## GHG emissions calculation methodology

Russian Railways calculates GHG emissions on the basis of the Methodology for GHG Emissions Volume Measurement at Russian Railways[1] prepared in line with applicable Russian methodological guidelines on the calculation of direct emissions[2] and indirect energy-related emissions[3], as well as methodological guidelines of the Intergovernmental Panel on Climate Change (IPCC). Emissions are calculated in relation to $CO_2$, without taking into account other greenhouse gases, according to data on the consumption of energy resources. Such approach is permitted by both Russian regulations and methodological guidelines of the IPCC.

The methodology involves the calculation of two GHG emissions categories:

- direct emissions from burning carbon-containing fuel on stationary and mobile equipment in Russian Railways' operations (Scope 1 under the Greenhouse Gas Protocol[4]);
- indirect energy-related emissions associated with the purchase of electricity and heat by Russian Railways' units from third parties (Scope 2 under the Greenhouse Gas Protocol).

Currently, the Company does not calculate any indirect GHG emissions associated with the purchase of construction materials, rolling stock and supplies, as well as any other goods (Scope 3 under the Greenhouse Gas Protocol).

# Climate change risks

The Company pays special attention to climate change risks, analysing the climate change impact and taking it into account when planning its activities. The key potential threat to the Company's business is damage to infrastructure in permafrost areas, growing number of meteorological hazards that jeopardise railway operations, including heavy rains and snowfalls, very low and high temperatures, extreme temperature swings, glaze, rime and greater impact of dangerous hydrological phenomena, such as spring floods and freshets, etc.

The main external risks of anthropogenic origin or naturally occurring which Russian Railways is exposed to include:

- damage and accidents at sites supporting the Company's operations;
- industrial accidents involving associated transport modes (primarily in sea port water areas and at highways);
- fires and natural disasters in the Company's areas of operation..

To mitigate these risks to infrastructure, the Company constructs various strengthening solutions (anti-washout slab covers, rock dumping, rock anchorage) and structures for protection of the track bed from natural hazards (such as mudflows, landslides, avalanches and rockfalls).

In 2021, as part of its R&D plan, Russian Railways started comprehensive analysis of exposure of the Company's infrastructure to external factors. The work will result in the creation of a hardware and software system based on Russian Railways' Geoinformation Platform to forecast and take account of changing environmental and anthropogenic factors affecting the technical condition of the engineering structure during its operating lifetime. As part of the above work, a methodology is being developed to calculate the impact of external risk factors on the condition and reliability of engineering structures.

[1] Approved by Russian Railways' Order No. 1602r dated 8 August 2017.
[2] Approved by Order of the Russian Ministry of Natural Resources and Environment No. 300 dated 30 June 2015.
[3] Approved by Order of the Russian Ministry of Natural Resources and Environment No. 330 dated 29 June 2017.
[4] Greenhouse Gas Protocol. Greenhouse Gas Protocol Corporate Accounting and Reporting Standard.