

In terms of the Annex-II scale, hydroelectric power plants comprise the highest share in installed capacity. The highest prices are for biomass/ biogas and solar power plant investments.

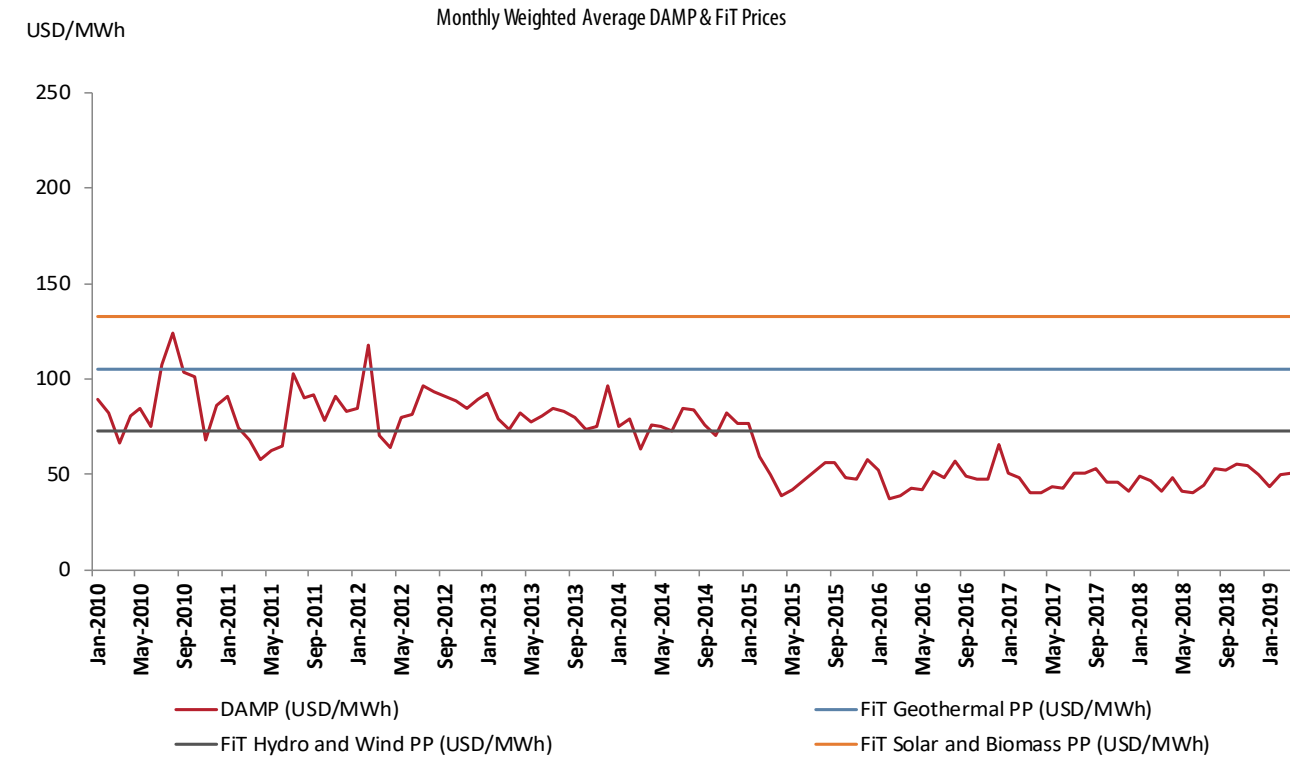
Feed-in Tariff Unit Price (USD cent/kWh)	Biomass (MW)	Solar (MW)	Hydroelectric (MW)	Geothermal (MW)	Wind (MW)	Total (MW)
7,30			12.417,3		3.749,4	16.166,7
7,78					1.059,8	1.059,8
7,90					418,0	418,0
8,10					49,2	49,2
8,15			30,4			30,4
8,47			3,4			3,4
8,58					169,8	169,8
8,60			92,9		3,0	95,9
8,70					957,6	957,6
8,72			12,1			12,1
9,30			32,4			32,4
9,40					88,8	88,8
10,50				676,9		676,9
11,20				210,0		210,0
11,61				13,8		13,8
11,80				352,1		352,1
13,30	469,7	14,9				484,6
13,56	6,0					6,0
13,74		66,8				66,8
13,90	10,9					10,9
14,10	11,0					11,0
15,30	5,5					5,5
Total (MW)	503,1	81,7	12.588,5	1.252,7	6.495,6	20.921,5

Source: MENR, TSKB Economic Research

In 2019, 60% of the power plants which will benefit from the feed-in tariff mechanism are hydroelectric power plants and 31% of them are wind power plants. These power plants are followed by geothermal power plants (6% of the total) and biomass plants (2.4%).

777 power plants are eligible to benefit from the feed-in tariff mechanism in 2019, while only 20 power plants were benefitting from the feed-in tariff mechanism in 2011. The total installed capacity of these 777 power plants is 20,922 MW. Of these 777 power plants, 463 are hydroelectric power plants and 160 of them are wind power plants, with 100 biomass/biogas and 45 geothermal power plants. There are only 9 licensed solar power plants benefitting from the feed-in tariff mechanism. A majority of the unlicensed solar power plants, with approximately 5,235 MW of installed capacity, also benefit from the feed-in tariff mechanism.

Monthly Weighted Average DAMP & FIT Prices



Source: EPIAŞ (Transparency Platform), CBRT, EMRA, TSKB Economic Research

With the depreciation of TL against the dollar in 2015, the guaranteed feed-in tariff prices for renewable power plants exceeded the market prices. The domestic equipment incentive is considered important both by the government and market players, and no formal explanation has been made as to whether or not the feed-in tariff mechanism will continue in the same way beyond 2020, and what kind of mechanism would replace it the feed-in mechanism does not continue.

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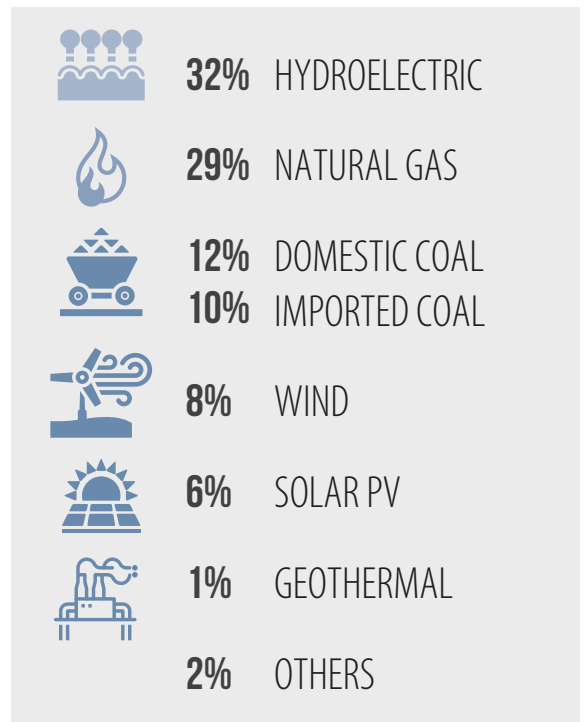
Total Installed Capacity and Electricity Generation

TOTAL INSTALLED CAPACITY
89,681 MW (April 2019)

SHARE OF DOMESTIC RESOURCES
61%

INSTALLED CAPACITY OF RENEWABLE ENERGY
43,163 MW (April 2019)

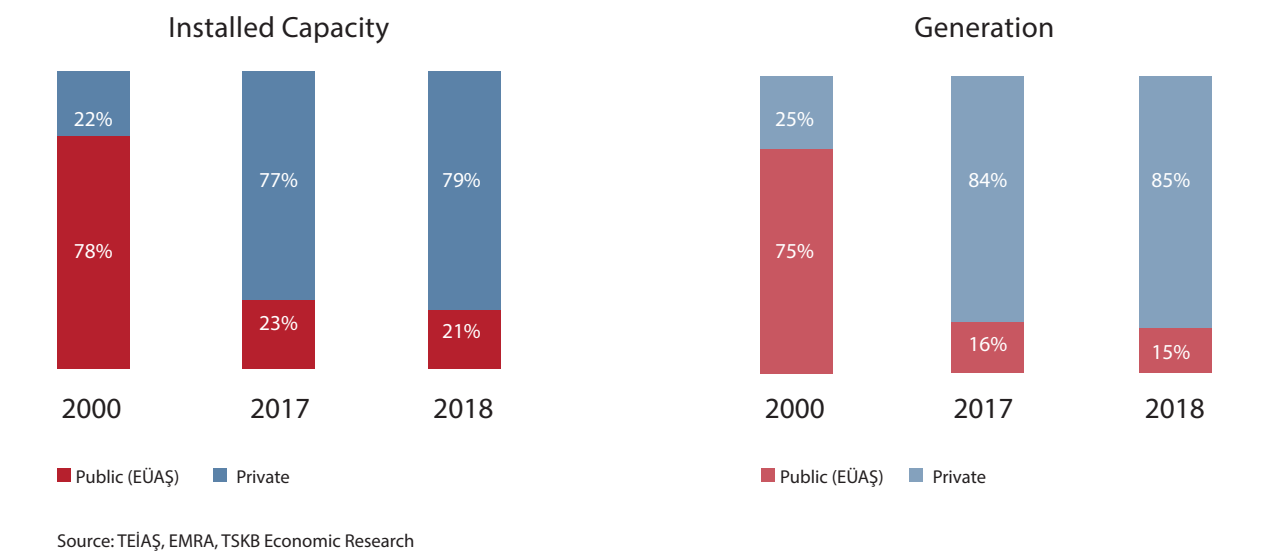
RENEWABLE ENERGY SHARE
48%



Source: TEİAŞ (Yıllık İstatistikleri), TSKB Economic Research

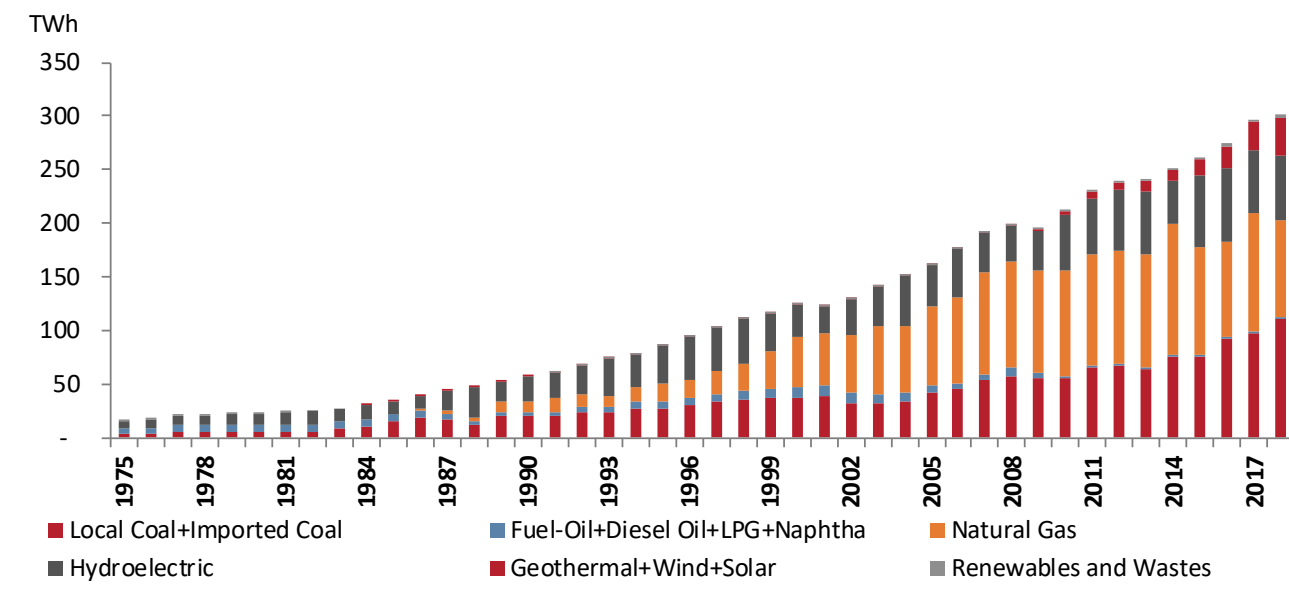
As of April 2019, Turkey's total installed capacity had reached 89,681 MW. 48% of the total installed capacity is comprised of renewable energy resources. The share of domestic resources is 61%.

The installed capacity of hydroelectric power plants constitutes 32% of Turkey's total installed capacity. In recent years, the share of renewable energy power plants has increased with the introduction of wind and unlicensed solar plants.



Source: TEİAŞ, EMRA, TSKB Economic Research

As a result of the recent privatizations in 2017 and 2018, the installed capacity of the public sector decreased from 21,343 megawatts (MW) to 18,489 MW. In 2018, total electricity generation was recorded at 300,717 GWh, while the amount of the electricity generated by state-owned plants was just 45,777 GWh.

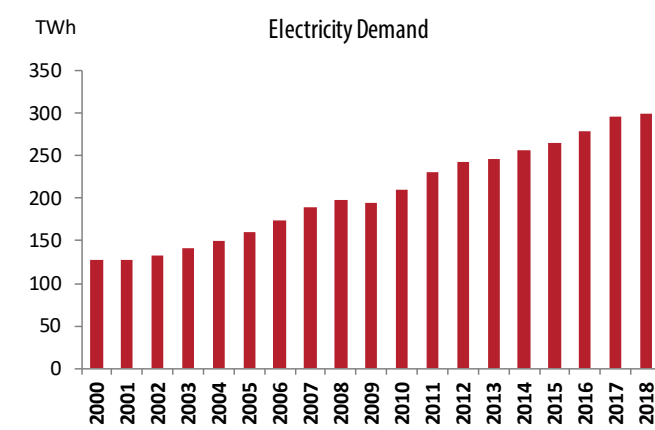


Source: TEİAŞ, TSKB Economic Research

The share of electricity generation from thermal power plants, which was around 80% in 2001, declined over the years to 70.3% in 2017 and to 67.7% in 2018. The share of electricity generated from natural gas power plants, which was 40.4% in 2001, declined to 30% in 2018. Meanwhile, the share of electricity generated from coal power plants increased from 31.3% in 2001 to 37.2% in 2018. The proportion of electricity generated from either fuel oil, naphtha, diesel or LPG decreased from 8.4% in 2001 to just 0.5% in 2018. The main reason for this change in the energy mix was the increase in the prices of oil products and the decrease in costs of alternative resources.

Since the beginning turn of the century, the share of electricity generated from renewable energy has increased significantly. The share of electricity generated from renewable energy resources stood at 20% in 2001, with virtually all of this generated from hydroelectric power plants. In 2018, this proportion had increased to 32.3% with diversification in the range of resources. The share of electricity generated from geothermal, solar and wind power plants has increased from 0.1% to 11.4% in the last 20 years. New investments in wind power since 2011 and in unlicensed solar power plants since 2013 have played a very effective role in this context.

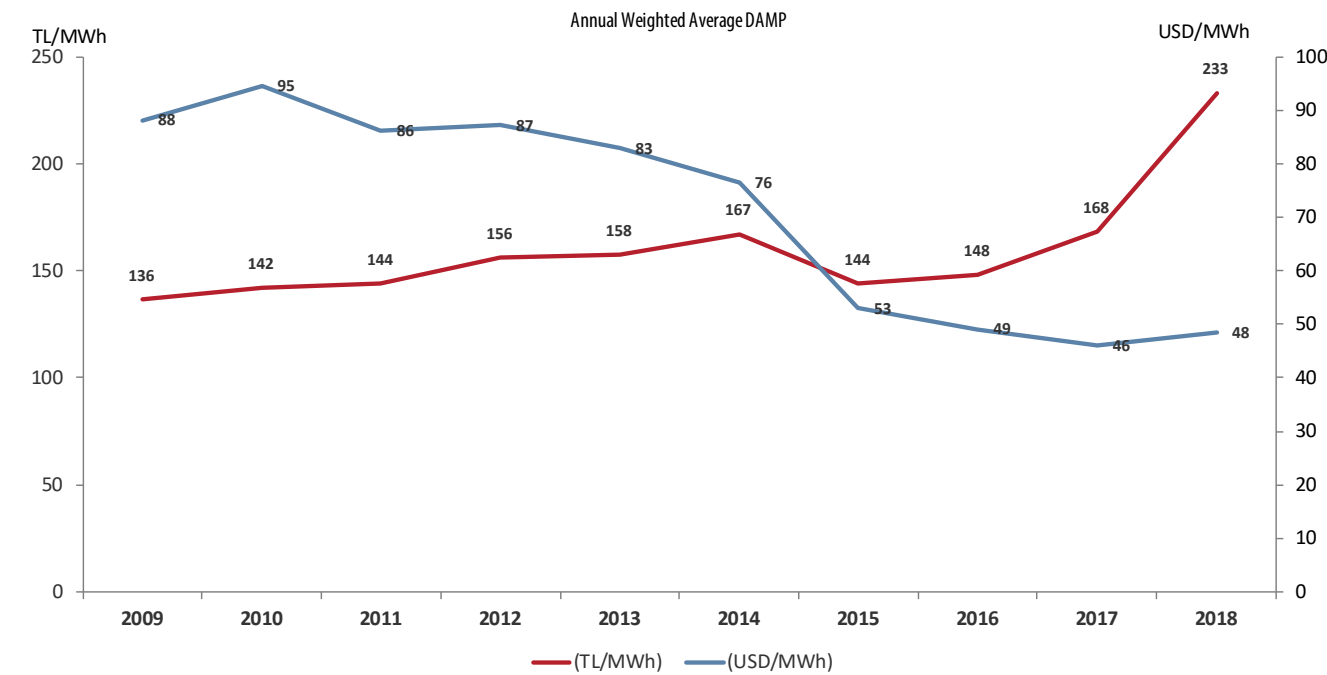
Electricity Demand



Source: TEİAŞ, TSKB Economic Research

Turkey's electricity demand has grown approximately 2.4 - fold in the last 19 years, falling only in two years during this period - 2001 and 2009, when Turkey faced the negative effects of economic crisis. Electricity demand grows in direct proportion to the increase in population and is also related to economic activity. Turkey's electricity demand increased by a mere 1.1% YoY in 2018 due to the economic turmoil in the last four months of the year.

Electricity Prices



Source: EPIAŞ, CBRT, TSKB Economic Research

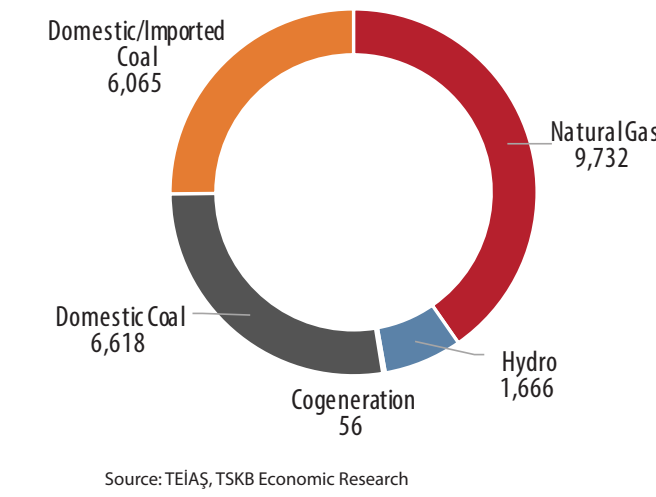
Due to low rainfall in 2014 and 2017, the share of electricity generated by hydroelectric power plants (HEPP) decreased, and thus the rate of generation from natural gas power plants increased. With the increase in the share of natural gas power plants, market prices moved upwards as the electricity was generated from more expensive resources. With the depreciation of the Turkish lira against the US dollar since 2014, electricity prices have experienced a significant decline in US dollar terms.

Capacity Mechanism

The capacity mechanism, which was introduced in 2018, was implemented for supply security in the electricity market. Monthly budgets were determined within the scope of Electricity Market Capacity Mechanism Regulation and payments were made depending on their generation. In 2018, a budget of 1.4 billion TL was allocated and this entire budget was distributed to the related power plants.

Source	Incentive Amount (TL/MW)
Domestic Coal	107,301
Natural Gas	75,416
Imported Coal	3,986

In 2019, with the regulation published on November 10, 2018, hydroelectric power plants which meet the criteria defined in the same regulation were added to the list of power plants that will benefit from the capacity mechanism. The budget for 2019 has also been increased to 2 billion TL. Currently (as of 2019), a total of 43 power plants are benefitting from the capacity mechanism. The 2019 list consists of natural gas fired power plants with a total generation capacity of 9,732 MW, domestic coal fired power plants with a total generation capacity of 6,618 MW for, domestic / imported coal –fired power plants with a total capacity of 6,065 MW and hydroelectric power plants with a total capacity of 1,666 MW.

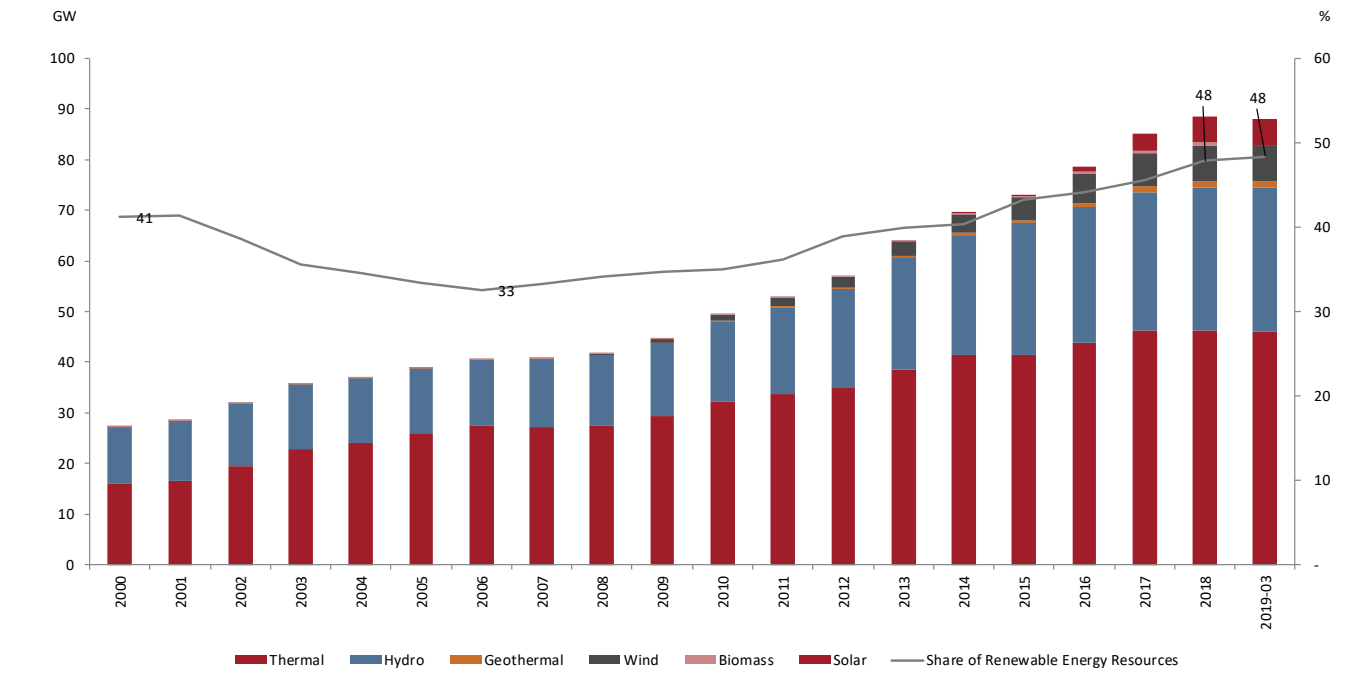


Source: TEİAŞ, TSKB Economic Research



Renewable Energy Sector

Turkey's total installed generation capacity has always increased over the years. The share of renewable energy in total installed capacity has varied between 30% and 50% in the last 30 years. The private sector's rising share in total installed capacity has mainly been driven by renewable energy investments. In particular, the rapid increase in the installed capacities of wind and unlicensed solar power plants contributed to the rise in the share of renewable energy resources to 48% in 2018.



Source: TEİAŞ, TSKB Economic Research

The price and purchase guarantee was determined to be valid for the plants already in operation or which would be operational by the end of 2015. Later in 2013, the feed-in tariff mechanism was extended to the end of 2020 with a published amendment in the regulation. Where domestic equipment is used in the licensed generation facility, the guaranteed purchase prices defined in the Annex-II Rule Law is added to the standard purchase guarantee in a manner to be applied for the first five years after the commissioning date.

Facility Type	Guaranteed Price (USD cent/kWh)	Maximum Additional Domestic Equipment Incentive (USD cent/kWh)
Hydro	7.3	2.3
Wind	7.3	3.7
Geothermal	10.5	2.7
Biomass/Biogas	13.3	5.6
Solar (PV – Photovoltaic)	13.3	6.7
Solar (Concentrated)	13.3	9.2

Source: MENR, EMRA, TSKB Economic Research