


INNOVATIVE ACTIVITIES


On 30 March 2021, 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 activities¹.


Key areas of the current Innovative Development Programme for 2020–2024 with an outlook to 2030²:

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Transition to smart 35–110 (220) kV substations
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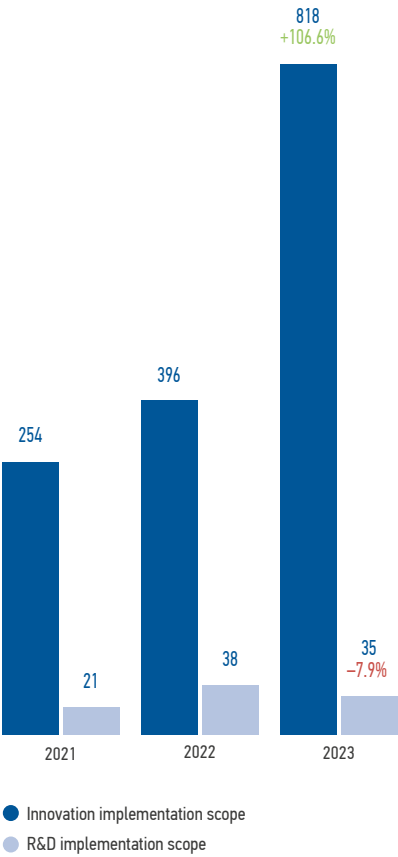
Transition to smart grids with a distributed intellectual automation and control system
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Transition to integrated business process efficiency and automation of control systems
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Application of advanced 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 2021–2023 (RUB mln)



Company’s main innovative projects implemented in 2023

| Project | Project implementation |
|---|--|
| Creation of a smart metering system in the branches of Rosseti Kuban | <p>Implementation timeframe: 2020–2030</p> <p>In the reporting year, innovative smart electricity meters were installed in all branches of the Company.</p> <p>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.</p> <p>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).</p> <p>The expected effect:</p> <ul style="list-style-type: none">• 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) | <p>Implementation timeframe: 2022–2024</p> <p>The PAMS development plan for 2023 envisages the implementation of six activities related to the fine tuning of the PAMS in terms of process automation.</p> <p>Five activities were completed:</p> <ul style="list-style-type: none">• Automated planning of multi-year and annual schedules and reporting forms for diagnostic works subject to the requirements of the Company’s centralised executive documents regulating the Diagnostics processes• Automated rate setting of the Company’s emergency reserve, its acquisition, rotation, utilisation and replenishment in PAMS• Automated process of recording and analysing emergency outages at 35 kV and above substations and power lines in the PAMS• Creation of automated vehicle management systems• Automation of control action selection (maintenance and repair / retrofitting and renovation) <p>Work was started to automate the maintenance of the equipment repair schedule, taking into account the integration of the equipment repair schedule with the automated power equipment repair management system. Late implementation of this activity is due to the finalisation of the terms of reference related to the use of domestic software, including databases (Postgres Pro).</p> <p>In addition, the features of PAMS for maintenance and repair, retrofitting and renovation were finalised.</p> <p>The achieved effect from the PAMS Development Plan:</p> <ul style="list-style-type: none">• 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 |

¹ Minutes No. 426/2021 dated 2 April 2021.
² Approved by the decision of the Board of Directors of Rosseti Kuban, PJSC dated 13 October 2021 (Minutes No. 450/2021 dated 15 October 2021).

| Project | Project implementation |
|--|--|
| Introduction of innovative wire for construction of Novaya-Zapadnaya-2 110 kV transmission line, I circuit with branch lines, Novaya-Zapadnaya-2 110 kV transmission line, II circuit with branch lines to Turgenevskaya substation | Implementation timeframe: 2021–2023 In 2023, Introduction of innovative wire for construction of Novaya-Zapadnaya-2 110 kV transmission line, I circuit with branch lines, Novaya-Zapadnaya-2.110 kV transmission line, II circuit with branch lines to Turgenevskaya substation involved scheduled construction and installation works to introduce innovative high-temperature steel-aluminium wire of domestic production, manufactured by plastic deformation method |



Costs in the main areas of innovative development in 2021–2023 (RUB mln (excl. VAT))

| Innovative development focus area | 2021 | 2022 | 2023 (plan) | 2023 (actual) |
|--|-------|-------|-------------|---------------|
| Transition to smart 35–110 (220) kV substations | 0.0 | 0.0 | 0.0 | 0.0 |
| Transition to digital smart grids with a distributed intellectual automation and control system | 229.1 | 392.5 | 453.3 | 765.1 |
| Transition to integrated business process efficiency and automation of control systems | 13.4 | 3.8 | 64.1 | 36.2 |
| Application of advanced technology solutions and materials in power engineering | 11.4 | 0.0 | 13.7 | 16.3 |
| Promotion of an innovative development management system and shaping of an innovative infrastructure | 4.2 | 0.5 | 0.3 | 0.3 |



Research and Development

Five R&D projects have been finalised in 2021–2023. In 2023, phases of two R&D projects were accepted.



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.

R&D results in 2023

| R&D description | Technical result |
|--|--|
| Transition to smart 35–110 (220) kV substations Development of a unified IoT platform ¹ for dispatching substation equipment status data | Implementation timeframe: 2021–2023 Technical results received: <ul style="list-style-type: none">• The prototype was tested in laboratory conditions• Working documentation was developed for installation at the implementation site• Programme and methodology of pilot testing were developed• Programme and methodology for training of operating personnel at the implementation site was developed• A patent application was prepared• IoT platforms were delivered to the implementation sites, installation and commissioning works were carried out at the implementation sites• Pilot testing began• Operational staff of the implementation object was trained• Pilot testing was supported, and a report on pilot testing at the implementation site was prepared• Pilot testing was completed |
| Transition to integrated business process efficiency and automation of control systems Automated classification of accidents based on machine learning methods | Implementation timeframe: 2021–2023 Technical results: <ul style="list-style-type: none">• A server was delivered to deploy a prototype of the System software in the Customer’s infrastructure• System’s software was modified• Operational documentation was amended• Acceptance tests were carried out in accordance with the test programme and methodology• Documents for registration of intellectual property with the Federal Institute of Industrial Property (FIPS) were drafted• The scientific and technical article agreed with the Customer was drafted• A report and presentation to the Scientific and Technical Council were prepared |



In 2021–2023, three titles of protection were obtained: two certificates of state registration of a computer programme and one certificate of state registration of a database. During the above period,

five licence agreements were concluded for R&D results, and one R&D result was integrated into the production activities of Rosseti Kuban, PJSC.

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.