Environmental activities

Environmental protection expenditures

Environmental protection expenditures are periodic. Gas cleaning equipment and treatment facilities are repaired and modernized depending on the state of the equipment. Additionally, this work includes measures for the development of regulatory and licensing documentation, which depends on the legally approved validity of the documentation (five years in most cases).

Protection of water resources

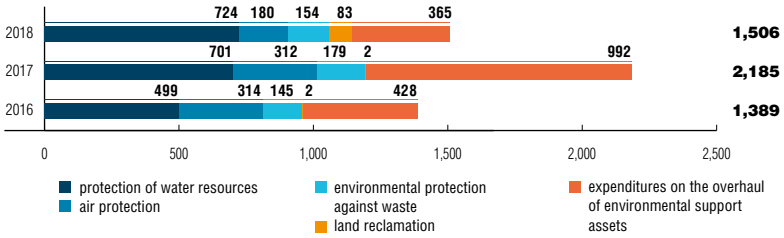
The Group's power plants annually take measures to increase the reuse of industrial water and reduce the volume of wastewater. For example, in order to reduce a power plant's need for fresh water, the cooling tower at Omskskaya CHPP-5 (Cooling Tower No. 4) was rebuilt and upgraded. A clean surface transfer pump was installed at Omskskaya CHPP-3, which also made it possible to reduce the volume of water withdrawn. In an effort to minimize the negative impact of wastewater from the Omskskaya CHPP-3 to surface water bodies, a chamber was built to redirect wastewater from CHPP-3 to the collector of OJSC OmskVodokanal.

JSC Inter RAO – Electric Power Plants is decontaminating industrial drains at the wastewater discharge point into Lake Gusinoye (Gusinoozyorskaya TPP). A project is being continued (and will be completed in 2019) for the reconstruction of the process water supply, discharge, and outlet channels at the Kostromskaya TPP. Work continues on the construction of a wastewater treatment plant at the Cherepetskaya TPP and the design of the wastewater treatment unit at Outlet No. 3 of the Kostromskaya TPP. The Kaliningradskaya CHPP-2 has developed a correctional cooling tower using salt inhibitors taking into account the rejection of the use of low-efficiency reagents under the current conditions.

The Group's heat network assets have managed to cut water consumption by reducing the feed to the heat network while decreasing heat network losses. In particular, LLC BashRTS-Sterlitamak reduced the heat network supply by 38,450 tons compared with 2017.

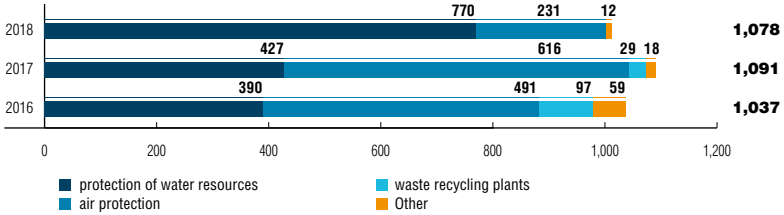
OPERATING EXPENDITURES ON ENVIRONMENTAL PROTECTION

RUB mln



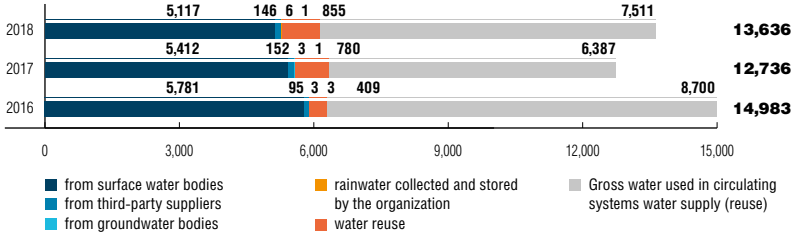
INVESTMENT EXPENDITURES ON ENVIRONMENTAL PROTECTION

RUB mln



WATER USAGE

mln cub. m.



WATER DISPOSAL, MLN CUB. M.

Indicator	2016	2017	2018	Change vs. 2017, %
Wastewater disposal, including:	5,741.8	5,962,0	5,716.9	–4.1
Disposed to third-party companies	5.7	5.3	5.1	–3.8
Disposed to surface water bodies, including:	5,736.2	5,956.7	5,711.8	–4.1
standard-compliant clean	5,718.1	5,940.6	5,672.0	–4.5
treated to standard quality	2.7	3.0	4.0	33.3
insufficiently treated	6.8	3.7	3.1	–16.2
polluted untreated	8.6	9.4	32.7	247.9
Share of standard-compliant clean water in total water disposal, %	99.70	99.72	99.21	–0.5 p.p.

Solid waste

Due to the specifics of production, ash and slag waste makes up the bulk of the waste generated at the Group's facilities. Given the lack of a developed permanent market for the use of ash and slag waste in Russia at this time, it is impossible to project how ash and slag waste (ASW) and other types of waste will be used. However, work is constantly underway to find a market for the sale of industrial waste.

TOTAL MASS OF WASTE BY TYPE AND TREATMENT METHODS, TONS

Indicator	2016	2017	2018	Change vs. 2017, %
WASTE GENERATION				
class 1	16	14	19	35.7
class 2	12	12	20	66.7
class 3	1,469	1,760	1,518	–13.8
class 4	18,696	19,665	16,601	–15.6
class 5	4,223,615	4,220,977	3,980,553	–5.7
total	**4,243,809**	**4,242,428**	**3,998,710**	**–5.7**
including ash and slag	4,201,335	4,190,600	3,403,554	–18.8
WASTE RECYCLING				
Placed at in-house storage facilities	4,090,097	4,089,622	3,856,798	–5.7
Ash and slag waste placed at in-house facilities	4,054,501	4,085,371	3,852,489	–5.7
Used	385,078	12,193	3,669	–69.9
Decontaminated	111	68	23	–66.2
Transferred to third parties	214,365	193,483	166,588	–13.9
including transferred ash and slag waste	177,559	152,293	132,950	–12.7

In accordance with legislative requirements, the Inter RAO Group develops draft standards for waste generation and disposal limits. Based on the degree of their environmental impact, ash and slag waste are classified as hazard class 5, which means they have a minimal impact on the environment.

The Kashirskaya TPP and Cherepetskaya TPP at JSC Inter RAO – Electric Power Plants contributed the most to the use of ASW in 2018 with 32,700 tons and 41,400 tons, respectively. ASW was transferred to third parties for use in the construction industry. In 2018, CHPP-4 (JSC TGC-11) organized the transfer of 24,900 tons of ash and slag for use.

Part of the waste is reused at the facilities of PJSC Inter RAO.

The Gusinoozyorskaya and Kharanorskaya TPPs have established workshops to process scrap and waste containing unpolluted ferrous metals. In addition, soil obtained during dredging work on canals is reused. Before being used, the soil is stored in piles to dehydrate. The piles are then leveled and undergo artificial grassing. Mineral oil waste and cleaning rags are also recycled. Oil-contaminated sands are neutralized (burned) in boiler furnaces. At the Kharanorskaya TPP, supernatant petroleum products and sludge are used as fuel additives during the firing of frozen mud with fuel oil (technical specifications have been developed for use).

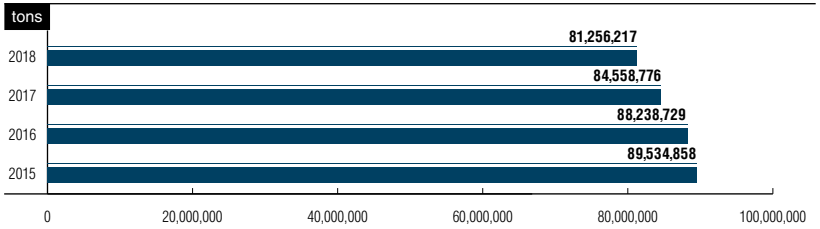
Silt from silt detention ponds at sewage treatment plants is used at the Kostromskaya TPP: the sediment is kept in ponds for two or three years and, in accordance with Sanitary Rules and Regulation 2.1.7.573-96, is removed for use as dried sludge fertilizer (compost) for subsoil placement.

The Moldova TPP also actively recycles waste in its production cycle. Oily waste (sludge from mineral oil facilities, used motor oil, compressor oil, and industrial oil) are used as fuel (burned in boilers by mixing with fuel oil). Turbine oil is partially recycled into the cycle after treatment. Babbitt waste is melted down for the production of bearings. Used work clothes are used as rags. In 2018, more than 2,800 tons of construction waste were used for the recultivation of an inactive pit located near the enterprise.

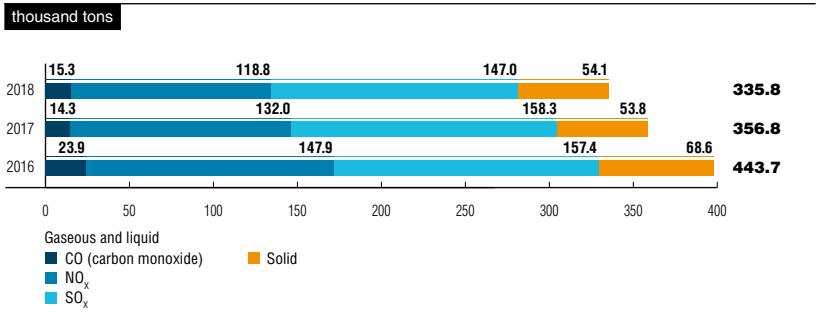
At the Group's power plants, certain types of waste are selectively collected and transferred for subsequent disposal.

Air protection

GROSS GREENHOUSE GAS EMISSIONS



EMISSIONS OF SIGNIFICANT TYPES OF POLLUTANTS TO THE ATMOSPHERE



Overall, pollutant emissions decreased by 5.9% compared with 2017. Solid matter emissions increased by 0.6% in 2018. This situation mainly resulted from an increase in solid matter emissions at Kharanorskaya TPP due to the growing share of coal in the fuel balance and the transition to another type of coal compared with 2017. Despite the isolated cases, there has been a trend toward improved efficiency with fuel usage. In particular, the commissioning of the Zatonskaya CHPP helped to reduce specific fuel consumption for electricity supply at LLC Bashkir Generation Company by 5.5 g/kWh compared with last year.

It should also be noted that the Group's companies are actively implementing projects to reduce pollutant emissions to the atmosphere. Specifically, projects to introduce low-toxic burners were completed on the ninth and tenth boilers at Ufimskaya CHPP-2 of LLC Bashkir Generation Company, which will reduce emissions of nitrogen oxides.

Projects to introduce new technologies

TGC-11 invested more than RUB 715 million in environmental protection in its region in 2018. The company retooled two electrostatic precipitators at CHPP-4 and CHPP-5 whose mechanical component uses a modernized system to shake out precipitation and corona elements and a more advanced gas distribution system that ensures the high efficiency of the gas cleaning process. Over the past five years, TGC-11 has upgraded nine electrostatic precipitators.

IN 2018, TGC-11 WAS INCLUDED IN THE LIST OF '100 BEST ORGANIZATIONS IN RUSSIA. ECOLOGY AND ENVIRONMENTAL MANAGEMENT.'

A project to build wastewater treatment plants at the CHPP-5 joint venture won the category 'For Achievements in the Protection of Surface and Groundwater.' The new process cleaning circuit of the industrial wastewater treatment plants provides the ability to reuse treated water in the plant's process water supply system. This should have a positive effect on protecting the open water bodies of the Omsk Region, including the Irtysh River. Modern, highly efficient equipment will ensure the reliability of mechanical, physical, and chemical treatment and the decontamination of treated wastewater during all stages of wastewater treatment.

At the Omskskaya CHPP-5 (JSC TGC-11), the electrostatic precipitator of Boiler Unit No. 1 was retooled, while the electrostatic precipitator of Boiler Unit No. 9 was replaced at the Omskskaya CHPP-4, which reduced the amount of particulate matter emissions. In addition, pollutant emissions to the atmosphere at JSC TGC-11 declined due to the cleaning of the condenser of the engine emission level and a reduction in suction devices on the CHPP-3 boiler units.

As part of the government's Ecology National Project, an action plan was approved to reduce pollutant emissions through improvements to gas cleaning equipment by replacing electrostatic precipitators with innovative hybrid filters. The issue of reducing pollutant emissions to the atmosphere was addressed in order to comply with Presidential Decree No. 204 dated May 7, 2018 (clause 7). The Ecology National Project was developed pursuant to the Decree (the project identification summary was approved by Minutes No. 16 dated December 24, 2018 of the Presidium of the Presidential Council for Strategic Development and National Projects under the President of the Russian Federation). The Ecology National Project includes the Clean Air federal project under which comprehensive action plans were drafted and approved to reduce pollutant emissions to the atmosphere in large industrial centers, including Omsk. A comprehensive action plan to improve the environmental situation and reduce pollutant emissions to the atmosphere in Omsk was approved by the Deputy Prime Minister of the Russian Federation (No. 11013p-P6 dated December 28, 2018).

Biodiversity

In 2018, work was carried out to assess the effectiveness of fish protection systems at the Permskaya and Iriklinskaya TPPs, and new fish protection nets were installed at LLC BashRTS-Sterlitamak. From 2019, fry will be released based on the updated calculations.

Permskaya TPP

The Permskaya TPP has been raising sterlet at its own fish reproduction workshop since 2003. Since this time, power industry workers have released more than 5 million fry into the rivers of the Kama region. Artificial reproduction is compensating and maintaining the balance of the natural population of this valuable sturgeon species, which is included in the Red Book of the Perm Territory. Experts from the Perm Department of the State Research Institute of Lake and River Fisheries as well as supervisory agencies have noted an increase in the population of the Kama sterlet in the places where they have been released.

In 2018, employees from the Permskaya TPP released 400,000 young sterlet into the rivers of the Kama region. The fish stocking took place in the Dobriansky, Usolsky, and Permsky Districts.

Iriklinskaya TPP

A total of 12,000 carp fry were released into the Iriklinskoe Reservoir.

Gusinoozyorskaya TPP

Fry are released annually in August in accordance with the plant's agreement with the Gusinoozyorskoye fish farm (Baikal branch of the Main Fisheries Agency) on the artificial reproduction of aquatic biological resources.

About 60,000 carp fry were released through the discharge channel of the Gusinoozyorskaya TPP into Lake Gusinoye.

Kaliningrad Generation

The Primorskaya TPP is being built on the shore of the Kaliningrad Sea Canal, and fish stocking is designed to compensate for the potential negative impact on the aquatic environment.

In 2018, Kaliningrad Generation released 31,000 whitefish fry into the Curonian Lagoon.

Moldova TPP

Each year, the Moldova TPP funds monitoring of the ecological state of a local reservoir by research organization representatives. They collect and calculate the qualitative and quantitative features of larvae entering the plant's water intakes and then give the appropriate recommendations. Based on these recommendations, the Cuciurgan Reservoir is stocked with the volume required to reduce the impact level and compensate for damage from the production activities of Moldova TPP. In spring 2018, 4,180,000 non-migratory fry were obtained at a hatchery at the plant. Of these, 3,680,000 were released into the reservoir as compensatory stocking. For experimental purposes, 500,000 fry were released into an enlarged wintering pond for rearing adult specimen and to determine their survival rate with the joint rearing of predatory and non-predatory fish species. In the fall, the fish were released into the reservoir in the presence of representatives of the Ministry of Agriculture and Natural Resources of the Pridnestrovian Moldavian Republic and the State Service for Ecological Control and Environmental Protection of the Pridnestrovian Moldavian Republic. The species consisted of pike perch, ram, bream, and carp. Thus, the fry released into the Kuchurgan Reservoir in 2018 will significantly replenish the small population of aquatic and plant-eating fish species, which will have a positive effect on the ecological situation in the reservoir.

Advanced training in nature conservation

In 2018, 18 specialists from JSC Inter RAO – Electric Power Generation took part in the 18th International Legal Seminar of Environmental Specialists, while one individual underwent a refresher course under the Environmental Management System Internal Auditor program.

Specialists from JSC TGC-11 underwent advanced training as part of the program 'Ensuring Environmental Safety by Managers and Specialists of Environmental Services and Environmental Control Systems' and took part in conferences and environmental forums in 2018.

At LLC BashRTS, eleven employees underwent environmental management training, with six of them trained in the course 'Ensuring Environmental Safety during Hazardous Waste Management' and three taking the 'Ensuring Environmental Safety by Managers and Specialists of General Economic Control Systems' course.

At JSC Omsk RTS, two specialists were trained in the courses 'Ensuring Environmental Safety during Hazardous Waste Management' and 'Quality Control Issues of Various Types of Waters.'

At JSC Ekibastuzskaya TPP-2, one specialist took part in the 4th CARBON – KZ – 2018 International Forum: 'System for Trading Greenhouse Gas Emissions in the Context of the International Low Carbon Development Initiative.'

Public awareness

The Group's subsidiaries pay considerable attention to providing public awareness and interacting with the authorities on matters concerning environmental education and training.

At JSC Inter RAO – Electric Power Plants, in an effort to inform the public and public organizations about environmental issues, a number of branches organized the following measures in 2018:

- disclosure of the results of environmental activities in 2017 at a press conference given by branch directors
- disclosure of the results of environmental activities in quarterly press releases on the production activities of branches
- tours of the enterprise for students at educational institutions and members of public organizations in the town of Dobryanka (February, May, September, and November)
- coverage of the release of sterlet fry in the local print media (May)
- an environmental campaign to collect used batteries among children at daycare centers in the Dobriansky District (January-April)
- an environmental campaign to plant birch saplings at daycare centers in the Dobriansky District (May-June)
- coverage of the environmental measures carried out by branches on corporate social media pages (throughout the year)