



TÜRKİYE RÜZGAR ENERJİSİ BİRLİĐİ
TURKISH WIND ENERGY ASSOCIATION



POLICY OF THE MINISTRY WITH REGARDS TO RENEWABLES IN TURKEY

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MAIN ENERGY POLICY CONCERNS OF TURKEY

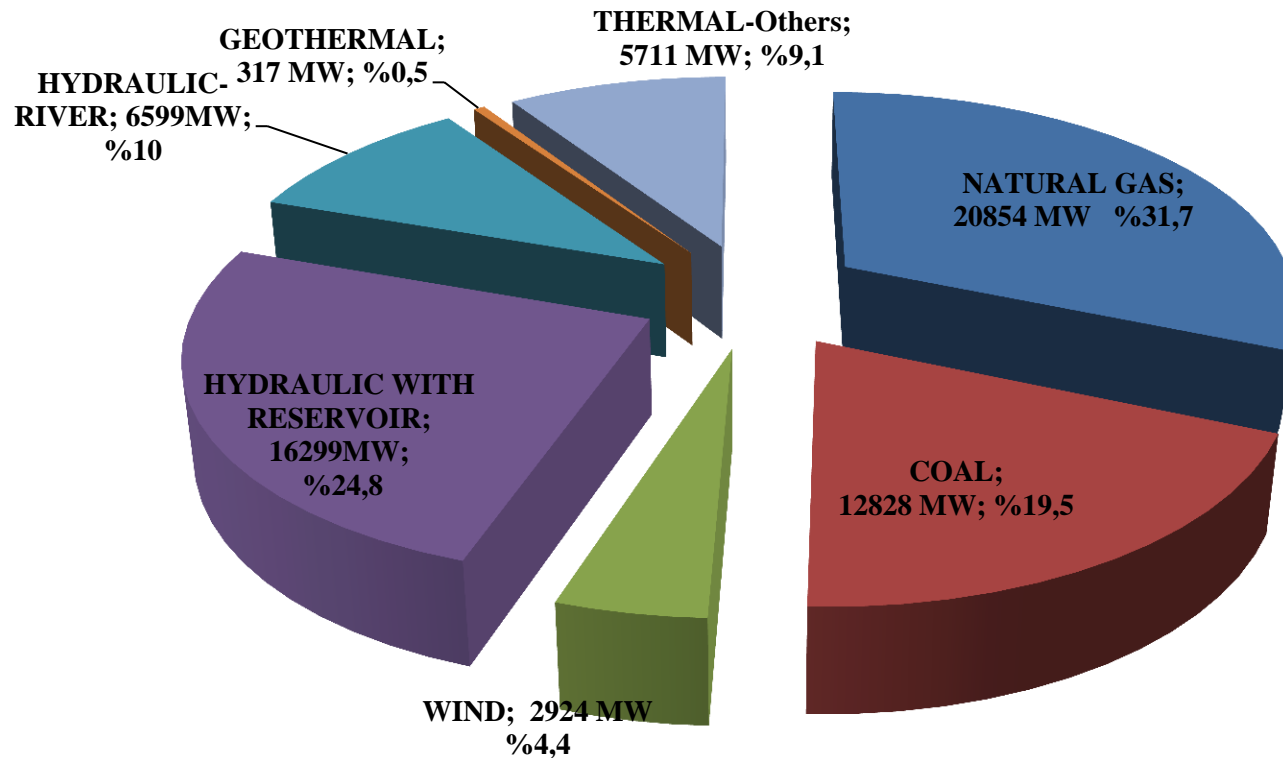
Energy security and sustainable energy supply are among the main policy concerns of Turkey.

Turkey attributes significant importance to;

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

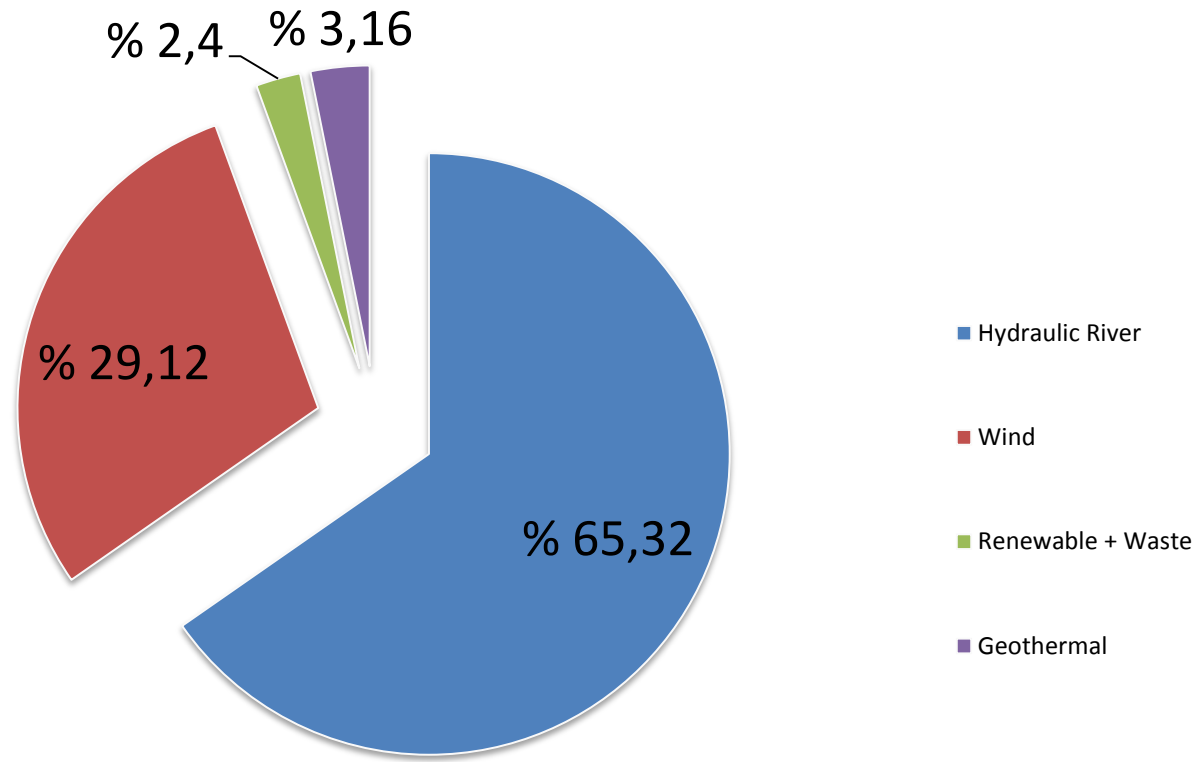
TOTAL INSTALLED CAPACITY IN TURKEY

(65 GW)



As of: 30.04.2014

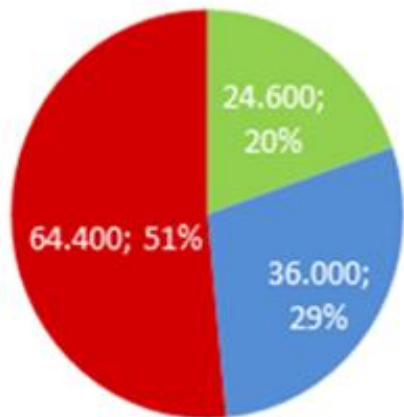
BREAKDOWN OF TOTAL INSTALLED RENEWABLE POWER CAPACITY (10 GW)



PROJECTION

INSTALLED CAPACITY (MW)

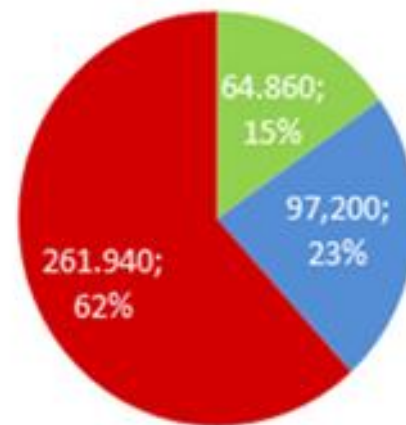
2023



TOTAL CAPACITY: 125 GW

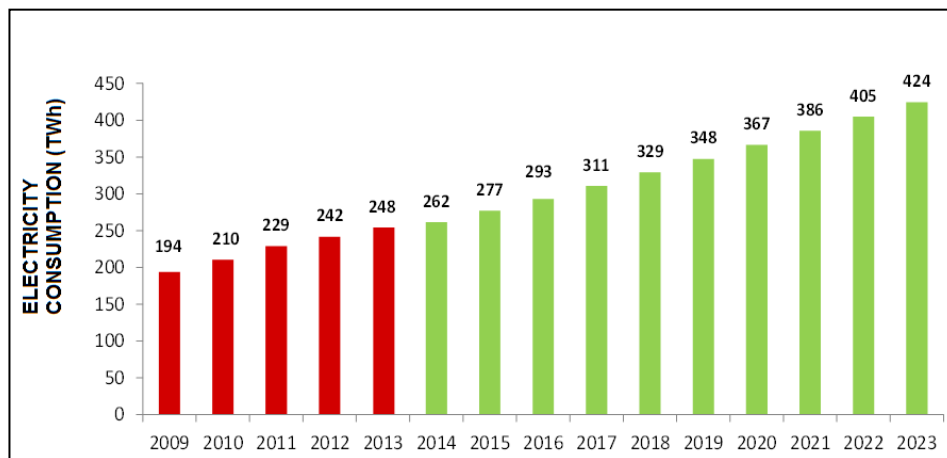
ELECTRICITY PRODUCTION (GWh)

2023



TOTAL PRODUCTION: 424 TWh

- RENEWABLES EXCEPT HYDRO
- HYDRO
- OTHERS



RENEWABLE ENERGY TARGETS FOR 2023

The whole economically feasible hydropower potential (36 GW) of Turkey will be provided for generating electrical energy,

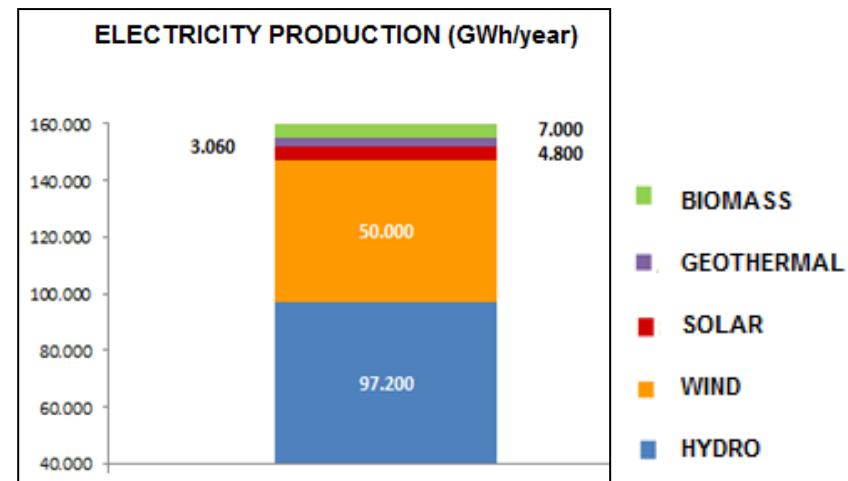
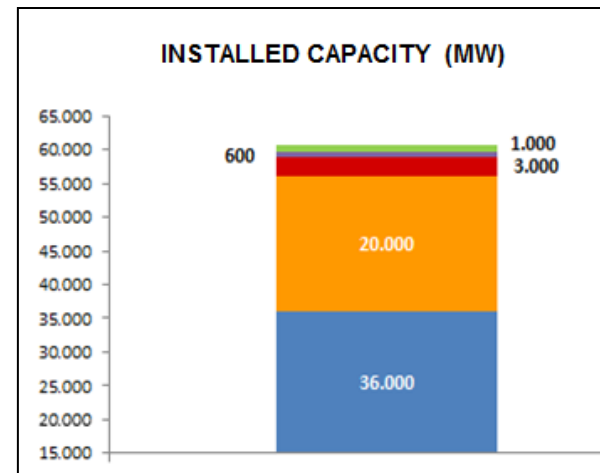
20000 MW capacity of wind power plant will be in operation

Minimum 3000 MW of solar energy capacity will be reached

Minimum 600 MWe geothermal will be implemented

1000 MWe installed capacity for biomass energy will be implemented

30% electricity from renewables



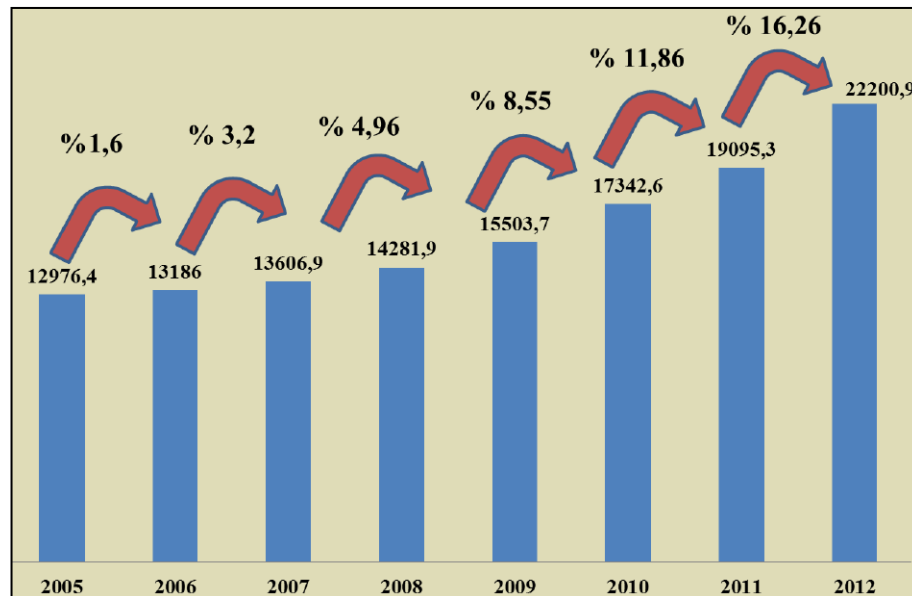
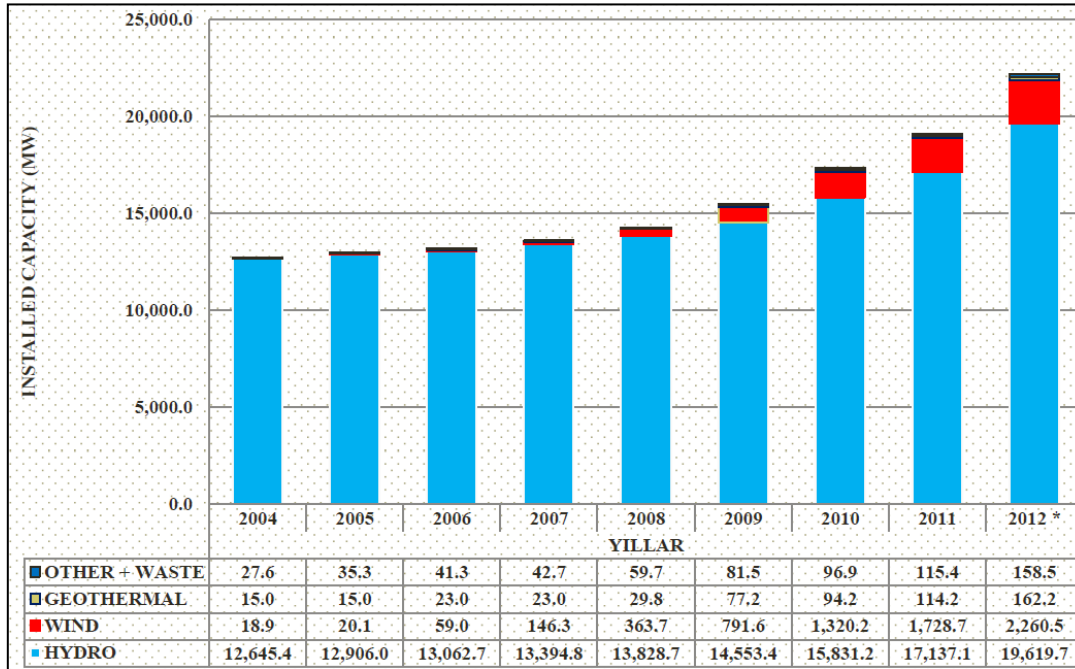
Turkey has substantial amount of renewable energy potential and the utilization rates are growing.

Hydro, wind and solar energy resources are the major portions of our renewable portfolio.

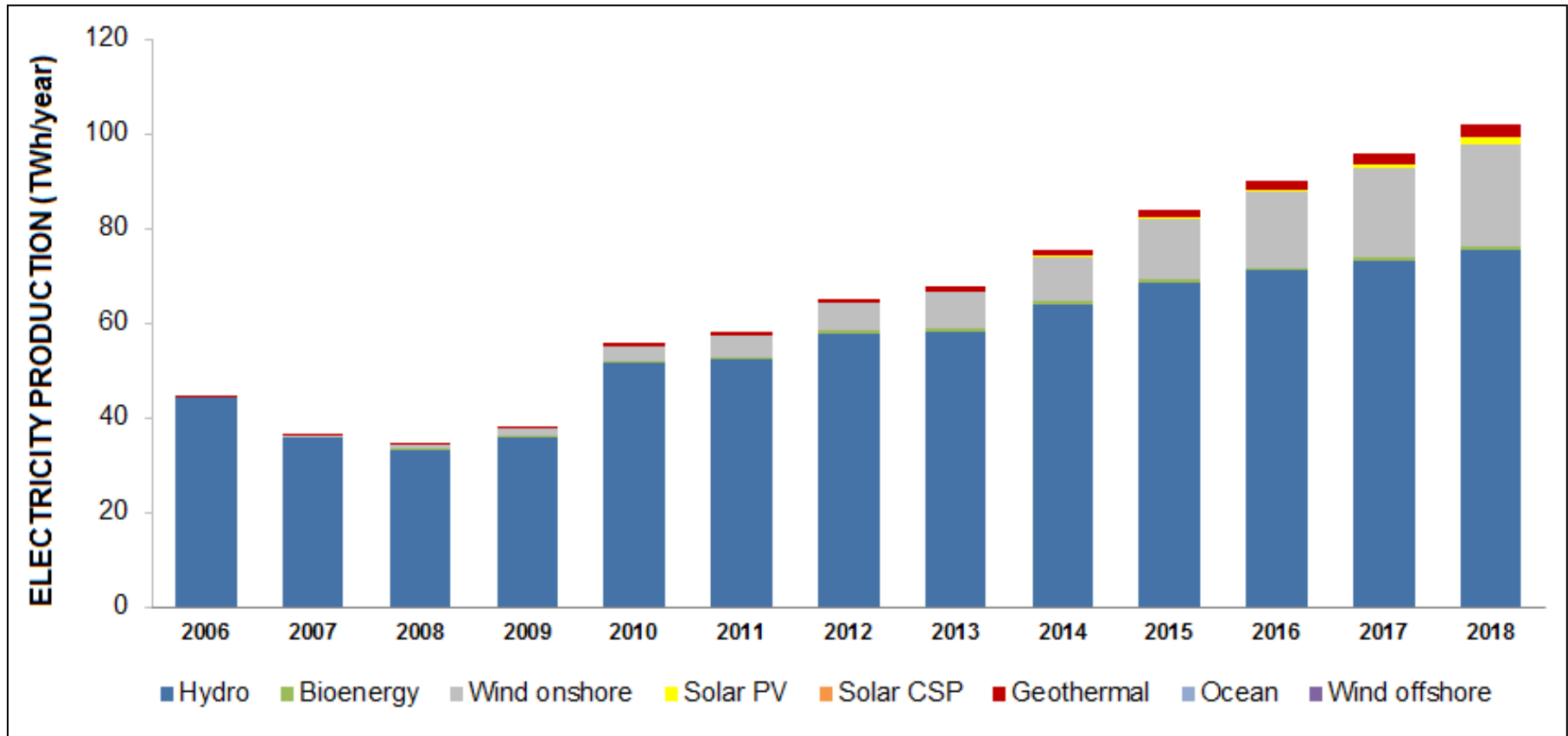
TURKEY has at least;

- 160 TWh/year economic hydro,
 - 48 GW wind capacity,
- 1500 kWh/m².year of average global solar radiation,
 - 31500 MWt geothermal,
- 2000 MWe geothermal electricity,
 - 20 MTOE biomass
- 1,5-2 MTOE biogas (theoreticaly)
potentials.

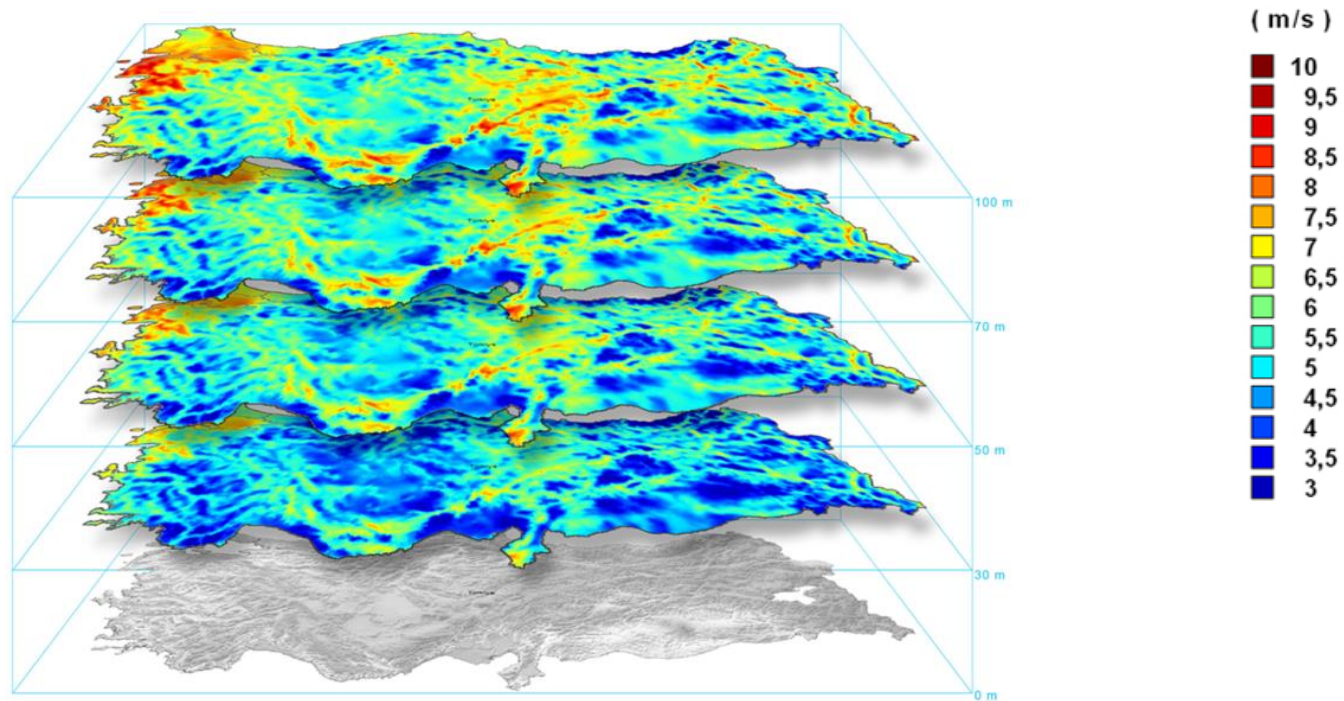
RENEWABLE ENERGY CAPACITY DEVELOPMENT



RENEWABLE ENERGY PRODUCTION PROJECTION

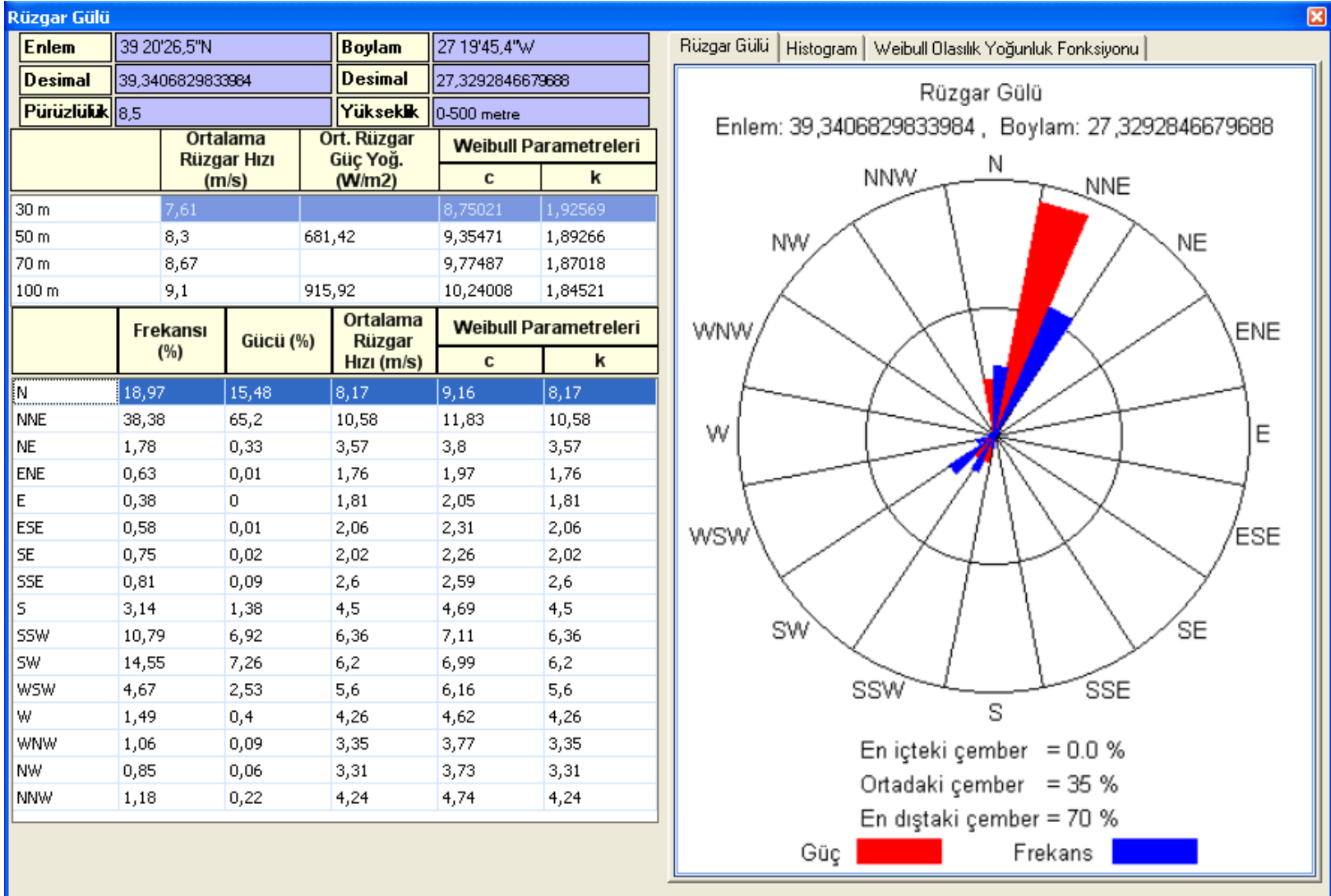


WIND ENERGY IN TURKEY



South of the Marmara region, coastal and some inner parts of the Aegean region, the eastern part of the Mediterranean and locations with rugged mountains in Eastern Anatolia have promising wind energy potential.

WIND SOURCE INFORMATION FOR A SPECIFIC POINT (COORDINATE)



TURKISH WIND ENERGY POTENTIAL

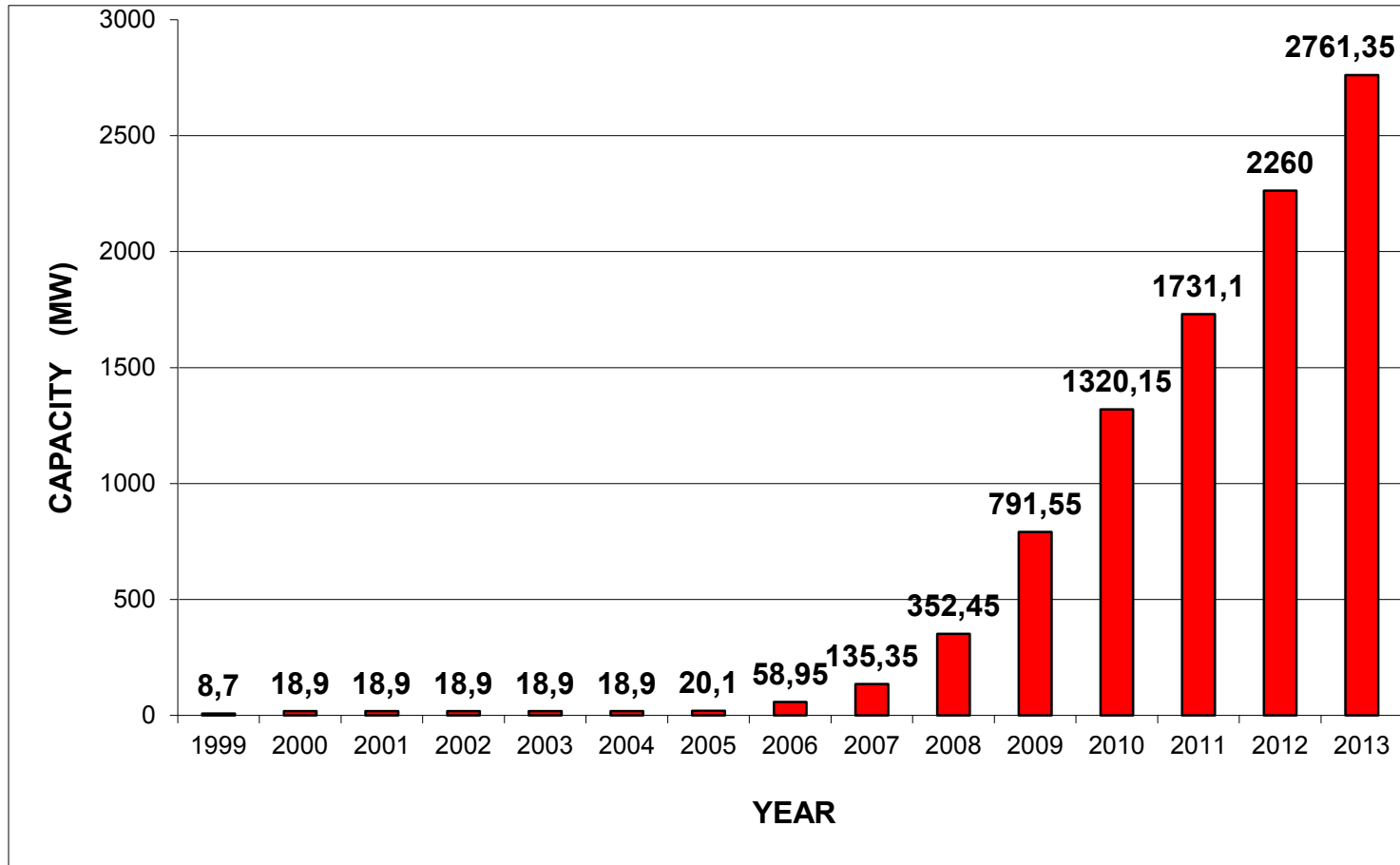
(Average Wind Speed > 7,0 m/s at 50 m.a.g.l.)

Resource potential	Wind class	Annual wind power density (W/m ²)	Annual wind speed (m/s)	Total capacity (MW)
Good	4	400 – 500	7,0 – 7,5	29.259,36
Excellent	5	500 – 600	7,5 – 8,0	12.994,32
Outstanding	6	600 – 800	8,0 – 9,0	5.399,92
Superb	7	> 800	> 9,0	195,84
TOTAL CAPACITY				47.849,44

ON-SHORE (MW)	OFF-SHORE (MW)
37 836	10 013

TURKEY has more than 48 GW economic wind capacity. TURKEY wants to harness this huge potential via private sector at a cost effective manner.

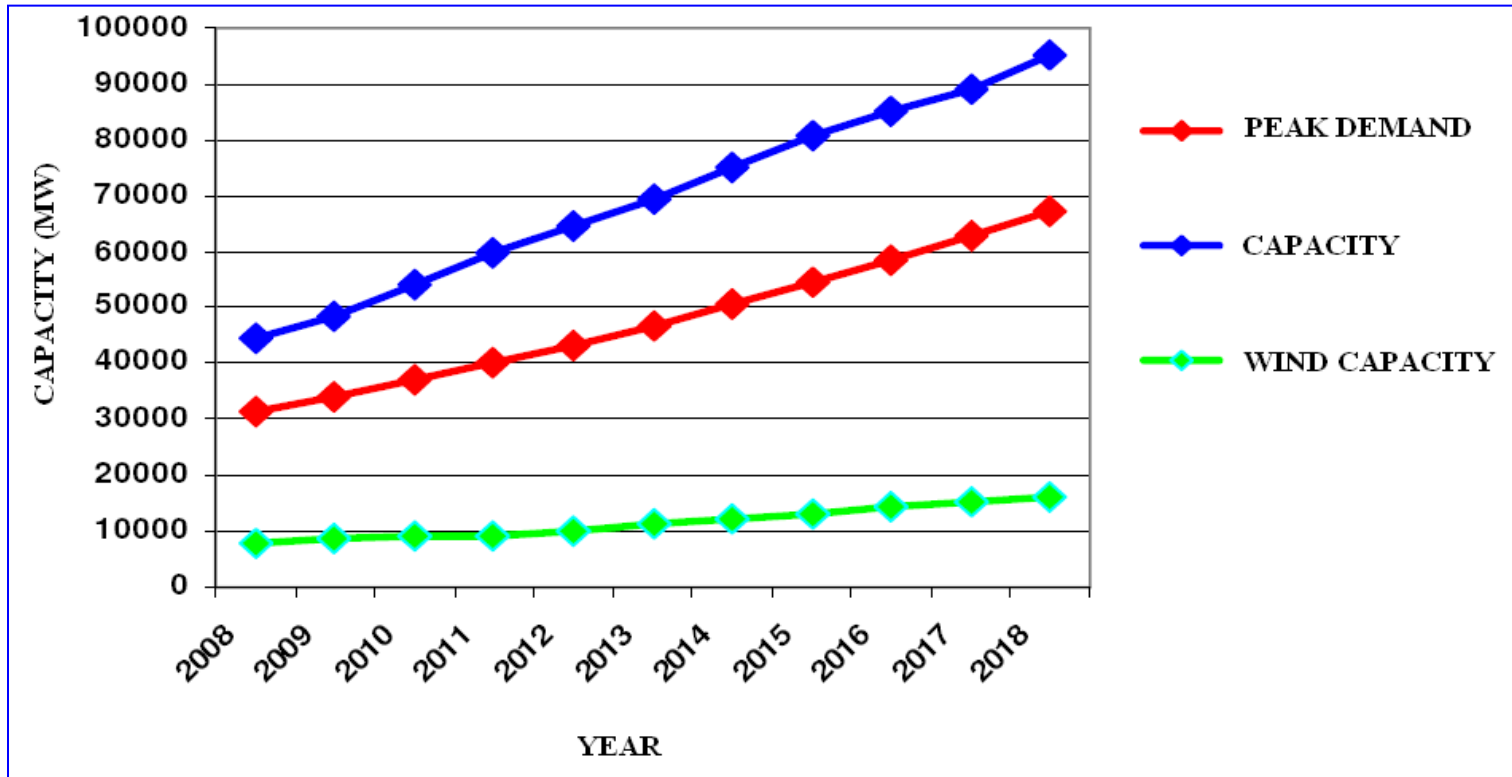
CAPACITY DEVELOPMENT



Wind energy is the most advanced and widespread renewable energy source in Turkey.

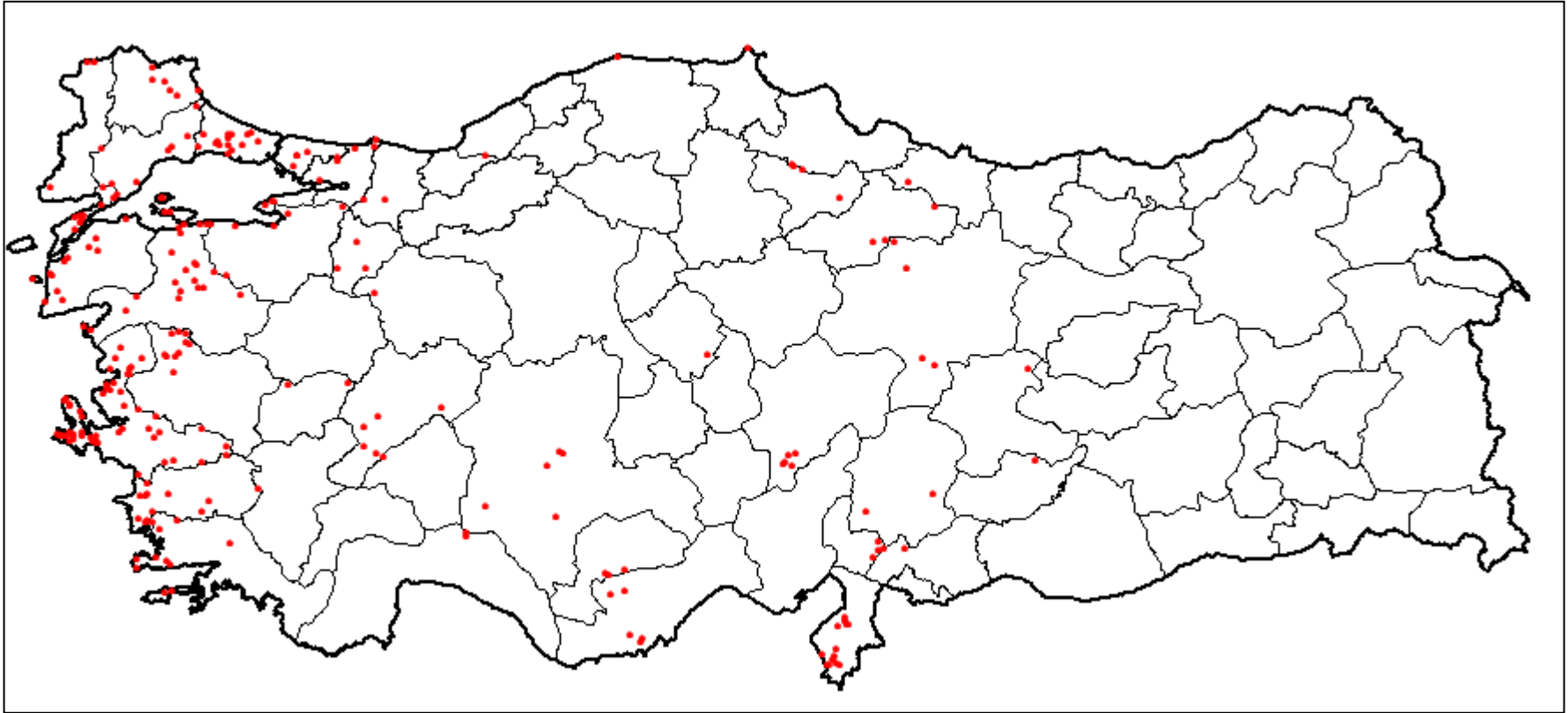
CURRENT CAPACITY AS OF TODAY : 3000 MW

CAPACITY DEVELOPMENT PROJECTION



Turkish Electricity Transmission Company (TEIAS) declared that integrated wind power plant capacity will reach to 20 GW at 2023.

LOCATIONS OF THE LICENSE GRANTED WIND POWER PLANTS



NUMBER OF LICENSED WPP: 256 (75 of these WPP are in operation)

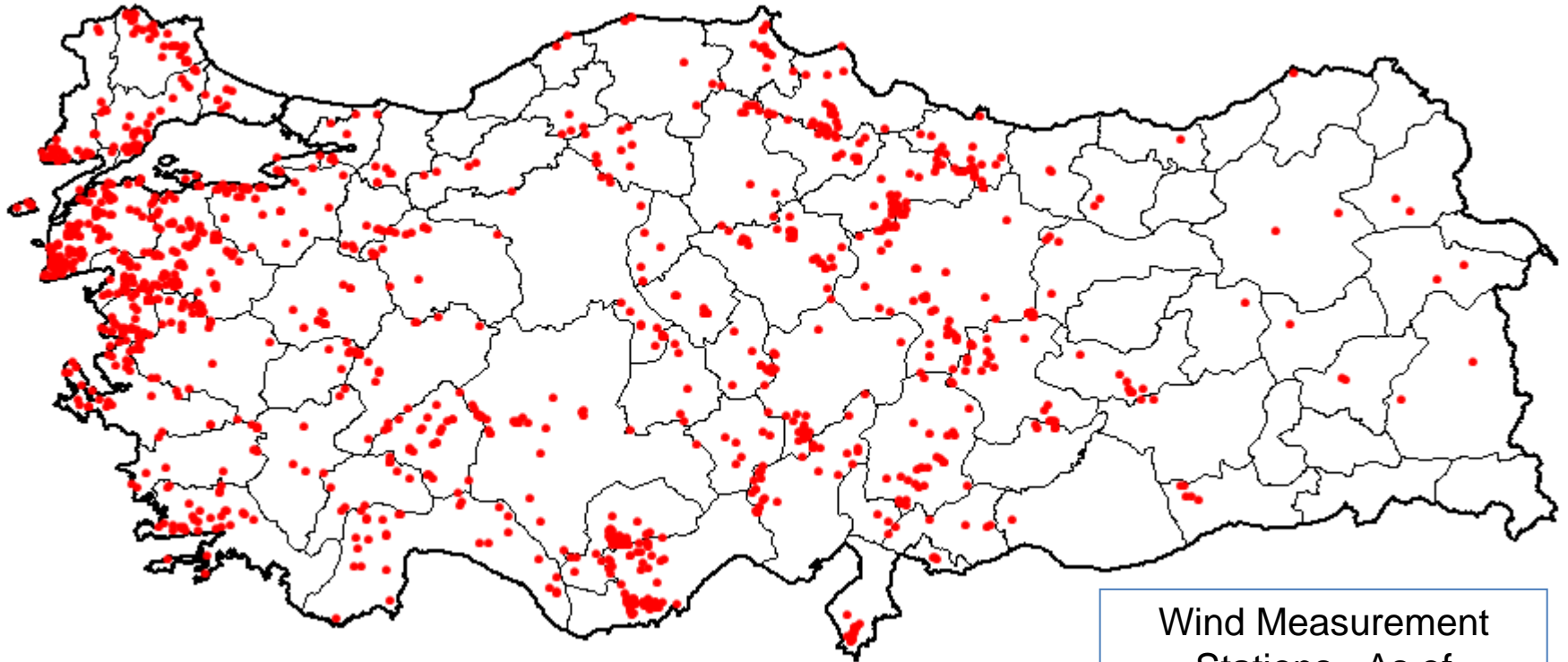
TOTAL LICENSED WIND CAPACITY: 9000 MW

TEIAS ANNOUNCED THAT ADDITIONAL CAPACITY FOR INTEGRATED WIND POWER PLANT WILL BE **3000 MW** AT THE END OF 2018.



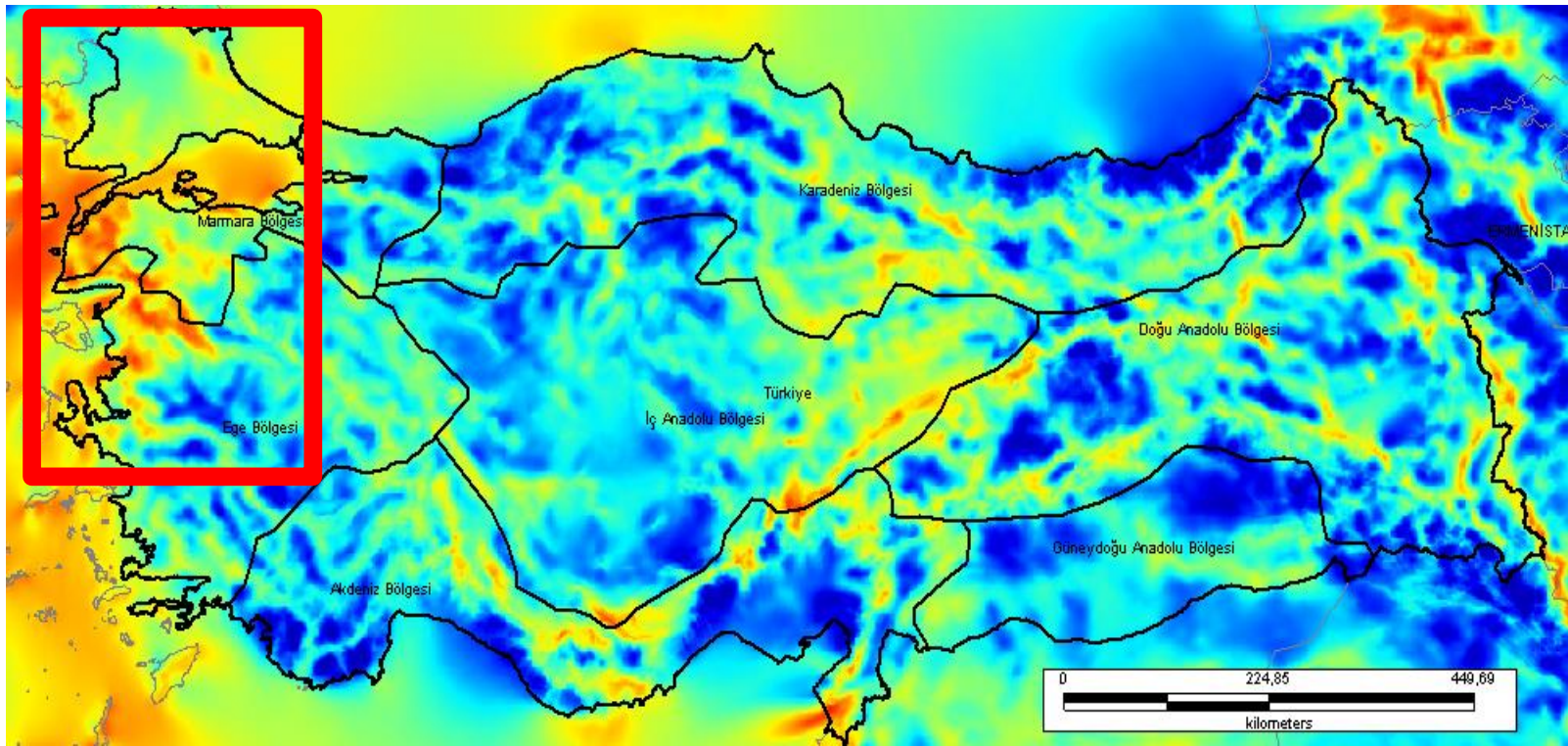
47 REGIONS AND CAPACITIES OF EACH REGION WERE ANNOUNCED.

MORE THAN 1300 WIND MASTS WERE ERECTED IN THE ANNOUNCED REGIONS FOR RELATED CAPACITIES.



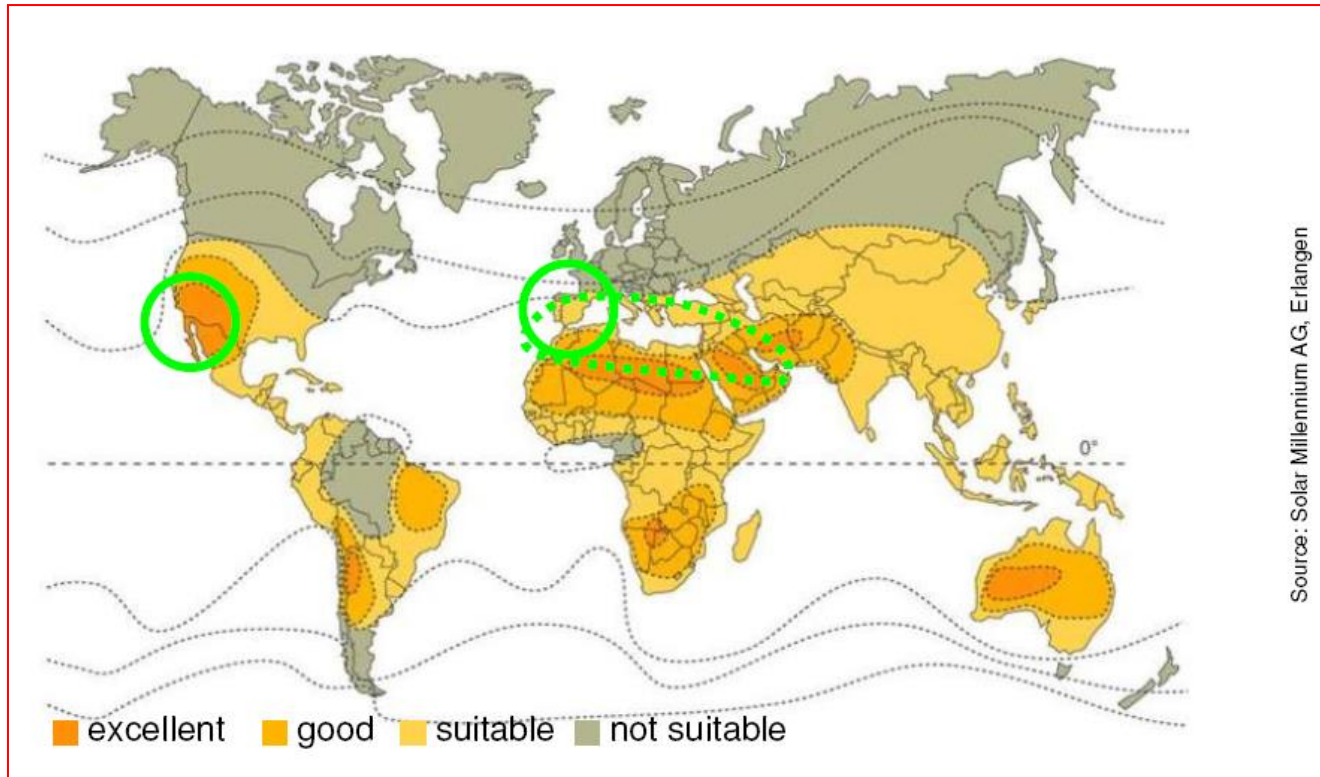
PRE-LICENSE APPLICATION DATES FOR 3000 MW CAPACITY

24,27,28,29,30 APRIL 2015



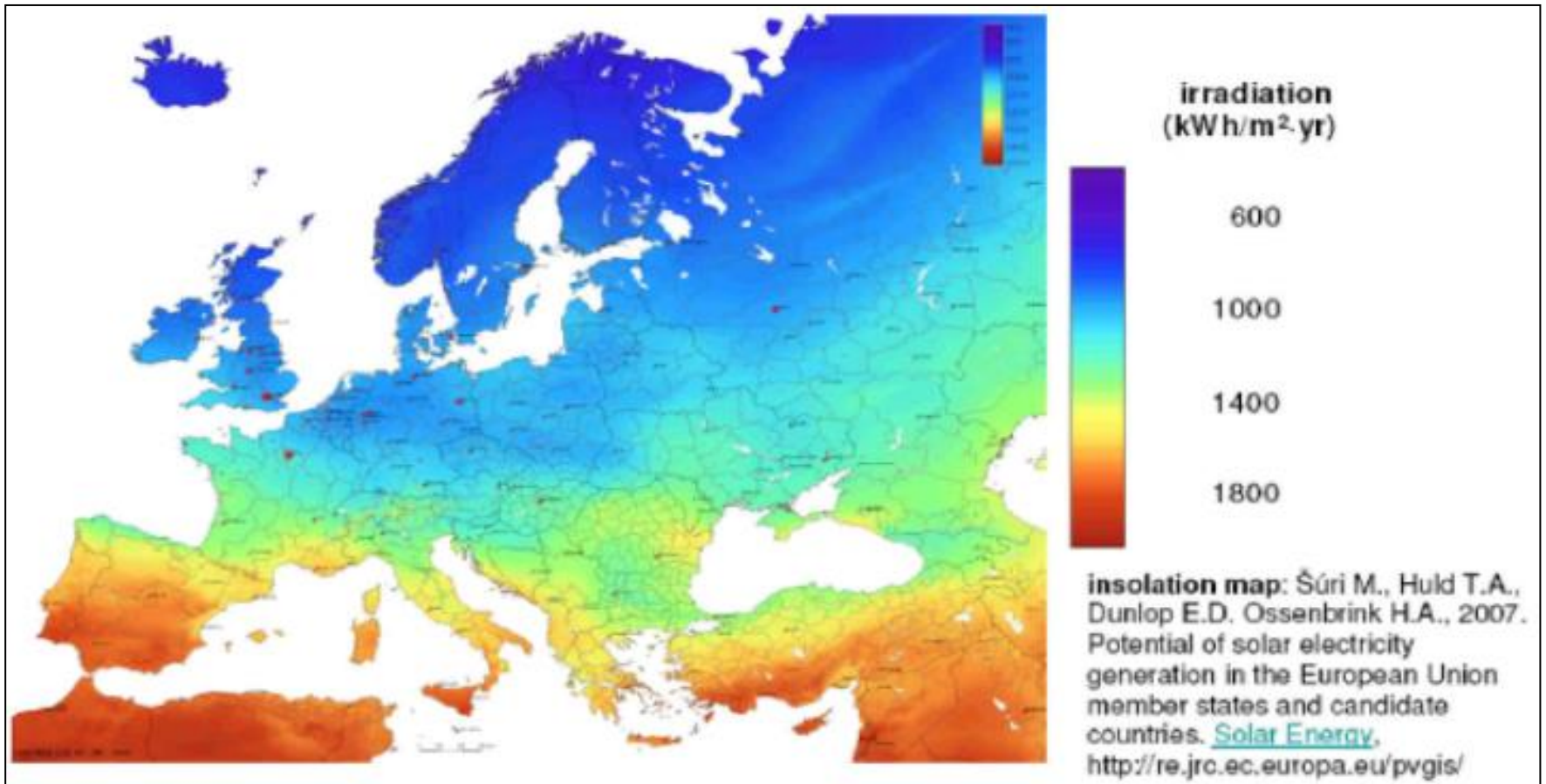
Turkish Electricity Transmission Company (TEIAS) will strengthen the electrical transmission infrastructure of the most promising windy areas by using World Bank Credit (300 million US-Dollar).

SOLAR ENERGY IN TURKEY



Turkey offers perfect natural conditions for solar power investments. The country is geographically located in the Mediterranean sun belt.

Solar radiation values are similar to Spain.



The South of Turkey and Eastern Anatolia have promising solar energy potential.

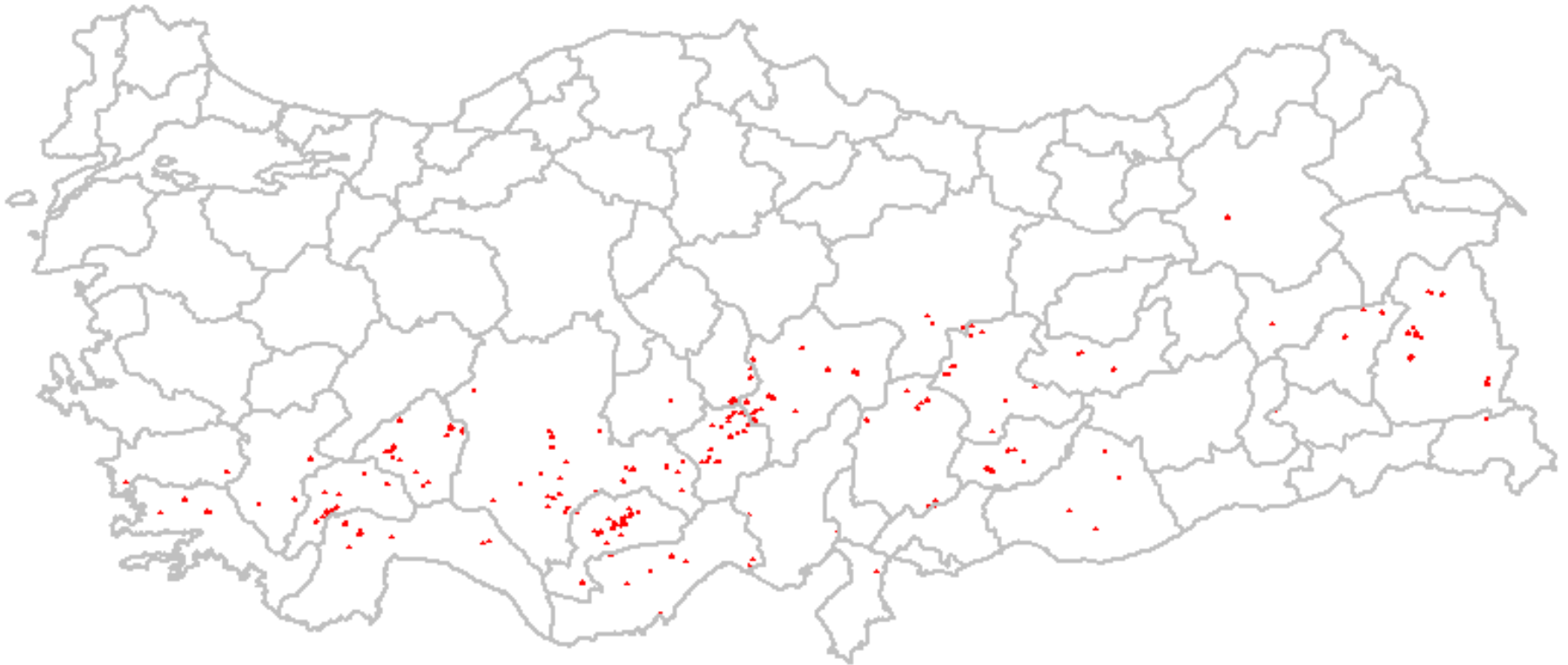
- ❖ Solar energy is used mainly in water heating in Turkey.
 - 18 million m² solar collectors are being used
 - More than 90 solar collector manufacturers
 - Solar collector production capacity is nearly 1,5 million m²/year (70% flat-plate, 30% evacuated tube)
- ❖ Total installed PV capacity is approximately 15 MW
- ❖ Currently, there are not any large scale (more than 1 MW) grid connected solar power plants.
- ❖ A 5 MW of CSP plant (solar tower) was constructed for research purposes. The system has 500 heliostats in Mersin region.
- ❖ PV module and cell manufacturing capacity are around 240 MW/year and 100 MW/year, respectively.
- ❖ A parabolic collector production facility with a capacity of 47 MW/year is also based in Ankara.

TOTAL CAPACITY OF INTEGRATED SOLAR POWER PLANT

600 MW

- TEIAS has announced 121 electrical substations where the solar power plants may be connected to, as well as the available interconnection capacity until 31 December 2013 in 27 regions.
- 496 companies made solar measurements and applied for license in the regions in June 2013. (Total application capacity is 8 GW.)
- Applications except Elazığ and Erzurum regions are still evaluation stage.
- TEIAS will organise a tender for applicants, which have applied for the same land or electrical substation. The applicants who offer to pay the maximum price per MW capacity will likely win the tenders.

LOCATIONS APPLIED FOR LICENSE

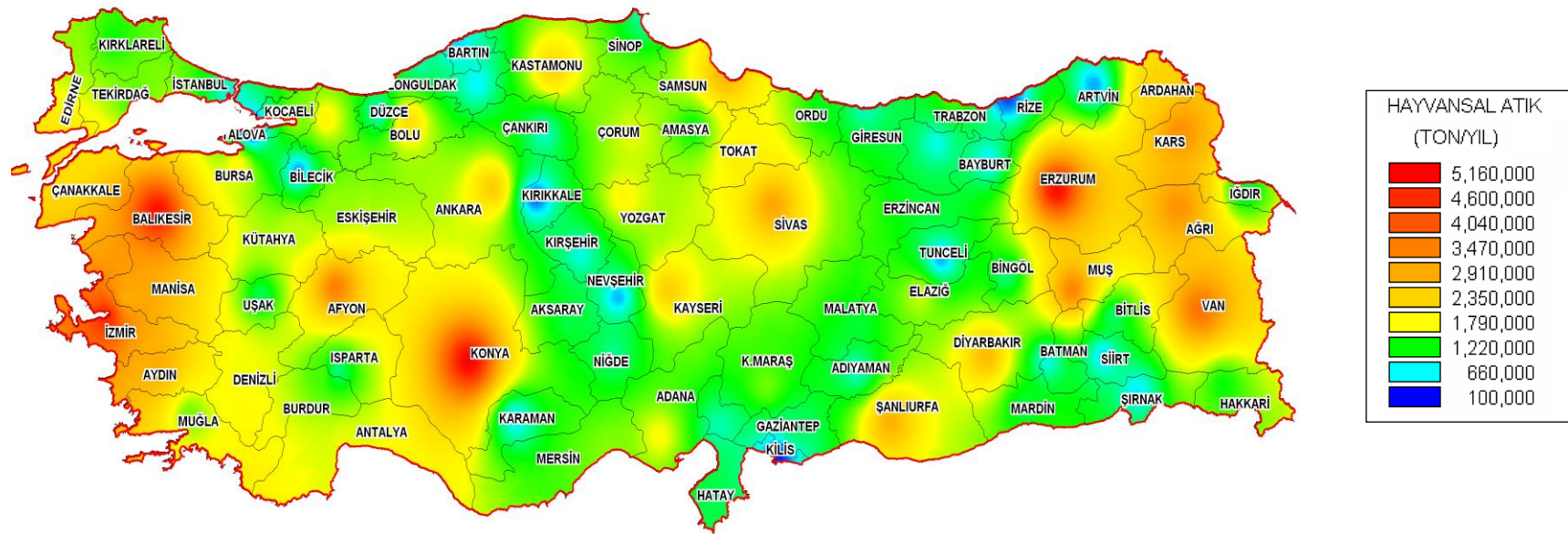


The Central Anatolian region and Konya are the leading provinces.

BIOMASS ENERGY IN TURKEY



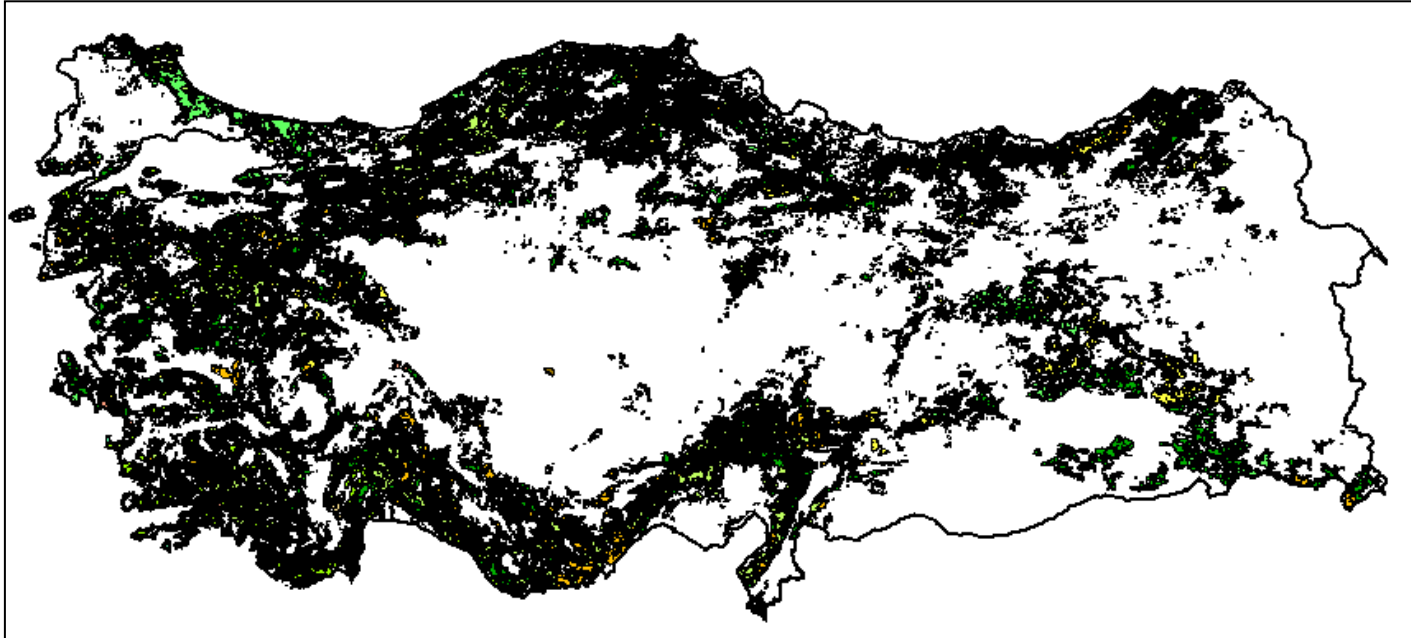
BIOGAS POTENTIAL BASED ON ANIMAL'S WASTE



West part of Turkey, eastern and some inner parts of the Anatolia have promising biogas energy potential.

NUMBER OF TOTAL ANIMALS: 362 MILLION
TOTAL ANIMAL WASTE: 156 MILLION TON / YEAR
TOTAL ENERGY VALUE = 1,3 MILLION TOE / YEAR

BIOMASS POTENTIAL BASED ON FORESTRY AND AGRICULTURAL RESIDUES



FORESTRY RESIDUES: 1 MILLION TOE / YEAR

AGRICULTURAL RESIDUES: 16 MILLION TOE / YEAR

URBAN WASTES: 2 MILLION TOE / YEAR

TOTAL ENERGY VALUE = 19 MILLION TOE / YEAR

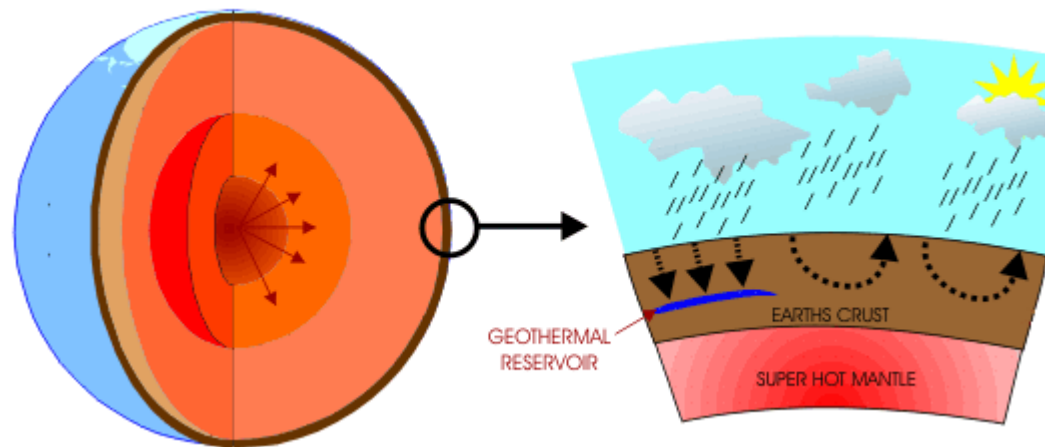
Landfill gas extraction has gained importance in Turkey
(total capacity 162,7 million m³/year)

44 projects of **713 MWe** capacity are licensed.

241 MWe is in operation as of March, 2014

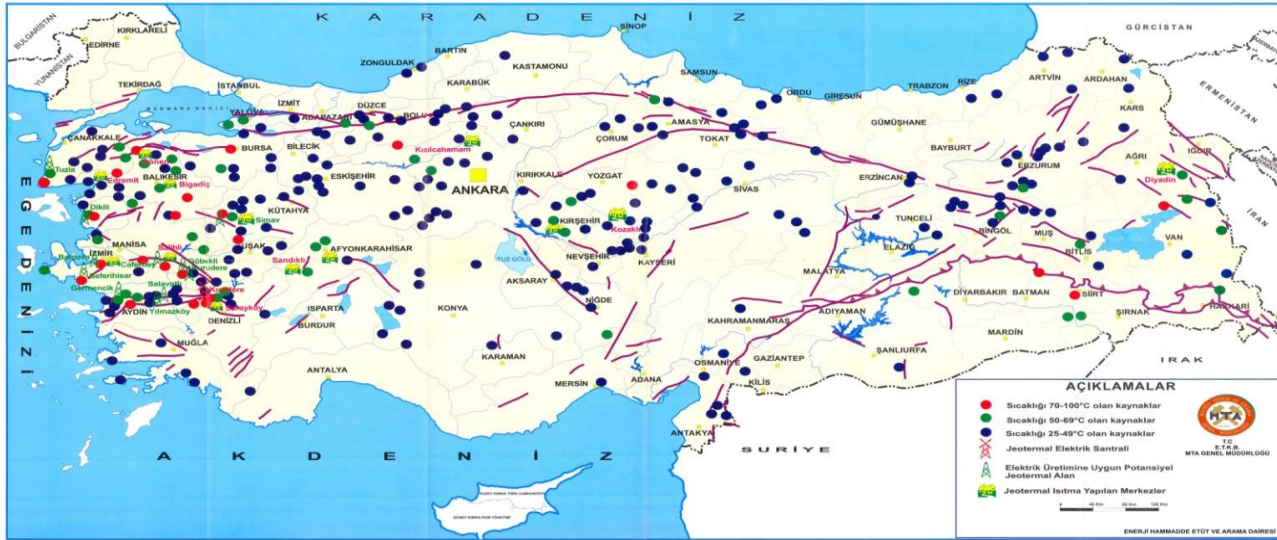
20 biogas power plant are in operation.

GEOHERMAL ENERGY IN TURKEY



Turkey is the richest country in Europe in terms of geothermal resources.

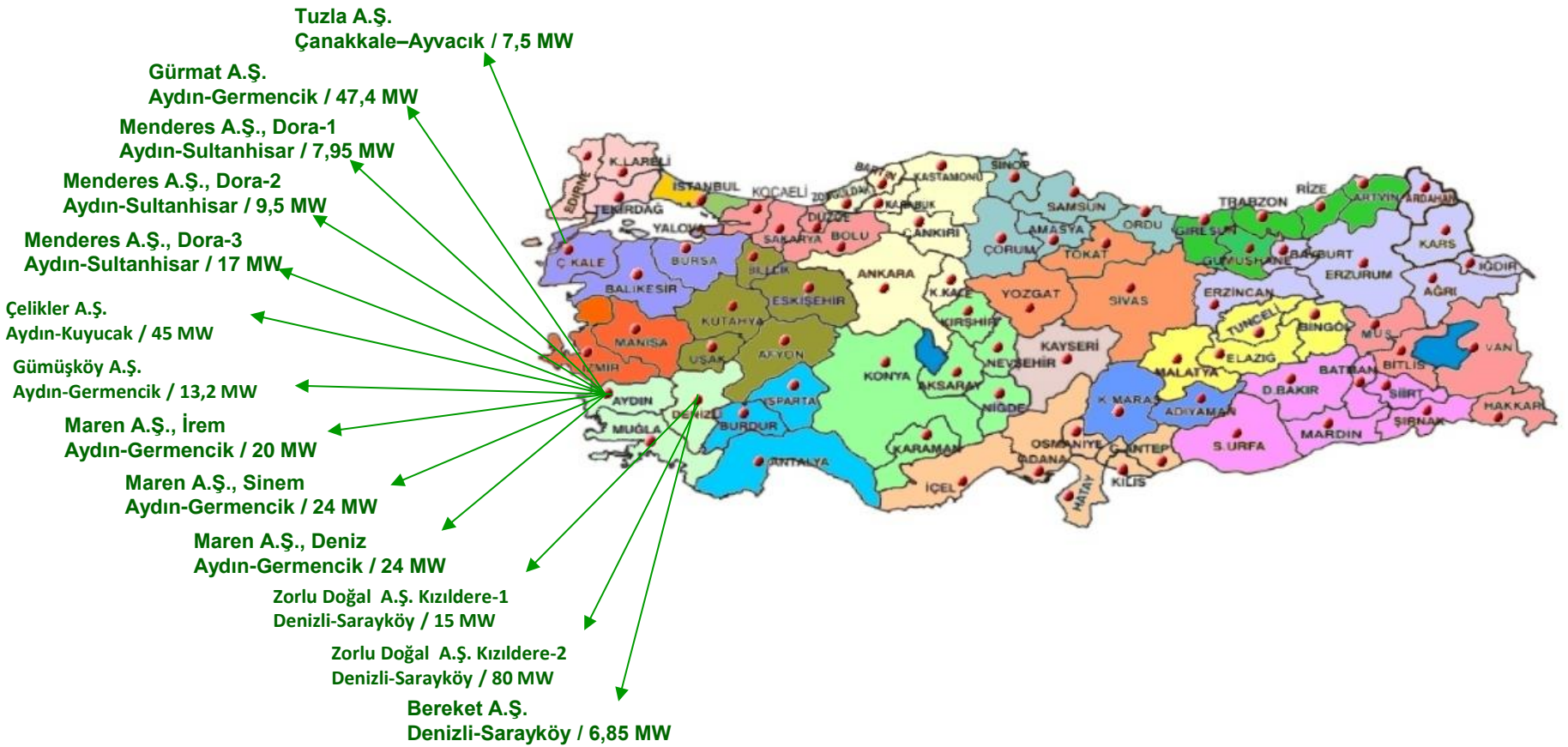
TÜRKİYE JEOTERMAL KAYNAKLAR DAĞILIMI VE UYGULAMA HARİTASI



Thermal capacity : **31500 MWth**

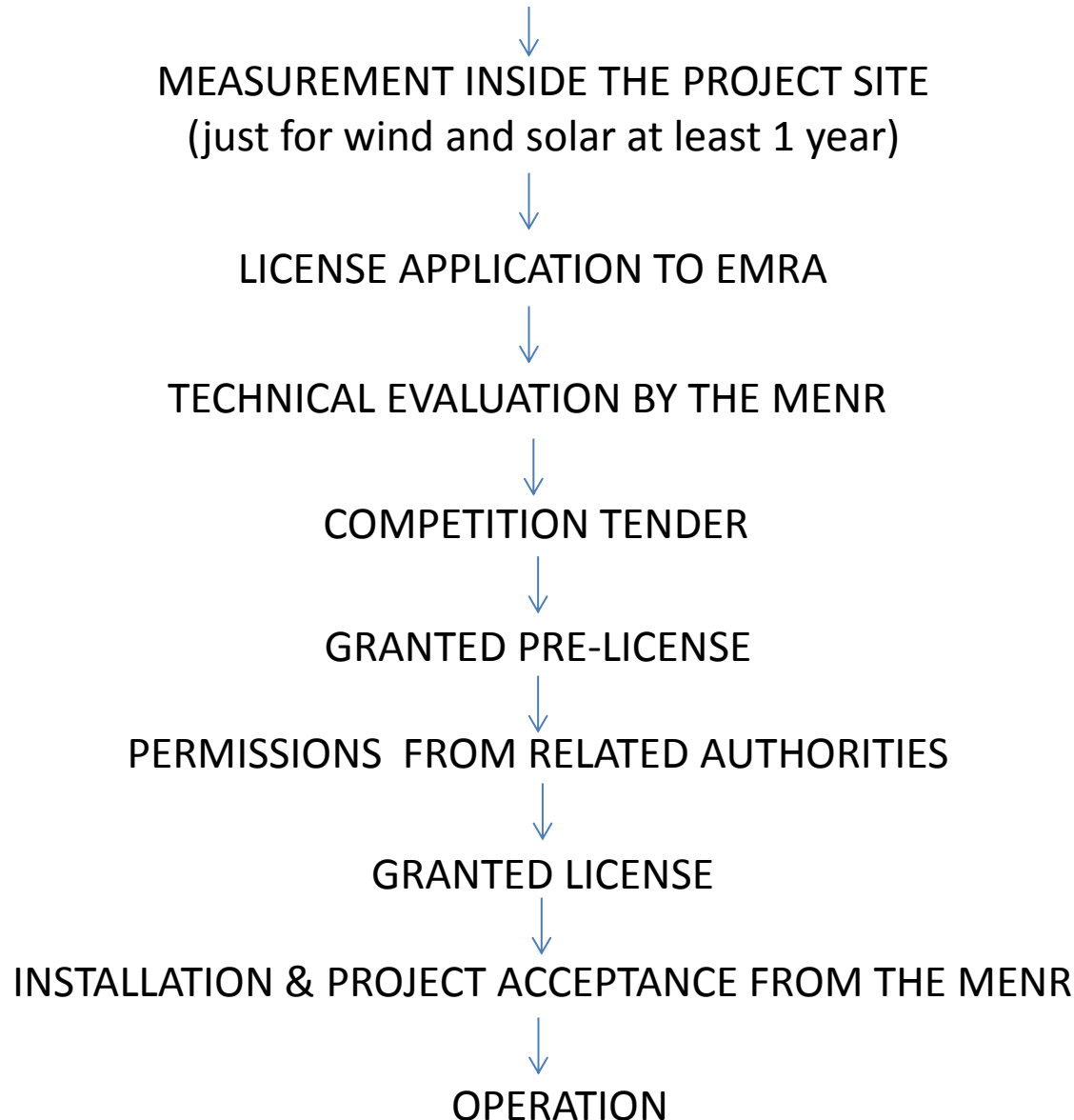
Electricity capacity : **2000 MWe**

- 78 % of this potential is in Western Anatolia
- 55 % of the geothermal areas in Turkey are suitable for heating
- Greenhouse heating & 90 000 households in 21 settlements heated with geothermal energy

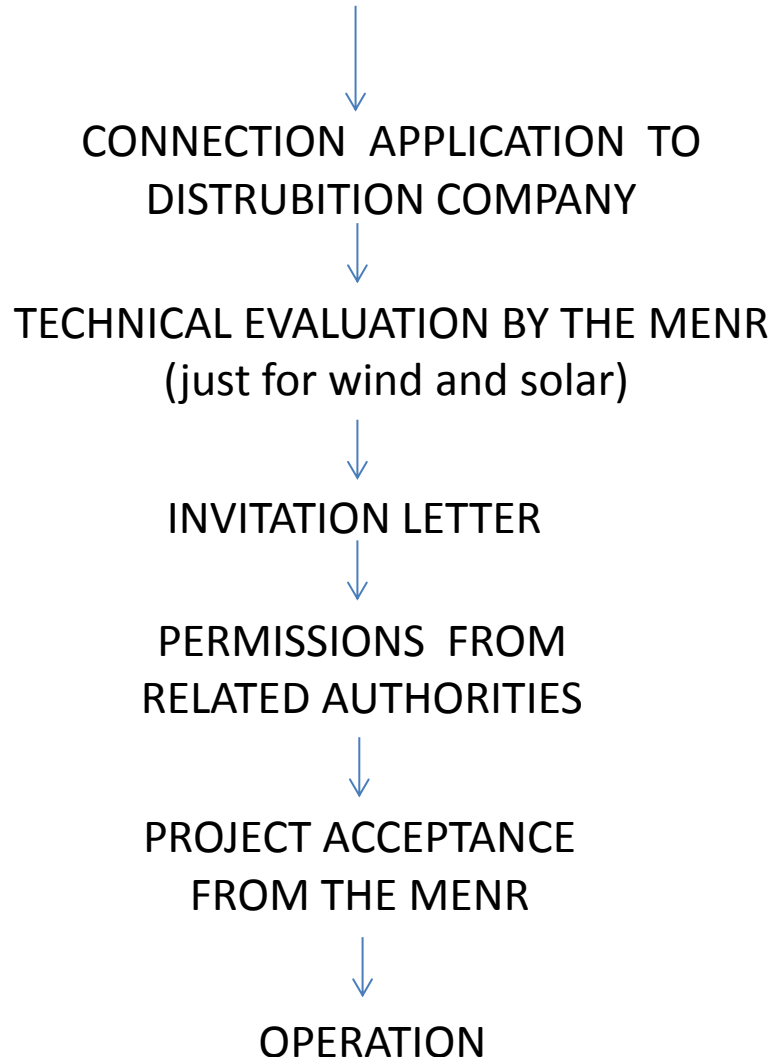


- Totally 27 projects of 713 MWe capacity are licensed.
- 13 geothermal power plants (total 317 MWe) is in operation as of April, 2014

IMPORTANT INVESTMENT PROCESS FOR THE LICENSED RENEWABLE ENERGY



IMPORTANT INVESTMENT PROCESS FOR THE UN - LICENSED RENEWABLE ENERGY

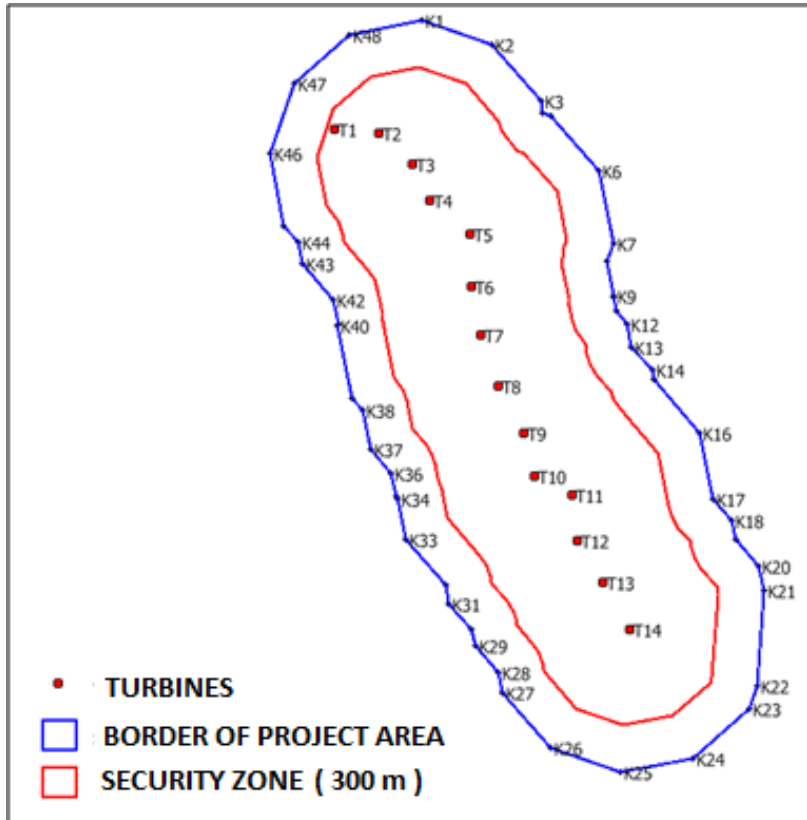


UN-LICENSED APPLICATIONS BASED ON RENEWABLE ENERGIES

SOURCE	APPLICATION		IN OPERATION	
	NUMBER	CAPACITY (KW)	NUMBER	CAPACITY (KW)
WIND	163	107.585,50	-	-
SOLAR	397	231.096,19	37	8.329,07
HYDRO	-	-	-	-
GEOHERMAL	-	-	-	-
BIOGAS	-	-	1	1.200
BIOMASS	-	-	-	-
WAVE	-	-	-	-
TOTAL	560	338.681,69	38	9.529,07

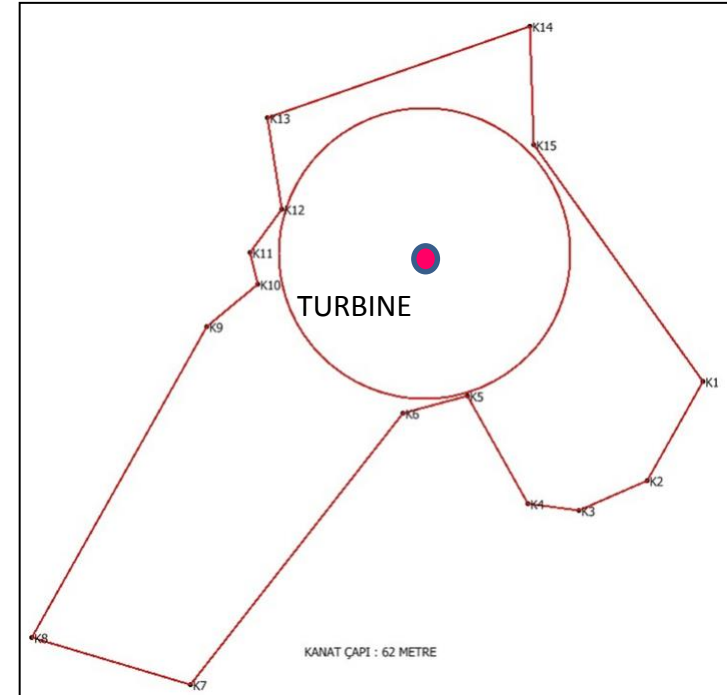
MAIN CRITERIAS THAT SHOULD BE PAID ATTENTION FOR WIND PROJECT DEVELOPMENT

LICENSED



**INSTALLED POWER /
PROJECT AREA
SHOULD BE MORE THAN
0,6 MW / km²**

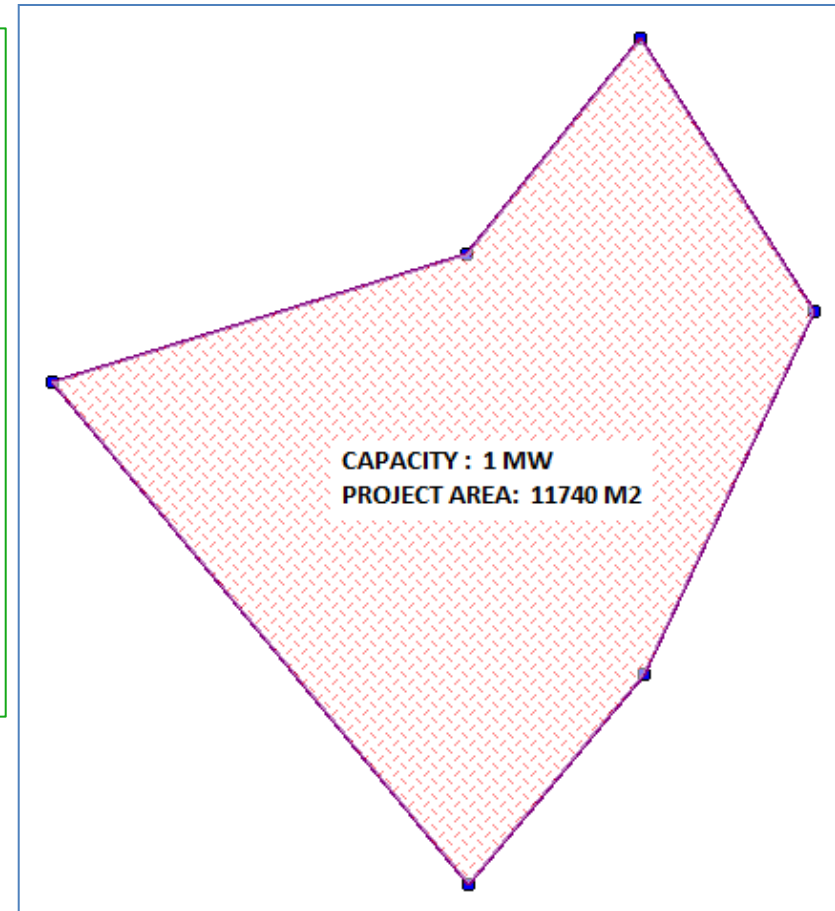
UN – LICENSED



- **ROTOR BLADES MUST TURN ON THE DECLARED AREA.**
- **ROTOR BLADES DO NOT AFFECT THE OTHER WIND TURBINES NEGATIVELY.**

MAIN CRITERIAS THAT SHOULD BE PAID ATTENTION FOR SOLAR PROJECT DEVELOPMENT

- A 1 MW solar plant capacity can be installed maximum in 20000 M2.
- A solar power plant can not be installed on eligible agricultural lands (soil protected lands) and forestry.



REGULATORY FRAMEWORK

LEGISLATIONS

MAIN LAW FOR RENEWABLE ENERGY

- **ELECTRICITY MARKET LAW (No: 6446)**
- **LAW ON UTILIZATION OF RENEWABLE ENERGY SOURCES FOR THE PURPOSE OF GENERATING ELECTRICAL ENERGY (Law No: 5346)**

SECONDARY REGULATION FOR **RENEWABLE ENERGY**

- **ELECTRICITY MARKET LICENSING REGULATION**
- **THE REGULATION FOR UNLICENSED GENERATION OF ELECTRICAL POWER IN THE ENERGY MARKET**
- **TECHNICAL REGULATION FOR EVALUATING LICENSE APPLICATIONS BASED ON WIND ENERGY GENERATION**
- **TECHNICAL REGULATION FOR EVALUATING LICENSE APPLICATIONS BASED ON SOLAR ENERGY GENERATION**
- **THE REGULATION ON COMPETITION FOR GRID CONNECTION RIGHTS FOR THE SOLAR AND WIND POWER GENERATION PLANTS (Tender Regulation)**

- **REGULATION FOR PRE-LICENSE WIND AND SOLAR MEASUREMENTS**
- **COMMUNIQUÉ ON MEASUREMENT STANDARDS FOR WIND AND SOLAR POWER PRE-LICENSE APPLICATIONS**
- **REGULATION REGARDING DOCUMENTATION AND SUPPORT OF RENEWABLE ENERGY RESOURCES (Acronym: YEKDEM)**
- **REGULATION REGARDING UNLICENSED GENERATION IN THE ELECTRICITY MARKET**
- **REGULATION ON DETERMINATION OF THE RENEWABLE ENERGY ZONES**
- **REGULATION REGARDING THE USE OF DOMESTIC MECHANICAL OR ELECTRO-MECHANICAL EQUIPMENT IN RENEWABLE POWER PLANTS**
- ***REGULATION ON THE PROJECT APPROVALS OF ELECTRICAL PLANTS***
- **REGULATION ON SOLAR POWER PLANTS**

DECISIONS & ANNOUNCEMENTS

FOR RENEWABLE ENERGY

- **EMRA Board Decisions on pre-license applications acceptance dates**
- **Announcements of the MENR regarding on grid connection capacities**

Main Incentive

RENEWABLE ENERGY SUPPORT MECHANISM

Renewable power plants that have come into operation since 18 May 2005 or will come into operation before 31 December 2020 will be eligible to receive the feed-in tariffs for the first 10 years of their operation.

In addition, if the mechanical or electro-mechanical equipment of the power plant is produced locally, a premium shall be added to the feed-in tariffs during the first five years of operation.

Feed-in Tariff Mechanism

Type of power plant facility	Feed-in tariff	Maximum local production premium	Maximum possible tariff
Hydroelectric PP	\$7.3 cents/kWh	\$2.3 cents/kWh	\$9.6 cents/kWh
Wind PP	\$7.3 cents/kWh	\$3.7 cents/kWh	\$11 cents/kWh
Geothermal PP	\$10.5 cents/kWh	\$2.7 cents/kWh	\$13.2 cents/kWh
Biomass (including landfill)	\$13.3 cents/kWh	\$5.6 cents/kWh	\$18.9 cents/kWh
Solar PV PP	\$13.3 cents/kWh	\$6.7 cents/kWh	\$20 cents/kWh
Concentrating Solar PP	\$13.3 cents/kWh	\$9.2 cents/kWh	\$22.5 cents/kWh

In Turkey, renewable electricity production is mainly promoted through a guaranteed feed-in tariff mechanism. The Renewable Energy Support Mechanism's feed-in tariff for renewable energy sources is between 7,3 – 13,3 \$ - cents/kWh for the first 10 years of operation.

Premiums for local equipment

Type of PP facility	Type of equipment	Premium
HPP	Turbine	\$1.3 cents/kWh
	Generator and power electronics	\$1.0 cents/kWh
WPP	Blade	\$0.8 cents/kWh
	Generator and power electronics	\$1.0 cents/kWh
	Turbine tower	\$0.6 cents/kWh
	Entire mechanical equipment in rotor and nose cone groups	\$1.3 cents/kWh
Solar PV	PV panel integration and solar structure mechanics	\$0.8 cents/kWh
	PV modules	\$1.3 cents/kWh
	PV module cells	\$3.5 cents/kWh
	Inverter	\$0.6 cents/kWh
	Focusing materials to collect solar rays onto PV modules	\$0.5 cents/kWh
Concentrating solar	Radiation collection tube	\$2.4 cents/kWh
	Solar tracking system	\$0.6 cents/kWh
	Reflective surface plate	\$0.6 cents/kWh
	Mechanical equipment in thermal energy storage system	\$1.3 cents/kWh
	Mechanical equipment in steam production system via collection of solar rays on roof	\$2.4 cents/kWh
	Stirling engine	\$1.3 cents/kWh
	Panel integration and solar structure mechanics	\$0.6 cents/kWh
Biomass	Steam boiler with fluid bed	\$0.8 cents/kWh
	Liquid-fired and gas-fired steam boiler	\$0.4 cents/kWh
	Gasification and gas removal group	\$0.6 cents/kWh
	Steam or gas turbines	\$2.0 cents/kWh
	Internal combustion engine or stirling engine	\$0.9 cents/kWh
	Generator and power electronics	\$0.5 cents/kWh
	Cogeneration system	\$0.4 cents/kWh
Geothermal	Steam or gas turbines	\$1.3 cents/kWh
	Generator and power electronics	\$0.7 cents/kWh
	Steam injector or vacuum compressor	\$0.7 cents/kWh

LICENSE HOLDERS WILL BE REQUIRED TO PRESENT TWO DOCUMENTS TO THE MENR IN ORDER TO BENEFIT FROM THE PREMIUMS

- The Local Manufacture Status Certificate
 - A Product Certificate

Incentives other than feed-in tariffs for renewable energy investments

Incentives within the Renewable Energy Law (No. 5346)

Assigning of land belonging to the Treasury and “land at the disposal of the state” to renewable energy projects. 85% discount in easement, usufruct, permit or lease fees for the first 10 years of operation.

Use of national parks, nature parks, natural protection areas, preservation forests, wildlife cultivation areas and special nature preservation areas with necessary permits.

Exemption from the compulsory 1% turnover payment for operating business on immovable assets of the Treasury.

Incentives within the Electricity Market Licensing Regulation (No. 24836)

99% exemption from licensing fee and annual license fees for the first 8 years of operation

Priority in system connection

Incentives other than feed-in tariffs for renewable energy investments

<p>Tax Incentives within the Cabinet Decree on State Aid Investments (No. 2009/15199)</p>	<p>VAT exemption for domestic equipment for Investment Support Certificate holders</p> <hr/> <p>VAT, Customs Tax, Resource Support Utilisation Fund payment exemptions in imports for Investment Support Certificate holders</p>
<p>Incentives within the Law Regarding the Support of Research and Development Activities (No. 5746)</p>	<p>R&D deduction (deduction of R&D expenditures from corporate tax base at a rate of 100%)</p> <hr/> <p>Income Tax exemption (80% of salary income for eligible R&D and support personnel), Social Security Premium support for 5 years, Stamp Tax exemption</p>



SOLARTR 2014
UFTPI

SOLAR CONFERENCE & EXHIBITION
19 - 21 NOVEMBER 2014
Swissôtel Büyük Efes, Izmir, Turkey

IMPORTANT DATES

- Abstract Submissions
25 July 2014
- Acceptance Notification
1 August 2014
- Full Paper Submissions
19 September 2014
- Acceptance Notification for Full Paper
10 October 2014



IWPC2015
ISTANBUL
INTERCONTINENTAL WIND POWER CONGRESS

30 March - 02 April 2015
Istanbul Congress Center
www.iwpc2015.org

INTERCONTINENTAL WIND POWER CONGRESS

- The Intercontinental Wind Power Congress (IWPC 2015)
 - Solar Conference and Exhibition (SOLAR-TR 2014)



TÜRKİYE RÜZGAR ENERJİSİ BİRLİĞİ
TURKISH WIND ENERGY ASSOCIATION



Wind Investor



Wind Investor

THANK YOU FOR YOUR ATTENTION....

Mustafa ÇALIŞKAN

TWEA Board Member

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