

Solar Energy for Residential Buildings in Israel

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Abstract

Israel leads the world (along with Cyprus and Greece) in using solar energy for heating water, and until recently was positioned globally as the country having the highest solar energy utilization per capita. About 3% of the primary national energy consumption is supplied by solar energy for household water heating, and the savings for the economy amount to 750,000 tons of oil equivalent (TOE) per year (according to the Ministry of Energy and Water and the Central Bureau of Statistics).

Planning and building regulations mandate installation of solar hot water supply in all new residential dwellings. However, this requirement does not apply to buildings over nine stories high. This limitation currently prevents high-rise residential houses to benefit from solar energy supply. The result of the absence of these systems is a significant increase in power consumption, and increasing the need for electrical infrastructures to supply these volumes. Furthermore, this causes indirect harm to the environment, and also prevents the ability to generate large economic savings at the national-economic level. Companies that specialize in the installation of solar systems reported, in recent years, that through improved systems as well as improved efficiency, they can heat water for all the tenants on all floors, without affecting the quality of the hot water for all floors, as was the case in the past. The Ministry of Energy and Water is currently leading a move designed to extend the requirement to install solar water heating systems to multi-story buildings. This is driven by the clear tendency in recent years to build high-rise buildings. Techno-Economic estimates conducted by the Ministry indicate the possibility to install solar systems in buildings of 15 floors or more, as well as installing heat pumps on the lower floors in buildings over 15 stories tall.

Meanwhile, the Knesset approved on 3.6.2012 the preliminary reading of a private bill by Knesset members Zeev Bielski and Dov Hanin, the Chairman of the Joint Commission on Environment and Health, regarding the installation of solar water heaters in high residential buildings. The justification for the law states: "The purpose of the law is to apply the requirement to install a solar energy system in each building, without limitation of number of floors in it, in view of the fact that in current reality there are systems that allow doing so. The bill will result in reducing the power consumption in Israel of the residents who live in high rise buildings, increase the protection of the environment, and save a lot of money."

In the 30 years that have passed since the planning and building regulations were implemented, requiring solar water heating installations in residential buildings up to nine stories high, many changes occurred in the nature of construction in Israel. Due to the increase in population and the shortage in land area, the proportion of high-rise buildings in residential construction is rising. The regulations dealing with solar systems for hot water supply must be altered to address the changing and apparent situation. The technology that enables solar water heating in high rise buildings does exist and is readily available. The possibility to extend the existing regulations and apply them to multi-story buildings will contribute significantly to enhance the use of solar energy, saving energy, money and air pollution on a national level. These savings may allow the deferment of building the next power station in Israel by several years.

Recommendations:

1. A considerable part of the objections to make the installation of solar systems compulsory in multi-story buildings results from the pressures of building contractors and also from lack of knowledge about the possibilities. On the other hand, there are already today contractors who install solar systems in buildings with more floors than required by law, viewing such an installation as a marketing tool. It is recommended to collect samples from existing projects of tall buildings - including photography of the building as well as data about the systems used, the area, and the energy produced, for

a number of apartment buildings. This database, that will be available to the public, will also help to reduce objections, and will possibly improve the quality and appearance of the installations.

2. It is important that enforcement be widespread and organized. Today, apparently, there is lack of sufficient enforcement, and many buildings do not meet the regulations. Enforcement is currently carried out by granting building permits, which is the task of the local committees. Transferring the enforcement authority to a government/regulatory agency with more "power" should be considered.
3. Regulation of solar systems on roofs of residential buildings should take into account all the relevant considerations and constraints. A situation in which the installation of one solar system or another may save energy but increase the waste of water or space, or may affect neighboring buildings, should be avoided.
4. We have to look ahead, beyond the residential buildings, at the business sector, which harbors great potential for savings by utilizing solar energy. Hotels, hospitals and various public buildings are large consumers of hot water. Swimming pools and sports facilities are using water at temperatures below 30 degrees. It is a "crime" to heat the water with fuel other than solar energy. Various industries such as textile, food and pharmaceuticals consume hot water or process heat at temperatures that can be readily available from the sun. In industrial zones there is usually no construction of tall buildings, no architectural problems, plenty of roof area, and work is done mainly during the day thus reducing the need for storage. Therefore, the capacity to implement maintenance operations and economies of scale could all reduce the cost.