Stationary sources

Emissions from stationary sources make up around 18.9% of all emissions by Russian Railways.

As part of the corporate Environmental Strategy, the Company cut its pollutant emissions from stationary sources in 2023 by 5.6% y-o-y, exceeding the target of 3.2%. This overachievement can be attributed to the additional conversion of small-capacity boiler houses from coal to electrothermal power, a reduction in bulk cargo handling, and modifications to the procedure for assessing stationary emission sources and air pollutant emissions[1], which led to recalculated emission figures. Also, the Company secured further savings in fuel and energy resources.

We are also increasing the share of alternative energy used in hot water and heat supply systems (solar collectors and heat pumps). We replaced small coal and diesel boilers with 43 boilers running on pellet fuel. The Company is also reconstructing and installing new dust collection and gas purification facilities.

At present, gas boilers produce as much as

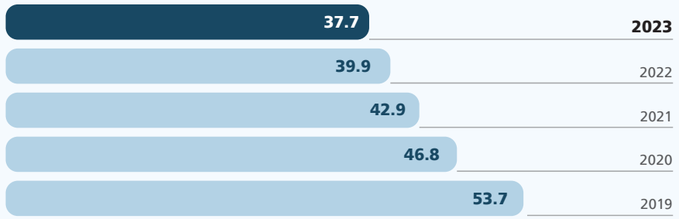
45.5 %

of heat energy

43 boilers

running on pellet fuel

Air pollutant emissions from stationary sources, kt



Mobile sources

Emissions from mobile sources make up around 81.1% of gross emissions of which approximately 87.8% come from mainline and shunting diesel locomotives. Initiatives to make transportation more energy efficient helped us reduce diesel driven transportation, cut downtime and time to cover delay for passenger trains, and decrease per unit diesel consumption in train traction. These factors enabled a reduction in per unit emissions of pollutants into the air from mobile sources, achieving a level of 33.6 mg/tkm against the target of 36.9 mg/tkm (down by 8.9%).

[1] Approved by Order No. 871 of the Russian Ministry of Natural Resources and Environment dated 19 November 2021.

Waste management

GRI 3-3, 306-2

Russian Railways views efficient waste management as a prerequisite for transitioning to the circular economy. In the long run, the Company seeks to minimise waste sent to landfills by increasing its processing.

Production and consumption waste

GRI 306-3, 306-4, 306-5

In 2023, Russian Railways generated 1.44 mt of production and consumption waste, of which 0.075 mt was disposed of or decontaminated by the Company's units. Given the waste generated by other business units in 2023, 1.55 mt of waste was transferred to third parties, including:

- 1.18 mt for subsequent disposal;
- 0.19 mt for decontamination;
- 0.18 mt for burial.

In 2023, the share of production and consumption waste sent to be buried amounted to 11.7%, which is 2 pp below 2022 (13.7%).

The Russian Railways Group's processes result in production and consumption waste of various hazard classes.

Structure of waste generation by hazard class in the reporting year

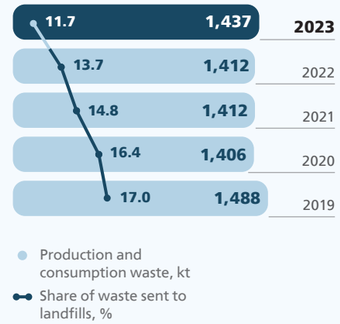
In 2023, Russian Railways generated 1.437 kt of production and consumption waste:

- Hazard class 1 – 124.42 t;
- Hazard class 2 – 126.98 t;
- Hazard class 3 – 134.56 t;
- Hazard class 4 – 189.21 t;
- Hazard class 5 – 1,113.40 t.

In 2023, the Company revised existing contracts and entered into new construction agreements with a focus on incorporating environmental safety requirements and traceability throughout the waste management cycle.

Over 85% of the waste generated by Russian Railways is decontaminated, reused or recycled. Most of it (ferrous and non-ferrous scrap metals and used petroleum products) is handled by waste processing professionals. In addition, waste is disposed of and decontaminated in accordance with the classes 1–4 waste management licence obtained by Russian Railways[1].

Waste generation and waste sent to landfills[2]



[1] Licence No. L020-00113-77/00114264 dated 21 December 2021.

[2] The share is calculated based on waste generated (taking into account waste accumulated as at the beginning of the period) and sent to be buried (including municipal solid waste transferred to a regional operator) in the reporting period in accordance with the 2-TP federal statistic form (waste) as regards reporting of industrial and consumer waste generated, processed, disposed of, decontaminated and sent to landfills.

Waste management

Waste disposal in 2023

Hazard class of waste	Disposed of at the Company's own facilities, kt	Transferred to third parties for disposal, kt
Hazard class 3	0.045	23.214
Hazard class 4	0.856	7.071
Hazard class 5	67.222	1,148.989

Waste decontamination and burial in 2023

Hazard class of waste	Decontaminated at the Company's own facilities, kt	Transferred to third parties for decontamination, kt	Transfer of MSW to regional operators, kt	Transfer of waste for burial (except MSW), kt
Hazard class 1	0	0.132	0	0
Hazard class 2	0.008	0.045	0	0
Hazard class 3	6.123[1]	125.131	0	0.067
Hazard class 4	0.154	61.292	107.602	18.768
Hazard class 5	0.055	0.388	37.129	18.583

We are progressively implementing a policy to foster sustainable waste management practices relying on circular economy principles. In 2023, we took various steps to increase the share of reused or recycled waste:

- Faustovo, Yanaul and Podvoloshnaya railway stations operate facilities to recycle reinforced concrete sleepers into crushed aggregate for construction and clean scrap reinforcement steel. In 2023, we processed 35,155 reinforced concrete sleepers.
- The Ukladochny, Perm-Sortirovochnaya and Tulun railway stations operate three disposal units for industrial rubber products. In 2023, the units recycled 711.1 t of waste, producing 350.1 t of rubber granules and 14,000 sq m of rubber flooring.
- Thermal neutralisation facilities of the Research and Production Centre for the Environmental Protection located at the Tagul railway station decontaminated 6.043 kt of industrial and medical waste.
- The reporting year saw a cogeneration unit at the Chernyakhovsk railway station consume hard fuel made of 28,100 wooden rails, generating 4,242 Gcal of heat and saving 576,36 cu m of natural gas.

Russian Railways operates facilities to handle railway-specific waste, including wooden and reinforced concrete sleepers, rubber waste products, and oil-containing waste.

The Company is also implementing electronic document management and replacing mercury-containing lamps with environmentally friendly, energy-efficient lighting solutions, among other initiatives.

In order to meet its commitments under the Stockholm Convention on Persistent Organic Pollutants, Russian Railways decontaminated 135 t (2,613 pieces) of spent capacitors in March 2023. This process, the first of its kind in the country, was carried out at a specialised landfill in Shikhany, Saratov Region, utilising the safest method of thermal plasma treatment.

▸ For more details on the project, see p.38-39

An example of how we implement circular economy principles is the processing of rubber products at three technology lines located at the Ukladochny railway station of the West-Siberian Railway, the Perm-Sortirovochnaya railway station of the Sverdlovskaya Railway, and the Tulun railway station of the East-Siberian Railway.

Russian Railways' passenger transportation business unit implements standard solutions for separate waste accumulation by engaging cleaning and outsourcing companies.

The reporting year also saw 2,463 t of paper, cardboard, glass, plastic, and household aluminium waste sent for disposal (up 272 t or 12% compared to 2,191 t in 2022).

In 2023, 158 railway stations were furnished with 216 reverse vending machines collecting plastic bottles and aluminium cans, with a bonus system in place for passengers. The reporting year saw 33,000 passengers hand over around 1.5 million containers for recycling, including 80% of plastic waste and 20% of household aluminium. Compared to 2022, the number of reverse vending machines increased eightfold (from 26 in 2022).

Russian Railways approved container sites for temporary collection of municipal solid waste and recyclable materials[1].

Separate waste collection on Sapsan trains

Russian Railways implemented separate collection of paper (newspapers and magazines) and plastics on its high-speed Sapsan trains. Cars feature labelled stationary containers to collect recyclables. Trains also have specially designed mobile collection trolleys. During the trip, passengers are encouraged to separate waste into two groups.

In 2023, Sapsan trains collected and sent 37.47 t of paper and plastic waste for recycling.

The High-Speed Transportation Directorate raises awareness about Russian Railways' responsible approach to the environment by means of on-board videos, publications in newspapers and magazines, social media and on-board catering activities.

The Company is committed to continuously enhancing waste management processes and promoting the separate collection of recyclable materials. To foster a sustainable environmental culture among passengers, a project was initiated to develop a network of reverse vending machines for collecting plastic bottles and aluminium cans, complete with a bonus system. This project introduced an innovative service for railway station passengers, increased the collection of recyclable waste, and reduced the volume of waste sent to landfills. Preserving the environment is a collective responsibility that requires each of us to recognise its importance and treat natural resources with care and respect. The environment is a shared effort of all of us.

Alexey Belonogov
Chief Engineer of the Railway Stations Directorate

[1] In 2023, thermal neutralisation facilities of the Research and Production Centre for the Environmental Protection located at the Tagul railway station (a branch of Russian Railways) decontaminated 6.042 kt of industrial waste and generated 5,179 Gcal of heat energy (heating and hot water supply).

[1] Russian Railways' Order No. 3325/r dated 26 December 2023.