Energy Industry in Turkey

Foreign Market Consulting Ltd. Sti.
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FMConsulting prepares market snapshot reports from selected trusted sources in Turkey which are regularly updated. These reports are brief presentations overviewing available facts & figures on major industries in Turkey. If you need a specific research on different segments, please contact with our Head of Market Research Department Mrs. Berna Gurleyen (b.gurleyen@fmconsulting.com). We would be happy to support you.

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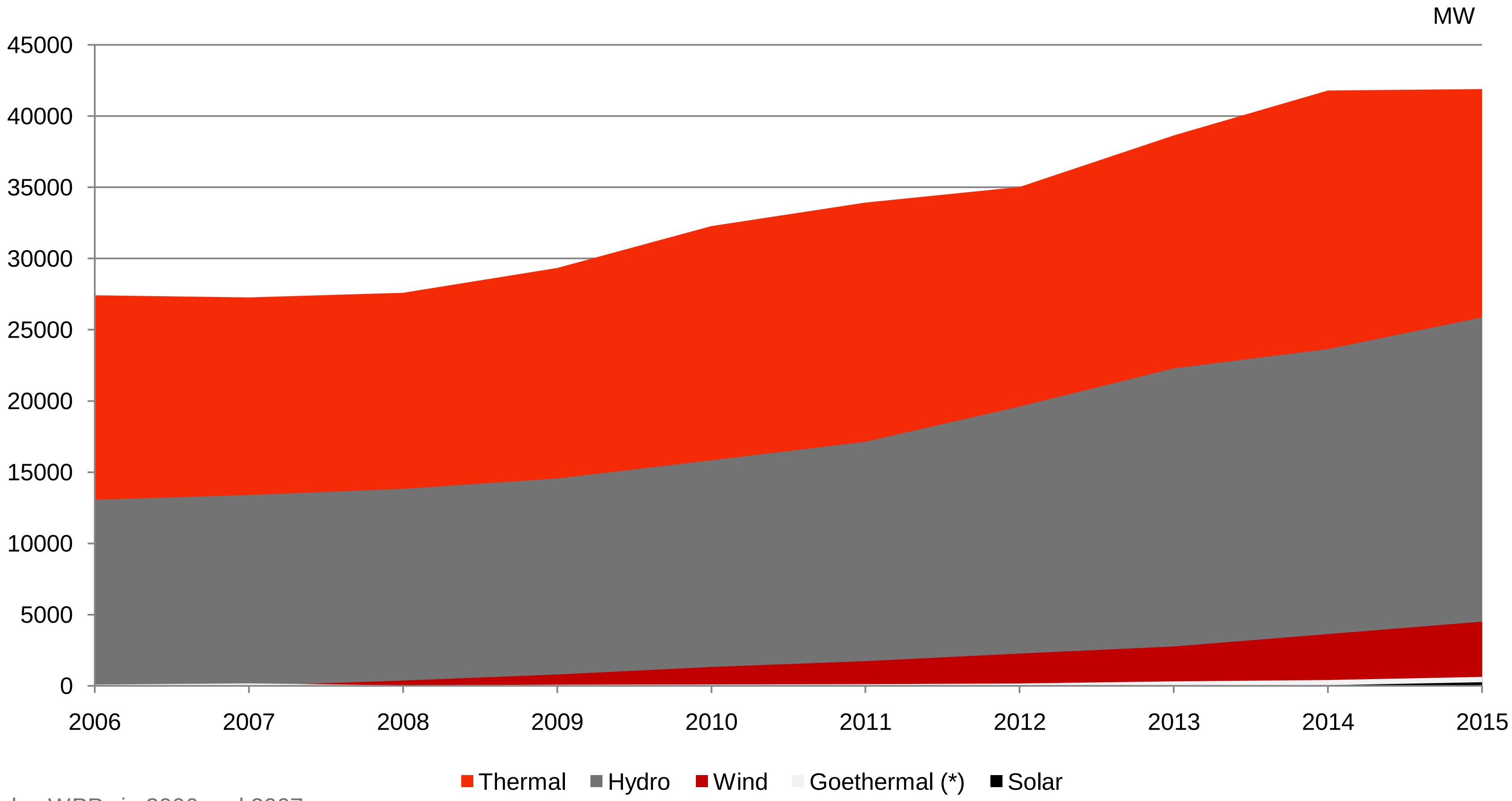
A. Electricity Generation & Demand

Installed Capacity

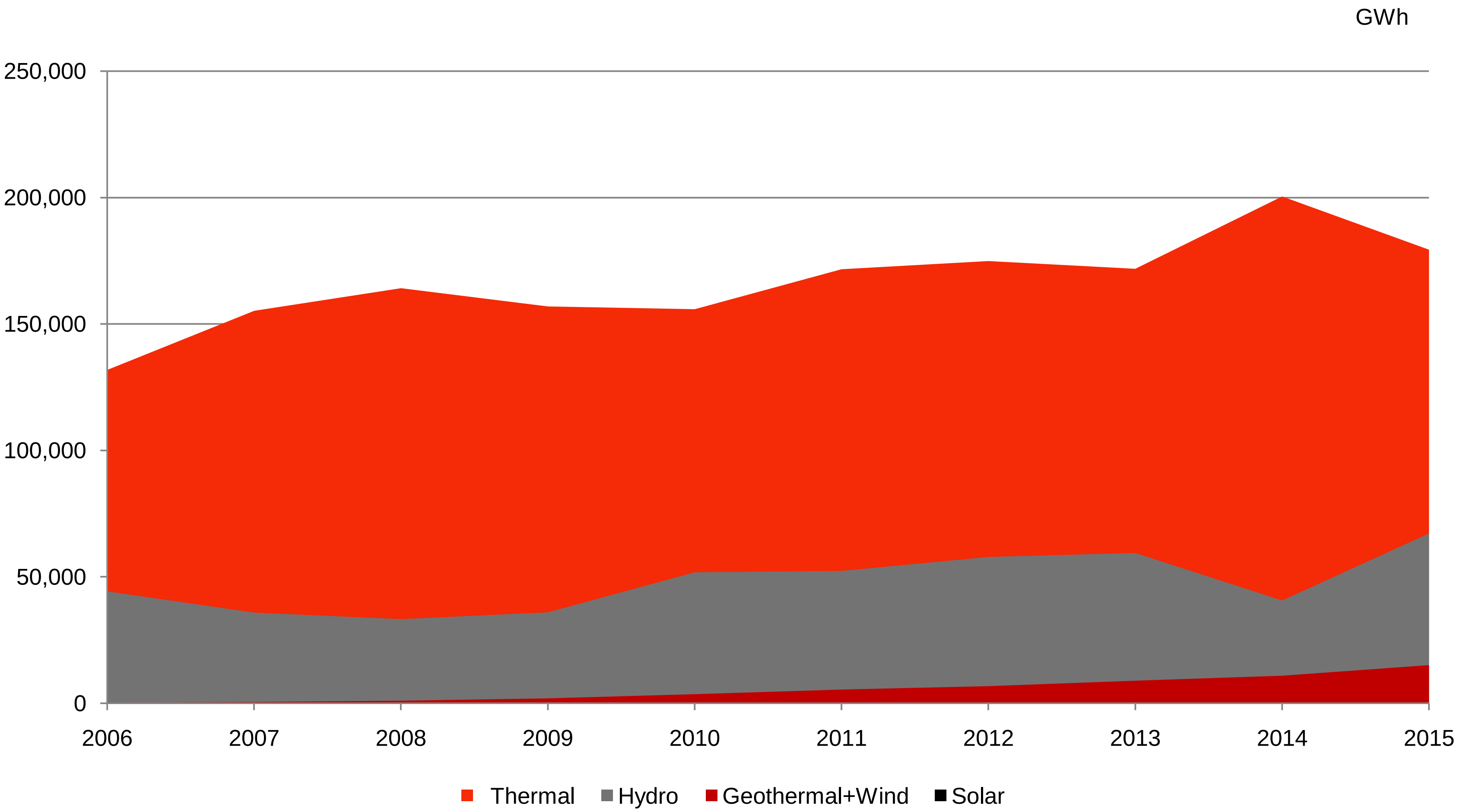
- Total installed capacity of **73,147 MW** in 2015, **5.2%** higher than 2016.
- **CAGR (2010-2015)**: **8.1%**
- The share of renewable energy has increased from **32%** in 2006 to **43%** in 2015.



*Includes WPPs in 2006 and 2007.
Source: Turkish Electricity Transmission Company (TEIAS), 2016

Electricity Generation By Resources

- Total electricity generation of **261,783 GWh** in 2015, **3.9%** higher than 2016.
- The share of renewable energy has increased from **25%** in 2006 to **31%** in 2015.

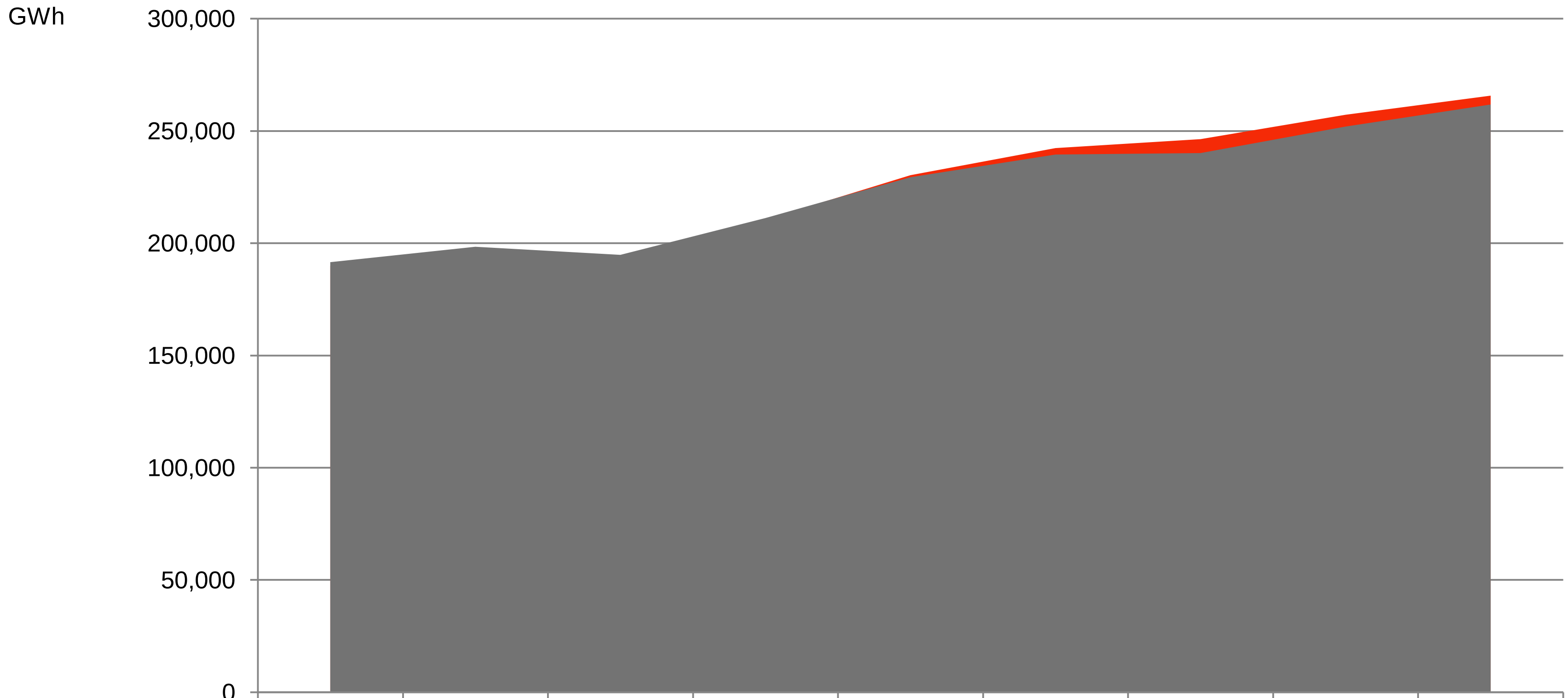


Source: TEIAS, 2016

A. Electricity Generation & Demand

Generation vs. Demand

- **CAGR (2010-2015)**: **4.4%** (Gross Generation), **4.8%** (Gross Demand)



	2007	2008	2009	2010	2011	2012	2013	2014	2015
Gross Demand	190,000	198,085	194,079	210,434	230,306	242,370	246,357	257,220	265,724
Gross Generation	191,558	198,418	194,813	211,208	229,395	239,497	240,154	251,963	261,783

Source: TEIAS, 2016

Renewable Energy

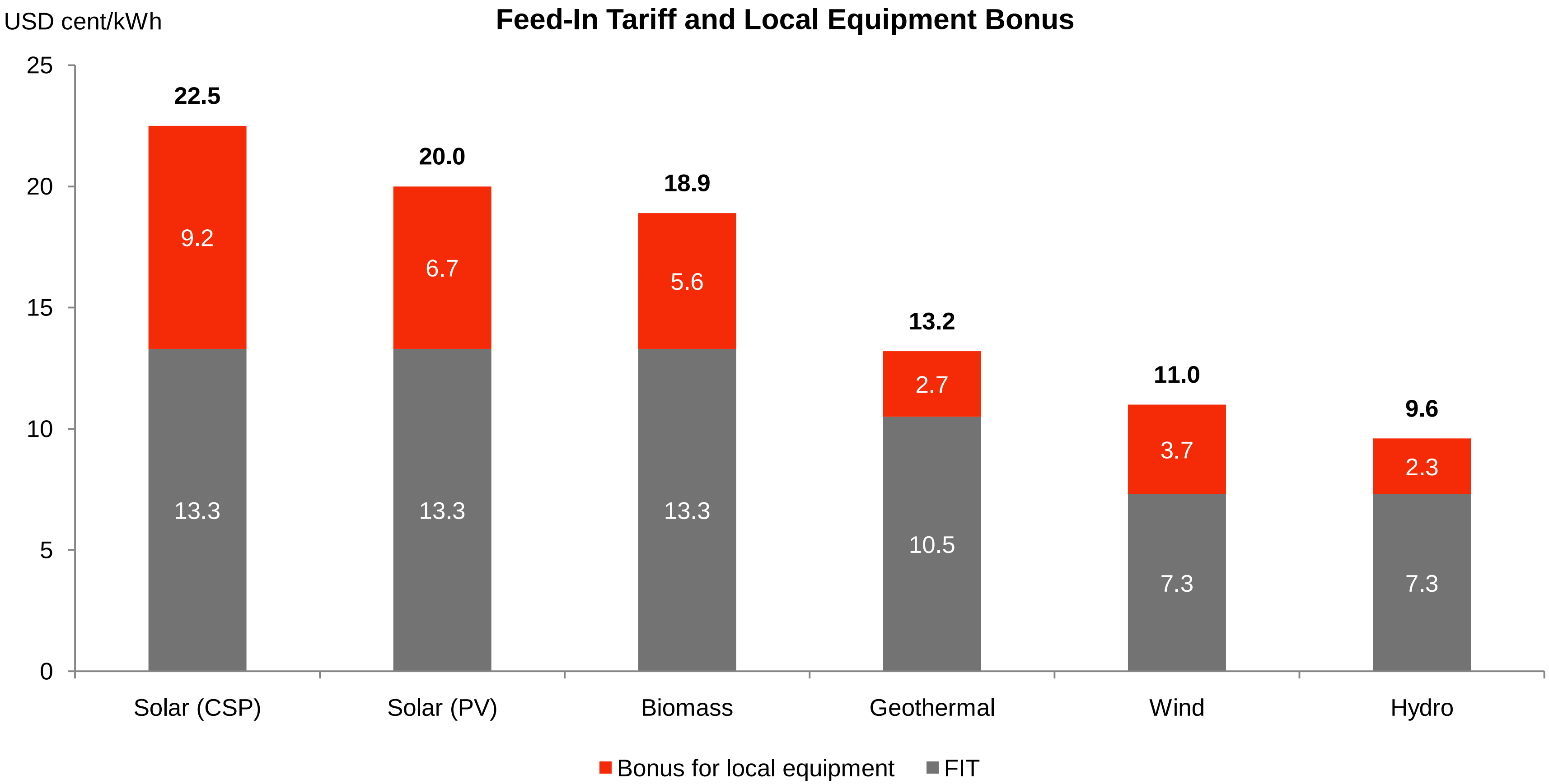
- Only a small portion of the **potential** is utilized; new investments are needed.

Type	Installed Power	Potential	Current Utilization Rate of the Potential
Hydroelectricity	26,247 MW (June 2016) 67,146 GWh annual production (2015)	140,000 GWh	48%
Wind	4,947 MW (June 2016)	48,000 MW	10%
Solar	505.9 MW (June 2016, PV power)	2,737 hours annual radiation 1,527 kWh/m^2 annual solar energy 2023 target: 3,000 MW	17% (of 2023 target)
Geothermal	623.9 MW (2015) *	31,500 MW	2%
Biomass	271.6 MW (2015)	Biomass: 8.6 MTEP, 100,018 MWh 2023 target: 1,000 MWe	27% (of 2023 target)

Sources: Ministry of Energy and Natural Resources (MENR), 2016
*TEIAS, 2016

Renewable Energy

- Renewable energy producers can benefit from:
  - Advantageous **feed-in tariff scheme prices** for **ten years**
  - **Local equipment bonus** for **five years**, if local equipment is used for energy generation



Source: R&D Law No. 5346

Electricity Prices

Lowest Electricity Prices (Industry) in the EU		
Rank	Country	EUR/kWh (Incl. Taxes), 2015 H2
1	Sweden	0.0738
2	**Turkey**	**0.0829**
3	Finland	0.0875
4	Bulgaria	0.0939
5	Czechia	0.0947
6	Luxembourg	0.0965
7	Romania	0.0989
8	Netherlands	0.1010
9	Poland	0.1059
10	Slovenia	0.1061

Sources: MENR, 2016

Oil Pipelines

Transit Lines in Operation (Green):

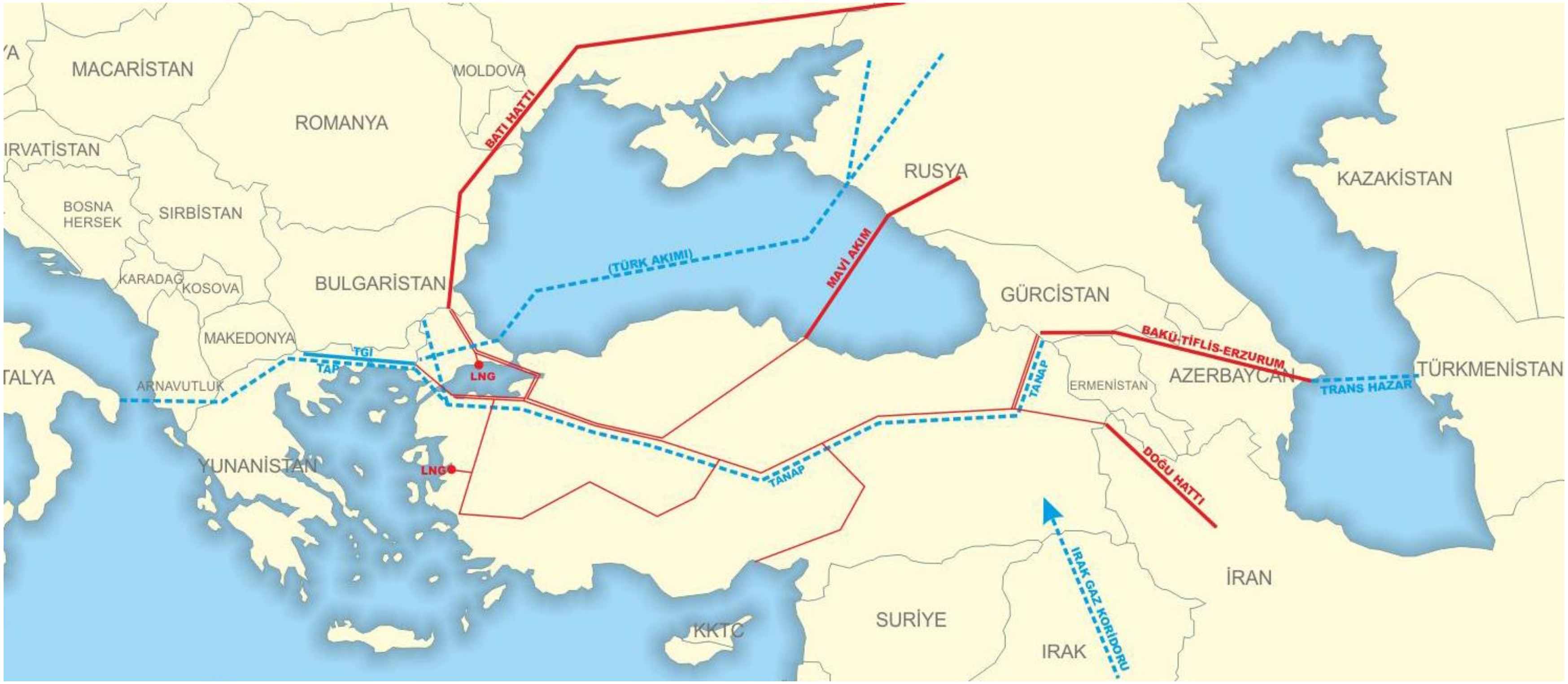
- Iraq-Turkey Crude Oil Pipeline (ITB)
- Baku-Tblisi-Ceyhan Crude Oil Pipeline (BTC)

Domestic Lines in Operation (Red):

- Ceyhan-Kirikkale
- Batman-Dortyol

Source: MENR, 2016

Natural Gas Pipelines



In Operation (Red):
- Russia–Turkey Pipeline (Bati Hatti / Western Line)
- Russia–Turkey Pipeline (Mavi Akim / Blue Stream)
- Iran–Turkey Pipeline (Dogu Hatti / Eastern Line)
- Baku–Tblisi–Erzurum Pipeline
- Turkey-Greece Pipeline (TGI or ITGI)

Planned Transit Lines (Dotted Blue):
- Trans-Anatolian Pipeline (TANAP)
- Interconnection Turkey–Bulgaria
- Russia-Turkey-Europe Pipeline (Turk Akimi / Turkish Stream)
- Adriatic Pipeline (TAP)

Source: MENR, 2016

State Enterprises and Privatization

- The **state** is still a major actor, but its share in the electricity market is decreasing, in parallel with the liberalization of the market.
  - Main regulatory body: **EPDK** (Energy Market Regulatory Authority)
  - State-owned **EUAS**'s (Electricity Generation Company) share in installed power has decreased from **90%** in 1990 down to **28%** in 2015. (Source:TEIAS, 2016)
  - The transmission, which is carried out by **TEIAS** (Electricity Transmission Company), is **100%** public.
  - **TETAS**'s (Electricity Trading and Contracting Company) share in consumption, which was **78%** in 2005, decreased down to **42%** in 2015, as EUAS has increasingly sold to the distribution companies directly. (Source: TETAS, 2015)

www.epdk.org.tr

www.euas.gov.tr

www.teias.gov.tr

http://tetas.gov.tr

- Still many state-owned power plants in the **privatization** portfolio.
- All **distribution** companies have already been privatized.

Leading Producers

ISO Rank*	Company	Installed Power (MW) – 2015
5	EUAS	20,325
6	Icdas Celik Enerji	465
52	Eren Enerji	1,390
53	Enerjisa	2,500
72	Icdas Elektrik Enerjisi	1,200
73	Aksa Enerji	2,076
109	OMV Samsun Elektrik	887
136	Celikler Seyitomer Elektrik	600
243	Park Termik	620
405	Rasa Enerji	180
446	Entek Elektrik	364
488	Cengiz Enerji	952
471	Zorlu Enerji Elektrik	627

*Rank among top 500 manufacturing enterprises in Turkey in terms of production based net sales in 2015
Source: EUAS, 2016

Power Plants Under Construction

Type of Fuel/Source	Number of Power Plants*	Capacity Under Construction* MW
Natural gas	26	8,090.2
Hydraulic	157	3,903.6
Coal	3	2,722.7
Wind	87	2,025.6
Import Coal	1	625.5
Domestic Coal	2	280
Geothermal	10	239
Biomass	6	28.2
Waste heat	1	5.5
Total	**293**	**17,920.3**

*Listed only if at least 10% of the project is completed
Source: EUAS, 2016

Nuclear Energy Projects

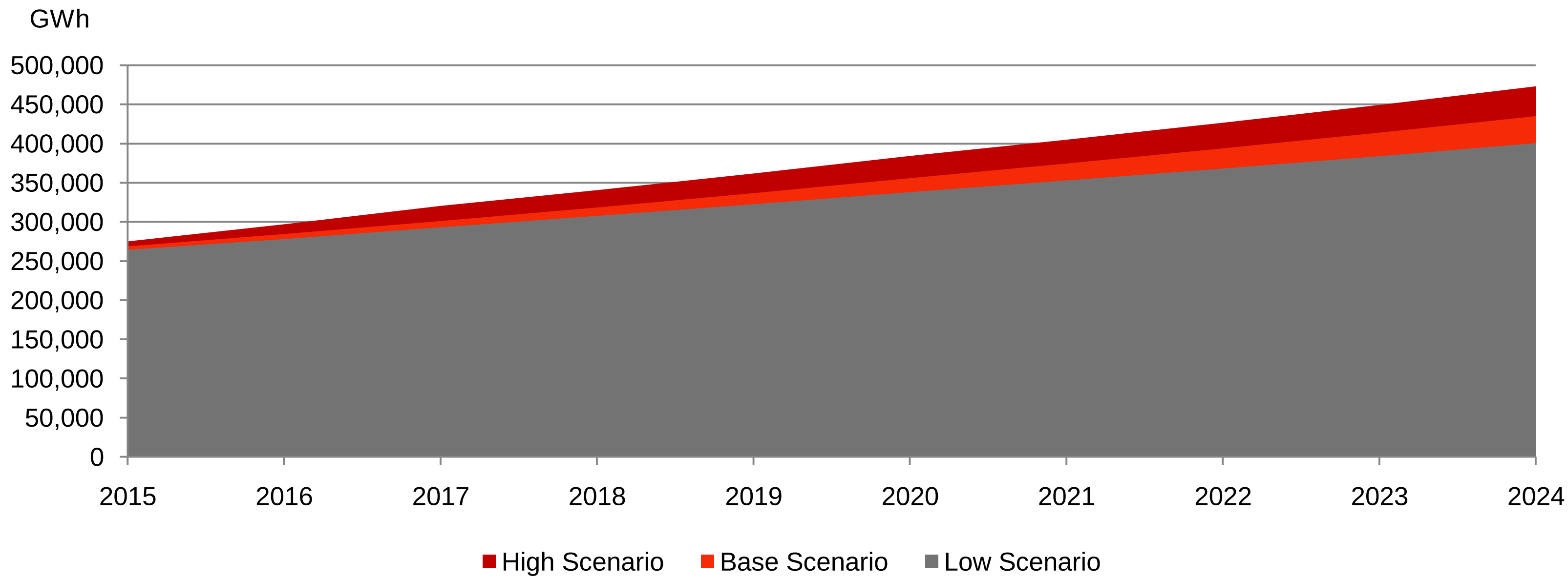
- The government targets that the nuclear sources will have a share of **5%** in total energy generation in 2025.

- **Akkuyu Nuclear Plant**
  - Partner country: Russia
  - Year of agreement: 2010
  - Location: City of Mersin
  - Number of units: 4
  - Power: 4,800 MW
  - Project cost: USD 20 bn

- **Sinop Nuclear Plant**
  - Partner country: Japan
  - Year of agreement: 2013
  - Location: City of Sinop
  - Number of units: 4
  - Power: 4,480 MW
  - Project cost: USD 20 bn

Electricity Demand Forecast

- According to the base scenario, the energy demand can be met until 2019 with sufficient power reserves.
- Expected CAGR (2015-2024): **5.5%**
- Expected shares of resources in installed power:
  - **Thermal**: Decrease from 58% in 2015 down to **55%** in 2019
  - **Hydraulic**: Constant around **34-35%**
  - **Renewable**: Increase from 7% in 2015 up to **11%** in 2019



Source: TEIAS, 2015

2023 Targets

- Higher energy efficiency: **20%** lower energy density (energy consumed per national income) compared to 2011.

- Installed power capacity: **125,000 MW**

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