

The Innovative Development Programme of IDGC of the South for 2016-2020 with an outlook until 2025 involves the priority trends of the Energy Saving and Energy Efficiency Innovative Development Policy of ROSSETI

The key areas of the innovative development of IDGC of the South under the programme are as follows:

Transition to digital substations with high voltage rating of 35–110 kV;

Transition to digital smart grids with a distributed intellectual automation and control system;

Transition to integrated business processes and automation of control systems;

Introduction of new technology solutions and materials in power engineering.

In 2018, the Company prepared to transition to digital smart grids with a distributed intellectual automation and control system, to integrated efficiency of business processes and control systems automation, and to the introduction of new technology solutions and materials in power engineering.

The main comprehensive innovative projects included in the Mid-Term Plan of the ROSSETI's Innovative Development Programme for 2016-2020 with an outlook until 2025:

1. Delivering a project of digital smart grids in the distribution power grid complex of Volgogradenergo, a branch of IDGC of the South, through the integration of the Smart Grid system. The project provides for integrated automation of 10 kV overhead lines and main substations and for better observability of the distribution power grids in the Petrovvalsky RPG of PD Kamyshin Power

Grids through the integration of the Smart Grids in order to reduce such targets as the System Average Interruption Frequency Index (SAIFI) and the System Average Interruption Duration Index (SAIDI).

The project will enhance the reliability indices of power supply to consumers (SAIFI, SAIDI) in 10 kV distribution power grids and reduce time and efforts required to locate places of failure and remove the consequences. Such result will be achieved through the possibility of continuous monitoring of the distribution power grids condition at all dispatch control levels, including the information system of task-specific monitoring, forecasting and support of the grids. This system designed within R&D initiatives is a prospective innovative trend for on-line managerial decision-making in an emergency in the area of the Company's operations.

During this innovative project, the Company fully completed construction, erection and commissioning works of the first and second start-up stages in line with the terms of Contract No.34001801004490 dated June 18, 2018 signed between KEU-Engineering LTD and Volgogradenergo.

Actual amount of funds spent for the project totalled RUB 35.01 mn vs the target of RUB 43.54 mn.

2. Delivering a project of digital smart grids in the distribution power grid complex of Volgogradenergo, a branch of IDGC of the South, by adopting the Smart Grid system, envisaging the integrated automation of 10 kV overhead lines and main substations and better observability of the distribution power grids in Chaltyrsky RPG, PD South-Western Power Grids of IDGC of the South branch - Rostovenergo.

The project requires the adoption of Smart Grid to reduce such targets as the System Average Interruption Frequency Index (SAIFI) and the System Average Interruption Duration Index (SAIDI).

While executing the project in 2018, the Company fully completed FEED, construction, erection, and commissioning stages, thus enhancing the reliability indices of power supply to consumers (SAIFI, SAIDI) in 10 kV distribution power grids and noticeably reducing time and efforts required to locate places of failure and remove the consequences. Now it is possible to monitor the distribution power grids condition at all dispatch control levels, including the information system of task-specific monitoring, forecasting and support of the grids. This system designed within R&D initiatives is a prospective innovative trend for on-line managerial decision-making in an emergency in the area of the Company's operations.

Actual amount of funds spent for the innovation project totalled RUB 24.57 mn vs the target of RUB 24.85 mn

3. Installation of icing monitoring system sensors manufactured by MIG LTD.

Industry experts highly appreciated the installed equipment following the results of the all-Russian Competition ENERGOPRORYV of innovative projects and designs in the smart electric power industry in 2014. The equipment was included in the ROSSETI Innovative Solutions Register under with the unique number No. 06-068-0059/1.

During the project, the Company fully completed FEED, construction, erection and commissioning works of the first start-up stage.

Actual amount of funds spent for the project totalled RUB 14.06 mn vs the target of RUB 16.36 mn.

4. Use of heat-resistant PV-0-coated covers included in the ROSSETI Innovative Solutions Register in laying 110 kV cable lines in the distribution power grid complex of Rostovenergo, a branch of IDGC of the South.

In 2018, the Company laid 110 kV cable lines in the distribution power grid complex of Rostovenergo with the extensive use of heat-resistant covers included in the ROSSETI Innovative Solutions Register to physically protect the 110 kV lines from mechanical damages without thermal destruction. PV-0 coat of the covers allows keeping cables undamaged and immediate replacing phases in case of failure.

Actual amount of funds spent for the installation of heat-resistant covers amounted to RUB 105 mn.

5. Pilot introduction of the innovative project on Engineering solutions to combine standard distribution grid facilities and charging infrastructure for electric vehicles (medium/low voltage transformer).

In 2018, the Company completed all the construction, erection and commissioning works under this project. The initiative is 100% completed.

Actual amount of funds spent for the project totalled RUB 6.53 mn vs the target of RUB 6.22 mn.

Key research, development, and engineering areas (RD&E)

Providing reliable (uninterrupted) and stable power supply to consumers, mitigating risks of faults in distribution power grids (ensuring reliable operation of power grids, including erection, adjustment, repair and maintenance of electrical equipment, hardware and power grid protection devices).

Reduction of material expenses for repair and maintenance of overhead lines with minimum expenses for repair and maintenance of the system equipment.

Transition to digital signal transmission at all control levels of substations.

Technical Policy and Regulatory and Engineering Provisions

In 2018, in line with the current ROSSETI's Regulations on the Unified Technical Policy in the Power Grid Complex approved by the Minutes No. 252 of ROSSETI's Board of Directors dated February 22, 2017, the following phases of activities on title projects were underway at IDGC of the South.

Major projects implemented in the reporting year

Rostovenergo started the pilot operation of the instrument-analytical complex for X-ray examination of high-voltage circuit breakers.

Specialists of Volgogradenergo launched the first and second start-up stages of the Smart Grid project. Petrovvalsky RPG proceeded with the installation of install vacuum reclosers at its power facilities (these reclosers are special-purpose automatic circuit breakers that are key components of the system).

Target and actual expenses by innovative development areas, RUB mn (excl. VAT)