

LONG-TERM INVESTMENT PROGRAMME

PARAMETERS OF THE COMPANY'S LONG-TERM INVESTMENT PROGRAMME FOR 2023–2027¹

Indicators	Period						
	2021 (actual)	2022 (actual)	2023 (plan)	2024 (plan)	2025 (plan)	2026 (plan)	2027 (plan)
Financing (RUB mn)	7,215	12,076	11,466	5,705	6,044	6,279	6,499
Assimilation of capital investments (RUB mn)	5,871	11,469	8,045	5,160	4,639	5,835	4,480
Commissioning as a part of fixed assets (RUB mn)	5,128	8,634	11,925	4,196	4,933	4,816	6,546
Commissioning as a part of transformer capacities (MVA)	220	579	476	144	64	154	373
Commissioning as a part of power transmission lines (km)	612	1,069	726	451	509	493	907

The primary focus of the Rosseti Kuban's long-term investment programme will be on renovation, upgrading and retrofitting of power grids.

CAPITAL CONSTRUCTION QUALITY CONTROL

Construction oversight is enforced by Decree No. 468 of the Government of the Russian Federation on the procedure for construction oversight during construction, renovation and overhaul of capital construction facilities dated 21 June 2010. Its aim is to check the compliance of work fulfilled during

the construction, renovation and overhaul of capital construction facilities with the requirements of project design documents, technical regulations, land plot development plan and engineering survey results.

Independent expert and inspection entities were involved in the construction oversight at seven facilities with a voltage of 35 kV and above, where construction and installation operations were carried out in 2022.

KEY INVESTMENT PROJECTS WITH COMPLETED CONSTRUCTION IN 2022

Facility	Construction period		Capacity commissioned		Investment amount (RUB mn, excl. VAT)
	start	end	km	MVA	
Renovation of the 110/35/10 kV Pochtovaya substation. Replacement of two 10 MVA T-1 and T-2 transformers with two 40 MVA transformers	2016	2022	0	80	473.2
Renovation of the 110/35/10/6 kV Cheremushki substation, including replacement of the 2.5 MVA T-3 transformer with 25 MVA transformer and installation of the 25 MVA T-4 transformer	2020	2022	0	50	569.8
Renovation of the 35/10 kV Kombizavod substation with replacement of two 2.5 MVA transformers by two 6.3 MVA transformers	2016	2022	0	12.6	171.1
Renovation of the 35/10 kV Sadovaya substation with installation of a 10 MVA T-2 transformer and construction of a incoming 35 kV overhead line with changes in the substation's connection to the grid	2020	2022	2.03	10	269.4
Renovation of the 35/10 kV Tul'skaya substation, with replacement of two 4 MVA transformers with two 10 MVA transformers	2020	2022	0	20	127.0
Renovation of the 110/35/10/6 kV Severnaya substation, including replacement of the 4 MVA T-3 transformer with 25 MVA transformer and installation of the 25 MVA T-4 transformer	2022	2022	0.27	50	476.0
Renovation of the 35/10 kV Enem substation, with replacement of two 5.6 MVA transformers with two 10 MVA transformers	2016	2022	0	20	245.6

¹ Plans for the long-term investment programme of Rosseti Kuban, PJSC were approved by Order No. 19@ of the Ministry of Energy of Russia dated 10 November 2022.

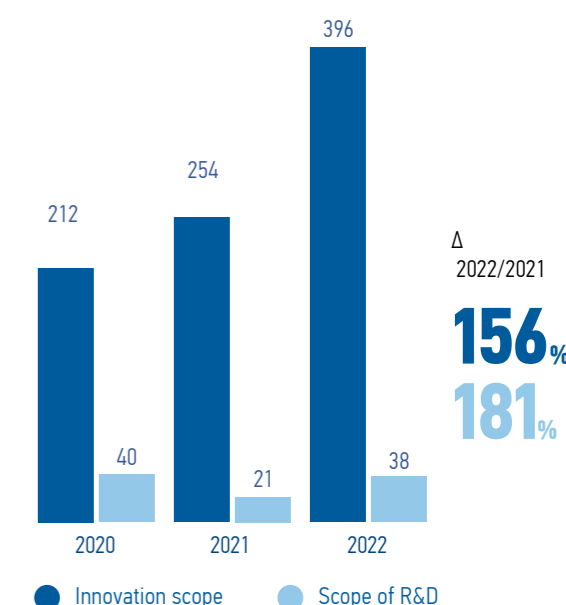
INNOVATIVE ACTIVITIES

The Company's Board of Directors designated innovative development along with the supervisory follow-up of the existing Innovative Development Programme as the priority area of the Company's activities on 30 March 2021 (Minutes No. 426/2021).

Key areas of the Innovative Development Programme for 2020–2024, with an outlook until 2030 approved by the Board of Directors of Rosseti Kuban on 13 October 2021 (Minutes No. 450/2021):

- Transition to smart 35–110 (220) kV substations
- Transition to smart grids with a distributed intellectual automation and control system
- Transition to integrated business process efficiency and automation of control systems
- Application of advanced technology solutions and materials in power engineering
- Promotion of an innovative development management system and shaping of an innovative infrastructure

KEY INDICATORS FOR INNOVATION ACTIVITIES OVER 2020–2022 (RUB MN)



COMPANY'S MAIN INNOVATIVE PROJECTS IMPLEMENTED IN 2022



Creation of a smart metering system in the branches of Rosseti Kuban

Project implementation

Implementation timeframe: 2020–2030

In the reporting year, innovative smart electricity meters were installed in all branches of the Company.

Smart meters are introduced across the Company within the framework of the Rosseti Kuban's Investment Programme to create a metering system as required by Federal Law No. 522-FZ dated 27 December 2018 On Amendments to Certain Legislative Acts of the Russian Federation in Connection with the Development of Electricity (Capacity) Metering Systems in the Russian Federation. In the reporting year, smart meters also were installed during the grid connection of new consumers of a capacity of up to 15 kW.

The project aims to create a smart metering system and integrate it into the innovative systems being established: supervisory control and data acquisition system (SCADA), distribution management systems (DMS), and outage management systems (OMS).

The expected effect:

- Reduced operating costs by remotely taking readings and parameters of electricity supply to electricity consumers
- Possibility of remote restriction and restoration of power supply to electricity consumers



Development of Rosseti Kuban's production asset management system (PAMS)

Project implementation

In the reporting year, the PAMS Development Plan and its Resource Plan for 2022–2024 were approved.

The expected effects:

- Increased efficiency of staff time utilisation in real time
- Improvement of operational processes, integrated processing of available data in different automated systems in the process of production asset management, expansion of the functionality of the systems

- Upgraded control over the creation of production programmes by making baseline data available, on the basis of which the type of technical intervention (maintenance and repair/maintenance and renovation) is chosen
- Higher transparency of the Company's activities, access to information at all management levels of power grid facilities

COMPANY'S SPENDING ON INNOVATIVE DEVELOPMENT

COSTS IN THE MAIN AREAS OF INNOVATIVE DEVELOPMENT IN 2020–2022 (RUB MN, EXCL. VAT)

Innovative development focus areas	2020 actual	2021 actual	2022 plan	2022 actual
Transition to smart 35–110 (220) kV substations	29.30	0.00	0.0	0.0
Transition to digital smart grids with a distributed intellectual automation and control system	180.15	229.1	300.8	392.5
Transition to integrated business process efficiency and automation of control systems	0.00	13.4	9.0	3.8
Application of advanced technology solutions and materials in power engineering	2.32	11.4	7.39	0.0
Promotion of an innovative development management system and shaping of an innovative infrastructure	0.64	4.2	0.5	0.5

RESEARCH AND DEVELOPMENT



Among other things, the Company's Innovative Development Programme focuses on research and development (R&D) meant to promote cutting-edge technologies to create fundamentally novel methods, as well as applied research meant to improve the existing technologies.

The design of four R&D projects was completed in 2020–2022. In 2022, phases of four R&D projects were accepted.

R&D RESULTS IN 2022



Transition to smart 35–110 (220) kV substations

R&D description	Technical result
Development of a unified IoT platform ¹ for dispatching substation equipment status data	<p>Implementation timeframe: 2021–2023</p> <ul style="list-style-type: none"> • Design and software documentation for a prototype of a unified IoT platform for dispatching of substation equipment status data was developed • A prototype of a unified IoT platform for dispatching of substation equipment status data was manufactured and is ready for testing in the laboratory • Test programme and procedure were developed, taking into account issues of electromagnetic compatibility and cybersecurity • Draft specifications for a unified IoT platform for dispatching of substation equipment status data were developed • Operational documentation for a unified IoT platform for dispatching of substation equipment status data was developed



Transition to integrated business process efficiency and automation of control systems

R&D description	Technical result
Study of the increment rate of key forest-forming tree species depending on climatic zones and soil quality along the right-of-ways of operating overhead lines with the preparation of regional maps for regular clearing of overhead line forest corridors and provision of recommendations on technique of works	<p>Implementation timeframe: 2020–2022</p> <ul style="list-style-type: none"> • Regional geo-information databases (digital layers) were developed to characterise the required frequency of clearing overhead line forest corridors from tree and shrubs • Recommendations on the frequency and methods of clearing overhead line forest corridors were developed • Geo-information databases (digital layers) were developed and prepared for integration into the information support of Rosseti's regulatory and reference information, the unified geoinformation system of Rosseti and regional centres of Rosseti Kuban's geoinformation system • Proposals for the creation of an information system for the annual monitoring of overgrowth and clearing of overhead line forest corridors from trees and shrubs
Development of a software package for the assessment and prediction of the technical condition and propagation of defects in 35–110 kV power transformers based on measurements performed by the automated monitoring and diagnostics system, as well as PAMS data, with the provision of relevant recommendations to operating personnel	<p>Implementation timeframe: 2021–2022</p> <ul style="list-style-type: none"> • Pilot testing was carried out, accumulating the necessary amount of data for model training: the forecasting software is now in a trusted mode of operation • The forecasting software package was finalised based on the pilot testing results, in line with suggestions
Automated classification of accidents based on machine learning methods	<p>Implementation timeframe: 2021–2023</p> <ul style="list-style-type: none"> • Set of machine learning algorithms is identified that meets the previously-defined criteria for the analysis of the prepared dataset and classification • Machine learning algorithms were trained and validated, with accuracy evaluation • Control procedures were described and implemented during validation • Algorithms that show the best results (and meet the functional and technical requirements) are generated

In 2020–2022, four copyright protection documents were obtained: two state registration certificates for a computer programme, one state registration certificate for a database and one patent for an invention. Three licensing agreements were signed for R&D results, and two R&D results were implemented in the production activities of Rosseti Kuban.

¹ IoT means Internet of Things, a set of physical objects that are connected to the Internet and exchanging data. An IoT platform is a software designed to connect the Internet of Things (sensors, controllers and other devices) to the cloud and access them remotely. It is a mediator between the hardware level (sensor level) and the application level.