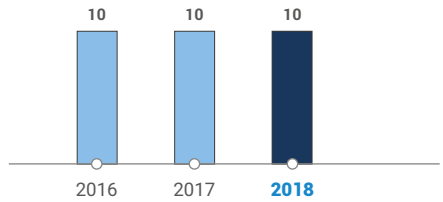
GREENHOUSE EMISSIONS

The Company assessed its GHG emissions in accordance with the existing national methodology. The assessment reflected the climatic conditions of operations, facilities upgrade and reconfiguration timelines. Direct GHG emissions total ca. 10 mtpa[1], including some 6.40 mtpa from fuel and energy assets, 3.45 mtpa from smelting operations, and up to 0.15 mtpa from transport and logistics. Next year, Nornickel intends to use the international methodology of GHG emission assessment for comparison purposes.

At the moment, Russian legislators are working to introduce statutory requirements for corporate GHG reporting.

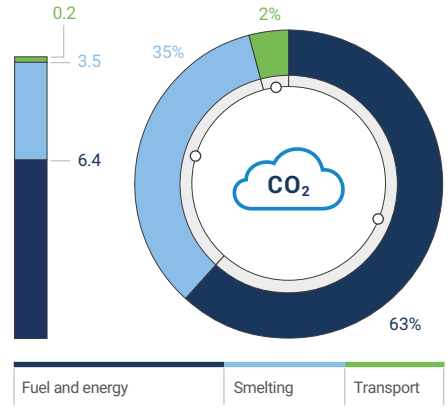
The Company is monitoring all legislative developments on this front to ensure compliance with the regulations.

Direct GHG emissions *(Scope 1, mt)*[1]



[1] *According to the GHG Emission Calculation Guidelines approved by Order No. 300 of the Russian Ministry of Natural Resources dated 30 June 2015.*

GHG emissions broken down by source *(mt)*



RENEWABLE ENERGY SOURCES

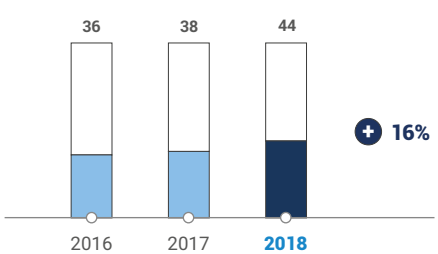
The European Union has set a target for a reduction of 20% in GHG emissions in the year 2020 compared with 1990 levels predominantly through shifting from fossil fuel to renewable energy sources.

The Company seeks to cover its energy needs primarily from renewable sources. Nornickel makes continuous efforts to reduce the consumption of such energy sources as diesel fuel, coal, and natural gas as well as to provide its enterprises with reliable and efficient low-carbon energy sources in the long term. As a result of Nickel Plant shutdown, the estimated coal consumption declined by 40–70 ktpa.

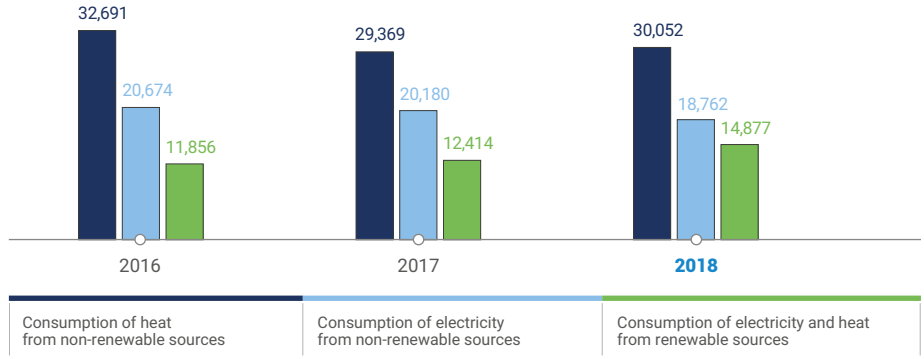
The Company's priority energy source is hydropower generated by hydropower plants: Ust-Khantayskaya and Kureyskaya HPPs (481 MW and 600 MW of installed capacity, respectively). In 2018, renewables accounted for 44% of total electric power generated by the Norilsk Nickel Group and 51% of power generated in the Norilsk Industrial District. The Company rolled out a project to replace hydropower plant equipment for rendering it more reliable and increasing power output through better performance of hydroelectric units (implemented in 2012–2021), thus laying out the groundwork to expand the share of renewables.

The use of other renewables such as solar, geothermal, and wind energy is limited, as Nornickel's major production assets are located beyond the Arctic Circle. There is not enough solar energy in winter because of polar night lasting approximately 60 days. Wind turbines are also inefficient due to changes in wind intensity: weather conditions range from dead calm lasting for weeks to snowstorms with a wind speed of up to 50 m/s.

Electric power generated from renewable sources *(%)*



Group's consumption of electricity and heat *(TJ)*



Power consumption and energy efficiency improvement

Nornickel is committed to the responsible use of heat and electricity. 85% of electricity is generated by the Company's fuel and energy companies supplying electric power to both intragroup facilities and third parties.

2018 saw the Company continue implementing initiatives in pursuance of Presidential Executive Order No 752 *On the Reduction of Greenhouse Gas Emission Volumes* of 30 September 2013. The Group's investment programme embraces several large-scale priority projects to fully unlock the potential of renewable power sources (hydropower) and ensure energy savings.

>>> *For more details on energy assets see* **p. 93–95**

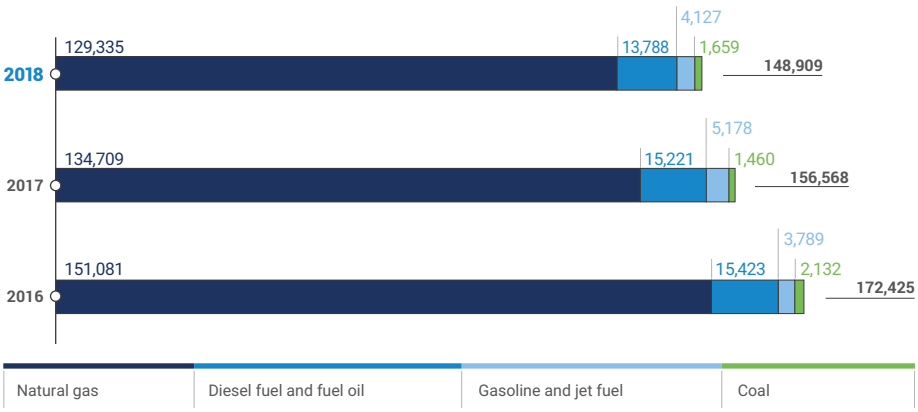
Major projects include:

- replacement of hydroelectric units and introduction of an automated dispatch system at Ust-Khantayskaya HPP;
- TPP-1 retrofit to enable automated process control;
- replacement of wooden supports at 110 kV lines with steel ones;
- construction of steam pipelines for the centralised heat supply system.

In 2018, significant efforts were invested in improving energy efficiency. As a result, the Group achieved savings of 87,822 tonnes of reference fuel (units). In the reporting year, per unit fuel consumption at TPPs stood at 265 g/kWh, down by 29 g/kWh vs target and by 17 g/kWh y-o-y. During the reporting year, the Company's subsidiaries saved 17.3 mcm of natural gas.

85% of electricity is generated by the Company's fuel and energy companies

Fuel consumption *(TJ)*



In 2018, the Company's spending under the programme totalled ca.

USD 92 mln (RUB 5.8 bn)

In 2018, the Group achieved savings of

87,822 tonnes of reference fuel

Group's electricity and fuel generation and consumption[2] *(TJ)*

Indicator	2016	2017	2018
Fuel consumption[3]	172,425	156,568	148,909
natural gas	151,081	134,709	129,335
diesel fuel and fuel oil	15,423	15,221	13,788
gasoline and jet fuel	3,789	5,178	4,127
coal	2,132	1,460	1,659
Energy from the Group's renewable sources (HPPs)	11,856	12,414	14,877
Electricity and heat procurement from third parties	8,968	10,483	10,931
Electricity and heat sales to third parties	19,882	19,503	18,926
TOTAL ENERGY GENERATION AND CONSUMPTION (1 + 2 + 3 – 4)	**173,367**	**159,962**	**155,792**

[2] *For a detailed breakdown of the Group's energy consumption by company, please see the 2018 Sustainability Report.*
[3] *Including the fuel used to generate energy for covering the needs of Norilsk.*