

TURKEY

Solar Era Is Just Beginning

In parallel with its population and GDP growth, Turkey has been experiencing rapid demand growth in all segments of the energy sector for decades. Turkey is developing an integrated energy policy aimed at securing a reliable supply of energy, as well as achieving a low-carbon and environmentally sustainable future. Turkey also intends to promote employment and economic growth through its energy development. Solar energy plays a major role in Turkey's renewable energy roadmap due to the fact that is geographically located the "solar band" region.

With a population reaching 76.7 million¹, Turkey's energy consumption based on primary energy resources is continuing to increase and this is compounded by the rapidly growing economy. Turkey's increasing energy demand is mostly met by fossil fuels, of which a large portion is imported. The total installed capacity of power is 69,516 MW and the breakdown by resource is 59.7% fossil fuels (natural gas, coal, liquid fuel, etc.), 34% hydro, 5.2% wind and 1.1% other renewables². Turkey pays millions of dollars for its energy imports every year. In addition to this, the number of buildings has reached 9.3 million and the number of residential and commercial units in these buildings reached to 22 million in 2014, which consume 28.2 million tons of oil equivalent (TOE), mainly natural gas, coal and wood for heating and electricity for cooling.

Energy security and a sustainable energy supply are among the main policy concerns of Turkey. Significant importance is placed on:

- Encouraging energy production from renewable sources in a secure, economic and cost effective manner,
- Expanding utilization of promising renewable resources,
- Increasing diversification of energy resources,
- Taking significant steps to increase energy efficiency,
- Reducing greenhouse gas emissions,
- Making use of waste products and protecting the environment, and

▼ **This multifamily housing project was built after the 2011 earthquake disaster in Van. Solar is used to provide hot water to the residents.**

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¹ "The Results of Address Based Population Registration System, 2013". Turkish Statistical Institute, Released in 2014.

² "5-year Electricity Energy Production Capacity Projection of Turkey (2014-2018)", Published by TEIAS (Turkish Electricity Transmission Company), June 2014. www.teias.gov.tr



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- Developing related mechanical and/or electro-mechanical manufacturing sector.

Reasons to support renewables in Turkey are to secure the energy supply using domestic sources, to lower import dependency (less than 28% of total produced locally, 32.3 million TOE), to manage the current account deficit (energy imports reached to 60 billion USD which is 25.3% of total imports) and to meet the energy target renewables' share is to be 61,600 MW by 2023.

Solar energy has the potential to greatly reduce this cost in the medium and long term with a feasible potential of a minimum of 450 GW. In the face of increasing

oil prices and the need for national energy security, it is widely recognized that it is imperative for Turkey to increase the contribution of renewable energy resources rapidly. Solar energy is the most important alternative clean energy resource that is still untapped in Turkey. The yearly average solar radiation is 1,311 kWh/m² per year and 3.6 kWh/m² per day. The total yearly solar radiation period is approximately 2,460 hours per year and 7.2 hours per day.



▲ **Solar thermal application for hot water production at the Ephesia Hotel in Kusadasi on the Aegean coast.**

Industry Development and the Importance of the IEA SHC Programme

Turkey currently has the biggest European solar thermal energy market. And worldwide, Turkey is ranked fourth in cumulated installed capacity and ranked second in newly installed capacity. The country's solar industry, with more than 90 manufacturers and 3,000 installers, is increasing its activities and supplying 1.5 million m² of locally produced solar thermal collectors annually. Domestic hot water is still the main usage area rather than solar heating and cooling, which are almost negligible at this stage although the market promises great opportunities.

Financial policies and supporting mechanisms, new laws and regulations, research and technology policies, and dissemination of knowledge, education and training targeting Solar Heating Cooling are the needs and the experiences to be learned from experienced countries. Turkey's participation in the IEA SHC Programme will not only speed up this transition period, but also add efficiency to Turkey's efforts. As Turkey's HVAC/R export is more than 4 billion USD and is strengthening its position in global HVAC/R trade with increasing quality and reputation, Turkey's cooperation with IEA SHC members will be beneficiary to all parties in all dimensions, especially for technology development and shaping the solar future.

The solar energy market is accelerating and development is occurring in all areas from production to installation with the support of raising awareness in all sectors of society. The Turkish solar energy associations continued their endeavors to facilitate information flow for a healthy market development. One of the events organized by GÜNDER entitled "SOLARTR 2014 Conference and Exhibition" held in Izmir on November 19-21, 2014, included trainings, meetings and workshops on capacity building and the removal of barriers. The conference was organized with the participation of the leading organizations in the solar energy industry from researchers to industry representatives and from the



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public to contractors. All these stakeholders came together to evaluate solar energy and the development of the industry. You can read and download the conference papers from www.solartr.org.tr

Now Turkey's solar industry is looking forward to inviting solar colleagues to the SHC 2015 Conference in Istanbul on December 2-4, 2015.

Turkey & IEA SHC

Turkey's immediate contribution to the IEA SHC is actively participating in the following projects, with the reasons briefly explained:

Task 53: New Generation Solar Cooling and Heating Systems (PV or Solar Thermally Driven Systems).

Many parts of Turkey are cooling-dominated, where global solar irradiation intensity on horizontal plane (GHI) varies between 1,600-1,800 kWh/m². These locations also have quiet high direct normal irradiation intensity, reaching 2,200 kWh/m². Under these conditions, Turkey is a very attractive test-bed and market for both PV driven small-scale solar air-conditioning and solar thermally driven medium/large scale absorption cooling systems.

Task 52: Solar Energy and Energy Economics in Urban Environments.

Turkey's urban population is experiencing remarkably increases, due to births in and migration to metropolitan areas. In addition, Turkey recently imposed a large-scale urban transformation law to reconstruct millions of homes, which are not earthquake resistant. This transformation law is leading to the construction of more energy efficient and stronger buildings. Solar energy applications for the central heating and cooling of these building complexes are highly desirable, if the lifetime costs are competitive.

Areas for Future Collaboration

Turkey hopes in the near future to initiate work on:

- Solar Refrigeration and Cold Storage for Foods
- Fully solar powered passive house strategies for Mediterranean climates
- Solar Energy for Rural Development and Employment
- Easy and Innovative Solar Energy Solutions for Rural Regions

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