

Roadmap for Prospective Electric Power Industry Development in the Krasnodar Territory for 2021–2025 as approved by Decree of the Governor of Krasnodar Territory No. 98-p dated April 30, 2020.

Roadmap for Electric Power Industry Development in the Republic of Adygea for 2020–2024 as approved by the Head of the Republic of Adygea's Decree No. 89-rg dated April 30, 2020.

Pursuant to the Roadmaps, the Company shall focus on developing the most challenging parts of Kuban's grids (South-Western and Central) that direly need their grid infrastructure improved.

To better plan the development of its grids, efficiently utilize the existing grid capacity, increase the grid load, and cut the grid development costs, the Company is drafting its Comprehensive Program for the Development of Company's Grids for 2020–2024 and up to 2026.

In 2019, the Company entered into an agreement with Federal Research Center PJSC for the development of this Program. Currently, the Program has been developed for the second stage (for 2021–2025), it is being adjusted taking into account the remarks of Rosseti Kuban and Kuban RDO dispatching center (branch of SO UES, JSC).

On February 24, 2021, the materials of this Program were submitted to the executive authorities of Krasnodar Territory and the Republic of Adygea as source data for drafting and approval of the regional roadmaps in 2021.

Technological Development and Innovation

Technical Policy

THE COMPANY'S BOARD OF DIRECTORS APPROVED ROSSETI'S REGULATION ON THE UNIFIED TECHNICAL POLICY IN THE POWER GRID COMPLEX AS THE COMPANY'S INTERNAL DOCUMENT DATED DECEMBER 25, 2019 (MINUTES NO. 369/2019).

THIS UNIFIED TECHNICAL POLICY SETS FORTH A COMBINATION OF TARGETS, PRINCIPLES, AND EFFICIENT TECHNICAL, TECHNOLOGICAL, AND ORGANIZATIONAL REQUIREMENTS AND SOLUTIONS TO IMPROVE THE EFFICIENCY, RELIABILITY, SAFETY, AND COST-EFFECTIVENESS OF ELECTRICITY DELIVERY AND DISTRIBUTION SO AS TO PURSUE THE DEVELOPMENT STRATEGY OF THE POWER GRID COMPLEX OF THE RUSSIAN FEDERATION.

THE POLICY ALSO SEEKS TO ENABLE THE COMPANY TO OPERATE AND SOLVE ITS PROBLEMS UNDER THE DIGITAL TRANSFORMATION 2030 CONCEPT.

The Company's key and most important investment projects use the advanced cutting-edge solutions pursuant to Rosseti's State on Unified Technical Policy in the Power Grid Complex.



The Company's milestone project that relied on advanced solutions

Branch of Rosseti Kuban	Project name	Key Technical Parameters
Power Grids of Krasnodar	Construction of 110/10 kV Angarskaya SS with 110 kV overhead lines	Two 110/10 kV power transformers of 25 MVA each are installed. SF6 switchgear of 110 kV is used. The facility uses advanced information technology and control systems and tools (relay protection and automation (RPA) solutions, emergency control automatics, data acquisition and transmission system, automatic information and metering system for commercial electricity metering), which ensure the processes of information exchange between the substation elements and the information exchange of the substations with external systems, as well as the control of the substation itself in digital form based on the protocols of IEC 61850 ¹ standard. The main and backup digital data transmission channels from the substation were established on the domestic transport digital equipment NATEKS FOM-16E1, which in 2020 was put into trial use as part of a pilot implementation at the facilities of Rosseti Kuban and launched into commercial operation

Rosseti Kuban approved the list of grid standards. The list is updated annually, as well as when reviewing the existing or adopting new standards. The documents are publicly available on the server to the Company's employees,

Over the reporting year, the Company's units developed 17 standards that form a single system and set forth uniform equipment and process requirements.

Company's Standards Developed in 2020

Regulated aspect	Standard
Energy management	Regulations on the Interaction of Business Units Within the Energy Management System
Energy management	Guidelines for Energy Analysis
Energy management	Regulations on the Representative of the Senior Management on the Energy Management System of Rosseti Kuban
Energy management	Regulations on the Representative of the Management on the Energy Management System of the Rosseti Kuban Branch
Energy management	Guidelines for the Integrated Management System
Electricity metering	Instructions for Organising and Conducting of Instrumental Incoming Control of Electricity Meters in Rosseti Kuban
Electricity metering	Regulations on the operation and Maintenance of Electricity Metering Systems in Rosseti Kuban
Buildings and structures	Regulations on Periodic Technical Inspection of Grid Equipment, Buildings and Structures of Rosseti Kuban
Substations and Core Equipment	Guidelines for the Operation of 6–35 kV Arc Suppression Coils of Rosseti Kuban
Operational and Process Control, Contingency Management	Procedure for Operational Data Transmission to Rosseti Kuban
Operational and Process Control, Contingency Management	Instructions for Quick-Response Switching in Rosseti Kuban's 0.4–220 kV Grids
HR management	Regulations on Holding the Day of the Operative Worker in Rosseti Kuban
Occupational safety	Guidelines for the Video Recording at the Power Grid Facilities of Rosseti Kuban Using Mobile and Stationary Video Recording Devices
Fire safety	Instructions for the Operation of Fire-Fighting Water Systems of the Executive Office and Production Facilities of Rosseti Kuban
Fire safety	Instructions for the Operation of Fire-Fighting Systems of the Executive Office and Production Facilities of Rosseti Kuban
Fire safety	Instructions for the Operation of Fire Extinguishers of the Executive Office and Production Facilities of Rosseti Kuban
Fire safety	Regulations on Production Control Over Compliance with Industrial Safety Requirements at Hazardous Production Facilities

¹ International Electrotechnical Commission Standard for communication networks and systems at substations, which specifies data streaming formats, form of information, rules of definition of power facility items, and a set of rules to arrange an event-related data transfer protocol.

Innovative Development

Here are the focus areas of the Innovative Development Program for 2016–2020 and up to 2025 as approved by Kubanenergo's Board of Directors dated July 19, 2017 (Minutes No. 281):

- transition to smart 35–110 (220) kV substations;
- transition to smart grids with a distributed intellectual automation and control system;
- transition to integrated business processes and automation of control systems;
- utilization of new technology solutions and materials in power engineering;
- promoting an innovative development management system and building an innovative infrastructure.

The Company's Main Innovative Projects Implemented in 2020

Project name	Project implementation
Creation on smart 110 kV Adler, Kudepsta and Pasechnaya substations	<p>Deadlines: 2020–2022</p> <p>In the reporting period, front-end engineering and design work was carried out, the decentralized architecture No. 3 for building digital substations was determined using sections IEC 61850–8-1 and IEC 61850–9-2 of IEC 61850 standard, the volume and type of equipment was defined. A feasibility study was made to compare the designed facility and the classic analogue adopted for comparison.</p> <p>The expected effect of implementation:</p> <ul style="list-style-type: none"> – experience in design, installation and setup of IEC 61850 compliant equipment at 110 kV substations; – upskilling of customer services concerning digital substations; – reduction of costs for design, construction, installation and commissioning due to unification of microprocessor devices and reduction of cable connections for 110 kV substations; – improving the safety of the facility maintenance by operating personnel.
Creation of a smart metering system in the branches of Rosseti Kuban	<p>Deadlines: 2020–2030</p> <p>In the reporting period, innovative smart metering devices were introduced in six branches of Rosseti Kuban: Adygea, Armavir, Krasnodar, Leningrad, Sochi and Tikhoretsk power grids. In these branches, except for the latter, as part of the creation of a distributed automation system in 6–10 kV distribution grids, the investment program for 2021–2022 included projects to establish digital RES.</p> <p>The project aims to create a smart metering system, integration into the established innovative systems: collecting and displaying information (SCADA), managing grid operating modes (DMS), managing grid operations (OMS).</p> <p>The expected effect of implementation:</p> <ul style="list-style-type: none"> – reduction of operating costs by taking the readings and power supply parameters for electricity consumers remotely; – the possibility of remote limitation and resumption of power supply to electricity consumers.
Development of the Production Asset Management System (PAMS)	<p>Deadlines: 2020–2022</p> <p>In the reporting period, the Development Plan for the Production Asset Management System of Rosseti Kuban was approved for 2020–2022 (Minutes of the meeting of the Board of Directors No. 402/2020 dated September 14, 2020). The Company's PAMS Development Plan for 2020–2022 includes 28 activities, including 15 activities related to PAMS development in terms of process automation, and 13 organizational activities. It is envisaged that PAMS will be integrated with the digital information systems of the Company.</p> <p>The expected effect of implementation:</p> <ul style="list-style-type: none"> – ensuring the power supply reliability level established by the regulator; – improving the efficiency of operating costs associated with production processes.

Research and Development

Among other things, the Company's Innovative Development Program focuses on research and development (R&D), namely promotion of cutting-edge technology to create fundamentally novel methods, as well as applied research designed to improve the existing technology.

In 2020, stages of work on three R&D projects were accepted, and the development of two R&D projects was completed.

R&D products of 2020

R&D description	Results
Transition to smart 35–110 (220) kV substations	
Development of technical requirements for the computer-aided design system according to IEC 61850 ¹ , algorithms and methods for checking the computer-aided design system for compliance with technical requirements	Deadlines: 2019–2020 The Company has produced: <ul style="list-style-type: none"> – the terms of reference for the creation of algorithms for checking the computer-aided design system for compliance with technical requirements, and checking the configuration files for compliance with the SCL scheme, corresponding version of IEC 61850 standard, and their syntax; – a working prototype of algorithms; – documentation for the set of algorithms: description of the method, which is implemented on the basis of algorithms, user manual, system administrator's guide, source codes of the set of algorithms in the selected programming languages; – software for checking the computer-aided design system for compliance with technical requirements, and checking the configuration files for compliance with the SCL scheme, corresponding version of IEC 61850 standard, and their syntax; – an explanatory note with a calculated estimate of the economic and other effects from the work, including the optimal business model for the distribution of the developed software
Transition to digital smart grids with a distributed intellectual automation and control system	
Research and development of special requirements, architecture, and possible technical solutions to guarantee information security of the smart metering system	Deadlines: 2019–2020 The Company has produced: <ul style="list-style-type: none"> – the list of requirements for the security of information of the smart metering system; – information protection measures in the smart metering system; – the final version of the Information Security Requirements for Commercial Electricity Metering Infrastructures; – main design solutions to ensure information security for the smart metering system – model design solutions and base architecture for infrastructure protection of the smart metering system; – guidelines for the risk-oriented management of the organization's information infrastructure as part of the process of installing critical software updates to the smart metering system; – recommendations for the acceptance, commissioning and decommissioning of the information security system of the smart metering system; – rules and procedures for internal control in terms of security of the smart metering system infrastructure; – guidelines for the detection, prevention and elimination of the consequences of computer attacks and computer incident response for the smart metering system; – specialized software "Integration Security Event Module for the Intersystem Integration Service Based on the IEC 61968 Logical Model²"
Transition to integrated business processes and automation of control systems	
Studying the increment rate of key forest-forming tree species depending on climatic zones and soil quality along the routings of operating overhead lines with the preparation of regional maps for regular clearing of overhead line right-of-ways and provision of recommendations on technique of works	Deadlines: 2020–2022 Technical results attained in 2020 <ul style="list-style-type: none"> – R&D Report "Conducting research aimed at the development of geoinformation databases on forest vegetation to determine the rate of overgrowth of overhead lines, make recommendations on the frequency and methods of their clearing within Rosseti Kuban's footprint"

In 2020, two titles of protection were obtained: a certificate of state registration of a computer program and a patent for invention.

One licensing contract was made for the R&D products, and two of those were introduced into production activities of Rosseti Kuban.

¹ IEC 61850 is an International Electrotechnical Commission Standard for communication networks and systems at substations, which specifies data streaming formats, form of information, rules of definition of power facility items, and a set of rules to arrange an event-related data transfer protocol.

² IEC 61968 is an International Electrotechnical Commission Standard for communication networks and systems at substations. It is designed to support the inter-application integration of a utility enterprise that needs to collect data from different legacy or new applications, each with different interfaces and run-time environments. IEC 61968 defines interfaces for all the major elements of an interface architecture for Distribution Management Systems (DMS) and is intended to be implemented with middleware services that broker messages among applications.

R&D Costs

Costs by key R&D areas in 2020, RUB mln (excl. VAT)

Innovative development area	Target	Actual
Transition to smart 35–110 (220) kV substations	55.20	29.30
Transition to digital smart grids with a distributed intellectual automation and control system	153.79	180.15
Transition to integrated business processes and automation of control systems	0.00	0.00
Utilization of new technology solutions and materials in power engineering	2.97	2.32

Digital Transformation

Pursuant to Decrees of President of the Russian Federation, Vladimir Putin, No. 203 dated May 9, 2017 "On the Strategy for the Development of the Information Society in the Russian Federation for 2017–2030" and No. 204 dated May 7, 2018 "On the National Goals and Strategic Objectives of the Development of the Russian Federation for the period until 2024." On January 21, 2021, the Board of Directors of the Company approved the Digital Transformation Program for 2020–2030 (Minutes No.374/2020 dated January 24, 2020).

The Program sets forth the goals, objectives, key principles, and approaches to the Company's digital transformation; it also enumerates the pilot projects and reports the structure of Company's digital transformation management.

The digital transformation looks to changing the logics of processes and transitioning the Company to risk-oriented management.

The objectives of digital transformation:

- Company's adaptability to new tasks and challenges;
- improving the reliability performance of electric power supply to consumers
- improving the Company's operational performance
- expanding the availability of the power grid infrastructure
- developing human resources and new competencies
- diversifying the Company's business through additional services.

Digital transformation phases

Phase	Description	Deadlines
Zero	Pre-digital era: making and implementing a decision is up to human	Phase is over
Phase I	Adoption of effective and tested technologies to lay the hardware and information foundation for further advancement;	2019–2024
Phase II	partial digitalization of the process, pilot testing of promising technology	2023–2026
Phase III	Adoption of technologies proven worthy during pilot tests and completion of introduction of first-level technologies.	2026–2030
	Completion of introduction of technologies proven worthy during pilot tests, continued introduction of second-level technologies	

In the reporting year, the Company implemented projects for the first phase of digital transformation:

- creating a single network control center;
- implementing the Smart Metering Development Program;
- introducing the Piramida-Seti software;
- creating the Integrated Contingency Management Information and Analysis System;
- adopting electronic workflow;
- developing the Production Asset Management System (PAMS) in Operations Management System;
- adopting and refining the automated HR and payroll accounting system at Rosseti Kuban on the basis of 1C: Payroll and HR Management 8. CORP of the Company.

All digital transformation projects are implemented in line with the information security requirements.

Funding for the activities of the Company's Digital Transformation Program in 2020 amounted to

RUB 386.2 mln