will come from solar energy, a resource that is abundant throughout the country. Solar energy is generated through daylight and is not available at all hours of the day. Moreover, during some seasons of the year solar production capacity is significantly reduced. This challenge may be overcome by means of storage, wherein power is produced in excess of demand during peak production hours, and the surplus is stored in a power storage system. Stored electricity may be delivered to the grid at times when solar energy is not produced (an example of how to supply electricity derived from solar energy at night).

Until recently, it was not economically viable to store energy in large volumes. However, the substantial reduction in the price of storage systems, alongside an expectation that this drop

will continue, allows us to establish our base load for electricity supply on solar energy integrated with storage.

The NZO scenario will enable a decrease in hundreds of thousands of tons of emissions that are harmful to the environment and to humans, in comparison with the BAU scenario that is based on an extension of the Israeli government in this regard.

POLICY RECOMMENDATIONS

The conclusions derived from this research indicate that the NZO scenario may indeed be realized, enabling roughly 95% of the power consumed in Israel to be produced from renewable sources. We thus propose a set of policy recommendations to decision makers among the public, business, and academic sectors.

STRATEGIC RECOMMENDATIONS

1. Devise a national policy to transition to renewable energy – reach a strategic decision to shift to an energy market based on renewable resources, defining milestones and targets in accordance with IPCC recommendations. In alignment with these recommendations, renewable energy targets in Israel will be set at 50% by 2030 and 95% by 2050.
2. Comprehensive planning at the national level – long-term plans for the country to transition to a low emission energy sector while establishing broad cooperation between different government ministries, the municipal sector and commercial sectors.
3. Climate Commission – establish a professional body funded by the State to advise the Israeli government regarding all aspects of curtailing greenhouse gas emissions in Israel, similar to the Committee on Climate Change that was established in Great Britain.

PRAGMATIC RECOMMENDATIONS

1. Remove obstacles and encourage the provision of solutions and tools to agents of change, to promote the generation of electricity from renewable resources.
2. Maximize solar power potential – define building standards that encourage and even mandate solar energy production for new buildings, and maximally increase to the establishment of PV systems in urban areas. Extend regulations for dual use (install supplemental PV systems to the site and/or building's central purpose) of all converted areas that can handle dual usage. Establish systems to make information available to the public regarding the installation of PV systems and relevant funding mechanisms.
3. Storage – assist in integrating storage systems into the electric grid by means of encouraging the establishment of power storage systems as an integral part of every new PV deployment. Develop a business model that will encourage the deployment of storage systems alongside existing PV installations. Promote storage in residences and commercial facilities (behind the meter) and integrate storage capacity as another means of retention for the power grid.
4. Establishing an equitably distributed energy market, based on a socioeconomic approach that defines availability of affordable electricity as a basic right within a progressive society.

5. Develop a renewable energy industry in Israel - government investment in R&D and, incentives for innovation in the renewable energy sector, and the development of technological capabilities and production capacities in the sector.
6. Cancel indirect support for the gas sector (maintaining low gas prices), while abstaining from future investments in the gas transmission grid.