ELECTRIC POWER IN RUSSIA [GRI 102–6]

Regulation

Russia currently operates a wholesale electricity and capacity market (WECM)[1] and a retail electricity and capacity markets in pricing and non-pricing zones. A regulated market has been set up in the non-pricing zones. Two types of products are traded on the wholesale market – electricity and capacity. Capacity is a special product whose purchase grants a wholesale market player the right to demand that the capacity seller ensure the availability of generating equipment to produce electricity of a specific quality in the amount required to meet said player's electric power needs.

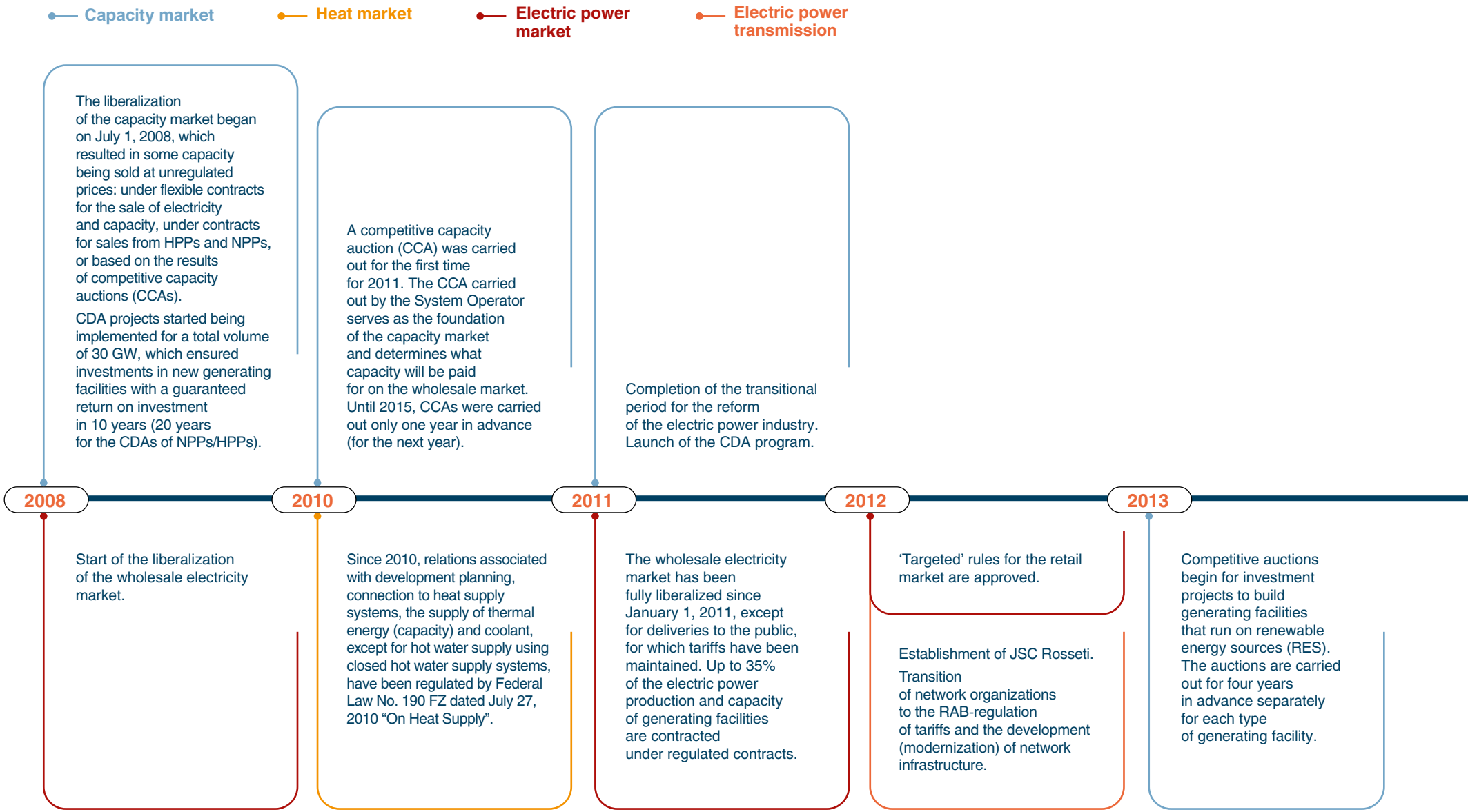
On the Russian electricity and capacity market, Inter RAO trades electric power and capacity on the WECM using regulated contracts and also at unregulated (flexible) prices. The price of electric power on the market is determined by the competitive selection of price bids from buyers and suppliers conducted a day before the start of delivery. In addition, in order to ensure a balance in the production and consumption of electric power, prices are also determined by the competitive selection of applications from suppliers and participants with regulated consumption that are conducted no later than one hour before the delivery of the electric power (balancing market).

The market price for capacity is based on a competitive capacity auction (CCA) that is conducted according to pricing zones based on the model of elastic demand. Payment must be made regardless of the results of CCAs for capacity provided under CDAs, contracts with new NPPs and HPPs that are similar to CDAs, contracts for the provision of capacity by qualified generating facilities that run on renewable energy sources, sale and purchase (supply) contracts for the capacity of modernized generating facilities as well as generating facilities whose operation is essential to maintaining the operating schedules of the power system or the supply of thermal power (mandated generators).

These market segments operate using the unified computing model of the Unified Energy System of Russia (UES of Russia). Calculations of the physical and cost indicators of trade operations by players on the electric power and capacity market are carried out by a number of infrastructure organizations: JSC SO UES, JSC ATS, JSC CFR, and PJSC FGC UES).

Major regulatory and structural changes have occurred in the Russian electric power industry over the ten years that Inter RAO has been implementing its Strategy. During this period, the liberalization of the wholesale electricity market was completed (with the exception of deliveries to the public) and the mechanism of capacity delivery agreements (CDAs) was introduced, which secured investments for the construction of 30 GW of new heat generating capacity and mechanisms for the development and modernization of network infrastructure.

[1] The principles used for the functioning of the wholesale market are determined by the Rules for the Wholesale Electric Power and Capacity Market approved by Resolution No. 1172 of the Government of the Russian Federation dated December 27, 2010.


Capacity market
Heat market
Electric power market
Electric power transmission
The liberalization of the capacity market began on July 1, 2008, which resulted in some capacity being sold at unregulated prices: under flexible contracts for the sale of electricity and capacity, under contracts for sales from HPPs and NPPs, or based on the results of competitive capacity auctions (CCAs).
CDA projects started being implemented for a total volume of 30 GW, which ensured investments in new generating facilities with a guaranteed return on investment in 10 years (20 years for the CDAs of NPPs/HPPs).
A competitive capacity auction (CCA) was carried out for the first time for 2011. The CCA carried out by the System Operator serves as the foundation of the capacity market and determines what capacity will be paid for on the wholesale market. Until 2015, CCAs were carried out only one year in advance (for the next year).
Completion of the transitional period for the reform of the electric power industry. Launch of the CDA program.
2008
2010
2011
2012
2013
Start of the liberalization of the wholesale electricity market.
Since 2010, relations associated with development planning, connection to heat supply systems, the supply of thermal energy (capacity) and coolant, except for hot water supply using closed hot water supply systems, have been regulated by Federal Law No. 190 FZ dated July 27, 2010 “On Heat Supply”.
The wholesale electricity market has been fully liberalized since January 1, 2011, except for deliveries to the public, for which tariffs have been maintained. Up to 35% of the electric power production and capacity of generating facilities are contracted under regulated contracts.
‘Targeted’ rules for the retail market are approved.
Establishment of JSC Rosseti.
Transition of network organizations to the RAB-regulation of tariffs and the development (modernization) of network infrastructure.
Competitive auctions begin for investment projects to build generating facilities that run on renewable energy sources (RES). The auctions are carried out for four years in advance separately for each type of generating facility.

2015

Starting from 2016, capacity is annually auctioned for the year starting three calendar years after the year of the CCA.

The first long-term competitive auction for capacity is carried out based on the model of elastic demand with the supply period starting from 2017, 2018, and 2019.

The list of thermal power plants to be built in the Kaliningrad Region is approved.

Capacity starts being delivered for the first RES facility.

2017

Since 2017, competitive auctions have been carried out for investment projects to build generating facilities that run on production and consumption waste (municipal solid waste).

The Republic of Buryatia is included in the list of territories where all electricity and capacity is sold at tariffs under regulated contracts (RC) (the Republics of Dagestan, Ingushetia, North Ossetia-Alania, Tuva, Chechnya, Kabardino-Balkaria, and Karachay-Cherkessia had previously been included in the list of zones with special wholesale market operation).
The Republic of Karelia was later assigned to the special regions in 2018.

Amendments were made to the Federal Law "On Heat Supply" to make it possible to classify settlements and urban districts as heat supply pricing zones with regulated relations for the supply of heat energy using the 'alternative boiler house' method (maximum price level for thermal power).

2018

Since January, fines for the short supply of capacity are calculated using a differentiation ratio that directly depends on the demand and reliability factors of generating equipment of companies working on the wholesale electricity market.

A CCA is held for the construction of new energy facilities on the Taman Peninsula.

Since January 1, 2018, price regulation was fully discontinued for thermal power (capacity) as steam and coolant in the form of steam as well as for thermal power (capacity) and coolant supplied by a heat supply organization to the individual collectors of consumers. This liberalization in regulation does not affect relations associated with the supply of thermal power (coolant) for the public and equivalent categories of consumers.

2019

Resolution No. 43 of the Government of the Russian Federation dated January 25, 2019 approved the parameters of the National Program for the Modernization of the Generating Facilities of Thermal Power Plants.

April – initial selection of projects for the modernization of thermal generation facilities for the three-year period of 2022-2024.

August – a long-term CCA was held to determine the price of capacity for existing power plants for the period of 2022-2024.

September – facilities to be modernized were selected with the start of capacity supply in 2025.

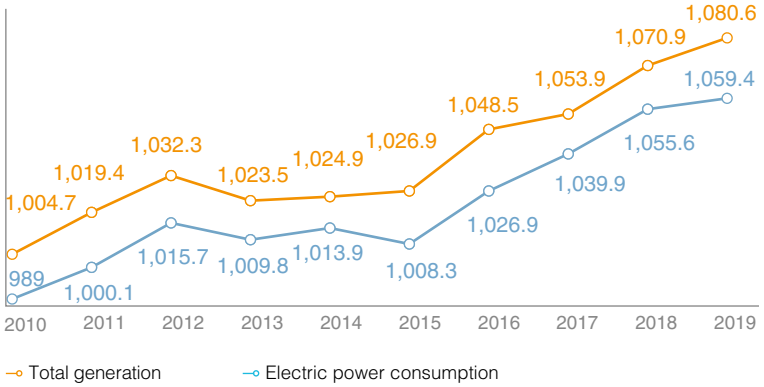
2020

Starting from 2020, a transition to long-term CCAs for a year is envisaged starting five calendar years after the year of the CCA.

Russian electric power industry indicators

Electricity consumption and generation in the Unified Energy System of Russia has been growing steadily over the past ten years. Compared with 2018, production increased by 0.9% in 2019 to almost 1,081 bln kWh, while consumption grew by 0.4% to just over 1,059 bln kWh.

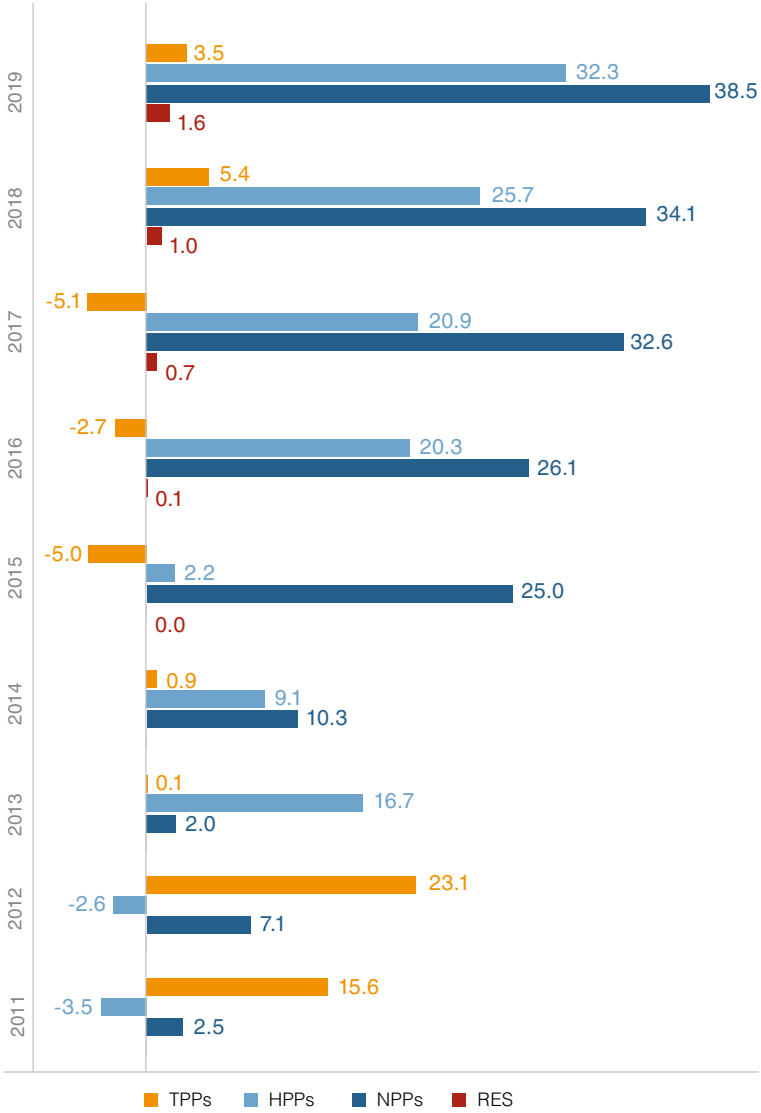
Electricity generation and consumption, bln kWh



Source: Reports on the operation of the UES of System Operator

Despite the large-scale program for the construction of new facilities (CDA projects), the volume of electricity generated by thermal power plants has not increased significantly over the last decade (an increase of 3.5 bln kWh in 2019 compared with 2010). This is due to the substantial decommissioning of the obsolete facilities of TPPs as well as reduced production at inefficient TPPs. The biggest increase in production has been seen at NPPs and HPPs. Solar and wind power plants have also demonstrated a significant increase in the last three years.

Change in the volume of electric power generated at various types of power plants vs. 2010, bln kWh



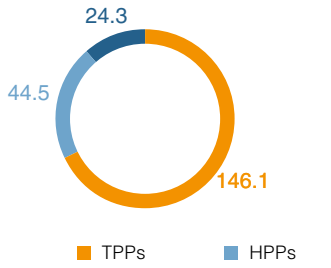
Source: Reports on the operation of the UES of System Operator

The power plants of the UES of Russia had installed capacity of 246,342.5 MW as of the end of 2019.

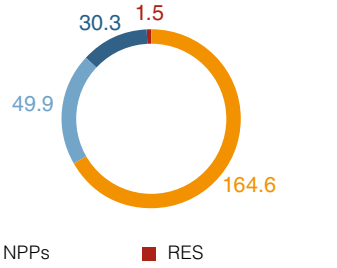
Over the period of the CDA program, over 36 GW of new capacity has been commissioned in Russia, including roughly 30 GW of thermal generating capacity. This has made it possible to decommission a number of obsolete facilities. In particular, more than 18 GW have been taken out of service since 2010.

Nevertheless, the problem of aging facilities remains relevant in the Russian energy sector. The average age of generating equipment at Russian power plants is more than 34 years, while over 30% of equipment is older than 45 years. The facilities modernization program aims to solve the problem of obsolete facilities.

Installed capacity as of December 31, 2010, GW

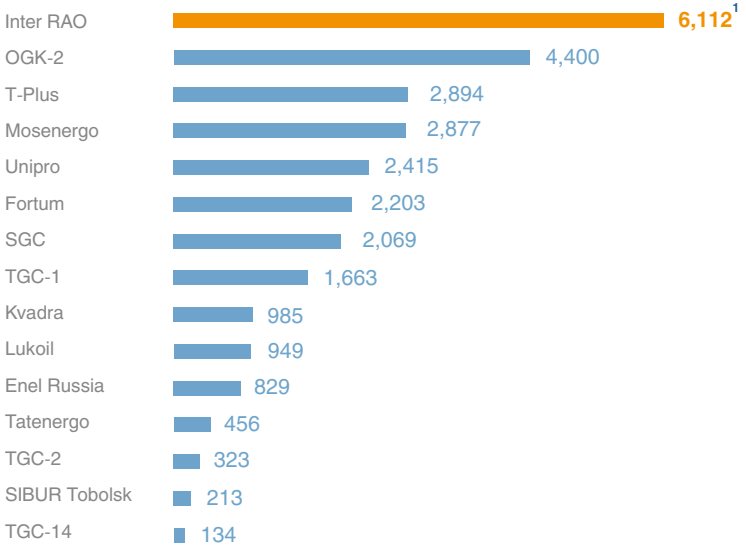


Installed capacity as of December 31, 2019, GW

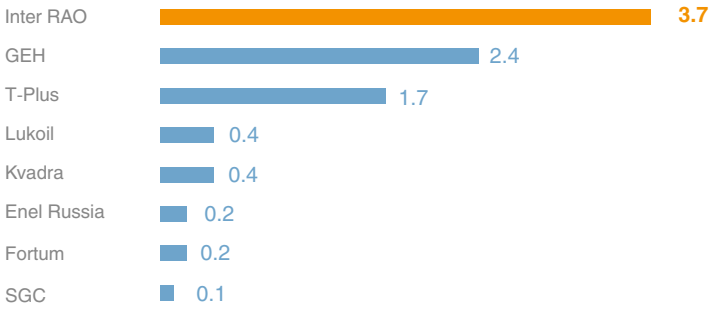


Source: System Operator

Commissioning of new CDA facilities, MW



Decommissioning of facilities since 2011, GW



Sources: System Operator, company data

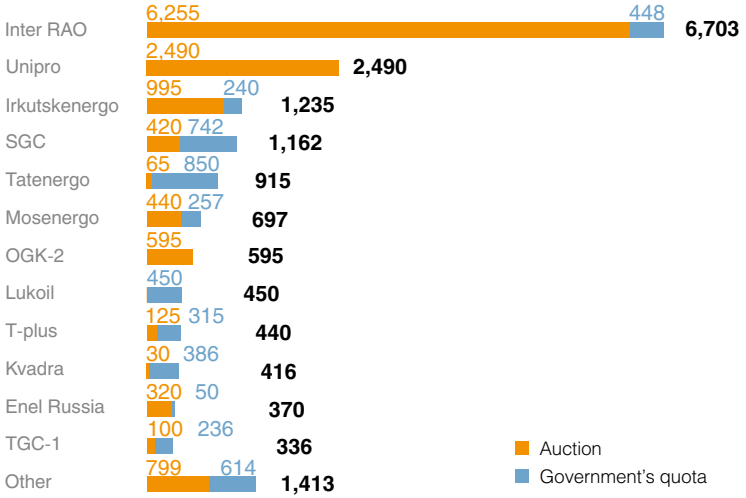
[1] Including re-marking.

Modernization program

In January 2019, the Russian Government approved a TPP modernization program for the period until 2031 to commission up to 41 GW of capacity, which is expected to attract RUB 1.9 trillion in private investment to the industry within ten years. Projects included in the TPP modernization program have a guaranteed return on investment of 15 years due to a special capacity tariff. As part of the TPP modernization program, 4 GW are to be selected annually: 85% of the annual volume for the total competitive selection where projects compete in terms of price, while another 15% are selected according to a special quota by a government commission in charge of developing the electric power industry.

In April 2019, 30 projects with total capacity of 8.61 GW were selected as part of the first three-year competitive auction for 2022-2024. Based on the government commission's quota, another 15 projects for 1.78 GW were selected in May 2019. In September 2019, 25 projects with total capacity of 4.02 GW were selected as part of the second competitive auction for 2025. According to the government commission's quota, another 16 projects for 2.81 GW were selected in February 2020. The modernization program for 2022-2025 added a total of 17.2 GW of capacity.

Facility modernization program for 2022–2025, MW



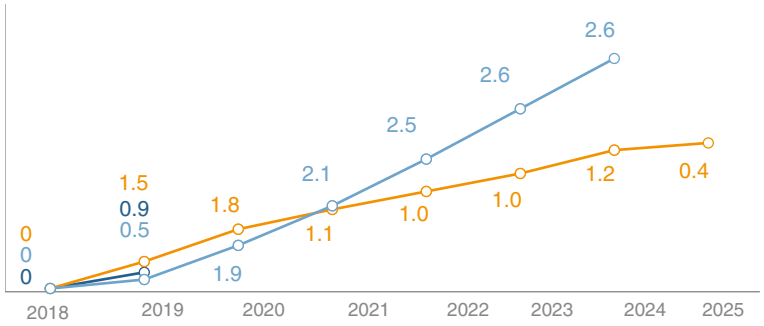
Industry trends and forecasts

In accordance with the Forecast for Russia's Socioeconomic Development until 2024 prepared by the Ministry of Economic Development, electricity consumption in 2024 is expected to increase to around 1,179 bln kWh, while generation is projected to total 1,193 bln kWh. TPPs will continue to bear the main load and are expected to increase electricity production by 10.4% in 2024 compared with 2019. The share of TPPs in the overall structure of electricity generation will increase to 65.9%, while the share of NPPs and HPPs will decrease to 16.9% and 16.3%, respectively.

The Plan and Program for the Development of the Unified Energy System of Russia for 2019-2025 approved by the Russian Ministry of Energy estimates that demand for electric power in the Unified Energy System of Russia in 2024 will amount to 1,139 bln kWh, while demand for electricity production is projected to be 1,153 bln kWh. The most significant factor in the increase in electricity consumption is expected to be the accession of the Western and Central Energy Districts of the Republic of Sakha (Yakutia) to the UES of the East.

Given the high level of dependence of energy consumption in the domestic market on temperatures, fluctuations in the rates of production and consumption may occur depending on temperature deviations from the mean annual values.

Forecast for increased electricity generation in the UES of Russia, %

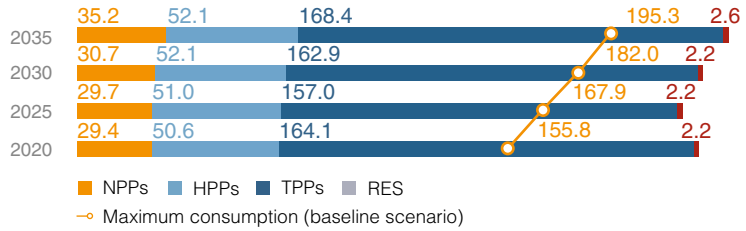


Sources: System Operator, Ministry of Economic Development, Ministry of Energy

A description of the future power and electricity balances across the UES of Russia is provided in the General Plan for the Siting of Electric Power Facilities until 2035, which was approved by the Government of the Russian Federation in 2017. Two scenarios for the long-term forecast are given in the document: a baseline scenario that envisages an average annual growth rate in electricity consumption of 1.3%, and a minimal scenario with a 1% growth rate in electricity consumption. The increase in electricity demand in 2035 under the baseline scenario is roughly 24% compared with 2020, while the minimum increase in demand is projected at 20%.

TPPs will handle the bulk of electricity demand in the period in question. The share of TPPs in the structure of electricity production will remain at 66%, the share of NPPs will be about 18%, the share of HPPs will be about 15%, and the share of renewable energy sources will be no more than 0.5%. **[EU10]**

Expected maximum consumption and planned capacity by generation mode in the UES of Russia, mln kW



Source: General Plan for the Siting of Electric Power Facilities until 2035

Given that the rate of change in the installed capacity of generating facilities lags behind the rate of growth in energy consumption, capacity utilization will have to be increased to cover the demand for electricity. Thermal power generation facilities will see the biggest increase in the overall load. In particular, depending on the forecast scenario, the average installed capacity utilization factor of TPPs is projected to be around 45–46% in 2020 and increase to 60% by 2035. Also, under both scenarios, electricity generated at CHPPs slightly predominates in the generation structure of all thermal power plants.

Price and tariff forecast

In accordance with the Forecast for Russia's Socioeconomic Development until 2024, the indexation of electricity tariffs for the public will remain at 5.0% annually in order to reduce the amount of cross-subsidization. The change in unregulated prices for end consumers, except for the public, on the retail market will average 5.6% in 2020 and will not exceed the target inflation parameters contained in the scenario in the period of 2021-2024 and will range from 2.9% to 3.5%.