

Renewable Energy In Turkey



Renewable Energy Overview



Renewable Energy Overview

Turkey - National Renewable Energy Action Plan



- Elimination of obstacles to the development of renewable energy
 - Increasing financial support for projects
 - Removal of barriers to administrative processes
 - Development of the legal framework for the implementation of new solutions
 - Providing secure access to renewable energy sources for electricity generation
 - Optimizing the use of related infrastructure
 - Development of support package programs



Renewable Energy Overview

2023 Targets

- Increasing the share of renewables to 30 percent
- Maximizing the use of hydropower
- Increasing wind power installed capacity to 20,000 MW
- Increasing biomass installed capacity to 1500 MW
- Installing power plants with 1000 MW of geothermal and 5,000 MW of solar energy

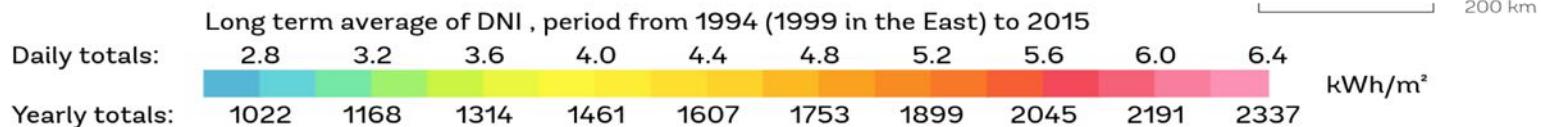
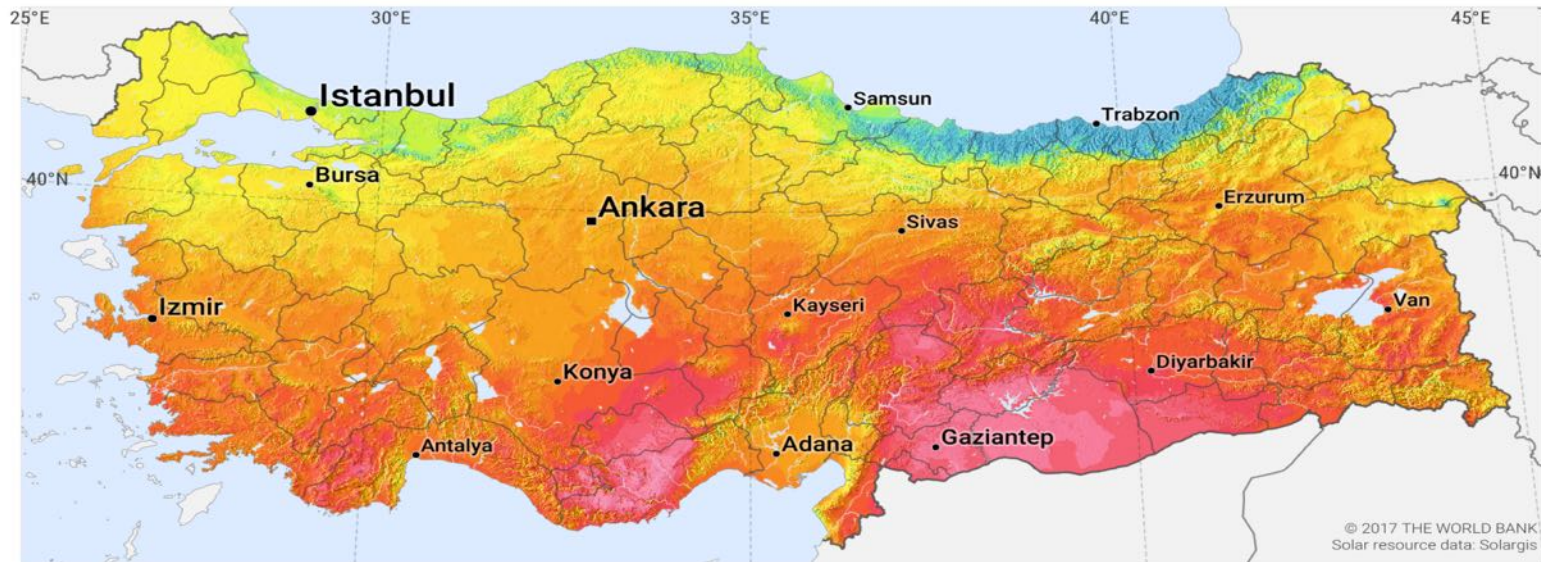


Renewable Energy Overview

Solar Potential

SOLAR RESOURCE MAP

DIRECT NORMAL IRRADIATION TURKEY

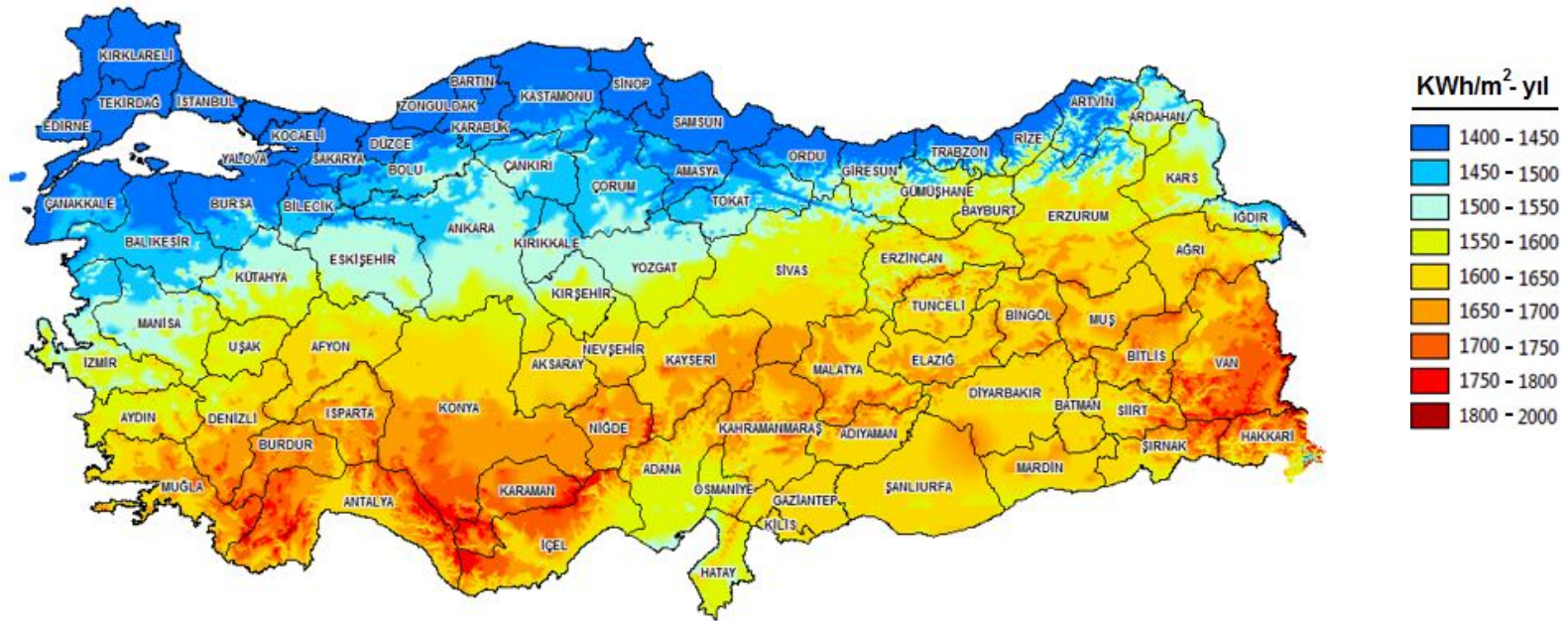


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Renewable Energy Overview

Solar Energy Potential Map (GEPA)

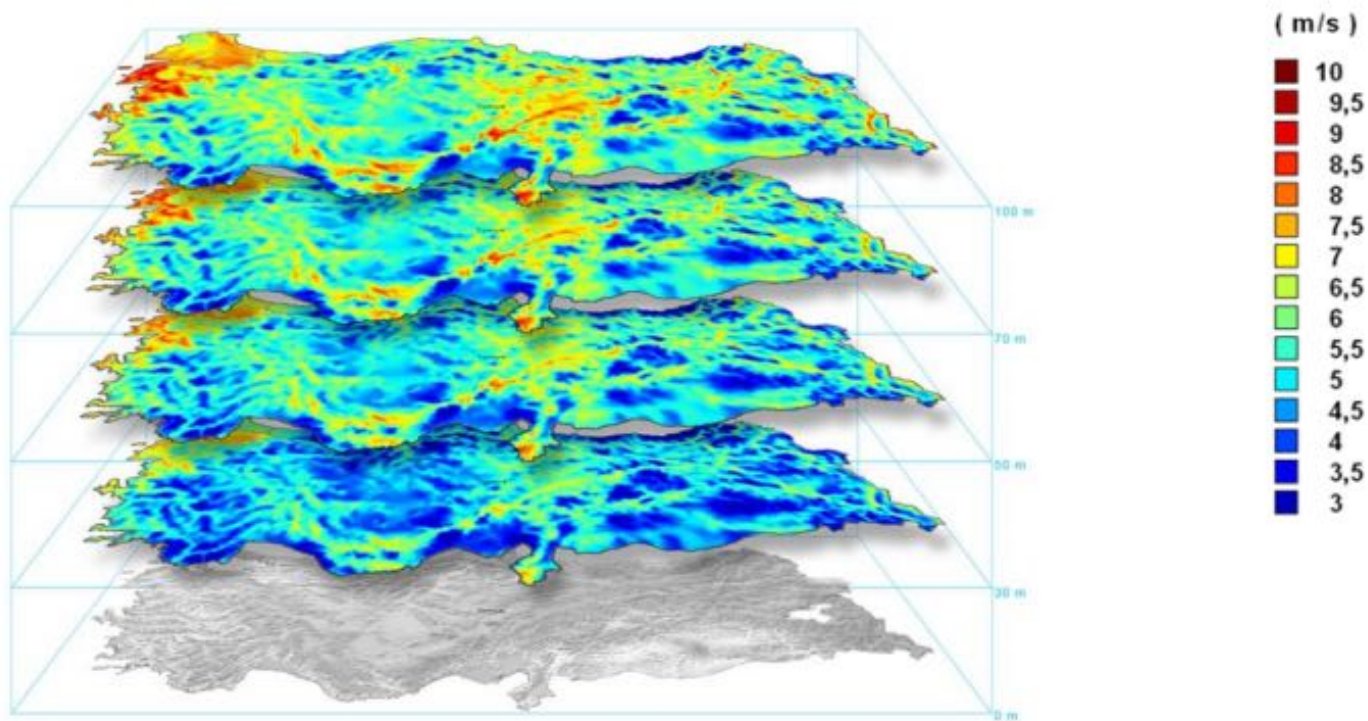


* YEGM: <http://www.yegm.gov.tr/MyCalculator/Default.aspx>



Renewable Energy Overview

Wind Energy Potantial Map (REPA) Power & Speed





Renewable Energy Overview

Cumulative Wind Energy Development In Turkey

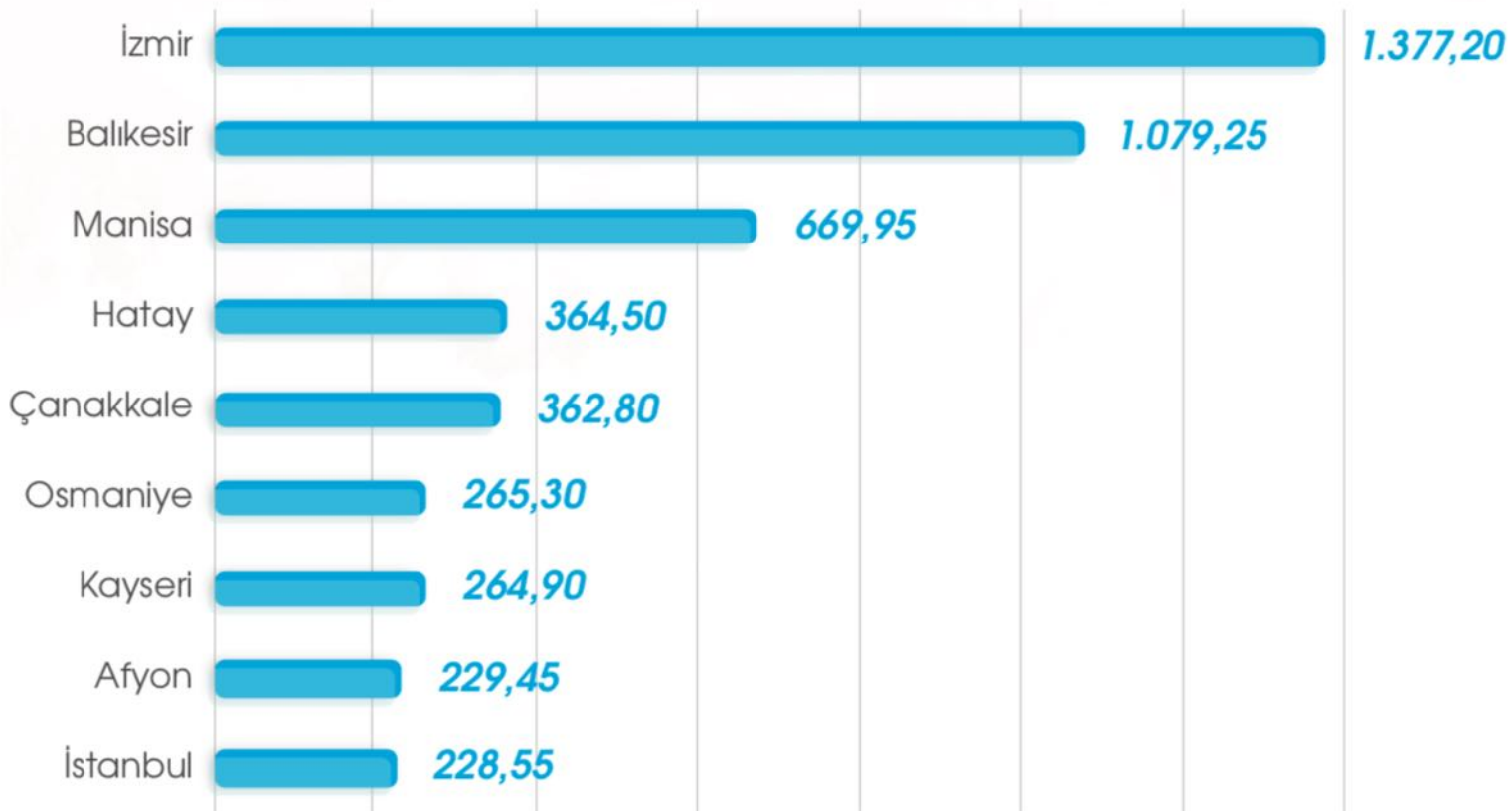
- 171 wind power plants as of July 2018 having total installed capacity 7012,75 MW





Renewable Energy Overview

Operational Wind Power Plants According to Cities (MW)

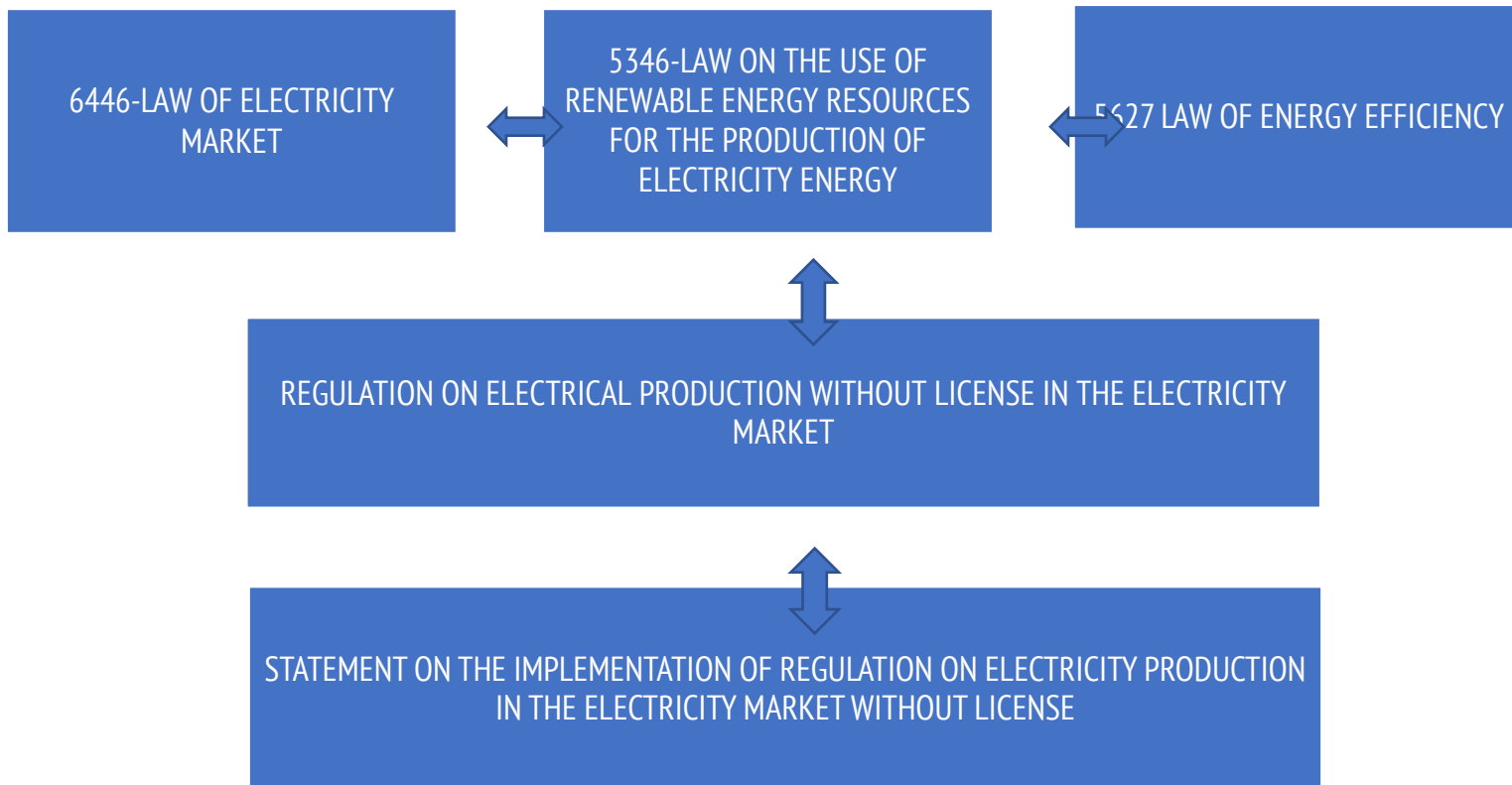




Legislative Framework

+ Legislative Framework

The Structure



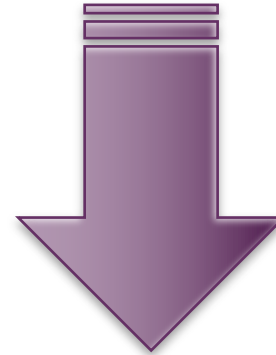


Renewable Energy Overview

3 Models

- Unlicensed
- Licensed
- RE-Zone model

Self Consumption



Commercial



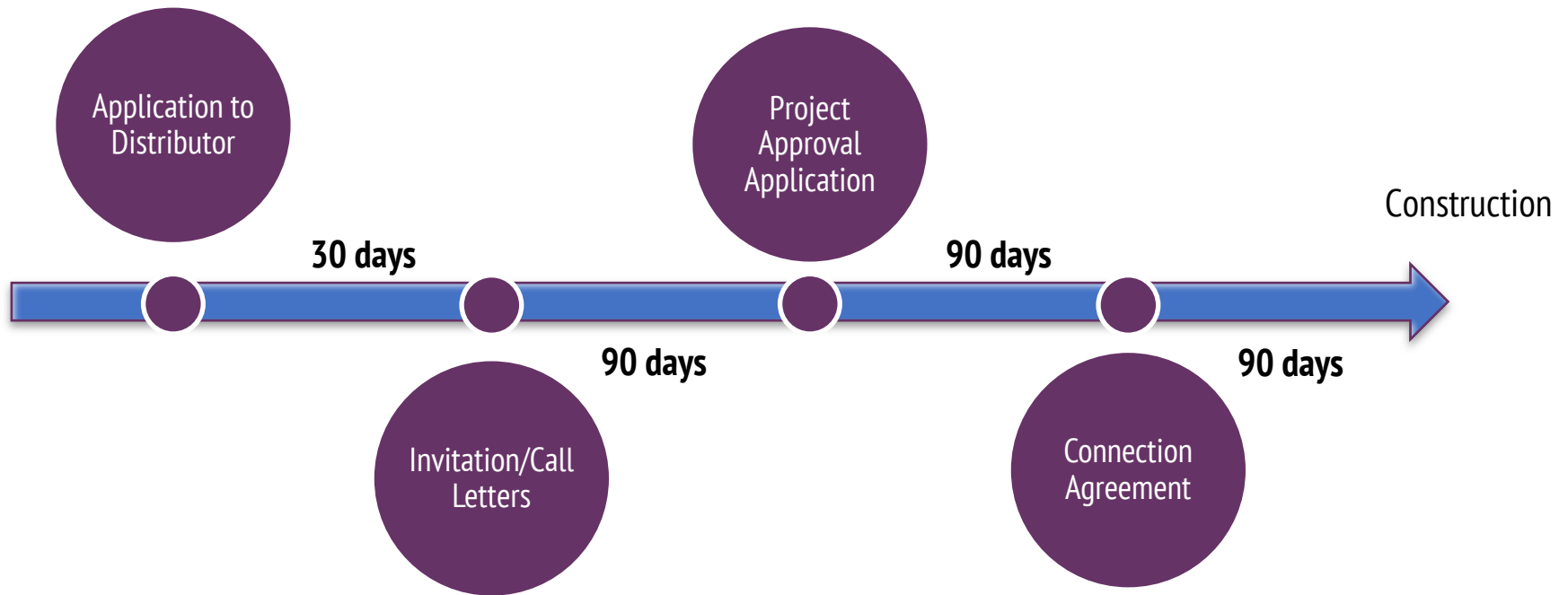
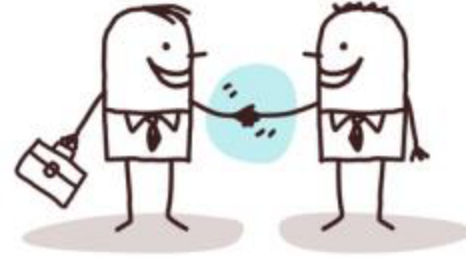
+ Legislative Framework

Unlicensed - up to 1 MW

- Unlicensed projects do not require establishment of a company
- The investor needs to apply to the relevant Network Operator (Distribution Company) with the following documents:
 - Connection Application Form for unlicensed electricity generation
 - The original or certified copy of the title deed or the rental contract for the project site
 - Single-line diagram
 - Bank receipt testifying to the payment of the application fee (596 TRY for capacities over 250 Kw)
 - Fact sheet testifying to non-sensitive nature of the location (it should not be a fertile agricultural land)
 - EIA exemption document from Provincial Directorate of Environment and Urbanization

+ Legislative Framework

General Application Process



+ Legislative Framework

Licensed (pre-license)

- On-site metering data of at least a 1- year period
- Submit an application for pre-license. The investors apply to EMRA for pre-license with the following documents:
 - Pre-license Application form
 - Certificate of authorization for real persons to represent the entity
 - A copy (certified by trade registrar) of the Articles of Incorporation
 - Fact sheet of the partnership structure of the company
 - Fact sheet on company capital (at least 5% of the total planned investment is required – see the table on “investment amount per unit” EMRA Decision No:4709-4 dated 21/11/2013)
 - Fact sheet on Generation Facility

+ Legislative Framework

Licensed (pre-license) “investment amount per unit” EMRA Decision No:4709-4 dated 21/11/2013

FUEL SOURCE	TOTAL INVESTMENT AMOUNT PER UNIT (TRY/MW _M)
Coal	1,500,000
Natural Gas / LPG	1,000,000
Fuel Oil / Nafta	1,000,000
Hydro	2,000,000
Wind	2,500,000
Geothermal	2,100,000
Biomass	1,900,000
Solar	3,000,000
Nuclear	6,000,000
Process waste heat	700,000
Others	1,400,000

+ Legislative Framework

Licensed (pre-license)

- (Cont.) Submit an application for pre-license. The investors apply to EMRA for pre-license with the following documents:
 - 1/25,000 and 1/5,000 scale maps covering facility location
 - Single-line diagram
 - Zoning status sheet
 - Fact sheet (from Provincial Directorate of Food, Agriculture and Livestock) testifying to non-sensitive nature of the location (it should not be a fertile agricultural land),
 - Guarantee letter (MW X 10,000 TRY-Upper Limit: 5,000,000 TRY, EMRA Board Decision No:4709-6 dated 21/11/2013)
 - Pre-license application fee

+ Legislative Framework

Licensed

- The Requirements to be fulfilled during the pre-license period (between 24 months-36 months)
- Once the preliminary license is granted, the investor will then be required to apply for and obtain the following permits and approvals:
 - License Application form
 - Certificate of authorization for real persons to represent the entity
 - A copy (certified by trade registrar) of the Articles of Incorporation
 - Fact sheet of the partnership structure of the company
 - Obtainment of ownership/usufruct rights of the power plant site
 - Approval for the zoning plan of the project site
 - Preliminary construction plans for the facility

+ Legislative Framework

Licensed

- Obtainment of relevant evaluations for environmental impact assessments
 - Obtainment of the permit for technical interaction with military and civilian air services (for wind power plants)
 - Obtainment of relevant evaluations pursuant to the Regulation on Military Forbidden Zones and Security Areas
 - Finalization of the Water Usage Agreement with the Administration of State Hydraulic Works (for hydroelectric power plants)
 - Application for system connection and usage agreements with TEIAS or the Relevant Distribution Company
 - Finalization of the Agreement with the Relevant Authorities Regarding the acquisition of the right to use relevant resources (for geothermal power plants)
 - License application fee

+ Legislative Framework

Licensed

- Business deadline plan to increase the company capital to at least 20% of the total planned investment (see the table on “investment amount per unit” EMRA Board Decision No:4709-4 dated 21/11/2013) Finalization of the Contribution Fee Agreement with TEIAS (for wind and solar power plants) and a guarantee letter (based on the formula below – Upper Limit: 78,600,000 TRY) (the guarantee letter offered the in pre-license period is discounted)

INSTALLED POWER (MW _M)	PERCENTAGE TO APPLIED TO THE TOTAL PLANNED INVESTMENT (%)	FORMULA
$0 < P \leq 10$	3	$P \times \text{IPU} \times 0,03$
$10 < P \leq 100$	2	$\text{IPU} \times [0,3 + (P - 10) \times 0,02]$
$P > 100$	1	$\text{IPU} \times [2,1 + (P - 100) \times 0,01]$

+ Legislative Framework

Licensed



Pre-license Periods

Installed Power (P-MW)	Pre-license period (months)
$P \leq 5$	24
$5 < P \leq 50$	30
$50 < P$	36

Construction Periods

Type of Generation Facility	Installed Power (P-MW)	Construction Period (months)
Wind	$P \leq 10$	22
	$10 < P \leq 50$	30
	$50 < P \leq 100$	38
	$100 < P$	46
Geothermal	$P \leq 50$	38
	$50 < P$	46
Biogas/Biomass	$P \leq 10$	24
	$10 < P \leq 50$	30
	$50 < P$	38
Solar	$P \leq 10$	18
	$10 < P \leq 50$	30
	$50 < P$	38

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Incentives for Licensed and Unlicensed Projects



Incentives for Licensed and Unlicensed Projects



- Feed-in-Tariffs
- Local Content Support
- Acquisition of Land
- Incentives for Pre-license/License/System Usage Fees and Taxes
- Investment Incentives



Incentives

Feed-in-Tariffs

- Law No. 5346 provides for a purchasing guarantee to electricity generated from renewables. Licensed and unlicensed facilities generating electricity from renewables that are operational currently or will be in operation before December 31, 2020 benefit from the tariffs in **Schedule I for a maximum term of 10 years from the operation date**. The new licensed projects tender regulation for applicants to the same connection points calls for a reverse-auction from FIT Prices.

SCHEDULE I (Provision of the law dated 29/12/2010 and numbered 6094)	
Type of Production Facility Based on Renewable Energy Resources	Feed-in-tariff Prices Applicable (US Dollar cent/kWh)
a. Hydroelectric production facility	7.3
b. Wind power-based production facility	7.3
c. Geothermal power-based production facility	10.5
d. Biomass-based production facility (including landfill gas)	13.3
e. Solar power based production facility	13.3

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Incentives

Local Content Support

- Local Content support, which may be considered as an extra bonus, is added to the FIT prices of the relevant renewable energy generation facility. This additional tariff is provided for a term of five (5) years from the starting date of operation for a particular generation facility. Local content support is not provided for unlicensed facilities.

SCHEDULE II (Provision of the law dated 29/12/2010 and numbered 6094)		
B- Wind power based production facility	1- Blade	0.8
	2- Generator and power electronics	1.0
	3- Turbine tower	0.6
	4- All of the mechanical equipment in rotor and nacelle groups (excluding payments made for the blade group and the generator and power electronics.)	1.3
C- Photovoltaic solar power based production facility	1- PV panel integration and solar structural mechanics production	0.8
	2- PV modules	1.3
	3- Cells forming the PV module	3.5
	4- Invertor	0.6
	5- Material focusing the solar rays onto the PV module	0.5



Incentives

Acquisition of Land

- Designated forested areas, land privately owned by the Treasury, or land under the disposal of the state in its entirety, can be utilized for the purposes of the renewable energy generation if permission is granted by the Ministry of Environment and Forestry or the Ministry of Finance.
- Forestry Peasant Development Revenue and Forestation and Erosion Control Revenue are not charged to the renewable energy generation facilities.
- Permission, lease, easement, and usufruct permission fees are discounted by 85% for renewable energy generation facilities during the initial ten years of investment and operation of power transmission lines, including those under operation.



Incentives

Incentives for Pre-license/License/System Usage Fees and Taxes

- Pursuant to the Article 43.4 of the Electricity Licensing Regulation, for the facilities generating electricity from the local natural resources and the renewables, the license holders are not required to pay the yearly license fees for the first eight years following the date of completion of the power plants. Yearly license fees are calculated based on the following formula: total electricity generated in kWh X 0.003 cent/TRY.
- Furthermore, pre-license and license application fees (listed in the Table-2 and Table-3) for these facilities are discounted by 90% as well. Excluded from presentation for simplicity.



Incentives

Incentives for Pre-license/License/System Usage Fees and Taxes

- Major investment incentive instruments are:
 - Exemption from customs duties: Customs tax exemption for imported machinery and equipment for projects with an investment incentive certificate.
 - VAT exemption: For imported or domestically purchased machinery and equipment for projects with an investment incentive certificate.





Market Outlook



Market Outlook

TURKEY WIND MARKET OUTLOOK-ROAD TO 20 GW BY 2023

	UNLICENSED MARKET	LICENSED MARKET	MEGA PROJECTS	
Capacity Threshold	< 1MW	> 1MW	> 1MW	10 GW in 3 or 4 projects
Location	Based on DisCo capacity	Based on TEIAS capacity	Renewable Energy Resource Zones	
Electricity sales	Spot market at FIT via authorized supply company	Spot market at FIT	Fixed price identified in auction	WPPs have balancing responsibility in the day-ahead market with a tolerance band of 2%
FIT Application timeline	Apply to DisCo's with no specific timeline	Apply to YEKDEM in October	-	
Auction model	No auction	Reverse auction	Reverse auction	<ul style="list-style-type: none">Blades: 0.8¢/kWhGenerator & Power electronics: 1.0¢/kWhTower: 0.6¢/kWhComplete mechanical parts in rotor and nacelle: 1.3¢/kWh
Local content	-	Extra FIT	-	
Installed capacity (as of end-2017)	34 MW	6,482.2 MW	-	552.7 MW in construction 2.8 GW tendered in June - December 2017 2 GW applications in 2020 April
Pipeline (as of end-2017)	-	552.7 + 2.8 GW + 2 GW	1 GW Re-zone tender completed in 2017 + 2 GW tenders expected in 2018	



Market Outlook

TURKEY SOLAR MARKET OUTLOOK-ROAD TO 5 GW BY 2023

	UNLICENSED MARKET	LICENSED MARKET	MEGA PROJECTS
Capacity Threshold	< 1MW < 50 kW for rooftop	> 1MW	> 1MW
Location	Based on DisCo capacity	Based on TEIAS capacity	Renewable Energy Resource Zones
Electricity sales	Spot market at FIT via authorized supply company	Spot market at FIT	Fixed price identified in auction
FIT Application timeline	Apply to DisCo's with no specific timeline	Apply to YEKDEM in October	-
Auction model	No auction	Reverse auction	Reverse auction
Local content	-	Extra FIT	-
Installed capacity (as of end-2017)	3,402 MW	17.9 MW	-
Pipeline (as of end-2017)	2.8 GW	415 MW prelicensed + 61.8 MW licensed	1 GW tender completed in March 2017 + 1 GW tender expected in 2018

KONYA KARAPINAR
6,000 hectares for 3 GW
NIGDE BOR
2,500 hectares for 1.5 GW

TURKEY IS AMONG THE LARGEST GROWING SOLAR MARKETS WITH 2.6 GW INSTALLATIONS IN 2017

- PV panel integration & structures: 0.8¢/kWh
- PV modules: 1.3 ¢/kWh
- PV cells: 3.5¢/kWh
- Inverter: 0.6¢/kWh
- Optical material: 0.5¢/kWh



Thank You!

- Onur Günduru
 - onur.gunduru@onurenerji.com.tr
- Web (Limited English Content)
 - www.onurenerji.com.tr
- Contact Email
 - iletisim@onurenerji.com.tr
- Office Tel
 - +90 232 4615830
- Office Fax
 - +90 232 4615838

