

RENEWABLE ENERGY IN TURKEY (SEPTEMBER 2015)

A) RENEWABLE ENERGY POTENTIAL

Turkey has at least;

- 160,000 GWh/a. economic annual hydroelectricity generation capacity,
- 48,000 MW techno-economical wind power capacity
- 1,500 kWh/m²-year of average Global Solar Radiation
- 31,500 MWt geothermal capacity
- 20 MTOE biomass energy potential
- 1.5-2 MTOE biogas potential

B) TARGETS:

In the Electricity Energy Market and Supply Security Strategy Paper of May 2009, the primary target is defined as to increase the share of domestic and renewable resources. In order to reach this target, measures are being taken to promote the use of indigenous resources. As reviewed later on the objectives related with utilization of renewable energy resources for 2023 are as follows;

- Increasing share of renewable resources in total electricity generation mix: at least 30% of total electricity generation from renewables,
- Hydroelectric: Utilization of all technical and economic hydroelectric potential for electricity generation with an installed capacity of 34000 MW until year 2023.
- Geothermal: Utilization of all confirmed geothermal potential of 1000 MWe for electricity generation until year 2023.
- Solar: Main targets for solar energy is to increase utilization rates and areas in Turkey, and enable maximum utilization of current potential. For electricity generation from solar energy, latest technological advancements are observed and implemented. With this perspective, minimum 5000 MW (including unlicensed generation facilities) is determined as 2023 target for solar energy.
- Wind: Target for wind power plant installed capacity for 2023 is determined as 20.000 MW.
- Biomass: Target for biomass power plant installed capacity for 2023 is determined as 1000 MW.

C) TOTAL INSTALLED RENEWABLE ENERGY IN TURKEY

SOURCE TYPES	SEPTEMBER 2015	
	INSTALLED POWER (MW)	PROJECT NUMBER
RENEWED. + + Waste + PYROLYTIC WASTE OIL	317	65
GEOTHERMAL	523,6	16
HYDRAULIC RIVERS	7.226,1	449
WIND	4.052,4	103
SOLAR (unlicensed)	155	252
TOTAL	12.274,10	885

D) FEED IN TARIFFS

Purchasing guarantee from a defined price has been given to electricity generated from renewables. According to this support mechanism, licensed and unlicensed facilities generating electricity from renewables which are operational currently and which will be in operation before December 31, 2020 benefit from this tariff system for a maximum term of 10 years from their operation date.

The positive effect of feed-in tariff mechanism can be clearly observed in the figures about increase in renewable energy investment in recent years.

<u>Tariffs</u>	
Wind and Hydroelectric power plants	: 7.3 ¢ /kWh
Geothermal power plants	: 10.5 ¢ /kWh
Solar and Biomass power plants	: 13.3 ¢ /kWh

E) LOCAL CONTENT SUPPORT

The usage of renewable energy resources has profound effects on creating and sustaining a clean environment, reduction of greenhouse gases, and reduction of imported energy amount thus fortifying energy independence, improving technological and industrial opportunities in renewable energy applications for local scope. Local content support, which can be considered as an extra bonus, shall be added to feed-in tariff of relevant renewable energy resource in order to encourage utilization of renewable energy resources.

Promoting ‘green energy’ in a country best can be realized by adopting a holistic approach; hence, such a policy should encompass all dimensions of the notion of ‘green energy’ including ‘technology transfer’ as well as providing favorable ground for the local manufacturers to familiarize themselves with the related know-how and modern clean technologies.

In case of usage of local mechanical or electronic equipment in generation facilities, commissioned before 31 December 2020 and subject to the Renewable Energy Source (RES) Support Mechanism, then a local equipment bonus shall be added to the feed-in tariff relevant to this renewable energy source accordingly. This additional tariff is provided for a term of five years from starting date of operation for a particular generation facility from a certain type of renewable energy resources. In order to deserve “local content additional tariff”, an equipment has to be manufactured locally in Turkey in the ratio of minimum 55%.

This support prompted a definite increase in making investment for manufacturing of renewable energy equipment in Turkey in recent years.

Local Content Support for different renewable energy technologies	
Locally Manufactured Component	Prices Applicable (US Dollar cent/kWh)
Local Content Support Mechanism for Wind	
<i>Blades</i>	0,8
<i>Generator and Power Electronics</i>	1,0
<i>Turbine Tower</i>	0,6
<i>Mechanical Equipment in rotor and nacelle (excluding blade and generator group)</i>	1,3
Local Content Support Mechanism for Solar PV	
<i>PV Panel Integration and Manufacturing</i>	0,8
<i>PV Modules</i>	1,3
<i>PV Module Cells</i>	3,5
<i>Inverter</i>	0,6
<i>Solar Concentrator for PV Modules</i>	0,5
Local Content Support Mechanism for Solar CSP	
<i>Radiation Collector Tube</i>	2,4
<i>Reflective Surface</i>	0,6
<i>Tracking System</i>	0,6
<i>Heat Storage System Mechanical Components</i>	1,3
<i>Tower Sun Light Collector Mechanical Equipment</i>	2,4
<i>Stirling Motor</i>	1,3
<i>Panel Integration and Structural Solar Mechanics Manufacturing</i>	0,6
Local Content Support Mechanism for Hydro	
<i>Turbine</i>	1,3
<i>Generator and Power Electronics</i>	1,0
Local Content Support Mechanism for Biomass	
<i>Fluidized Bed Steam Boiler</i>	0,8
<i>Liquid or Gas Fired Steam Boiler</i>	0,4
<i>Gasification and Gas Cleaning Group</i>	0,6
<i>Steam or Gas Turbine</i>	2
<i>Internal Combustion or Stirling Motor</i>	0,9
<i>Generator and Power Electronics</i>	0,5
<i>Cogeneration System</i>	0,4
Local Content Support Mechanism for Geothermal	
<i>Steam or Gas Turbine</i>	1,3
<i>Generator and Power Electronics</i>	0,7
<i>Steam Injector or Vacuum Compressor</i>	0,7