

### Specific discharges of insufficiently treated wastewater into bodies of water by Russian entities of LUKOIL Group

	2016	2017	2018
Oil and gas extraction, cubic meters/ton of oil equivalent in hydrocarbon resources	0.005	0.008	0.004
Oil products supply, cubic meters/ton of oil products sold	0.001	0.004	0.003
Transportation, cubic meters/ton of oil products transported	0.002	0.008	0.009

**Notes.** At oil product supply, petrochemical and electrical energy sector entities, there are no discharges of insufficiently treated waters into bodies of water.

### Circulating water

The facilities of generating entities in the electrical energy sector and oil-refining and petrochemical production

facilities in Russia are equipped with circulating process water supply systems. New production facilities

are required to be equipped with circulating and recycled water supply systems and treatment facilities.

### Volumes of circulating water supply and reused water in LUKOIL Group entities, million cubic meters

	2016	2017	2018
<b>Russian entities</b>			
Volume of circulating water supply	2,371.9	2,253.1	2,284.2
Volume of reused-sequentially used water	930.6	875.5	896.5
<b>Foreign entities</b>			
Volume of circulating water supply	no data	no data	198.9
Volume of reused-sequentially used water	no data	no data	1.1

**Notes.** The data presented for 2018 on foreign entities include data for LUKOIL Neftohim Burgas AD, PETROTEL-LUKOIL S.r.l.A., and LUKOIL Uzbekistan Operating Company LLC.

## EMISSIONS AND WASTE



**In 2018 Russian entities significantly reduced emissions of pollutants into the atmosphere (by 14%)**

### Emissions into the atmosphere

The main measures of the environmental safety program in Russia in relation to pollutant emissions into the atmosphere comprise:

- Upgrading and constructing new generation facilities at electrical energy sector entities that are equipped with improved automated systems to regulate fuel combustion processes and heat losses and minimize emissions of pollutants

- Replacements or upgrades according to the principle of utilizing the best available technology and equipment at industrial facilities
- Use of emission trapping and treatment systems

In 2018 Russian entities significantly reduced emissions of pollutants into the atmosphere (by 14%), including solid particles and nitrogen oxide. This result

was achieved chiefly through reducing associated petroleum gas combustion volumes.

The majority of discharges from foreign entities was attributable to the rapid development of a gas project in Uzbekistan.

### Gross discharges of pollutants into the atmosphere (net of CO<sub>2</sub>) by LUKOIL Group entities, thousand tons

	By Russian entities			By foreign entities
	2016	2017	2018	2018
<b>Total, including:</b>	<b>627.5</b>	<b>502.5</b>	<b>433.3</b>	<b>18.0</b>
NO <sub>x</sub> discharges	44.0	49.6	47.1	2.3
SO <sub>2</sub> discharges	59.7	23.0	25.1	12.4
solid particle discharges	26.9	24.3	14.7	0.2
CO discharges	295.9	216.6	153.9	2.0
hydrocarbon discharges (including volatile organic compounds (VOC))	199.2	187.8	188.3	1.1
discharges of other pollutants	1.8	1.2	4.2	0.0

**Notes.** 1) The data for 2018 for foreign entities include data for LUKOIL Neftohim Burgas AD, PETROTEL-LUKOIL S.A., and LLC LUKOIL Uzbekistan Operating Company. 2) The weight of hazardous substances (benzo[a]pyrene) in discharges by the Russian entities of LUKOIL Group in 2018 amounted to 0.00098 thousand tons.

### Specific discharges of pollutants into the atmosphere by Russian entities of LUKOIL Group

	2016	2017	2018
Oil and gas extraction, kg/ton of oil equivalent in extracted hydrocarbon resources	5.5	4.1	3.4
Oil refining, kg/ton of refined oil	0.9	0.9	0.8
Petrochemicals, kg/ton of processed raw materials	1.0	1.3	1.1
Oil products supply, kg/ton of oil products sold	0.7	0.8	0.8
Transportation, kg/ton of oil products transported	0.1	0.1	0.2
electrical energy sector, kg/ton of oil equivalent in consumed fuel	3.7	2.6	2.9

## Waste

**Our main approach to the management of industrial waste consists of**

- 1) applying the latest technologies that reduce waste generation,**
- 2) preventing excessive build-ups of waste at LUKOIL Group entity facilities,**
- 3) placing waste at specialized facilities**

**that meet modern requirements, and 4) the timely and safe disposal of waste.**

Most of the production waste of LUKOIL Group in Russia is generated during the process of well drilling and operation; the volume of waste

generated depends primarily on the scope of drilling and repair works at wells. For this reason, in the past three years the volume of waste generation has risen by approximately 50%. The main types of waste are drilling mud and spent drilling fluids.



**In 2018 the ratio of recycled waste to newly formed waste was equal to one.**

### Generation of waste of Hazard Classes 1-5 and waste handling in Russian entities of LUKOIL Group, thousand tons

	2016	2017	2018
Waste generation volume, total	1,033	1,434	1,529
Amount of waste used, neutralized, and handed over to specialized entities, as well as landfill waste	1,115	1,396	1,582

**Notes.** Data on waste generation volumes for 2016–2018 are shown net of rock waste generated during the boring of oil wells at LLC LUKOIL-Komi (Hazard Class 5).