

# ENVIRONMENTAL RESPONSIBILITY

A careful and responsible attitude to the environment is a mandatory part of the socially responsible business policy. The implementation of programmes for the modernization of production, energy saving and increasing energy efficiency, the development of renewable energy, innovative development - all of this contributes to reducing negative impact on economic development.

RusHydro Group is the largest Russian energy holding company, the leader in the production of electricity based on renewable sources. The Group is a main water user in the water management system of Russia and the largest supplier of electricity and heat in the Far East.

## ENVIRONMENTAL POLICY

### Environmental impact management <sup>[103-2]</sup>

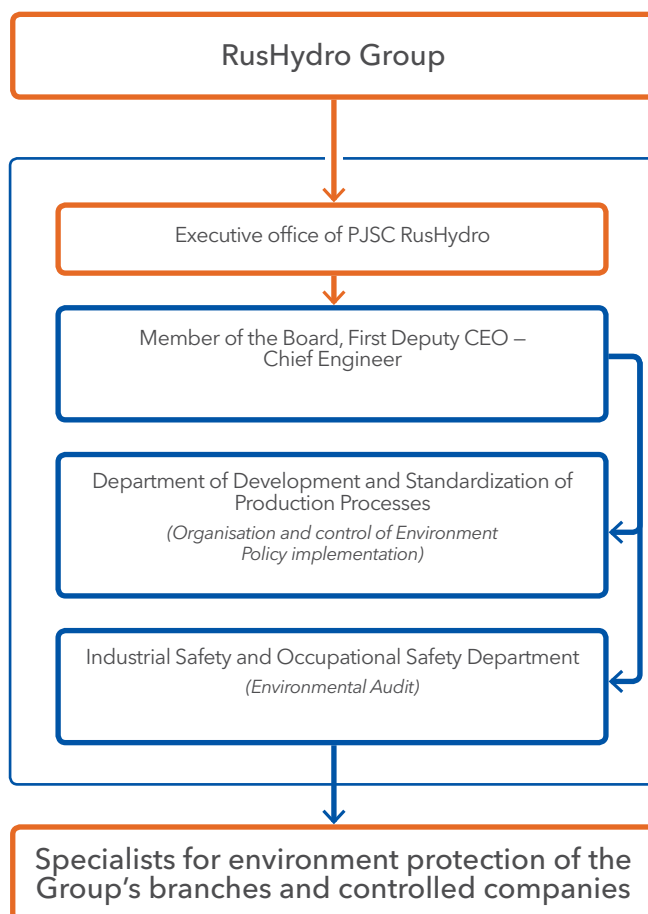
The activities of RusHydro Group in the field of environmental protection and environmental management are carried out in accordance with the approved Environmental Policies, which are based on the provisions of the state policy in the field of environmentally sustainable development and environmental safety, the Constitution of the Russian Federation, federal laws and other regulatory legal acts, international treaties of the Russian Federation in the field of environmental protection and the rational use of natural resources.

RusHydro Group also takes into account the requirements of international standards in the field of environmental management and international best practices in the implementation of energy projects in its activities. During planning and implementing its activities, the Group follows the precautionary principle approved at the United Nations Conference on Environment and Development in 1992<sup>1</sup>.

[102-11]

<sup>1</sup> Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (Rio Declaration on Environment and Development, 1992).

### Environmental Impact Management



## In RusHydro Group, the regulation on the environmental management system is being developed, and the document approval period is in the first quarter of 2019.

RusHydro Group's activities are aimed at minimising the negative impact on the environment and maintaining it in a favourable condition for present and future generations. This principle is enshrined in the Environmental Policies of PJSC RusHydro and JSC RAO ES East, which are the basis for planning and implementing activities within the majority of RusHydro Group business processes.

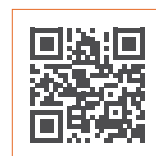
The environmental policy of PJSC RusHydro was updated in 2016. The main purpose of this policy is to identify the challenges, goals, objectives and mechanisms for implementing measures aimed at increasing the level of environmental safety of existing and prospective hydro generation facilities. The Policy applies to all structural divisions and controlled companies of PJSC RusHydro (with the exception of RAO ES East Subgroup), and its provisions are included in the system of business relations between PJSC RusHydro and its partners.

Following the integration of PJSC RusHydro and JSC RAO ES East, RusHydro Group's production activities have changed. This has led to the development of a new version of the Environmental Policy, which takes into account not only the current challenges and trends in the field of environmental protection, but also the peculiarities of the Group's hydropower and thermal assets.

Public hearing of the new version of the Group's Environmental Policy took place in October 2017. The hearings were attended by representatives of environmental community, expert and scientific organisations, business community, including WWF Russia, Russian Union of Industrialists and Entrepreneurs, UC RUSAL, JSC EuroSibEnergo, PJSC Rosseti, Moscow State University, and others. The updated version of the Environmental Policy is submitted for consideration to a wide range of experts in order to obtain feedback and opinions on the Company's priorities in the field of ecology and environmental protection. Participants of the hearing highly appreciated the open nature of the Company's public dialogue and the involvement of stakeholders in the process of discussing significant strategic documents in the field of environmental protection. The participants also submitted proposals for improving both the document itself and the Company's activities to implement the provisions of the Environmental Policy. The approval of RusHydro Group's Environmental Policy is scheduled for Q3 2018.

The environmental policy of JSC RAO ES East was approved in 2014, with its objectives being:

- technical re-equipment and replacement of equipment with low technical, economic and environmental indicators with more cost-effective and environmentally friendly one;
- involvement of personnel in activities to reduce environmental risks, improve the environmental management system and the production indicators in the field of environmental protection;
- increasing the efficiency of non-renewable natural resources;
- minimization of the negative man-made impact on the environment.



The environmental policy of JSC RAO ES East can be found on the website: <http://www.rao-esv.ru/en/>



## Mechanisms for the implementation of the Environmental Policy of PJSC RusHydro

PJSC RusHydro has approved a programme of measures to ensure the implementation of the Environmental Policy. Within the framework of the Technical Rehabilitation and Modernization Programme, measures are being taken to modernize and replace hydroelectric power stations of HPPs and repair hydro turbine equipment, including those aimed at eliminating environmental pollution during the operation of hydroturbine equipment. Coastal protection measures are regularly carried out to maintain the proper condition of the water protection zones. RusHydro Group replaces oil-filled electrical equipment with vacuum or SF<sub>6</sub> gas, which does not contain oils, or replaces this equipment with that with lower oil content.

The Company conducts other activities aimed at reducing the negative impact on the environment, among which are:

- construction of sites for the accumulation of scrap metal;
- reconstruction of stormwater drainage system of HPP buildings;
- collection of floating rubbish and transfer to waste disposal facilities;
- landscaping and planting of greenery.

### The key environmental measures implemented in 2017 by the branches and controlled companies of PJSC RusHydro, within the framework of the Technical Rehabilitation and Modernization Programme

#### Branch /controlled companies Events

Votkinskaya HPP	<ul style="list-style-type: none"> <li>■ Replacing hydraulic unit No. 4</li> <li>■ Current repair of concrete slopes of earthen and spillway dams</li> </ul>
Zeyskaya HPP	<ul style="list-style-type: none"> <li>■ Replacement of oil-filled current transformers with transformers with lower oil content</li> <li>■ Replacement of rotor blades of turbine impeller</li> </ul>
Saratovskaya HPP	<ul style="list-style-type: none"> <li>■ Modernization of hydraulic turbines No. 1-21, 24</li> <li>■ Current repair of concrete and earthen slopes of the left bank dam and channel dam</li> </ul>
Zhigulevskaya HPP	<ul style="list-style-type: none"> <li>■ Replacement of hydraulic turbines No. 8, 11, 20</li> <li>■ Comprehensive reconstruction with the replacement of power and measuring equipment of switchgear-500 kV in accordance with design documentation</li> </ul>
Volzhszkaya HPP	<ul style="list-style-type: none"> <li>■ Repair of oil-filled impellers of hydraulic turbines</li> <li>■ Replacement of hydraulic turbines No. 2, 1 with new ones</li> <li>■ Repair of perennial green plantations of groundfill dams No. 40,41,42</li> <li>■ Replacement of 10 oil-filled transformers by dry ones</li> </ul>
Kamskaya HPP	<ul style="list-style-type: none"> <li>■ Repair of industrial and storm water drain</li> <li>■ Repair of HPPs' drainage systems</li> </ul>
Nizhegorodskaya HPP	<ul style="list-style-type: none"> <li>■ Reconstruction of switchyard-110/220 kV with the replacement of the equipment with gas-insulated one</li> <li>■ Reconstruction of the water supply and sewerage system with replacement of pipelines and stop valves</li> </ul>
Karachaevo-Cherkessia Branch	<ul style="list-style-type: none"> <li>■ Replacement of oil circuit breakers with vacuum ones</li> </ul>
Verkhnevolzhskiy HPPs Cascade	<ul style="list-style-type: none"> <li>■ Reconstruction of fastening of slopes of Rybinskaya HPP's earth-fill dam No. 5</li> <li>■ Reconstruction of the drainage system of dam 40 with the installation of treatment facilities at the Uglichskaya HPP</li> </ul>
Zagorskaya PSP	<ul style="list-style-type: none"> <li>■ Comprehensive reconstruction of switchyard - 35 kV with the replacement of auxiliary transformers-1,2,3,4 to dry ones with cast insulation</li> </ul>
Novosibirskaya HPP	<ul style="list-style-type: none"> <li>■ Replacement of hydraulic turbine No. 3 with new one</li> <li>■ Replacement of 5 oil-filled switches of 220 kV switchyard with gas-insulated modules</li> </ul>
Cheboksarskaya HPP	<ul style="list-style-type: none"> <li>■ Works on purification facilities</li> </ul>
PJSC Kolymaenergo	<ul style="list-style-type: none"> <li>■ Reconstruction of switchgear -10 kV with the replacement of the switches with vacuum and microprocessor ones</li> </ul>

## Normative and technical regulation in the field of environmental safety

There are a number of standards in the field of environmental safety within the framework of technical regulation in PJSC RusHydro.

To assess the impact on the environment and the organisation of production control, PJSC RusHydro has introduced corporate standards "Hydroelectric Power Plants. Protection of the environment. Environmental impact assessment. Methodical instructions and Hydroelectric power stations. Industrial environmental control. Norms and requirements".

The National Standard of the PNST 15-2014 "Environmental protection. Norms of losses of oil products of the hydroturbine equipment during operation. Method for calculating losses of turbine oil in the process of operation of hydroturbine equipment." has been developed to apply both within its own management activities and within the framework of state control.

## Environmental Impact Assessment

PJSC RusHydro provides environmental safety of production activities at all stages of the life cycle of industrial facilities. Before a new project's implementation or before the modification of existing facilities (at the initiation and design stages), measures are taken to assess the impact of such projects on the environment (EIA).

In 2017, there was no need to hold public hearings on the EIA of the designed facilities and facilities under construction.

## Assessment and mechanisms for managing the environmental impact at all stages of the project life cycle

Stage	Mechanisms for managing the environmental impact
Planning (pre-project stage)	<ul style="list-style-type: none"> <li>■ Research and development work of ecological orientation</li> <li>■ Preliminary Environmental Impact Assessment for New Construction and Reconstruction Planning</li> </ul>
Engineering	<ul style="list-style-type: none"> <li>■ Conduct of the EIA: Assessment of the impact of the facility on the environment for making decisions on the possibility of construction and reconstruction of production facilities</li> <li>■ Design of measures to ensure the required level of environmental safety</li> </ul>
Construction	<ul style="list-style-type: none"> <li>■ Implementation and control of the implementation of activities, envisaged projects and projects aimed at ensuring the environmental safety of the facilities</li> <li>■ Compliance with the requirements of environmental legislation in the performance of construction and installation works</li> </ul>
Exploitation	<ul style="list-style-type: none"> <li>■ Implementation of industrial environmental control: implementation of measures to prevent deviation from a given level of the facility's environmental safety</li> <li>■ Voluntary initiatives to conserve biodiversity and improve the environmental awareness of the public and employees</li> </ul>

## Provision of activities in accordance with legislative requirements in the field of environmental protection

Projects of all required environmental standards are in mandatory manner developed during construction and operation of facilities, including standards of allowed emissions and discharges of pollutants into the environment, draft standards waste disposal limits, sections of design documentation related to environmental protection, including biodiversity conservation measures.

The documents are approved by the executive authorities that carry out state regulation in the field of environmental protection, among which:

- Ministry of Natural Resources and Environment of the Russian Federation;
- Federal Service for Supervision of Nature Management;
- Federal Agency for Water Resources;
- Federal Agency for Fisheries;
- Federal Service for Supervision of Consumer Rights Protection and Human Welfare.

On the basis of agreed projects, permits for environmental protection, which are necessary for the performance of production activities, are obtained.

## Scientific and Technical Council

The Company has a permanent expert collegial body - the Scientific and Technical Council (STC). It ensures the creation and functioning of a unified system of technical expertise of scientific and technical solutions, projects and programs in compliance with the requirements of the Technical Policy and the current regulatory and technical documents.

To ensure environmental safety in the formation of new technical solutions, a profile section of the STC "Reservoirs and environmental protection" was created. The section includes representatives of scientific research and design institutes: the Institute of Water Problems of the Russian Academy of Sciences, the Department of Land Hydrology of the Moscow State University and Federal Agency for Water Resources.



# Mechanisms for implementing the environmental policy of JSC RAO ES East

Within the framework of the Environmental Policy of JSC RAO ES East, Subgroup companies implement initiatives aimed at:

- reconstructing gas cleaning equipment;
- switching combined heat and power plants to gas fuel;
- constructing of wastewater treatment plants.

The implementation of these initiatives allows not only to increase the basic production performance indicators, but also to reduce the negative impact on the environment.

There were no accidents and incidents that caused damage to the environment in the reporting year in companies of RAO ES East Subgroup.

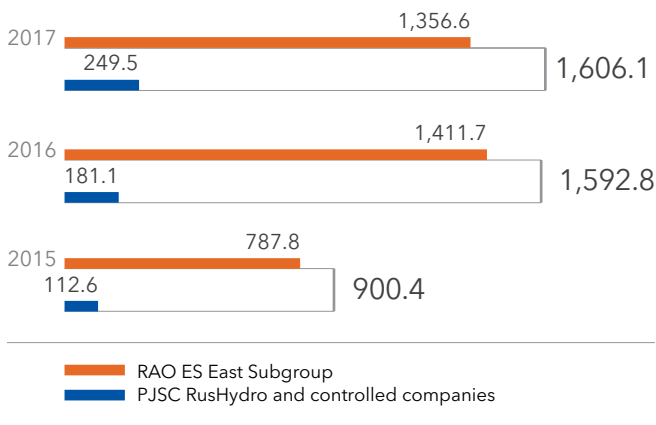
## Key environmental measures implemented in 2017 by the RAO ES East Subgroup

Branch / controlled companies	Actions
JSC DGK	<ul style="list-style-type: none"> <li>■ Repair, commissioning, testing of ash collecting and aspirating plants</li> <li>■ Construction of a wastewater treatment plant at Khabarovskaya CHPP-2</li> <li>■ Repair of circulating hydraulic ash sluice at Birobidzhan GRES</li> <li>■ Construction of ash dump dykes</li> <li>■ Transition to the use of gas fuel at Khabarovskaya CHPP-1</li> </ul>
JSC DRSK	<ul style="list-style-type: none"> <li>■ Repair, reconstruction, organisation of oil receiving devices under power transformers</li> <li>■ Replacement of oil circuit breakers with vacuum ones</li> </ul>
PJSC Magadanenergo	<ul style="list-style-type: none"> <li>■ Current repair of ash collecting facilities of MCHPP, ArGRES</li> <li>■ Repair of the aeration tank of the secondary treatment plant at GRES</li> <li>■ Replacement of oil circuit breakers with SF<sub>6</sub> circuit breakers</li> </ul>
PJSC Kamchatskenergo	<ul style="list-style-type: none"> <li>■ Major overhaul of boiler equipment</li> </ul>
PJSC Sakhalinenergo	<ul style="list-style-type: none"> <li>■ Repair of metal pipes Venturi, repair of scrubbers hydroelectric units No. 1 - 5</li> <li>■ Major overhaul of boiler equipment</li> <li>■ Repair works of industrial sewerage, fecal pumping</li> </ul>
JSC Chukotenergo	<ul style="list-style-type: none"> <li>■ Repair, adjustment, testing of ash collecting facilities</li> <li>■ Cleaning oil traps</li> <li>■ Replacement of cyclonic elements of the BC in the period of overhaul of boiler equipment</li> <li>■ Maintenance, repair and operation of ash-and-slag disposal sites</li> </ul>
JSC SENK	<ul style="list-style-type: none"> <li>■ Flue gas cleaning from soot and dust with special equipment (cyclones)</li> <li>■ Reconstruction of DPP-23 in Ust-Kamchatsk with replacement of the diesel generator</li> </ul>
PJSC Yakutskenergo	<ul style="list-style-type: none"> <li>■ Replacement and repair of boiler burners</li> <li>■ Repair of the cooling tower section</li> <li>■ Replacement of the oil circuit breakers with vacuum ones</li> </ul>
JSC Sakhaenergo	<ul style="list-style-type: none"> <li>■ Current repair, removal of air suction cups from the ramjet and battery cyclone (4, 5 boiler) CHPP, Deputatskiy settlement</li> <li>■ Commissioning of hazardous waste class from I to IV (Tiksi settlement, Olekminsk, Batagay settlement)</li> <li>■ Replacement of oil circuit breakers with vacuum ones</li> <li>■ Reconstruction of ash and slag recycled water supply, CHPP, Deputatskiy settlement</li> <li>■ Construction of solar power plants: <ul style="list-style-type: none"> <li>– Zhigansky power distribution zone (Kystatyam settlement SPP 40 kV)</li> <li>– Kobyayskiy grids (Batamai settlement, increase in the autonomous inverter system of the accumulation system of Autonomous power supply systems)</li> <li>– Kobyayskiy grids (Sebyan-Kuel settlement SPP-50 kV)</li> <li>– Oymyakonsky power distribution zone (Orto-Balagan settlement SPP-50 kV)</li> </ul> </li> </ul>
JSC LUR	<ul style="list-style-type: none"> <li>■ Water spraying (dust suppression) of roads, downhole platforms, construction opencast mines</li> <li>■ Repair of oil traps for the treatment of transport vessels in mountain areas</li> </ul>

## Investments in environmental protection

Expenses for the implementation of RusHydro Group's environmental activities in 2017 amounted to 1,606.1 million rubles.

### Total expenditures and investments for environmental protection, RUB mn <sup>[103-2], [103-3]</sup>



## Cooperation in the field of environmental protection

RusHydro Group actively cooperates with international organisations on issues of environmental protection and conservation of biological diversity. The Company supports industry and international initiatives to reduce the anthropogenic load on the environment and strives to adopt the best practices for the successful implementation of its environmental projects.

PJSC RusHydro is a partner of the project of the United Nations Development Programme, Global Environmental Facility and the Ministry of Natural Resources and Environment of the Russian Federation "The Tasks of Biodiversity Conservation in Russia's Energy Sector Policies and Programmes" (hereinafter, the UNDP Project). <sup>[102-44]</sup> Since 2012 the project has been implemented on the territory of Russia. The Project Objectives are as follows:

- demonstration and introduction of the best international practices in the field of biodiversity conservation in the energy sector of Russia;
- improving the status of biodiversity in the industrialized regions of Russia;
- assistance in the set-up of a monitoring system for the status of biodiversity and the testing of environmental technologies in oil producing, coal mining, and hydropower production;
- promoting the adoption of normative and methodological documents on the conservation of biodiversity in the energy sector;

Within the UNDP project in RusHydro, the work is carried out in the following directions:

- biodiversity conservation;
- sustainable development of hydropower;
- development of methodological documents on biodiversity conservation in the hydropower sector.

### Russian Climate week 2017

Within the framework of the Russian Climate Week 2017 in Moscow, the roundtable "Hydropower in the Context of Global Climate Change" organized by PJSC RusHydro was held. Scientists of leading Russian scientific centers discussed the actual problem of the influence of reservoirs on the balance of greenhouse gases in the atmosphere.

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In 2017, PJSC RusHydro continued its membership in international industry associations, such as the Centre for Energy Advancement through Technological Innovation (CEATI), the International Hydropower Association (IHA) and the International Commission of Large Dams (ICOLD). Participation in these organisations allows the Company to interact with the world community on the safe, innovative and sustainable development of hydropower.

To promote the principles of sustainable development in Russia, the Company promotes the implementation of the Hydropower Sustainability Assessment Protocol (HSAP) as an official regulatory and legal act.

In 2013-2014, PJSC RusHydro carried out approbation of the Methodology on designed hydropower projects and HPPs under construction. As a result of the audit, a number of inconsistencies, which require the improvement of internal processes of development and decision-making in PJSC RusHydro, were identified. Primarily, the changes should concern the processes of interaction with stakeholders, ensuring the preservation of cultural heritage sites and conservation of biodiversity.

To fulfill these tasks, the Working Group on the Development of Methodological Approaches to Ensuring and Evaluation of the Compliance of Hydropower Projects with the Criteria for Sustainable Development was formed. It is planned to prepare a local regulatory document (act) for ensuring the compliance of hydropower projects with the criteria for sustainable development, and to begin work on giving the Methodology the status of an official normative legal act on the territory of the Russian Federation.



## Cooperation to combat climate change

At the end of 2015, PJSC RusHydro supported the initiative to unite the efforts of Russian business to reduce the impact on the environment and prevent climate change. RusHydro signed a Statement of Russian Business on the Negotiation Process and Adoption of a New Climate Agreement at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change.

This initiative is intended to be an additional step, aimed at ensuring the adoption of a new climate agreement at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change.

Since 2015, PJSC RusHydro has been a member of the Climate Partnership of Russia. The main purpose of the partnership is to unite the efforts of business in the interests of transition to environmentally friendly technologies.

In 2017, the Company continued to report on greenhouse gas emissions to CDP (Carbon Disclosure Project), in which it participates since 2015.

In addition, in 2017, PJSC RusHydro in cooperation with JSC EuroSibEnergo and the Association of Hydropower of Russia continued its work within the Working Group on the development of methodological approaches to study global climate change processes in terms of greenhouse gas emissions from the surface of freshwater reservoirs of HPP and the evaluation of their absorbing capacity.