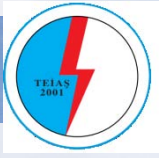


TEİAŞ

Turkish Power System
Renewables & Electricity Market

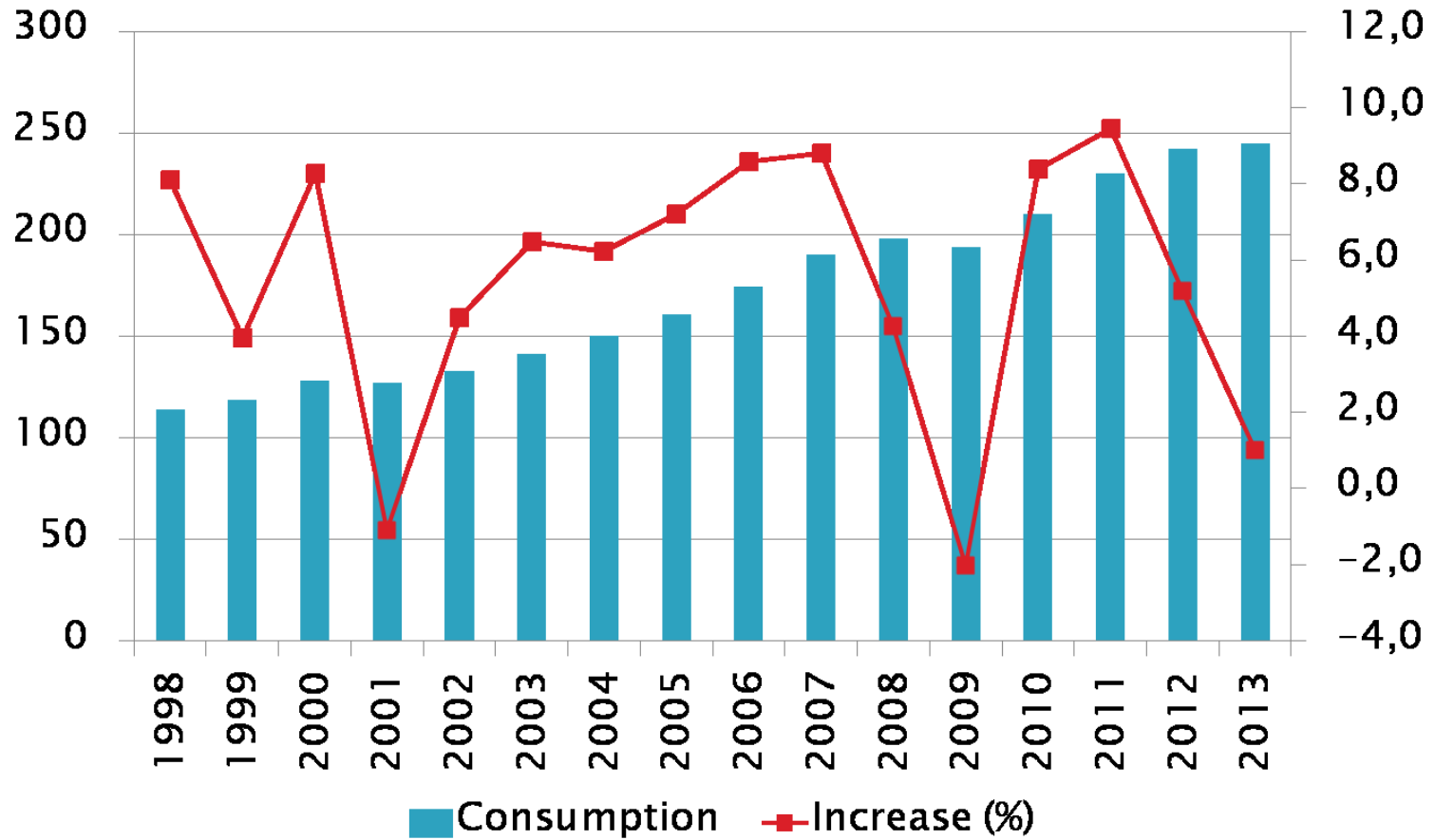


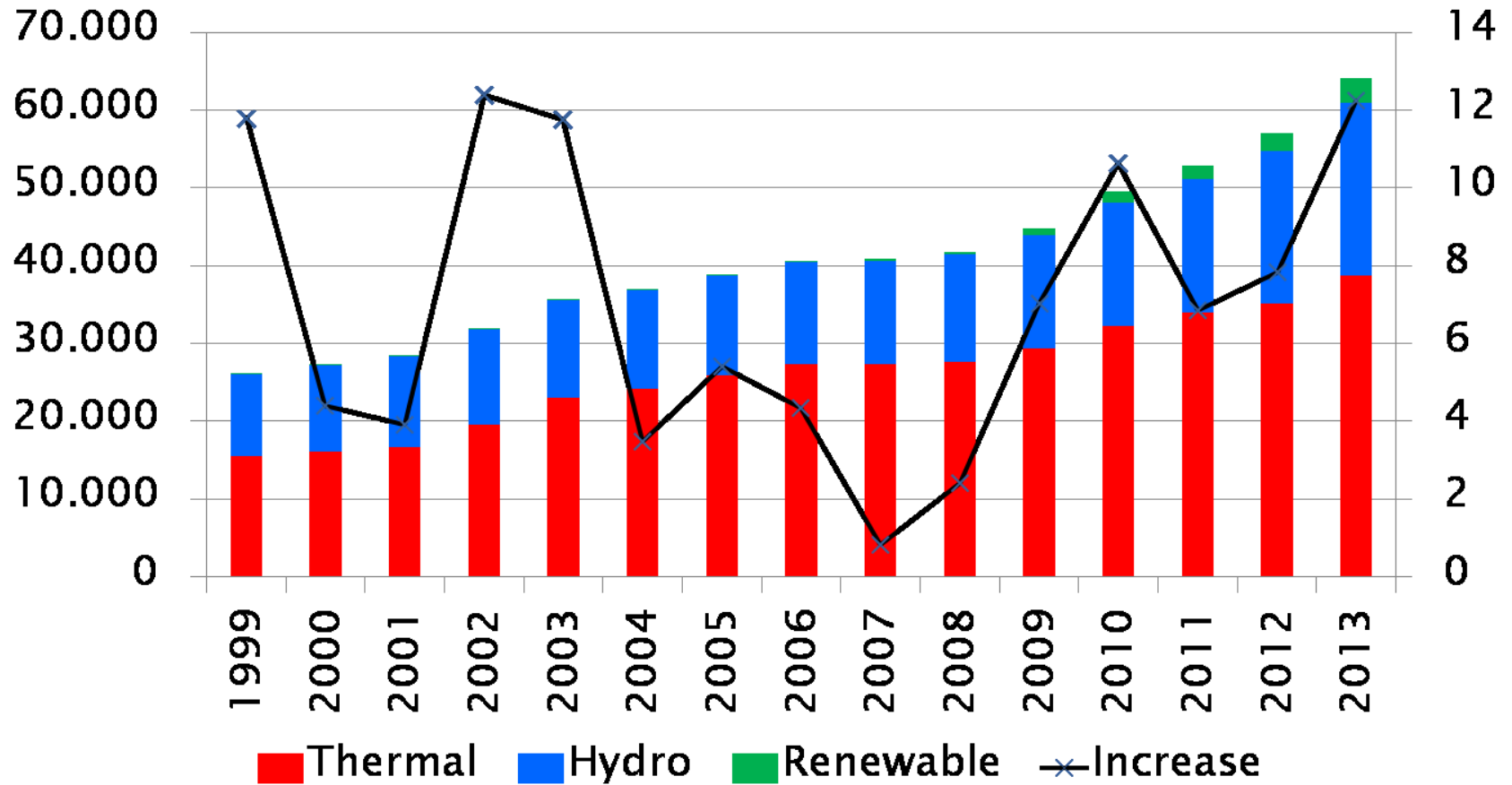


	SUBSTATIONS	Length (km) OHL+Cable
400 kV	91	16.778 + 40
220 kV	1	85
154 kV	556	33.751 + 244
66 kV	14	509
TOTAL	649	50.882



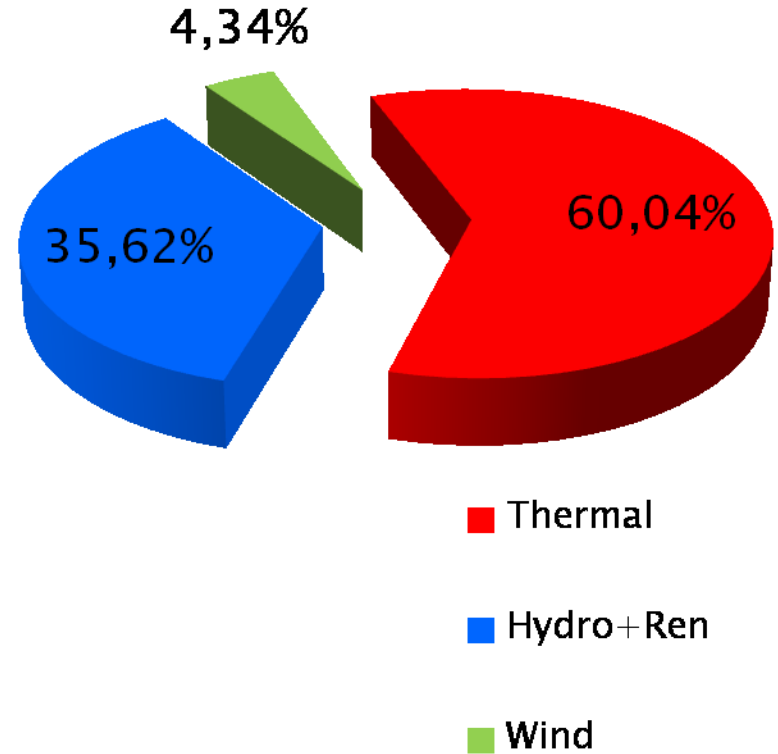
Year	New OHL in 380 kV (km)	New OHL in 154 kV (km)	New Transformer Capacity (MVA)	Investment Budget (US\$)
2009	202.7	277.8	4196	402,308,844
2010	936.3	676.1	6180	249,462,402
2011	419.2	270.6	4806	318,037,425
2012	365.3	602.4	8188	397,748,134
2013	464.6	461.7	9390	611,145,064
TOTAL	2388.1	2288.6	32760	1,978,701,868

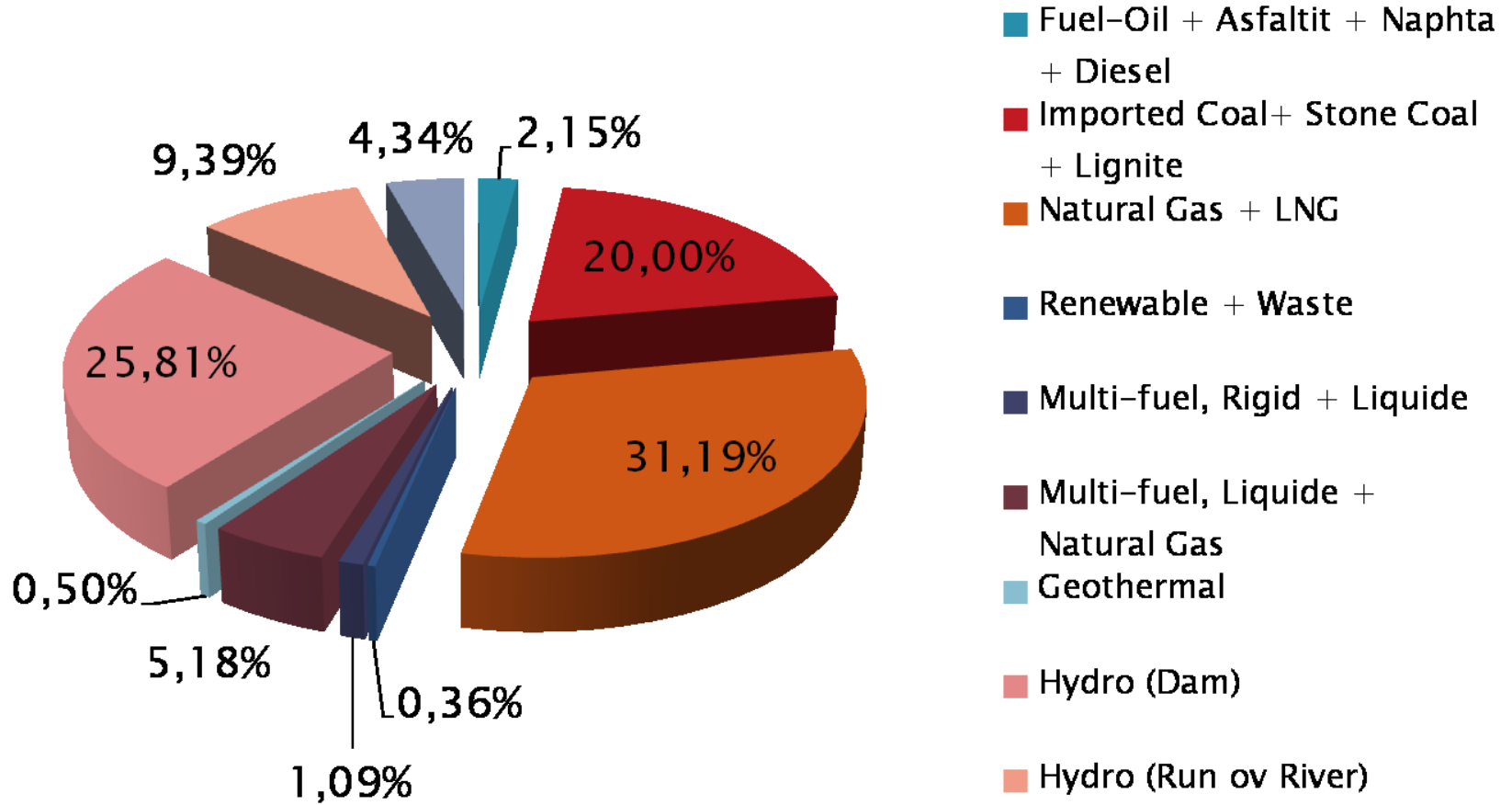




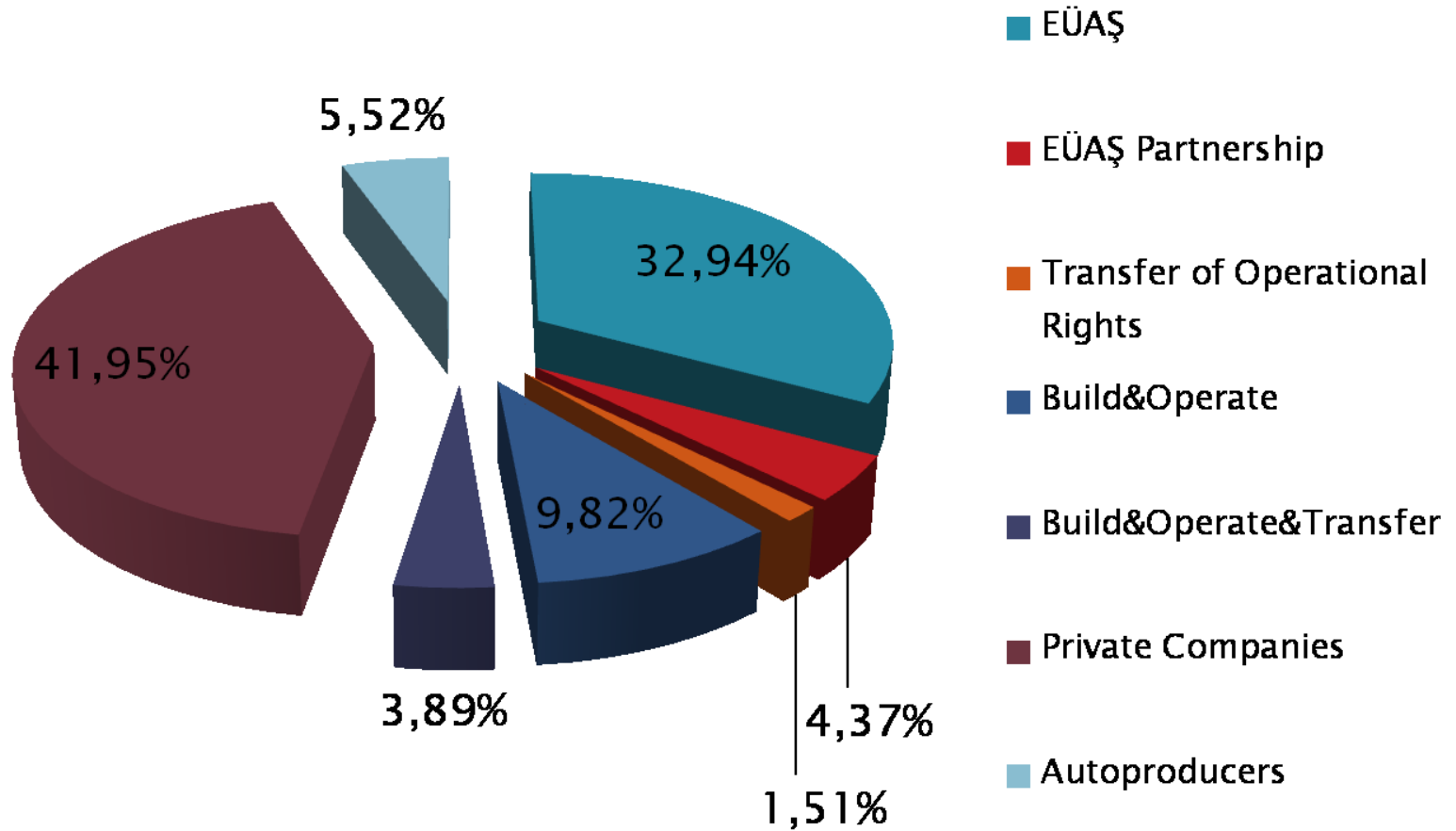


Installed Capacity	64.043,9 MW
Hydro+Geo.	35,62 %
Thermal	60,04 %
Wind	4.34 %





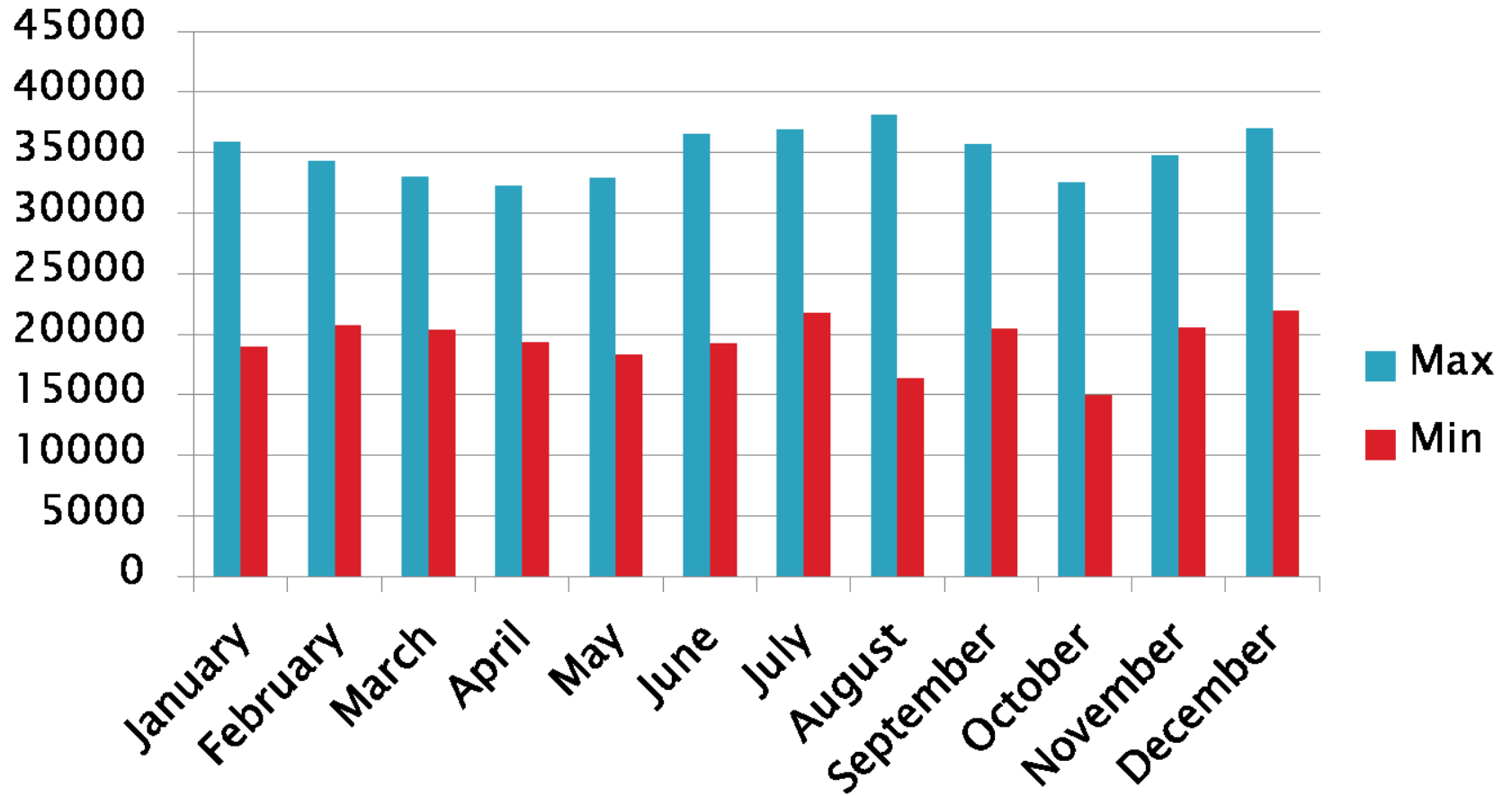
- Fuel-Oil + Asfaltit + Naphta + Diesel
- Imported Coal+ Stone Coal + Lignite
- Natural Gas + LNG
- Renewable + Waste
- Multi-fuel, Rigid + Liquide
- Multi-fuel, Liquide + Natural Gas
- Geothermal
- Hydro (Dam)
- Hydro (Run ov River)

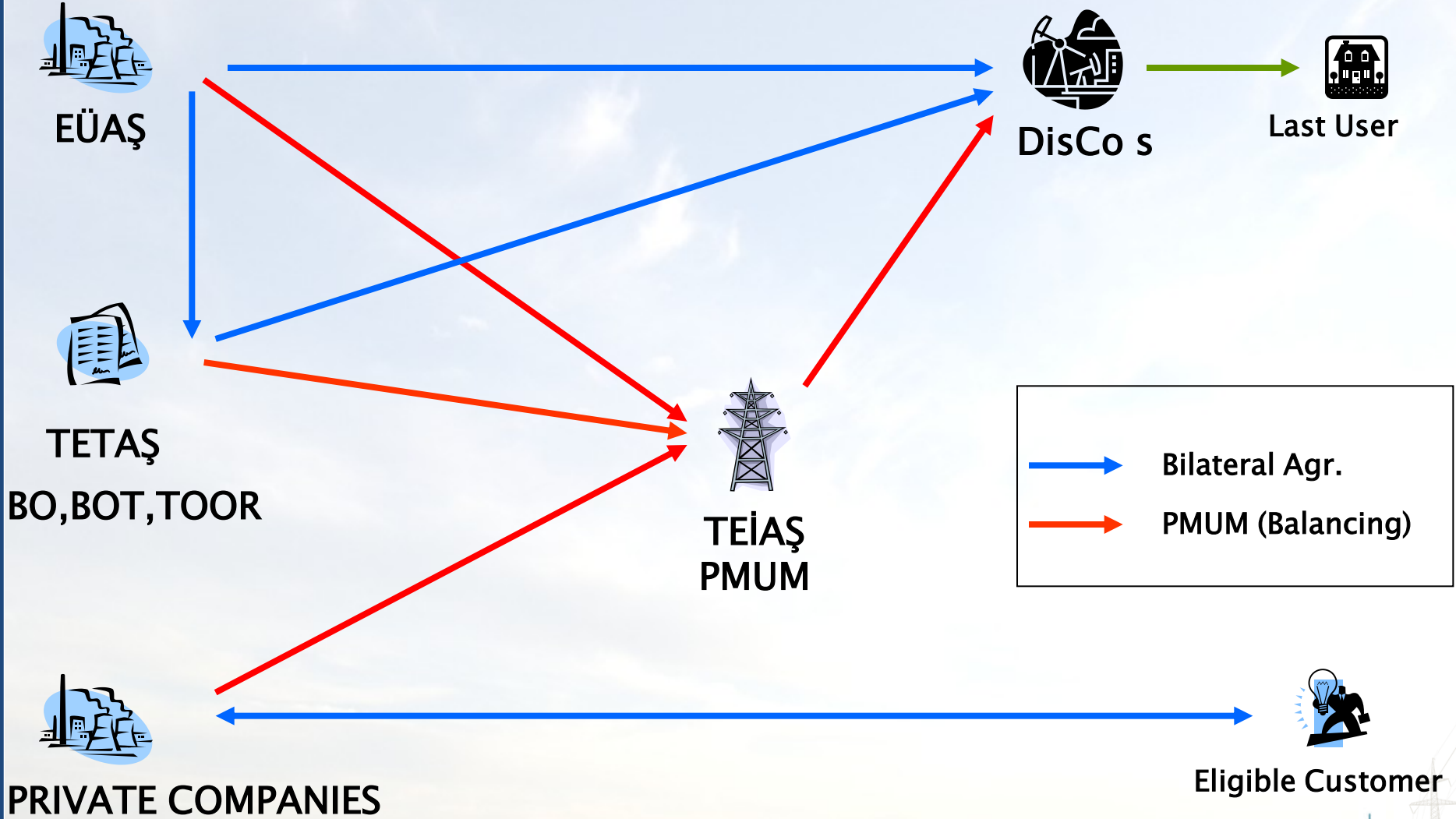




	Peak Load (MW)	DATE	TIME (EET)
2012 Winter	35,751.5	19-01-2012	17:50
2012 Summer	39,044.9	27-07-2012	14:30
2013 Winter	36,135.0	09-01-2013	17:30
2013 Summer	38,274.0	29-08-2013	14:20









2001

- Electricity Market Law numbered 4628 was published.

2006

- Market Financial Settlement Center (PMUM) started to operate the balancing mechanism
- Transient Balancing and Settlement Ordinance was published
- First phase of Balancing Mechanism came into force
- Imbalances started to be settled as night, day and peak time period

2009

- Final Balancing and Settlement Ordinance was published on 1st December of 2009
- Day Ahead Planning was being used for day ahead trading and balancing activities
- Balancing Power Market is being used for real-time balancing. Imbalances started to be settled hourly

2011

- Day Ahead Market came in to force on **1st December of 2011**
- Daily advance payments, collateral mechanism and
- Renewable energy resources support mechanism started to be implemented

2013

- Electricity Market Law numbered 6446 published.

2015

- Intraday Market is expected to start to operations in 2015



Market Participants

- Producing Companies,
- Transmission License,
- Distribution Companies,
- Wholesale Companies
- Retail Companies

Market Financial Settlement Center (PMUM-EPİD)

- Market operator
- Operates day ahead market and determines market clearing prices
- Performs settlement based on hourly values and finance procedures

National Load Dispatch Center (MYTM)

- System operator
- Operates balance power market
- Performs reserving capacity process
- Manages ancillary services





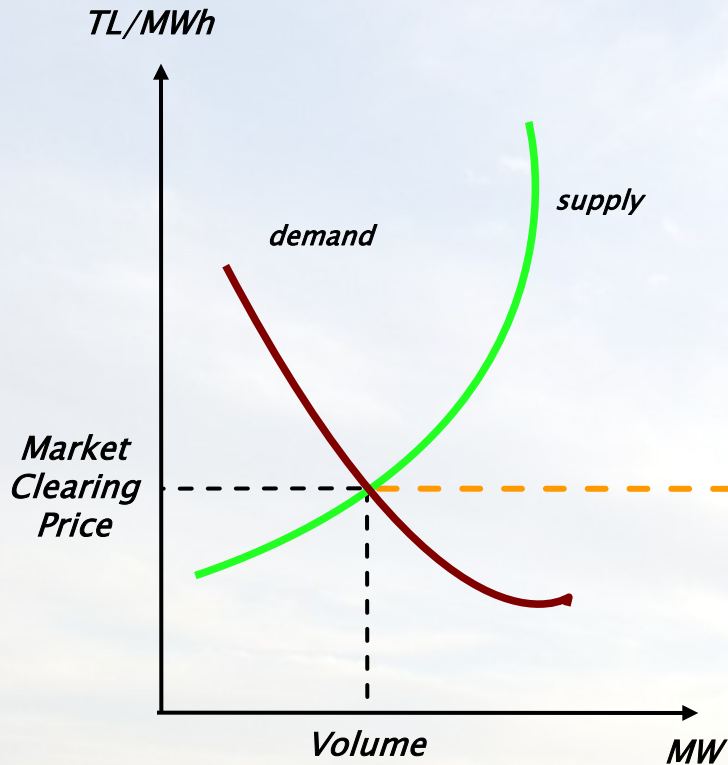
- Each day until 09:30; *System Operator* determines hourly transmission capacity between trade zones and market participants are notified about it.
- *Market Participants* submit their bids for each hour for the following day until 11:30.
- *Market Operator*
 - checks the consistency of bids together with the collateral amount of that participant until 12:00.
 - Calculates the day ahead market price for each hour and for each trade zone and notifies the market participants regarding their energy sales and purchase volumes until 13:00
 - Published sales and volumes with price at hours 14:00



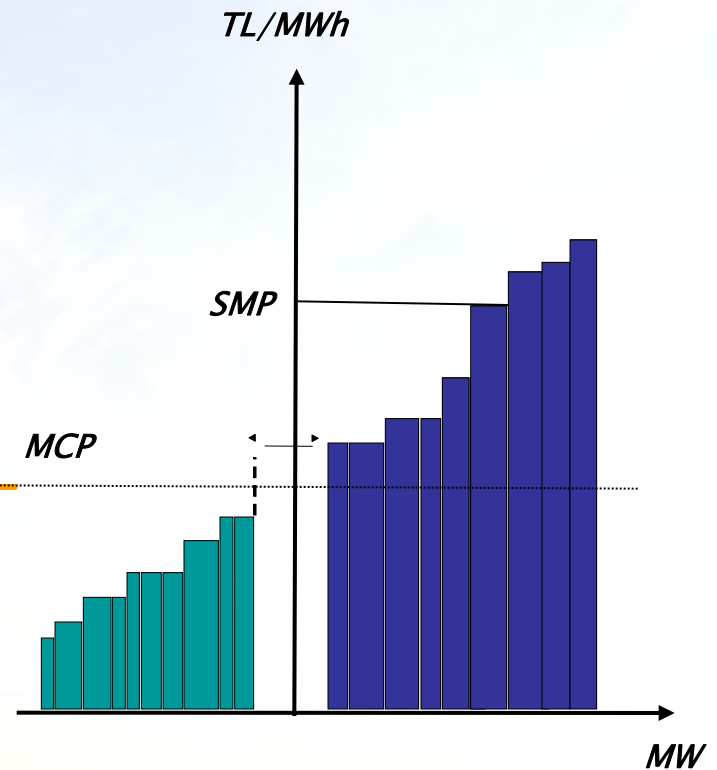
- Balancing Power Market is the organized wholesale electricity market and operated by the SO. In BPM, reserve capacity obtained by the change in output power within 15 minutes can be sold or purchased by Balancing Participants. Its executed for the purpose of real-time balancing of demand and supply,
- Market participants who own balancing entity registered under their own account are obliged to participate in BPM,
- Instructions regarding BPM can be notified at any moment starting from the end of the bid submission period until the end of the relevant hour,
- The system marginal prices for each hour, is determined after four hours following the related hour and is announced to market participants by the SO.



Day Ahead Market
Price Determination

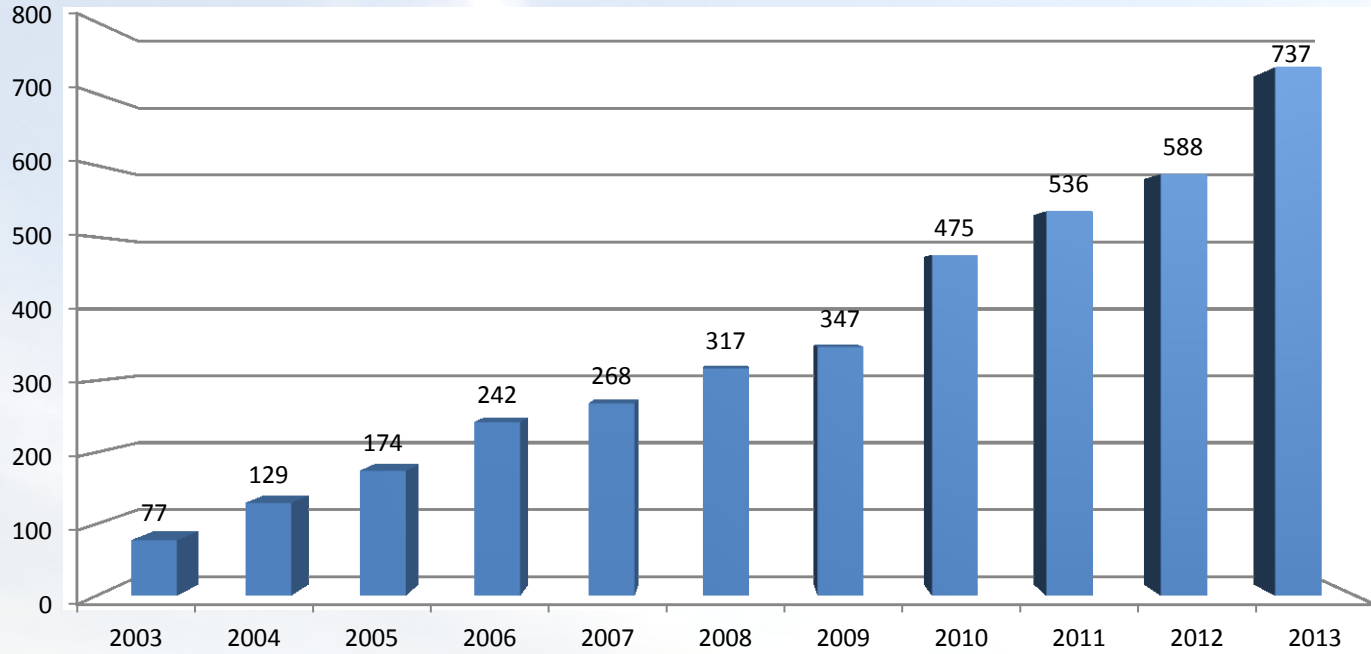


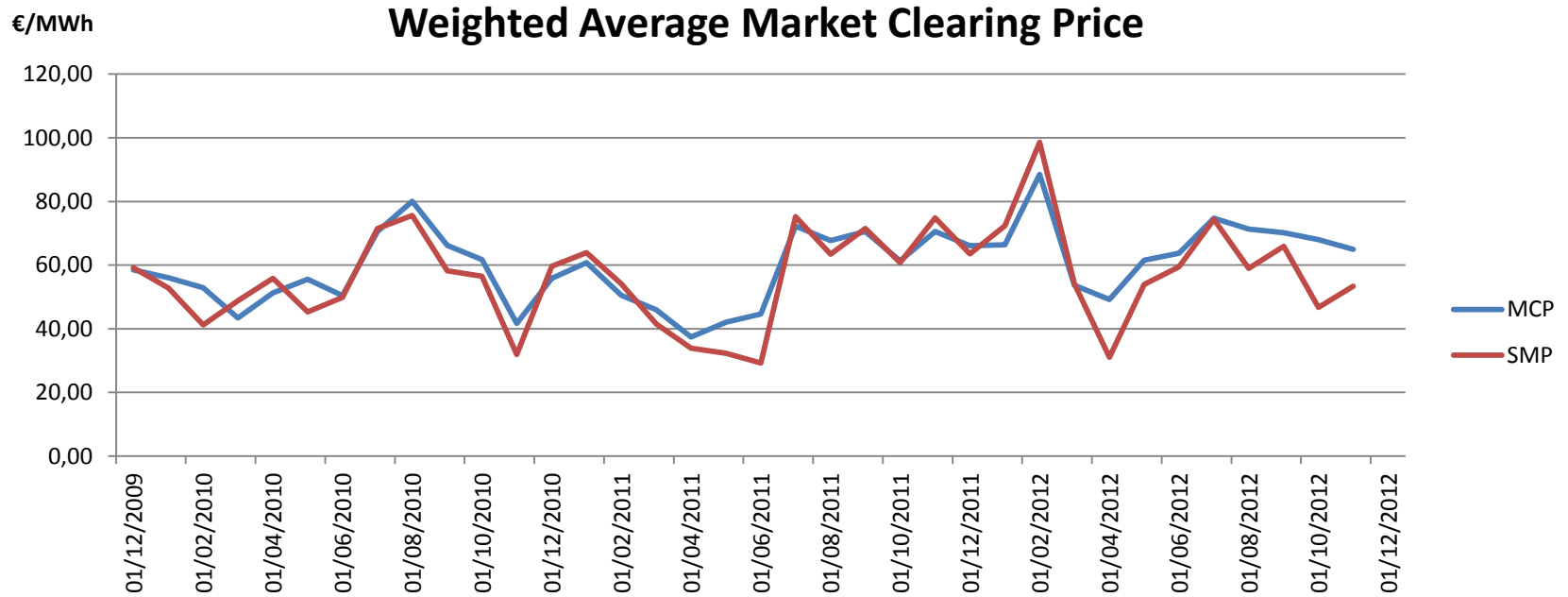
Balancing Power Market
Price Determination





Number of Participants

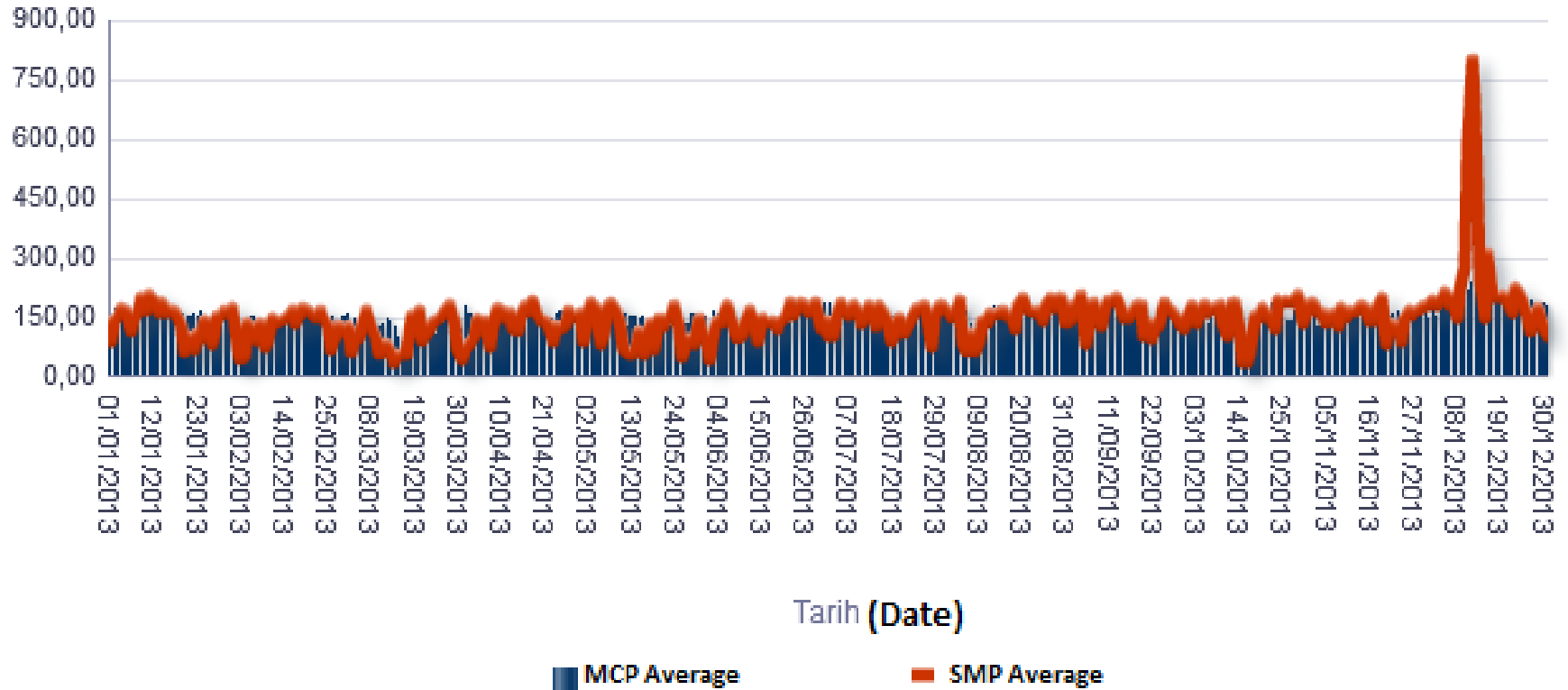




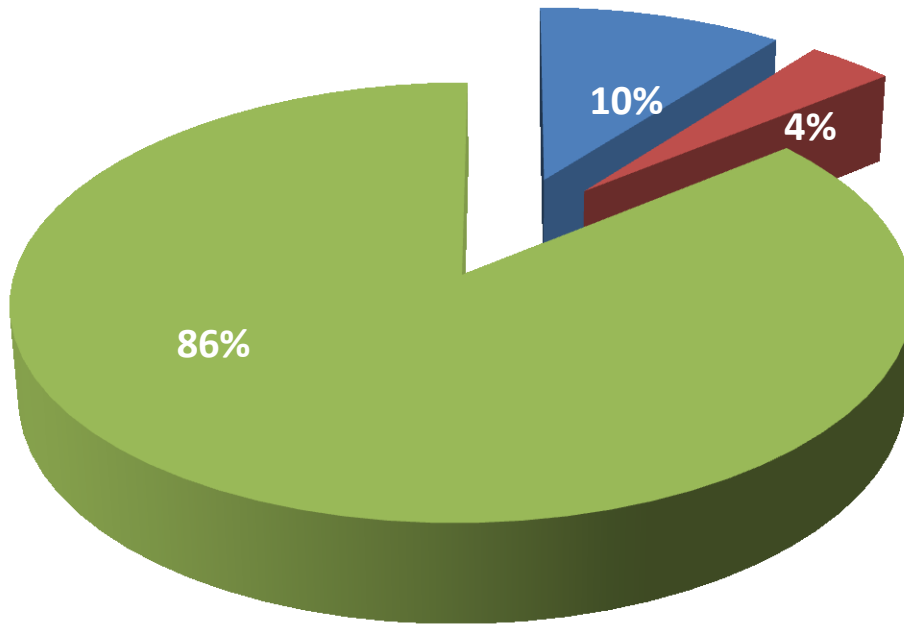
- Demand is increasing 8-10% each year. Although demand is higher than before, due to hydro generation, prices are sometimes lower than before.
- Average prices since December, 2011, when the Day Ahead Market has commenced, to the end of November, 2012 is 155 /MWh (around € 66) .
- Realized average of MCP in 2010 is 133 /MWh and 134 /MWh for the 2011 (around €57)



SMF ve PTF Ortalamaları (Average MCP & SMP)

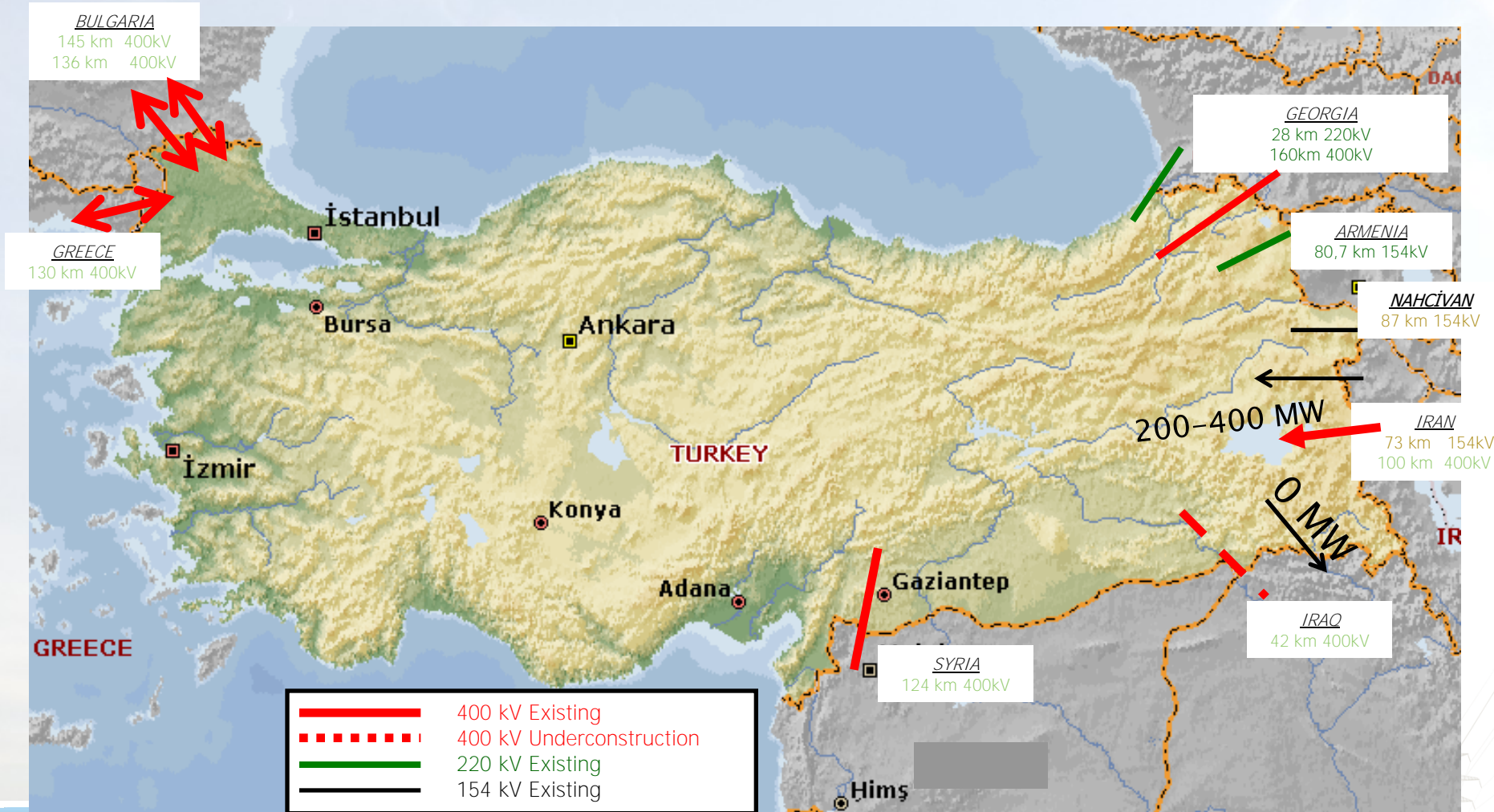


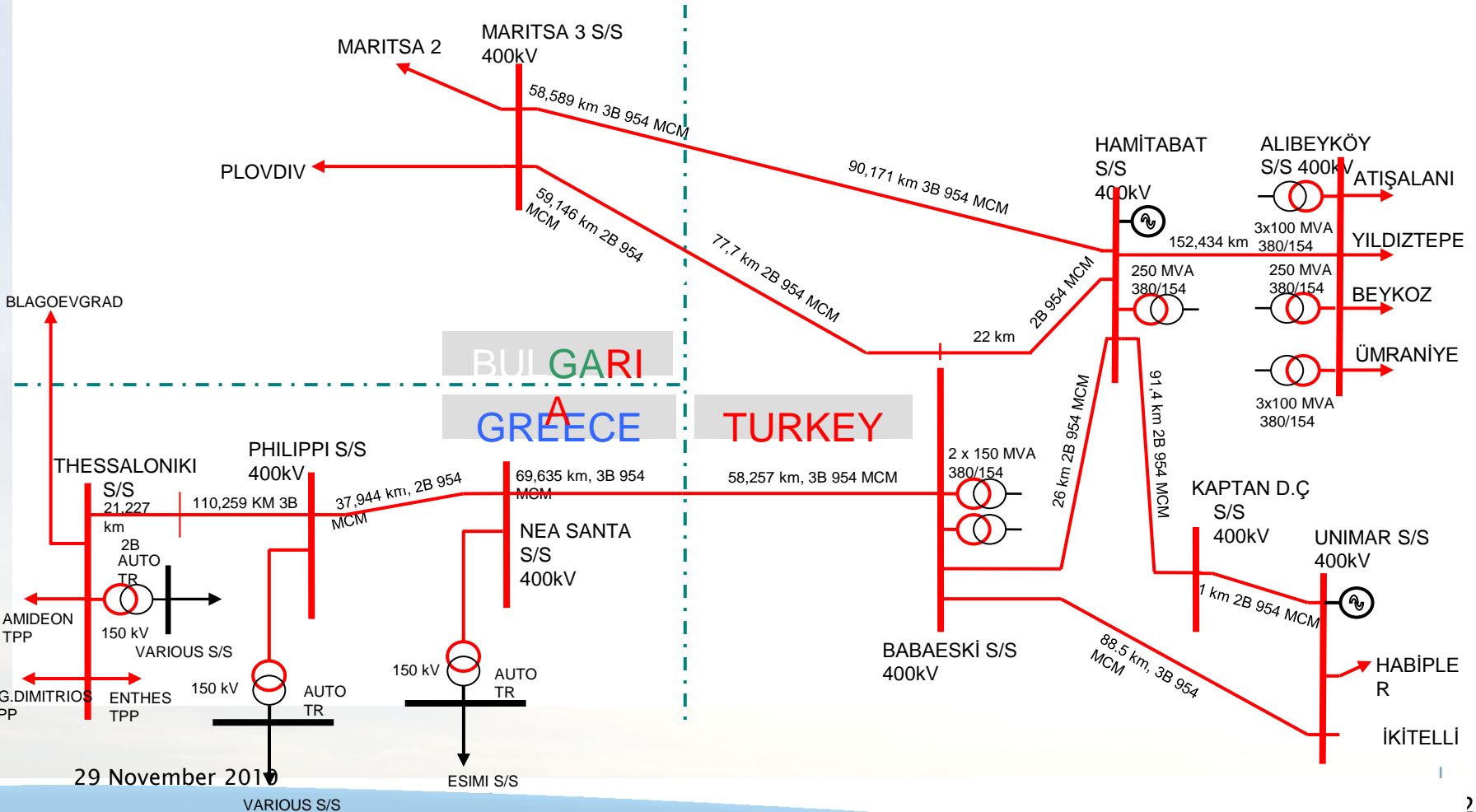
➤ Average Market Clearing Price (MCP) for 2013 is 155TL/MWh (about 52€), whereas average System Marginal Price (SMP) is 151,28 TL/MWh(about 51€).



- DAM Volume
- BPM Volume
- Bilateral Contracts Volume

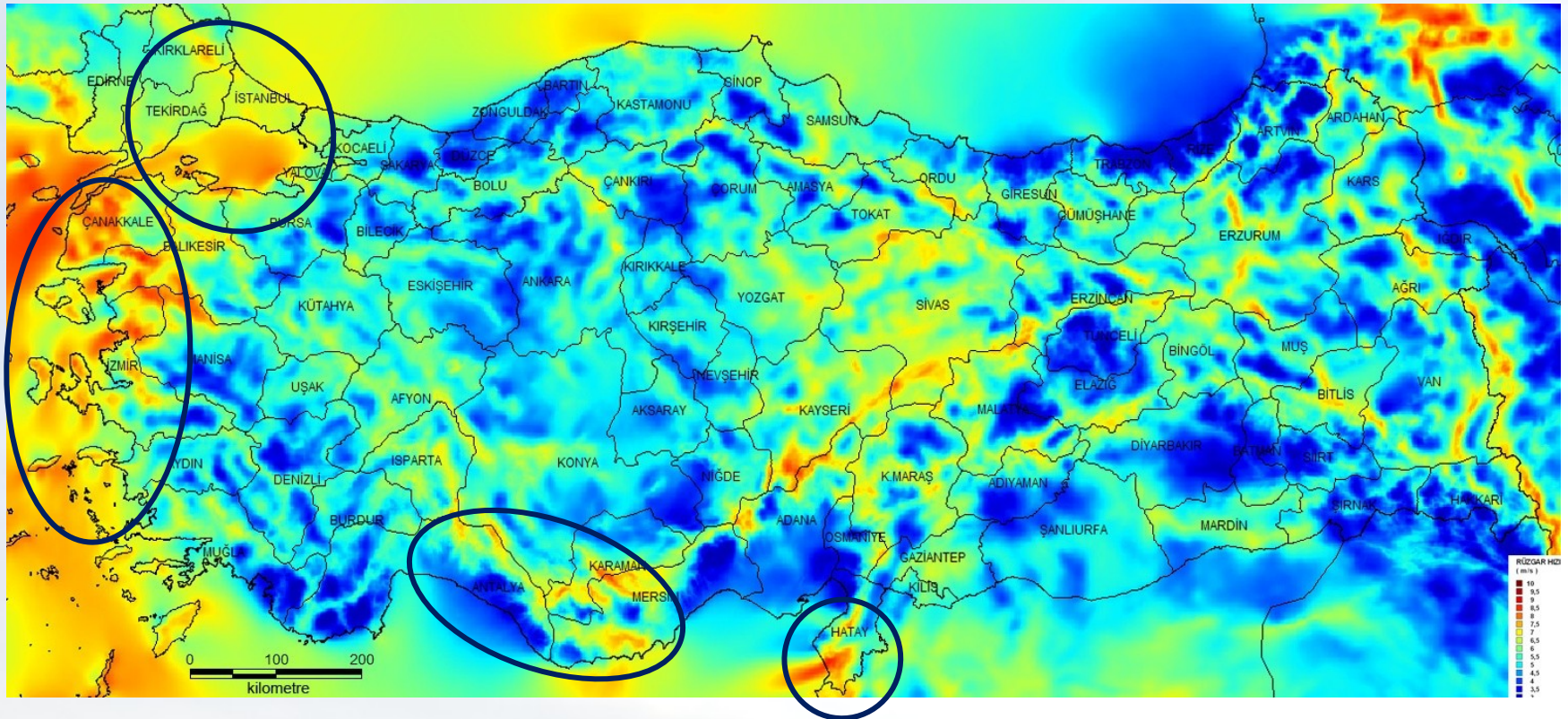
Nearly 15% of total energy consumption is sold through Day-a-Head and balancing power market, whereas the remaining portion is through bilateral contracts.







- Started since June 2011
 - ▶ ENTSO-E -> TR 550 MW
 - ▶ TR -> ENTSO-E 400 MW
 - ▶ Monthly Auctions
 - ▶ TCAT (Teiaş Capacity Allocation Tool)
 - ▶ <https://tcat.teias.gov.tr>
 - ▶ Auction, Secondary Market, Scheduling, Accounting etc.

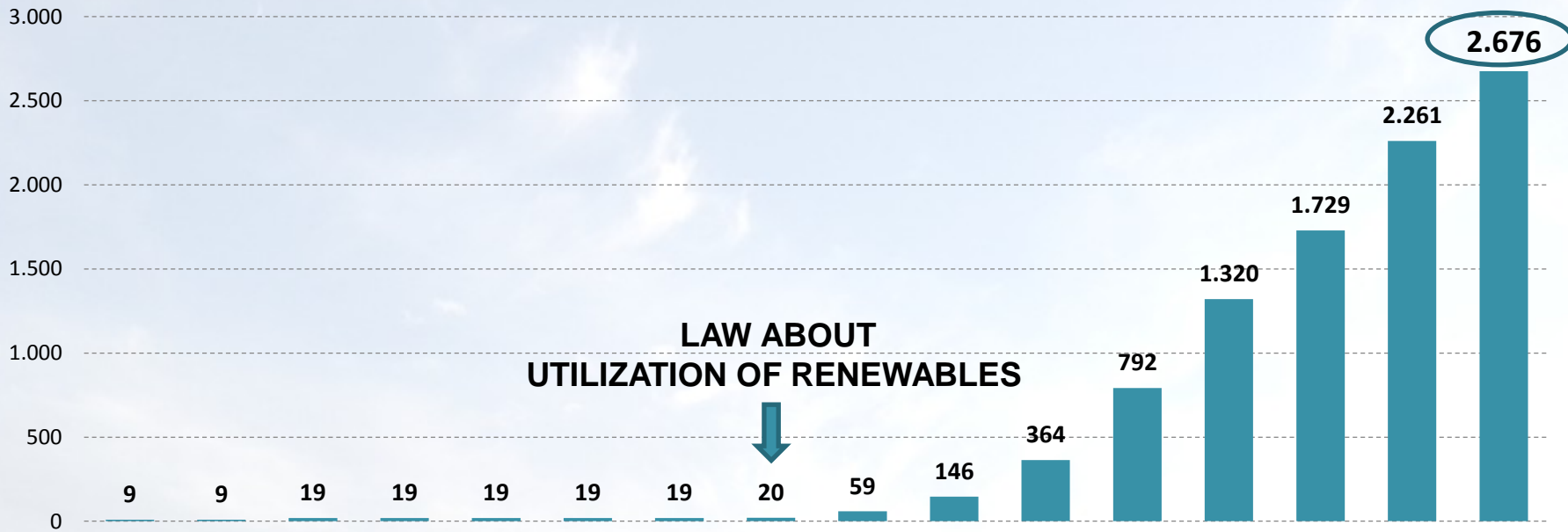


The techno-economic wind potential of Turkey is **48 GW**, according to General Directorate of Renewable Energy.

The locations with highest potential are in the Aegean, Marmara, and Eastern Mediterranean and Hatay.



WIND POWER INSTALLED CAPACITY IN TURKEY (MW)

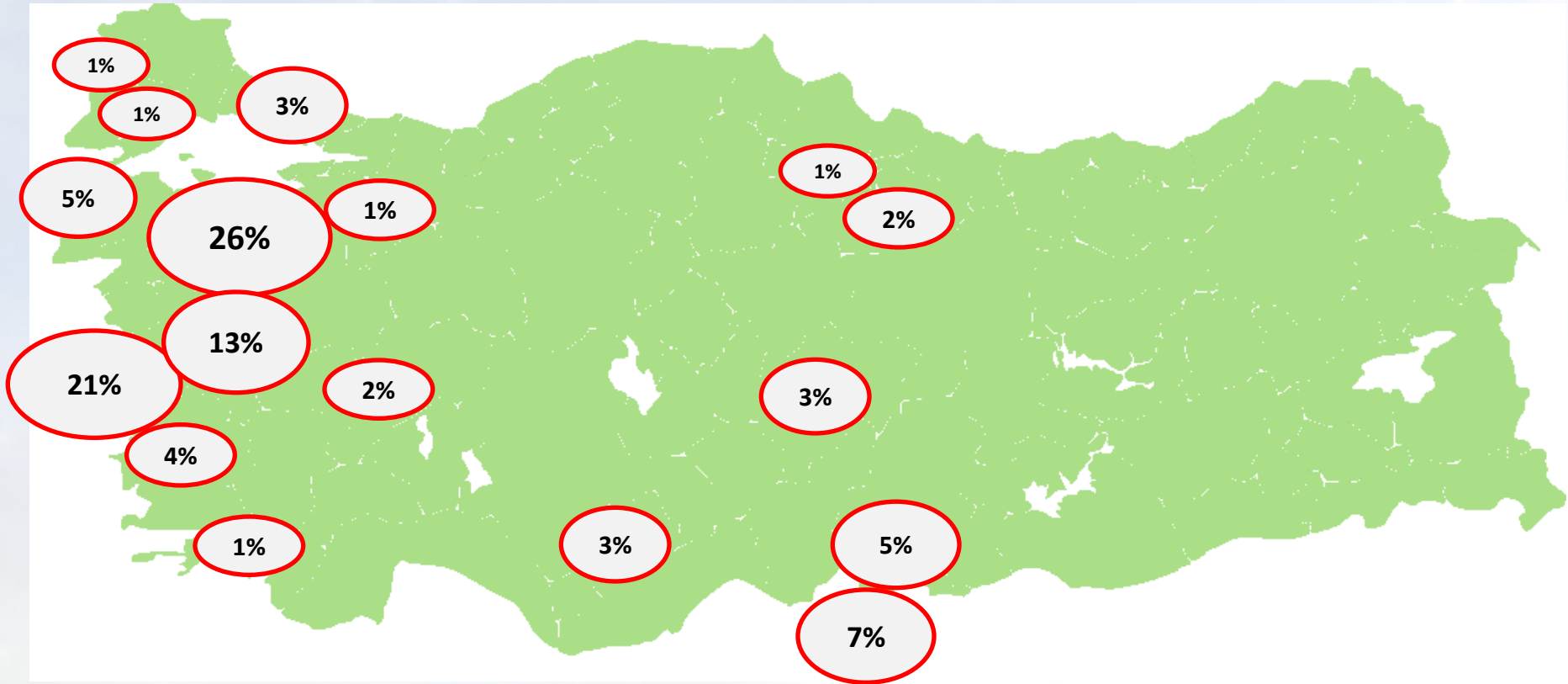


	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
INSTALLED CAPACITY (MW)	9	9	19	19	19	19	19	20	59	146	364	792	1.320	1.729	2.261	2.676



WPP STATUS

	MW
IN OPERATION	2,677
HAS CONNECTION AGREEMENT with TEIAS	2,629
LICENSED by EMRA	3,961
PERMITTED for CONNECTION	997
EXTENSIONS PERMITTED in 2013	959
TOTAL	11.914



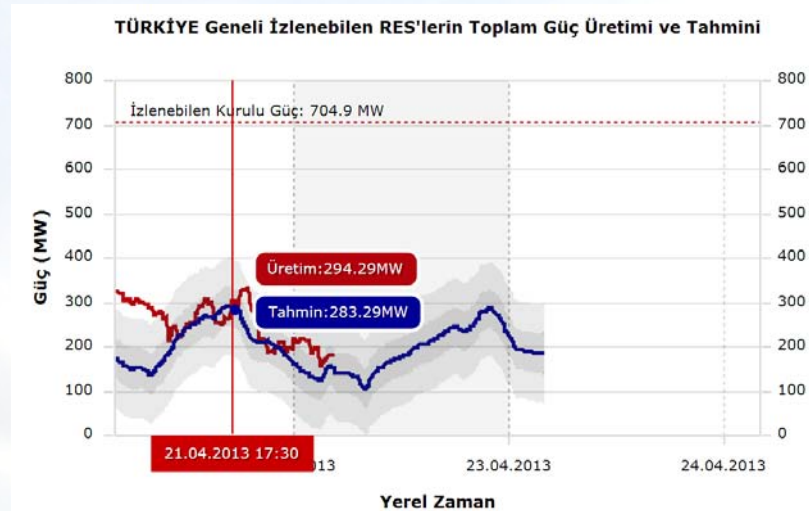
TOTAL INSTALLED WPP : ~2700 MW

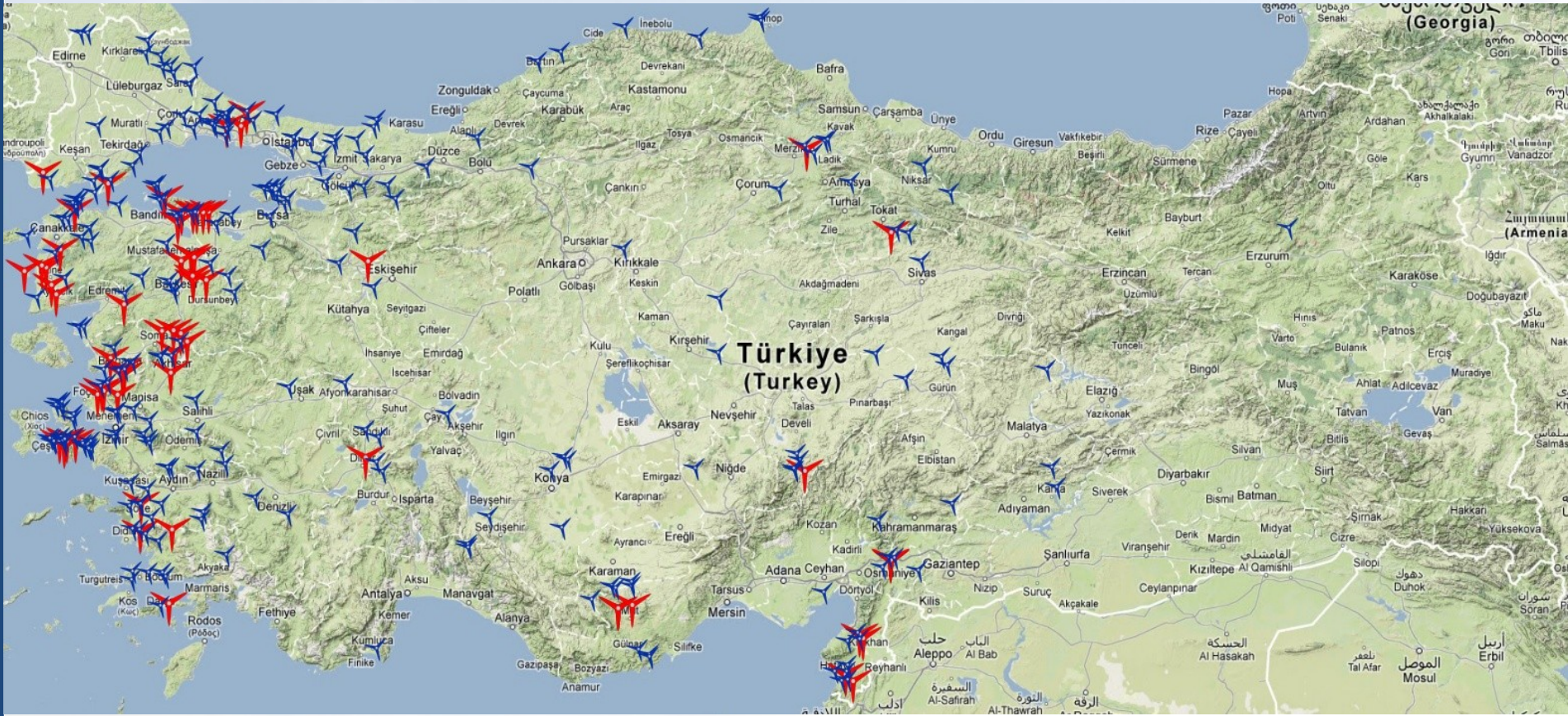


All the wind power plants shall establish the necessary infrastructure to provide the monitoring of the wind park from **Wind Power Monitoring and Forecast Center (RİTM)**, developed by General Directorate of Renewable Energy. WPP's will be monitored also from TEİAŞ Dispatch Centers for forecast and system operation.



T.C.
ENERJİ VE
TABİİ KAYNAKLAR
BAKANLIĞI





* Red: In Operation Blue: Planned

TOTAL PLANNED + INSTALLED WPP: ~12.000 MW



Type	Feed-in Tariffs (USD Cent / kWh)	If Production Made Domestically	Additional Feed-in Contribution (USD Cent / kWh)
Hydro	7,3	Turbine	1,3
		Generator and power electronics	1,0
Wind	7,3	Blade	0,8
		Generator and power electronics	1,0
		Turbine tower	0,6
		Entire mechanical components within rotor and nacelle groups	1,3
Geothermal	10,5	Steam or gas turbine	1,3
		Generator and power electronics	0,7
		Steam injector or vacuum compressor	0,7



Type	Feed-in Tariffs (USD Cent / kWh)	Production Made Domestically	Additional Feed-in Contribution (USD Cent / kWh)
Solar (PV)	13,3	Panel structural mechanics construction	0,8
		PV modules	1,3
		Cells forming PV module	3,5
		Inverter	0,6
		Material focusing solar irradiance onto PV module	0,5
Solar (CSP)	13,3	Radiation collection tube	2,4
		Reflector surface plate	0,6
		Solar tracking system	0,6
		Mechanical components of the heat storage	1,3
		Mechanical components steam generation	2,4
		Stirling engine	1,3
		Solar panel structural mechanics	0,6



Type	Feed-in Tariffs (USD Cent / kWh)	Production Made Domestically	Additional Feed-in Contribution (USD Cent / kWh)
Biomass	13,3	Fluid bearing steam boiler	0,8
		Liquid or gas fuelled steam boiler	0,4
		Gassification and gas purging group	0,6
		Steam or gas turbine	2.0
		Internal combustion engine or Stirling Engine	0.9
		Generator and power electronics	0,5
		Cogeneration system	0,4



REGULATION REGARDING THE SELECTION PROCESS FOR MULTIPLE WIND PROJECT APPLICATIONS

- This regulation defines competition process, obligation of investors who will attend the competition and Contribution Rate of Wind and Solar Power Plant in the case of existence of more than one power plant application based on solar/wind energy for the same region.



1. Investors apply for license to Energy Authority (EMRA)



2. Applications are forwarded to TEIAS for grid assessment.



3. Attendees are listed according to connection area and/or connection point.



4. Investors who will attend to competition submit related documents to TEIAS.



5. Investor prepares bidding letter, letter of bank guarantee.



6. Investors attend to competition with the related documents.



7. Bids are ranked, bidders who submitted the highest Contribution Fee are permitted for grid connection.



8. Results of the competition are forwarded to EMRA.



9. Contribution Fee Agreement is signed with successful bidders.

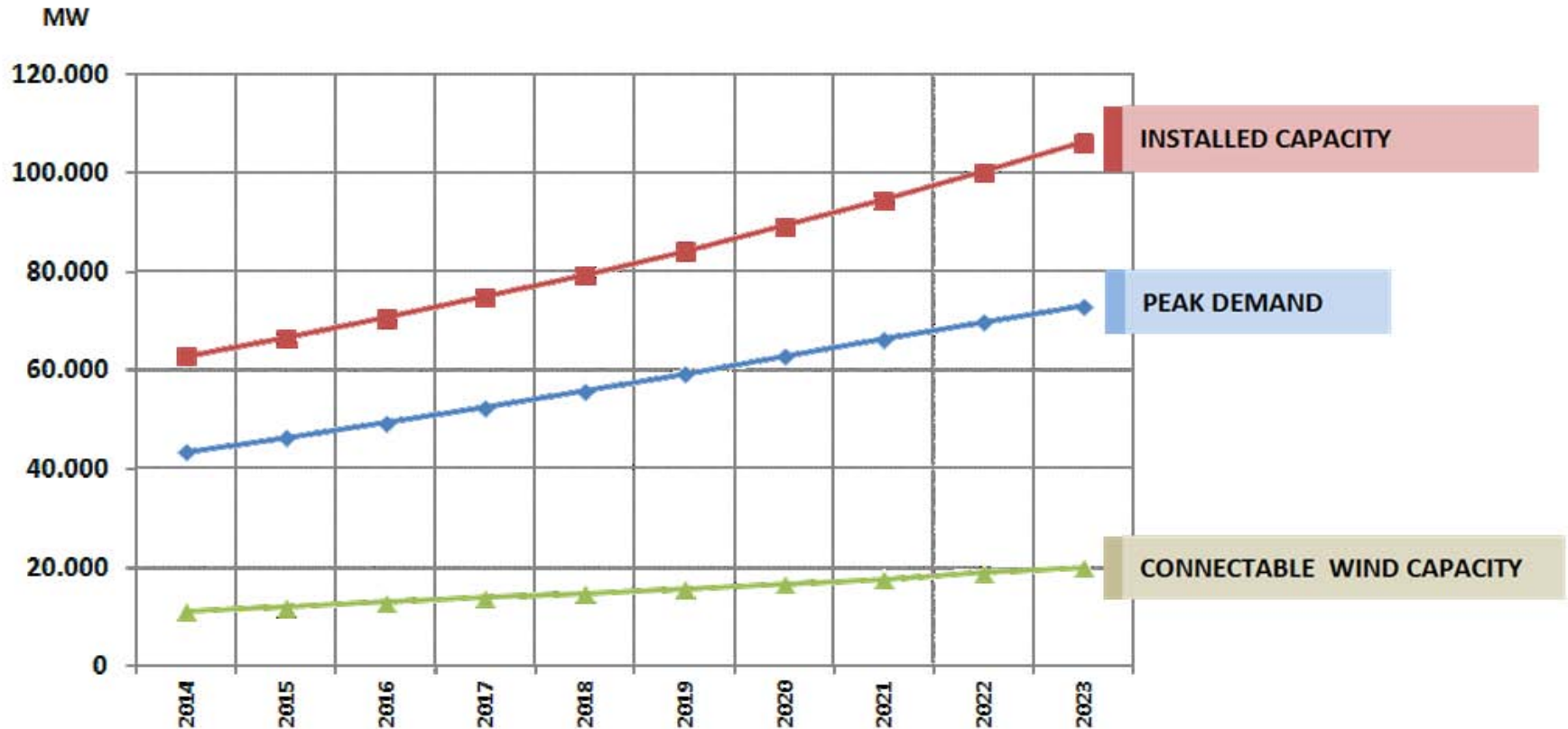


10. Pre-License is given by EMRA



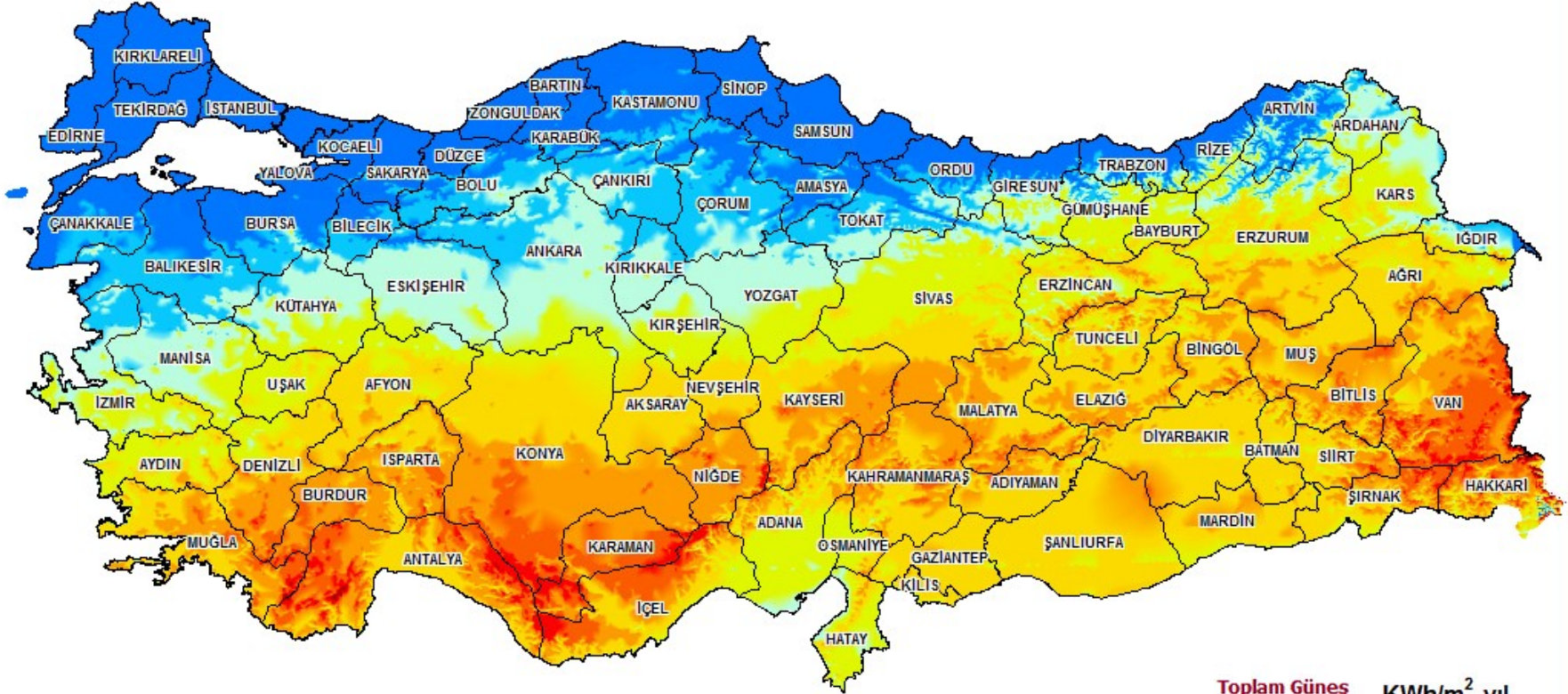
	No. of Companies Competing	No. of Subs.	Permitted WPP's to connect grid	Total Permitted Capacity (MW)
1	27	12	16	626
2	11	5	6	281
3	26	8	8	500
4	31	3	8	395
5	30	8	9	520
6	38	8	16	289,4
7	46	6	15	427
8	54	6	12	607
9	41	3	4	74
10	37	5	9	217
11	175	16	31	1199
12	33	4	7	198
13	47	3	6	166
TOTAL	596	87	147	5500

Average Contribution Fee that will be paid to TEIAS per kWh of energy produced is **1,91** kuruş/kwh (~1 USD cent)



In accordance with the Ministry of Energy's Strategic Plan, Turkey is targeting **20,000 MW** installed wind-power capacity by the end of 2023.





- ▶ According to Strategy Paper of Energy Ministry, Turkey's aim in solar energy is to have 3.000 MW solar power plant integration by 2023.



- Total installed capacity of the solar power plants which will be connected to transmission grid should not be higher than 600 MW until 31/12/2013. (LAW FOR USE OF RENEWABLE ENERGY RESOURCES FOR THE PRODUCTION OF ELECTRICAL ENERGY)
- Total installed capacity is distributed regarding the provinces, according to total average annual radiation and sunshine duration.
- Necessary information is obtained from YEGM (Renewable Energy General Management)
- Provinces with 1620 kWh/m²-per year and higher total average annual radiation are included in calculations.

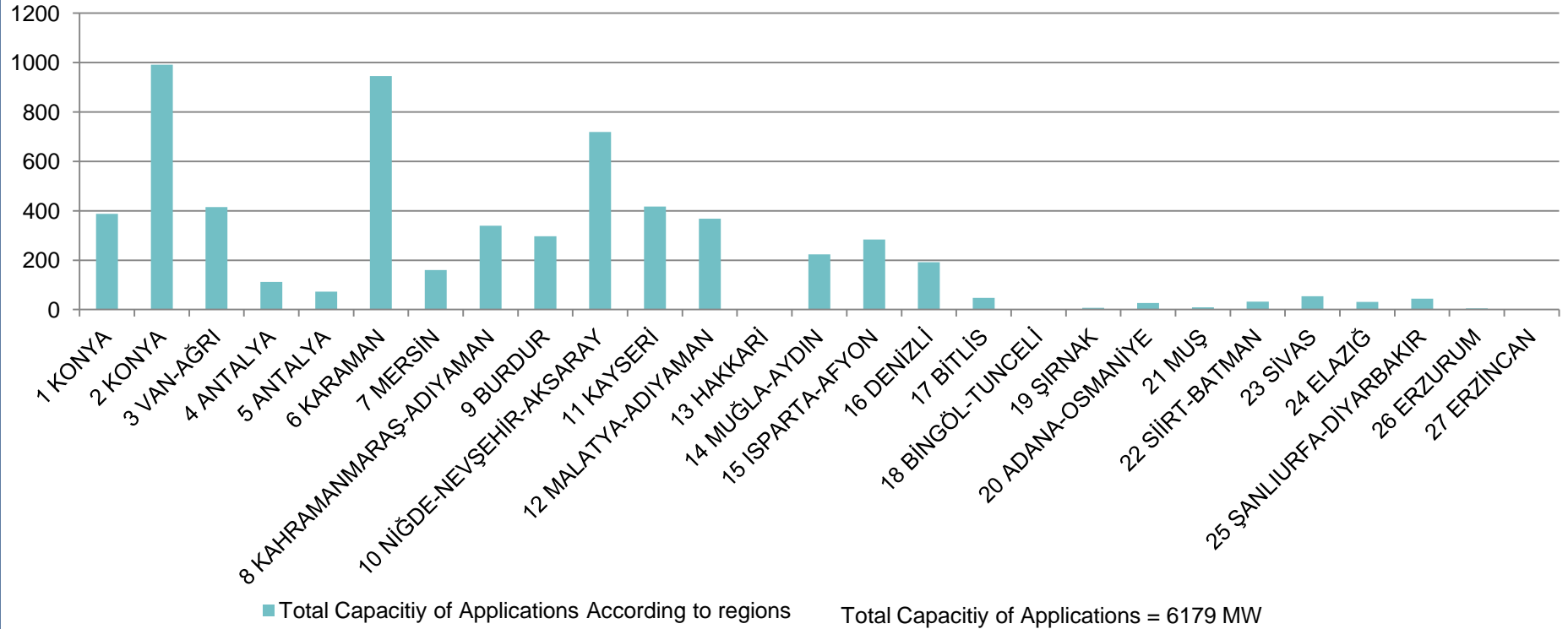


REGION	NUMBER OF SS	CAPACITY (MW)
1 KONYA	8	46
2 KONYA	5	46
3 VAN AĞRI	5	77
4 ANTALYA	6	29
5 ANTALYA	8	29
6 KARAMAN	3	38
7 MERSİN	7	35
8 KAHRAMANMARAŞ ADİYAMAN	9	27
9 BURDUR	3	26

REGION	NUMBER OF SS	CAPACITY (MW)
10 NİĞDE NEVŞEHİR AKSARAY	4	26
11 KAYSERİ	6	25
12 MALATYA ADİYAMAN	6	22
13 HAKKARİ	2	21
14 MUĞLA AYDIN	8	20
15 ISPARTA AFYON	7	18
16 DENİZLİ	3	18
17 BİTLİS	2	16
18 BİNGÖL TUNCELİ	4	11

REGION	NUMBER OF SS	CAPACITY (MW)
19 ŞIRNAK	3	11
20 ADANA OSMANIYE	4	9
21 MUŞ	1	9
22 SİİRT BATMAN MARDİN	5	9
23 SIVAS	1	9
24 ELAZIĞ	5	8
25 ŞANLIURFA DİYARBAKIR	1	7
26 ERZURUM	3	5
27 ERZİNCAN	2	3

TOTAL	121	600
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According to regulation dated 03th December 2010 published by Energy Market Regulatory Authority (EMRA), legal and natural personalities get right to construct cogeneration systems without license.

For this purpose, TEİAŞ allocated 2 MW for wind and solar, and 1 MW for cogeneration for each substation. Accordingly, the total amount of the application until it reaches the allocated capacity distribution companies will not ask TEİAŞ for permission.

However, in case this amount is exceeded, TEİAŞ will be asked to re-vision for capacity increase and TEİAS will make a new assessment of the particular substation.

- Location:
Akkuyu – Mersin
- Configuration:
4 X 1,200 MW
- Operation:
2019-2022



Thank You..

Serhat METİN

Turkish Electricity Transmission Company

serhat.metin@teias.gov.tr