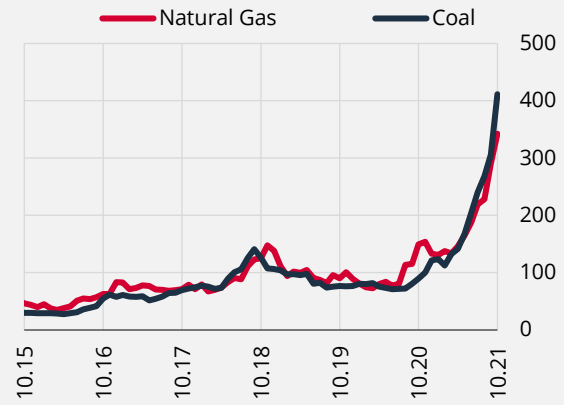
Box 2.3

Recent Developments in Electricity Market

International energy prices rose significantly in 2021 with the recovery in global demand. Sharp increases in international oil, natural gas and coal prices are important in terms of producer and consumer inflation, especially for energy importing countries. This box presents an evaluation of the effects of recent international commodity prices and developments in electricity generation structure on domestic electricity prices.

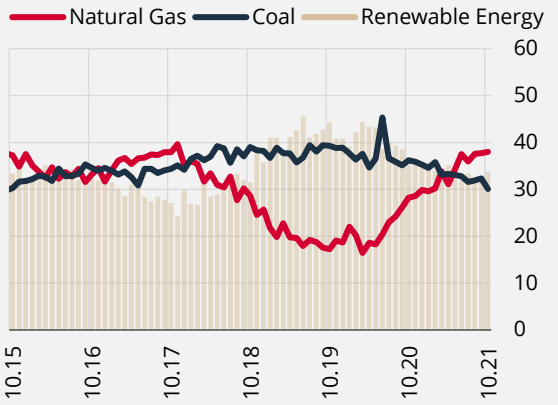
Developments in international energy prices directly affect the cost of electricity generation. The considerable share of import dependent sectors in the distribution of electricity generation by source makes electricity prices highly sensitive to international energy prices and exchange rates. Natural gas and coal prices, whose share in electricity generation reached approximately 70% in September 2021, increased significantly throughout the year (Chart 1).

Chart 1: International Natural Gas and Coal Prices (TRY, 2018 = 100)



Source: Bloomberg, CBRT.

Chart 2: Share of Electricity Generation by Source (%, Seasonally Adjusted)



Source: Energy Exchange Istanbul (EXIST).

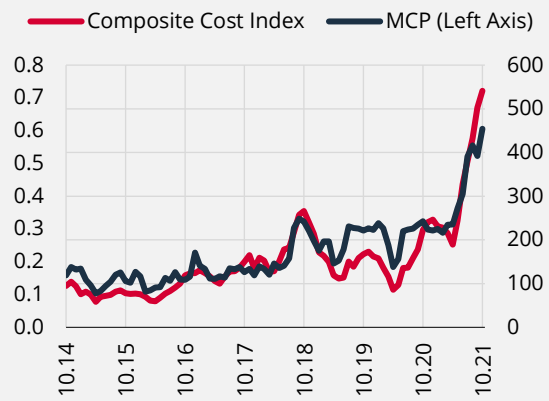
In addition to the course of international prices, changes in the generation structure can also have an impact on electricity generation costs. The variety of the sources that drives electricity generation, such as natural gas, coal, hydraulic, wind, etc. causes variation of unit production costs based on the composition of production (Chart 2). The share of renewable energy sources accounting for a significant part of the total, especially through hydroelectric production, can affect the cost structure, and therefore prices. A decrease in the share of renewable energy due to factors such as drought and weather conditions leads to a tendency towards resources such as natural gas and imported coal. As a matter of fact, the share of electricity generated from hydraulic sources in the third quarter of 2021 decreased compared to the average of previous years, while the share of natural gas reached around 40% (Table 1).

Table 1: Share of Electricity Generation by Source (%)

	Dammed Hydro and River	Natural Gas	Lignite	Imported Coal	Wind	Other
Average of 3rd Quarters (2015-2020)	22.3	32.5	13.5	19.7	7.0	5.0
3rd Quarter, 2021	14.6	39.3	12.9	17.0	10.3	5.9

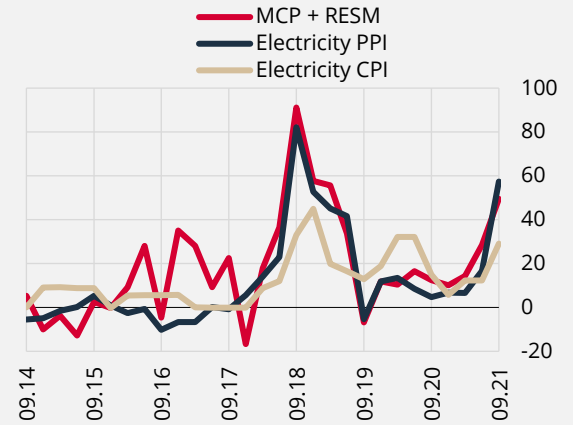
The significant decrease in the share of renewable resources in production in 2021, together with the increase in international energy commodity prices in TL, have made cost developments a significant pressure factor for recent electricity prices. As a matter of fact, the composite cost index, obtained by weighting the international natural gas and coal prices in TL, and domestically produced lignite (D-PPI) prices by the shares of these sources in electricity generation, is close to market prices (Chart 3). The Market Clearing Price (MCP)[1], which is the reference price for electricity prices, has recently posted significant increases in tandem with the rise in costs. In addition to the cost-side effects, the increase in electricity consumption above seasonal norms in the third quarter of 2021 also puts additional pressure on the MCP. Evaluated together with the Renewable Energy Support Mechanism (RESM)[2] unit costs, the developments in the Market Clearing Price seem to play an important role in electricity producer and consumer prices (Chart 4). Particularly in recent years, the pass-through from the sum of MCP and RESM costs to electricity producer prices, which affects industrial electricity costs, has been close to one-to-one.

Chart 3: Market Clearing Price (MCP, TRY/kWh) **and Natural Gas-Coal Composite Cost Index** (2014 = 100)



Source: Bloomberg, CBRT, EXIST.

Chart 4: Market Clearing Price, PPI and CPI Electricity Prices (Annual % Change)



Source: EXIST, TURKSTAT.

Developments in electricity prices affect inflation directly and indirectly. A 10% increase in electricity prices has a direct impact on consumer inflation by 0.27 points. Additionally, developments in electricity prices also affect producer prices through the production costs, and are indirectly reflected in consumer prices. Ertuğ and Özmen (2020) estimated vector auto-regressive regression (VAR) models to measure the extent of indirect effects. Their findings indicate that the indirect effect of a 10% increase in D-PPI electricity prices on consumer inflation is around 0.15 (0.12-0.16) points.

As a result, the course of international energy prices, which is affected by the pandemic-led supply-demand mismatch, and developments in the domestic production composition due to climatic conditions play an important role in electricity prices.

References

Ertuğ, D. & Özmen, M.U. (2020). "Indirect Effects of Electricity and Natural Gas Price Increases on Consumer Prices", CBRT Blog.

[1] MCP is the hourly electricity price that is determined by the offers in the electricity market within Energy Exchange Istanbul (EXIST) according to supply and demand.
[2] RESM is a support mechanism implemented to promote generation of electrical energy based on renewable energy sources.