

Solar Energy in Iran: Current State and Outlook

G. Najafi^a, B. Ghobadian^a, R. Mamat^b, T. Yusaf^c, W.H. Azmi^b

^aMechanics of Biosystem Engineering Department, Tarbiat Modares University, Tehran, Iran

^bFaculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600, Pekan, Pahang, Malaysia

^cFaculty of Health Engineering and Sciences, University of Southern Queensland, Australia

ABSTRACT

This paper introduces the resource, status and prospect of solar energy in Iran briefly. Among renewable energy sources, Iran has a high solar energy potential. The widespread deployment of solar energy is promising due to recent advancements in solar energy technologies. Therefore, many investors inside and outside the country are interested to invest in solar energy development. Iran's total area is around 1600,000 km² or 1.6×10¹² m² with about 300 clear sunny days in a year and an average 2200 kW-h solar radiation per square meter. Considering only 1% of the total area with 10% system efficiency for solar energy harness, about 9 million MW h of energy can be obtained in a day. The government's goal on 2012 was to install 53,000 MW capacity plants for electricity generation. To reach this goal, it was assumed that the new gas-fired plants along with the hydroelectric and nuclear power generating plants could be financed by independent power producers including those of foreign investment. Based on the fifth 5 year Socio-economic and Cultural Development Plan, the private sector was expected to have a share of at least 270 MW in renewable energy development. The existing small capacity solar energy plants are in Shiraz, Semnan, Taleghan, Yazd, Tehran and Khorasan. Based on the specified available solar trough technology, solar area, average solar hours and average solar direct irradiation, the technical potential of solar electricity was estimated to be 14.7 TWe. Under the current energy policies, the combined solar, wind and geothermal power plants are economically viable. These huge RES's potential can be realized assuming the availability of technology, investment capital, human expertise and the other resources along with a long-term driven renewable energy policy. Due to high growth rate of electricity demand in Iran, the nominal installed capacity has increased by 8.9% per annum during 2001–2007. In the reference scenario, the share of RES in total installed electricity capacity is expected to be about 2% in 2030. It is expected that the cumulative RES installed capacity will reach 2.8 GW in 2030. This requires more than 2800 million US dollar investment during 2010–2030.

KEYWORDS: Solar energy resources; Iran renewable energies; Electricity; Sustainable development

DOI: [10.1016/j.rser.2015.04.056](https://doi.org/10.1016/j.rser.2015.04.056)