

Electricity from solar energy in Israel

Summary and recommendations by the Energy Forum at the Samuel Neaman Institute, the Technion, 24.12.2013

Edited by Prof. Gershon Grossman and Idan Liebes

Abstract

In recent years there has been a clear and worldwide tendency to increase electricity production from renewable energy sources and reduce production from conventional sources, such as fossil fuels, for obvious reasons - the decline in reserves and the rising prices of fossil fuels and the environmental pollution that accompanies their use. By the forecast of US-EIA (2013 Outlook), global electricity generation from renewable energy will reach about 25% of the world's total electricity production in 2040, in comparison with 21.7% in 2012. Most of that amount comes from hydroelectric facilities, but there is also a clear increase in the global market share from renewable energy sources which are not hydroelectric (solar, wind, biomass/biogas, geothermal, etc.) from 5.1% in 2012 to a forecast of approximately 9% in 2040. The growth forecasts for the OECD countries alone are similar to the global outlook, with a growing segment of the various renewable energies.

Israel is also making efforts in this direction. Despite the increase in electricity production from renewable energy – by 3 times since 2010, the volume of electricity production from these sources is still a tiny fraction of the total electricity produced in the country. In 2012, the fraction of renewable energy in electricity production was 0.7%, representing about 400 million kWh, out of a total of about 57 billion kWh total consumption of the economy.

In 2009, the Israeli government decided on a 10-20 target: 10% of the total electricity in 2020 will be produced from renewable energy sources; and on an interim target of 5% in 2014. Within this framework, the Ashalim BOT tender was published for the construction of two thermo-solar power stations in the capacity of about 120 MW each, alongside with a photovoltaic power station of 30 MW. Moreover, the policy of government support in establishing facilities for the production of electricity from renewable energy is expressed primarily in setting quotas and empowering the Public Utility Authority - Electricity to set feed-in tariffs, as is done in other countries. The will to reduce the excess economic cost caused by the costs of electricity produced from renewable energy sources, has led to the

establishment of a committee to examine the economic benefits of renewable energies (Kandel Committee).

With a marked drop in the prices of photovoltaic panels in recent years, there is a tendency to change the orientation of projects planned earlier to use thermo-solar technology - to PV technology. One of the important issues discussed in this context is the benefits associated with thermo-solar facilities, which enable the integration of solutions of energy storage and hybrid operating system (heat supply from combustion of fuel in times of low or no solar radiation), which is not possible with the PV technology.

Among the renewable energy sources, solar energy has the biggest potential in Israel. Israeli companies have been and are pioneers in the development of technologies to generate electricity from solar energy, mainly in the thermo-solar section. One of the topics that emerged repeatedly in the Forum discussions is the comparison of thermo-solar technology to the photovoltaic one. In the current state PV is cheaper, and its price may drop even more, but thermo-solar energy has related benefits that cannot be ignored: storage capability to improve dispatchability; and the possibility of a hybrid operation. Also – thermo-solar technology is an Israeli technology, and local content should be given priority.

Recommendations:

1. It is advised to extend the Israeli R&D in all areas of solar- thermal technology, PV and storage technology of thermal and electrical energy. A future integrated facility for electricity production from solar energy and storage in a manner that allows dispatchability, and in a price that is competitive against conventional electricity generation, will bring about a real revolution in electricity sectors worldwide.
2. It is advised to extend the Israeli R&D to include technologies and methods to absorb PV energy into distribution networks in large percentages without interfering with the stability of the network.
3. Regarding the report of the Committee to examine the economic benefits of renewable energies (Kandel Committee), special costs involved in the integration of renewable energy must be taken into account. These costs were not taken into account in the Committee's calculations, including, for example, the costs of backup due to the construction of pumped storage facilities, cost due to transmission and distribution and cost of the increased use of land. The summary of benefits to the electricity sector from renewable energy should be updated accordingly.

4. It is advised to demand from new producers to provide storage capacity, as was done recently in California and Germany. This will allow utilizing excess electricity from intermittent sources. In this context, it is necessary to think what would happen here with the proliferation of small producers without control.
5. It is advised to call for a discussion by a team of experts to examine the potential of hybridization.