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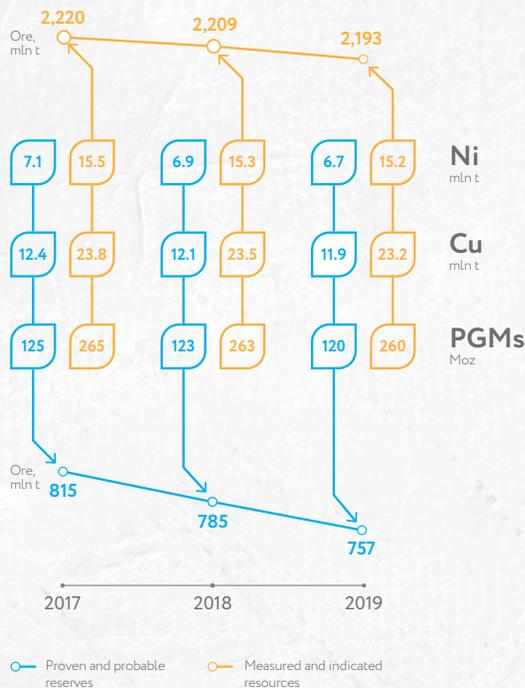
Overview

64	Mineral base	96	Transport assets
73	Operational performance	102	Research and development innovations
89	Sales and distribution	108	Financial performance (MD&A)
94	Energy assets		

MINERAL BASE

Nornickel boasts a unique mineral resource base of Tier 1 assets in Russia, on the Taimyr and Kola Peninsulas and in the Zabaykalsky Region. Nornickel's continued focus on expanding its resource base is essential to its long-term development.

MINERAL RESOURCES AND ORE RESERVES¹



EXISTING DEPOSITS

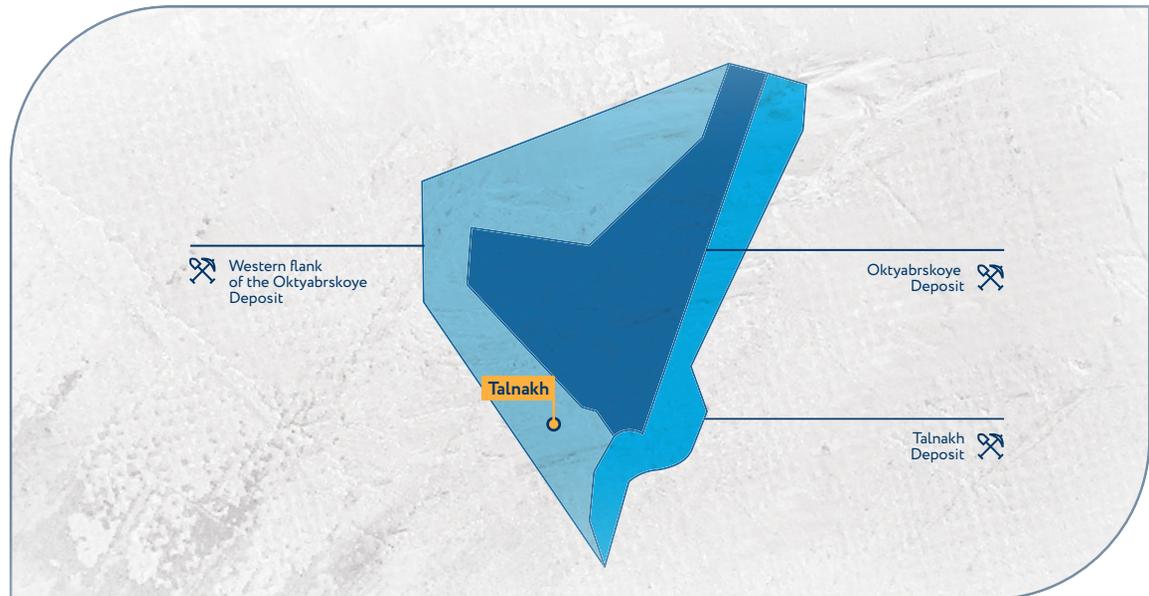
Nornickel is well-positioned to maintain a high level of economic ore reserves given the significant mineral resources within the existing deposits. The depleted ore reserves at the existing mines are replaced through resource development. The Company plans to ramp up its production by tapping into new rich ore deposits and gradually developing disseminated and cuprous ore horizons.

>80

years
of resources at the current
production rate

For more details on mineral resources and ore reserves, please see p. 326

^{1/} Data on mineral resources and ore reserves are based on the data on ore and metal balance reserves from the Russian divisions (reported in Form No. 5-gr under the Russian classification), analysed and converted as necessary to estimates under the Australasian Code for Reporting of Mineral Resources and Ore Reserves (the JORC Code). The estimates are JORC-compliant, use the terms recommended by the Russian Code for the Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves (the NAEN Code), and are based on the rules and regulations developed by Micon International Limited which conducts regular audits of the Group's reserves in Russia. The reserves and resources include wholly owned international assets (the Honeymoon Well project), net of GRK Bystrinkoye's deposits. Platinum group metals (PGMs) are platinum, palladium, rhodium, ruthenium, osmium, and iridium.



TALNAKH ORE CLUSTER

Location and profile

The Talnakh ore cluster is located in the Norilsk Industrial District, on the right bank of the Norilskaya River. It includes the world's largest Oktyabrskoye and Talnakhs koye copper-nickel deposits located on the north-western margin of the Siberian Craton. In the early 1960s, multiple ore bodies of high-grade cuprous and disseminated ores were discovered within the area. Nornickel is still well supplied with base and noble metals from the uniquely rich and vast resource base of the Talnakh ore cluster developed through mining operations of its Polar Division.

Balance reserves growth in 2019

4

mln t of ore

Ni – 109 kt

Cu – 123 kt

PGMs – 1 Moz

Balance metal reserves involved in 2019

14

mln t of ore

Ni – 259 kt

Cu – 448 kt

PGMs – 4 Moz

Average metal content

Ni – 3.0%, **Cu** – 3.3%, **PGMs** – 8.6 g/t

Proven and probable reserves

631

mln t of ore

Ni – 6 mln t

Cu – 11 mln t

PGMs – 112 Moz

Measured and indicated resources

1,554

mln t of ore

Ni – 11 mln t

Cu – 22 mln t

PGMs – 234 Moz

Balance reserves

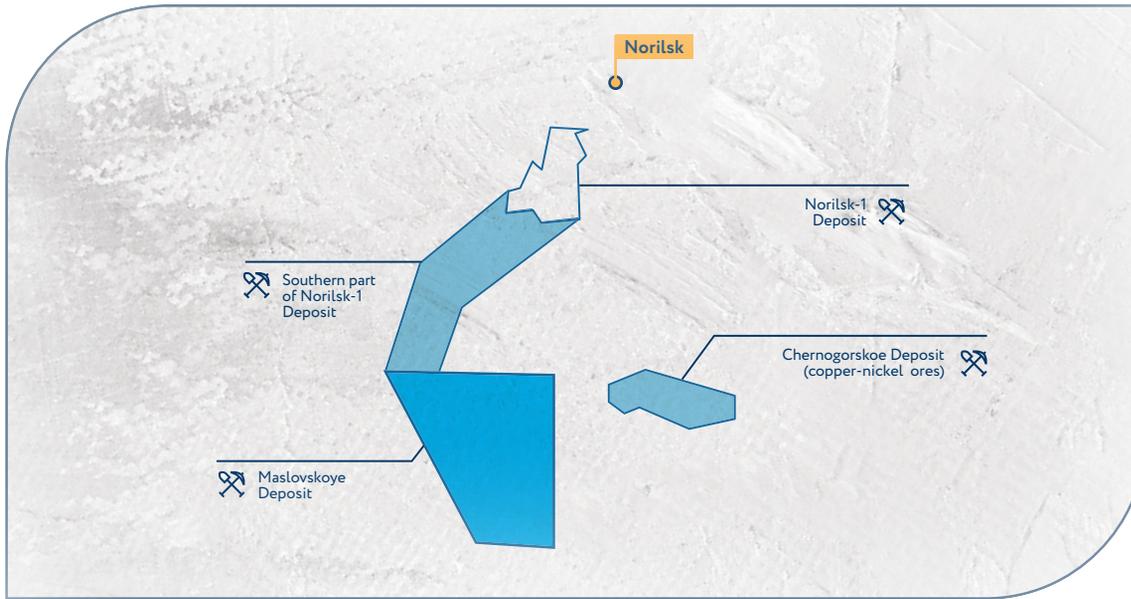
1,991

mln t of ore

Ni – 15 mln t

Cu – 29 mln t

PGMs – 312 Moz



NORILSK ORE CLUSTER

Location and profile

The Norilsk ore cluster (NID) is located in the Norilsk Industrial District. Brownfields include the northern part of the Norilsk-1 deposit producing disseminated sulphide ores since the 1930s.

To finance brownfield expansion in the northern part of the Norilsk-1 deposit, Nornickel launched the South Cluster project. A licence to develop Norilsk-1 and also some of the Polar Division’s assets were transferred to Medvezhy Ruchey, a wholly owned subsidiary established specifically to implement the expansion project. Medvezhy Ruchey includes Norilsk Concentrator, an open pit and an underground mine at Zapolyarny Mine, and tailing dumps No. 1 and Lebyazhye.

Balance reserves growth in 2019

1
mln t of ore

Ni – 2 kt
Cu – 3 kt
PGMs – 0.1 Moz

Balance metal reserves involved in 2019

2
mln t of ore

Ni – 7 kt
Cu – 10 kt
PGMs – 0.4 Moz

Average metal content

Ni – 3.0%, **Cu** – 0.5%, **PGMs** – 2.3 g/t

Proven and probable reserves

42
mln t of ore

Ni – 0.1 mln t
Cu – 0.2 mln t
PGMs – 8 Moz

Measured and indicated resources

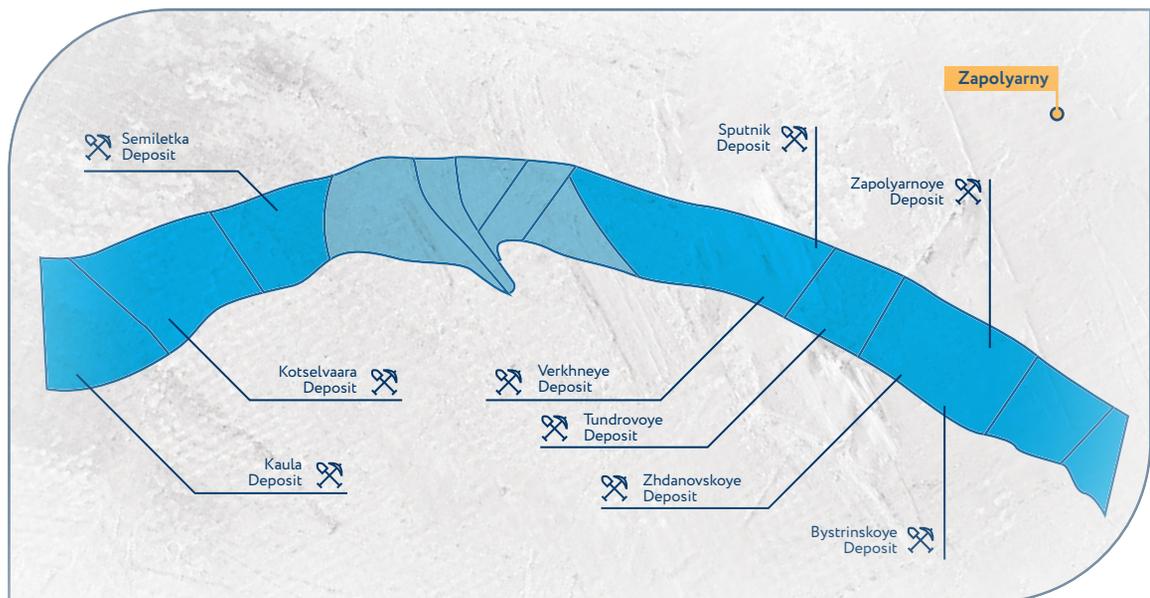
145
mln t of ore

Ni – 0.4 mln t
Cu – 0.5 mln t
PGMs – 25 Moz

Balance reserves

146
mln t of ore

Ni – 0.4 mln t
Cu – 0.6 mln t
PGMs – 25 Moz



KOLA MMC DEPOSITS

Location and profile

Kola MMC develops deposits located within a 25 km stretch between Nickel and Zapolyarny in the west of the Murmansk Region, and grouped into two ore clusters: Western (Kotselvaara and Semiletka deposits) and Eastern (Zhdanovskoye, Zapolyarnoye, Bystrinskoye, Tundrovoye, Sputnik, and Verkhneye deposits). The deposits in the Western and Eastern clusters have been developed since the 1930s and 1960s, respectively.

Balance metal reserves
involved in 2019

7

mln t of ore

Ni – 47 kt
Cu – 21 kt

Proven
and probable reserves

85

mln t of ore

Ni – 0.5 mln t
Cu – 0.3 mln t

Measured
and indicated resources

321

mln t of ore

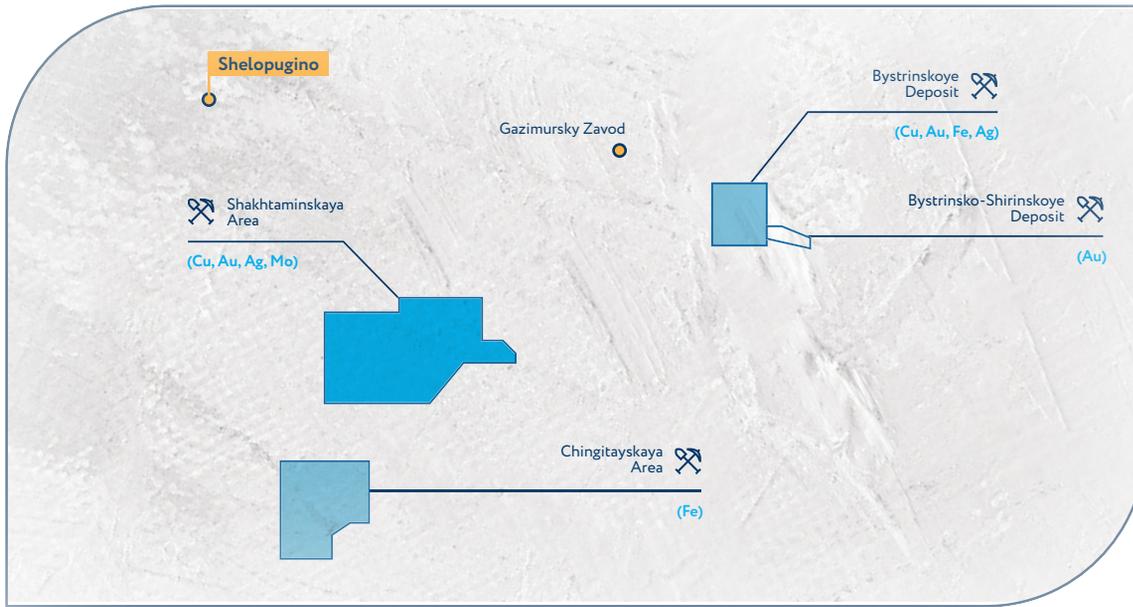
Ni – 2 mln t
Cu – 1 mln t

Balance reserves

465

mln t of ore

Ni – 3 mln t
Cu – 1.5 mln t



BYSTRINSKOYE DEPOSIT

Location and profile

The Bystrinskoye deposit is located in the Zabaykalsky Region, 16 km east of Gazimursky Zavod. Nor Nickel owns 50.01% of GRK Bystrinskoye which develops gold-iron-copper ores of the Bystrinskoye deposit. The Bystrinskoye deposit and Bystrinsky GOK came online in 2019.

Balance reserves

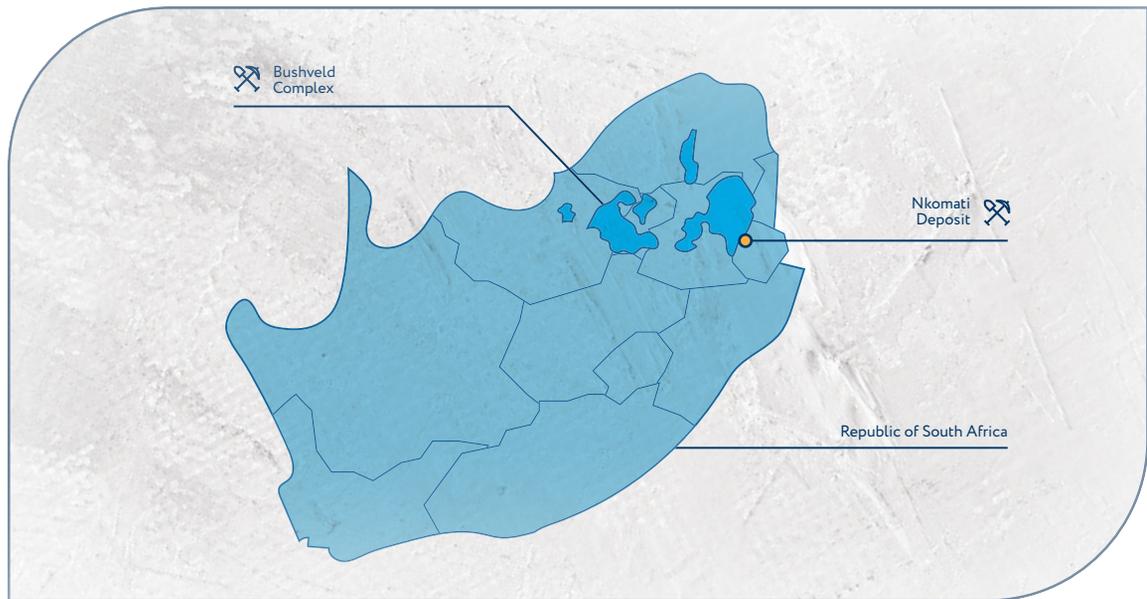
316
mln t of ore

- Cu** – 2 mln t
- Au** – 9 Moz
- Ag** – 38 Moz
- Fe** – 70 mln t

Balance reserves involved in 2019

10
mln t of ore

- Cu** – 61 kt
- Au** – 317 koz
- Ag** – 823 koz
- Fe** – 2 mln t



NKOMATI DEPOSIT

Location and profile

The Nkomati disseminated copper-nickel sulphide ore deposit is part of the Bushveld Complex in South Africa. The deposit consists of several ore bodies. The major ones are a solid sulphide ore body (high-grade nickel ore) and the main mineralisation zone (MMZ ore). It also includes a peridotite chromite mineralisation zone (PCMZ) with a lower metal content vs the main mineralisation zone. The deposit is developed by Nkomati (50%-owned by Nor Nickel). In 2019, the Group and its operating partner, African Rainbow Minerals, reached an agreement to scale down production at Nkomati Nickel Mine during 2020. As part of this process, the partners will elaborate in due course a plan contemplating the cessation of the mining operations and the placing of the mine in care and maintenance.

Proven
and probable reserves

8

mln t of ore

Ni – 22 kt

Cu – 8 kt

Co – 1 kt

PGMs – 0.2 Moz

Measured
and indicated resources

173

mln t of ore

Ni – 602 kt

Cu – 236 kt

Co – 32 kt

PGMs – 5.2 Moz

GROWTH PROJECTS

MASLOVSKOYE DEPOSIT

Location and profile

The Maslovskoye deposit is located in the Norilsk Industrial District, 12 km south of the Norilsk-1 deposit.

The Company received the licence to explore and mine the Maslovskoye deposit's platinum-copper-nickel sulphide ores in 2015.

Balance reserves

A feasibility study of permanent exploratory standards and a reserve statement for the Maslovskoye deposit were approved by the State Reserves Commission of the Russian Ministry of Natural Resources and included into the State Register of Mineral Reserves (Minutes No. 5561 dated 12 October 2018).

B + C₁ + C₂ mineral reserves

Item	Ore	Metal content in ore
Total ore	207 mln t	-
PGMs	49 Moz	7.4 g/t
Palladium	33 Moz	5.0 g/t
Platinum	13 Moz	2.0 g/t
Nickel	1 mln t	0.3%
Copper	1 mln t	0.5%
Cobalt	26 kt	0.01%
Gold	1 Moz	0.2 g/t

BUGDAINSKOYE DEPOSIT

Location and profile

The Bugdainskoye molybdenum deposit lies in the Alexandrovo-Zavodsky District of the Zabaykalsky Region, 30 km north-west of Alexandrovsky Zavod.

Its mineral reserves were included into the State Register of Mineral Reserves in 2007. In 2014, Nor Nickel halted the development of the Bugdainskoye deposit for three years in a low-price global molybdenum market, and in 2017 extended the suspension of operations for another five years, until 31 December 2022.

Balance reserves

Item	Reserves
Ore	812 mln t
Molybdenum	600 kt
Gold	360 koz
Silver	6,221 koz
Lead	41 kt

HONEYMOON WELL

The Group holds a mining licence to develop the Honeymoon Well project in Australia, which comprises deposits containing disseminated nickel sulphide ore (the Hannibals, Harrier, Corella and Harakka deposits), and massive and stockwork ores (the Wedgetail deposit). The total measured and indicated mineral resources of the Honeymoon Well project are estimated at 173 mln t of ore at an average grade of 0.68% nickel.

In 2017, Nornickel halted the development of the Wedgetail deposit for five years, until 7 October 2021.

BYSTRINSKO-SHIRINSKOYE DEPOSIT

The Bystrinsko-Shirinskoye gold ore deposit is located 24 km south-east of Gazimursky Zavod in the Zabaykalsky Region. The licence area shares a boundary with the Bystrinskoye deposit. In 2019, technical and economic viability of the potential development option was evaluated for the Bystrinsko-Shirinskoye gold ore deposit based on the results of a scoping study conducted to evaluate development options.

TALNAKH ORE CLUSTER DEPOSITS

To unlock the full potential of its deposits supporting existing operations and determine the best configuration for new operations, Nornickel explores the Talnakh ore cluster deposits, ensuring increases high-grade and cuprous ore reserves.

Eastern flank of the Oktyabrskoye deposit

In 2018, Nornickel conducted surface exploration within its licence boundaries as part of the Follow-Up Exploration of the Oktyabrskoye Deposit project. The results included multiple drill-hole intersections of rich ores outside the boundaries of the approved reserves, adding to the quantity of the high-grading ore reserves of the Severnaya 4 and Severnaya 3 Lens deposits. A quantitative estimate of the additions is planned following the project completion in 2020.

Western flank of the Oktyabrskoye deposit

In 2017, Nornickel obtained an exploration licence to prospect for and appraise mineral deposits within the western flank of the Oktyabrskoye deposit. The exploration licence area shares a boundary with the already licensed mining area. Prospecting on the property continued in 2019, with chemical analysis and laboratory tests completed for the 2018 prospecting results.

NON-METALLIC MINERAL DEPOSITS IN THE NORILSK REGION

Mokulaevskoye deposit

The Mokulaevskoye deposit lies 10 km north-west of the Oktyabrsky and Taimyrsky Mines. A mining licence for this limestone deposit was obtained upon its discovery in 2017. In 2018, the State Reserves Commission of the Russian Ministry of Natural Resources reviewed the feasibility study of permanent exploratory standards and the reserve statement for the deposit, including its limestone reserves into the State Register of Mineral Reserves for potential use in cement and lime production and in desulphurisation. The deposit can be developed through open-pit mining.

Its B + C₁ + C₂ balance reserves of limestone are 135,661 kt.

Gribanovsky licence area

In 2017, Nornickel obtained an exploration licence to prospect for and appraise silica sand deposits within the Gribanovsky licence area on the Yenisey River, 22.5 km south of Dudinka. A prospecting and appraisal programme for the property was completed in 2019. A feasibility study of permanent exploratory standards and a silica sand reserve statement for the deposit were completed based on its results and submitted to the State Reserves Commission of the Russian Ministry of Natural Resources for review.

The estimated C₁ + C₂ reserves of silica sand are 88,371 kt.

Ozero Lesnoye deposit

In 2017, Nornickel obtained a survey, exploration and mining licence for the basalt reserves of the Ozero Lesnoye deposit (licence area No. 2), located 22 km north of Norilsk.

Following a review of the 2019 feasibility study of permanent exploratory standards and the reserve statement, the deposit's basalt reserves were included into the State Register of Mineral Reserves for potential use as inert reinforcement for backfill concrete in underground mines.

The $C_1 + C_2$ balance reserves of basalt are 187,911,000 m³.

PROMISING AREAS AND PROSPECTS

Khalilskaya area

The Razvedochny, Mogensky, Khalilsky, Nizhne-Khalilsky, and Nirungdinsky copper-nickel sulphide ore prospects lie within the Khalilskaya area, located 150–160 km south-east of Norilsk.

In 2014, Nornickel obtained an exploration licence to prospect for and appraise deposits within the area. In 2019, the Company conducted surface prospecting and geochemistry, and identified promising areas for drilling to confirm the geology.

The Lebyazhninskaya area

The Lebyazhninskaya copper-nickel sulphide ore prospect is located 20 km north-west of Norilsk.

In 2014, Nornickel obtained an exploration licence to prospect for and appraise deposits within the area. In 2019, laboratory tests were conducted for previous prospecting results.

Yuzhno-Norilskaya area

The Morongovsky and Yuzhno-Yergalakhsky copper-nickel sulphide ore prospects lie within the Yuzhno-Norilskaya area, located 30 km south of Norilsk. In 2019, Nornickel obtained an exploration licence to prospect for and appraise deposits within the area.

Mikchangdinskaya area

The Yuzhno-Neralakhsky, Snezhny and Neralakhsky copper-nickel sulphide ore prospects lie within the Mikchangdinskaya area, located 70 km north-east of Norilsk. In 2019, Nornickel obtained an exploration licence to prospect for and appraise deposits within the area.

OPERATIONAL PERFORMANCE



Sergey Dyachenko

First Vice-President –
Chief Operating Officer



In 2019, the Company increased the output of all key metals as a result of improved operating efficiency, optimization of production flow and ongoing ramp-up of Bystrinsky project.

Total nickel output increased 5% year-on-year to 229 kt owing to the ramp-up of the refining shop operating new chlorine leaching technology and expansion of carbonyl nickel production capacity at Kola MMC. Total copper output increased 5% year-on-year to a record of 499 kt driven by improved operating efficiency, increased mined ore volumes and higher copper grades at Talnakh mines as well as the ramp-up of Bystrinsky (Chita) project that was fully commissioned in September 2019. Palladium and platinum output increased 7% and 8% year-on-year to 2.9 moz and 0.7 moz, respectively, owing primarily to the release of work-in-progress inventory.

Ore output (mln t)

Asset	2017	2018	2019
Assets in Russia (copper-nickel sulphide ore)	25.0	25.2	26.3
Polar Division and Medvezhy Ruchey	17.4	17.3	18.4
Kola MMC	7.6	7.9	7.9
Assets in Russia (gold-iron-copper ores)	0	7.9	10.5
GRK Bystrinkoye	0	7.9	10.5
Nkomati (South Africa)¹	3.5	3.1	3.5

Average mined grades

Asset	2017	2018	2019
Nickel, %			
Polar Division and Medvezhy Ruchey	1.3	1.3	1.3
Kola MMC	0.5	0.6	0.5
Nkomati	0.3	0.3	0.3
Copper, %			
Polar Division and Medvezhy Ruchey	2.2	2.2	2.2
Kola MMC	0.2	0.2	0.2
GRK Bystrinkoye	n/a	0.4	0.6
Nkomati	0.1	0.1	0.1
PGMs, g/t²			
Polar Division and Medvezhy Ruchey	6.8	6.8	6.9
Kola MMC	0.1	0.1	0.1
Nkomati	n/a	n/a	n/a

^{1/} All metrics for Nkomati are hereinafter shown based on the 50% ownership. Nkomati's operating results are not consolidated into the Group's total results.

^{2/} Five platinum group metals: palladium, platinum, rhodium, ruthenium, and iridium.

Metals recovery in concentration¹

Asset	2017	2018	2019
Nickel, %			
Polar Division and Medvezhy Ruchey	79.9	81.5	83.1 ¹
Kola MMC	69.8	69.5	67.9
Nkomati	70.7	65.9	64.2
Copper, %			
Polar Division and Medvezhy Ruchey	94.7	94.6	95.2 ¹
Kola MMC	75.4	74.1	73.2
GRK Bystrinkoye	n/a	82.9	87.7
Nkomati	90.9	88.4	87.7
PGMs, %			
Polar Division and Medvezhy Ruchey	81.5	82.7	85.2 ¹

Metals recovery in smelting

Asset	2017	2018	2019
Nickel, %			
Polar Division and Medvezhy Ruchey ²	93.9	94.6	94.6
Kola MMC ³	96.5	96.7	96.7
Kola MMC ⁴	98.2	98.0	97.0
Norilsk Nickel Harjavalta ⁴	98.5	97.9	97.9
Copper, %			
Polar Division and Medvezhy Ruchey ²	94.0	94.4	94.1
Kola MMC ³	96.2	96.1	96.2
Kola MMC ⁴	97.4	97.6	96.5
Norilsk Nickel Harjavalta ⁴	99.7	99.7	99.8
PGMs, %			
Polar Division and Medvezhy Ruchey ²	95.6	95.9	95.8
Kola MMC ⁴	96.7	94.0	91.6
Norilsk Nickel Harjavalta ⁴	99.3	99.8	99.8

1/ Metals recovery in bulk concentrate.

2/ Feedstock to finished products.

3/ Feedstock to converter matte.

4/ In refining, converter matter to finished products.

Saleable metals production

Product	2017	2018	2019
Group total			
Nickel, kt	217.1	218.8	228.7
– from own Russian feedstock	210.1	216.9	225.2
Copper, kt	401.1	473.7	499.1
– from own Russian feedstock	397.8	473.5	498.8
Palladium, koz	2,780	2,729	2,922
– from own Russian feedstock	2,728	2,729	2,919
Platinum, koz	670	653	702
– from own Russian feedstock	650	653	700
Assets in Russia			
Nickel, kt	157.4	158.0	166.3
Copper, kt	387.6	455.6	486.2
Palladium, koz	2,738	2,671	2,868
Platinum, koz	660	642	690
Norilsk Nickel Harjavalta (Finland)			
Nickel, kt	59.7	60.8	62.4
Copper, kt	13.4	18.0	12.9
Palladium, koz	42	58	54
Platinum, koz	10	11	12
Nkomati (South Africa)⁵			
Nickel, kt	8.0	6.6	6.5
Copper, kt	4.5	3.1	3.4
Palladium, koz	46	33	33
Platinum, koz	20	13	14

Production breakdown by asset in 2019 (share of the Group's total production) (%)



5/ Nkomati's operating results are not consolidated into the Group's total results.

POLAR DIVISION AND MEDVEZHYY RUCHEY, TAIMYR PENINSULA

The Polar Division and Medvezhy Ruchey are the Group's flagship assets boasting a full metals production cycle from ore mining to the shipment of finished products to customers. They are located in the Taimyr Peninsula in Russia, in the north of the Krasnoyarsk Region beyond the Arctic Circle, and linked to other regions by the Yenisey River, the Northern Sea Route, and by air.

Operating the Company's largest deposits, they mine over 18 Mtpa of copper-nickel sulphide ore.

In 2019, the Polar Division and Medvezhy Ruchey accounted for 71% and 36% of the Group's total output of copper and PGMs, respectively.

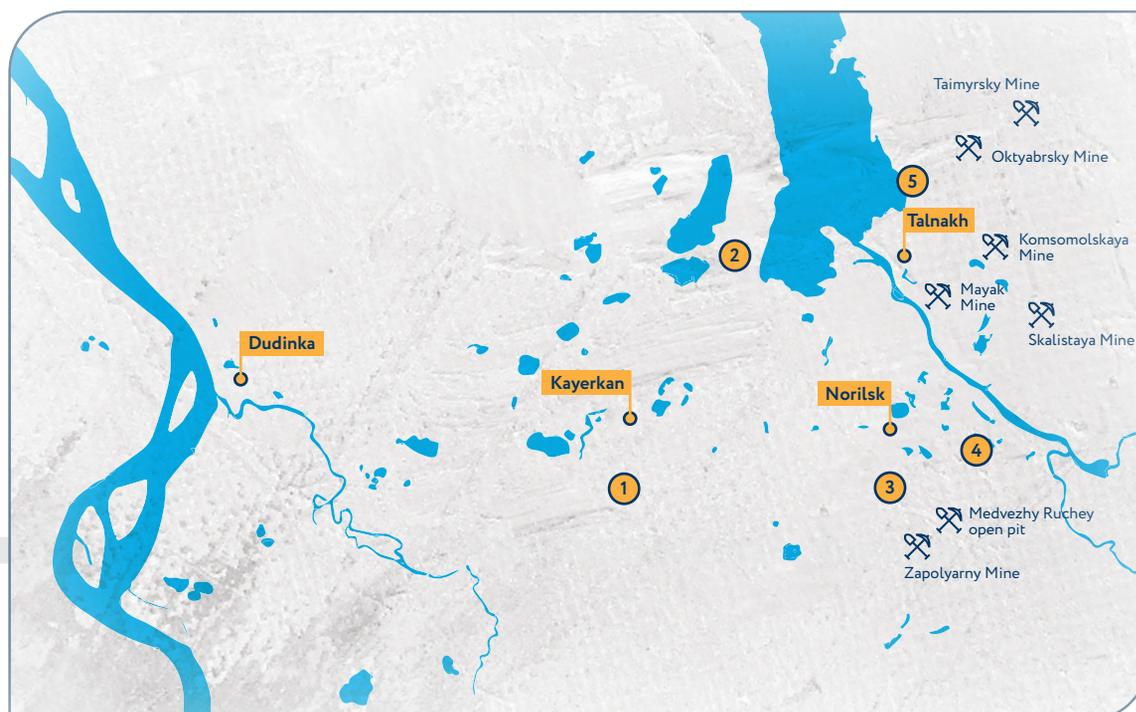
MINING

The Polar Division and Medvezhy Ruchey mine copper-nickel sulphide ores of three grades: rich ores, characterised by a higher content of base and precious metals; cuprous ores, with a higher copper content vs nickel; and disseminated ores, with a lower content of all metals.

The Talnakhskoye and Oktyabrskoye deposits are developed by Taimyrsky, Oktyabrsky, Komsomolsky, Skalisty, and Mayak Mines. The mines deploy slicing and chamber methods with the cut-and-fill system. Stopes are refilled with backfill mixtures, with their composition adjusted in each case to technological requirements to mine backfill durability.

The Norilsk-1 deposit is developed by Medvezhy Ruchey's Zapolyarny Mine through open-pit and underground mining. Underground mining is carried out through sublevel (level) caving using

- 1 Norilsk Airport
- 2 Nadezhda Metallurgical Plant
- 3 Norilsk Concentrator
- 4 Copper Plant
- 5 Talnakh Concentrator



front ore passes and self-propelled vehicles. In 2019, a feasibility study of Zapolyarny Mine was completed to assess the combined development options for the remaining disseminated ore reserves at the Norilsk-1 deposit. Based on the study results, disseminated ore production at Medvezhy Ruchey is expected to increase to 9 Mtpa by 2027.

Combined ore production from the Polar Division and Medvezhy Ruchey was 18.4 mln t in 2019,

up 1.1 mln t y-o-y (+ 6%). Rich and cuprous ore production increased by 8% and 10%, respectively, with Taimyrsky and Skalisty Mines also increasing their combined rich ore production by 12% y-o-y. Oktyabrsky and Komsomolsky Mines increased cuprous ore production by 10% while disseminated ore production was almost flat (+ 0.3%). The change in the mined ore output was in line with the annual production plan.

Ore output (mln t)

Mining asset, ore type	Mine type	2017	2018	2019
Total ore		17.38	17.32	18.42
- rich		6.57	6.78	7.35
- cuprous		5.56	5.24	5.75
- disseminated		5.23	5.30	5.32
Polar Division				
Oktyabrskoye deposit:		8.82	8.95	9.45
Oktyabrsky Mine	Underground	5.23	5.17	5.37
- rich		1.13	0.98	0.88
- cuprous		3.15	2.98	3.38
- disseminated		0.95	1.21	1.11
Taimyrsky Mine	Underground	3.59	3.79	4.08
- rich		3.59	3.79	4.08
Talnakhskoye and Oktyabrskoye deposits:		6.92	6.70	7.34
Komsomolsky Mine	Underground	5.86	3.82	4.00
- rich		1.83	0.11	0.10
- cuprous		2.41	2.18	2.28
- disseminated		1.63	1.53	1.62
Skalisty Mine	Underground	n/a	1.95	2.34
- rich		n/a	1.87	2.25
- cuprous		n/a	0.09	0.09
Mayak Mine	Underground	1.06	0.93	1.00
- rich		0.03	0.04	0.04
- disseminated		1.03	0.89	0.97
Medvezhy Ruchey				
Norilsk-1 deposit, Zapolyarny Mine, disseminated ore	Open-pit/ underground	1.64	1.67	1.63

CONCENTRATION

Concentration facilities

- Talnakh Concentrator
- Norilsk Concentrator (part of Medvezhy Ruchey)

Talnakh Concentrator processes rich, cuprous, and disseminated ores from the Oktyabrskoye and Talnakhskoye deposits to produce nickel-pyrrhotite and copper concentrates, and metal-bearing products. The key processing stages include crushing, milling, flotation, and thickening.

Norilsk Concentrator processes all disseminated ores from the Norilsk-1 deposit, cuprous and disseminated ores from the Oktyabrskoye and Talnakhskoye deposits, and low-grade ores from Copper Plant to produce nickel and copper concentrates. The key processing stages include crushing, milling, flotation, gravity concentration, and thickening.

Thickened concentrates are transported from Talnakh and Norilsk Concentrators via slurry pipelines to the Polar Division for further processing.

In 2019, the Company's concentration facilities processed a total of 18.2 mln t across all types of ore feedstocks (including rich, cuprous, and disseminated ores).

Talnakh Concentrator processed 10.7 mln t of ore in 2019 (up 0.3 mln t y-o-y). Its nickel recovery into bulk flotation concentrate, including the output of metal-bearing pyrrhotite products, increased by 2.7% y-o-y to 85.9% due to the optimised technology for obtaining metal-bearing pyrrhotite products deployed at Talnakh Concentrator.

Norilsk Concentrator processed 6.8 mln t of ore in 2019 (down 0.7 mln t y-o-y), in line with the mining plan.

The facility's nickel recovery into bulk concentrate was 0.6% lower y-o-y at 71.3%. During the year, the facility also processed significant amounts of low-grade ores from Copper Plant.

SMELTING

Smelting assets of the Polar Division

- Nadezhda Metallurgical Plant
- Copper Plant
- Copper Plant's smelting shop

Nadezhda Metallurgical Plant produces converter matte and elemental sulphur by processing:

- Talnakh Concentrator's nickel-pyrrhotite concentrate and metal-bearing products
- Norilsk Concentrator's nickel concentrate
- pyrrhotite concentrate from Kayerkansky open-pit coal mine's storage.

PRODUCTION CHAIN

The produced concentrates, including steam cured sulphide concentrate, are fed into flash smelting furnaces at Nadezhda Metallurgical Plant. Steam cured sulphide concentrate is leached at Hydrometallurgical Shop of Nadezhda Metallurgical Plant from products with low metal content, such as Talnakh Concentrator's metal-bearing products, products from Nadezhda Metallurgical Plant's tailings facility,

Sulphide ores processed (mln t)

Concentrator	2017	2018	2019
Talnakh Concentrator	10.0	10.4	10.7
Norilsk Concentrator	7.5	6.8	7.5

Nickel recovery (%)

Concentrator	2017	2018	2019
Talnakh Concentrator	81.7	83.2	85.9
Norilsk Concentrator	71.7	71.9	71.3

and concentrates from tailings ponds. The matte produced in flash smelting furnaces is then converted into high grade converter matte.

Copper Plant processes all of the copper concentrate from the Company's concentrators, as well as third-party feedstocks, to obtain copper cathodes, elemental sulphur and sulphuric acid for the operational needs of the Polar Division.

Copper Plant's smelting shop recycles sludge from the copper tankhouses of Copper Plant and Kola MMC to produce precious metal concentrates, commercial selenium and tellurium.

The precious metals produced by the Polar Division are refined at Krastsvetmet and URALINTECH under tolling agreements.

The Polar Division produces metals from its own feedstock. Since the fourth quarter of 2016, all nickel converter matte from Nadezhda Metallurgical Plant has been processed at Kola MMC due to Nickel Plant shutdown.

The Polar Division products:

- Copper cathodes
- Nickel converter matte sent for processing to Kola MMC
- Precious metal concentrates
- Technical sulphur, selenium
- Tellurium in billots

Copper production remained basically flat y-o-y in 2019, with a slight increase of 1% driven by a higher copper content in the ore mined. Production of PGMs grew by 4% y-o-y, mainly through drawdowns in high-value work-in-progress inventory.

Production volumes

Product	2017	2018	2019
Copper, t	306,859	353,131	355,706
Palladium, koz	956	987	1,042
Platinum, koz	259	260	251

KOLA MMC, KOLA PENINSULA

Kola MMC is Nornickel's wholly owned subsidiary and a valuable production asset located in the Kola Peninsula in the Murmansk Region of Russia.

In 2019, Kola MMC accounted for 73%, 17% and 62% of the Group's total nickel, copper, and PGM finished products, respectively.

- The Kotselvaara and Semiletka deposits primarily use stoping from sublevel drifts and sublevel caving. Room-and-pillar short-hole and long-hole stoping are also used on a limited scale.

MINING

Kola MMC's mines disseminated copper-nickel sulphide ores.

At Kola MMC, various ore mining methods are used:

- The Zhdanovskoye and Zapolyarnoye deposits use three mining methods: gravity caving with front ore passes, sublevel caving with room-and-pillar ore removal, and room-and-pillar mining. To ensure full utilisation of the concentrator's design capacity, off-balance open-pit mining waste is processed as well.

- 1 Concentrator and Briquetting Shop 2 Smelting Shop 3 Refining Shop 4 Tankhouse Cells



Ore output (mln t)

Mining asset	Mine type	2017	2018	2019
Total ore		7.64	7.90	7.91
Zhdanovskoye deposit		6.81	7.14	7.25
– Severny Mine	Underground	6.55	6.56	6.49
– Severny Mine	Open-pit	0.26	0.58	0.77
Zapolyarnoye deposit		0.14	0.08	0.06
– Severny underground section	Underground	0.14	0.08	0.06
Kotselvaara and Semiletka deposits:		0.70	0.68	0.60
– Kaula-Kotselvaara mine	Underground	0.70	0.68	0.60

In 2019, Kola MMC produced about 8 mln t of ore (up 0.2% y-o-y). The slight increase was due to off-balance open-pit mining waste processing to ensure full utilisation of the concentrator's design capacity, in line with the annual production plan.

CONCENTRATION**Concentration facilities**

- Zapolyarny Concentrator

The concentrator produces briquetted copper-nickel concentrate. Briquettes are delivered to the smelting shop to produce converter matte.

In 2019, Kola MMC's concentrator processed 7.6 mln t of ore, down 0.3 mln t y-o-y. The rate of metals recovery in bulk concentrate decreased as well, due to a higher share of complex morphology ores with disseminated sulphide minerals in the charge.

SMELTING

Downstream facilities

- Smelting Shop (Nickel)
- Briquetting section (Zapolyarny)
- Smelting Shop (Monchegorsk)
- Refining Shop (Monchegorsk)
- Tankhouses 1 and 2 (Monchegorsk)

Nornickel continues upgrading Tankhouse 2 to launch nickel cathode production using the technology of nickel electrowinning from chlorine dissolved tube furnace nickel powder. The project is expected to boost Tankhouse 2 production capacity from 120 ktpa to 145 ktpa of electrolytic nickel while also improving the recovery rate by 1%. In 2019, Nornickel commissioned the second, the fourth and a part of the third series of electrowinning cells. The project is expected to ramp up to full design capacity in Q2 2020. Pre-commissioning is also in progress for a new precious metal concentrate section of Kola MMC's Smelting Shop. The section's commissioning is an integral and essential part of Nornickel's plan to optimise the configuration of refining facilities.

In 2019, Kola MMC used only Nornickel's own Russian feedstock in metals production. The y-o-y increase in nickel and copper output was driven by the expansion of carbonyl nickel production capacity and supplies of richer copper concentrate from the Polar Division. The increase in PGMs output in 2019 was due to drawdowns in high-value work-in-progress inventory.

Products:

- Nickel cathodes
- Nickel carbonyl
- Saleable nickel concentrate
- Copper cathodes
- Saleable copper concentrate from converter matte separation
- Electrolytic cobalt
- Cobalt concentrate
- Precious metal concentrates
- Sulphuric acid
- Crushed converter matte for Harjavalta

Production volumes

Product	2017	2018	2019
Nickel, t	157,396	158,005	166,265
– from own Russian feedstock	155,110	157,519	166,265
Copper, t	80,781	83,070	86,976
– from own Russian feedstock	78,587	82,987	86,976
Palladium, koz	1,782	1,684	1,826
– from own Russian feedstock	1,737	1,684	1,826
Platinum, koz	401	381	439
– from own Russian feedstock	385	381	439

GRK BYSTRINKOYE, ZABAYKALSKY REGION

GRK Bystrinskoye (Bystrinsky GOK) is Nornickel's 50.01%-owned subsidiary. Bystrinsky GOK is located in the Gazimuro-Zavodsky District, Zabaykalsky Region, 16 km east of Gazimursky Zavod village, 350 km away from Chita.

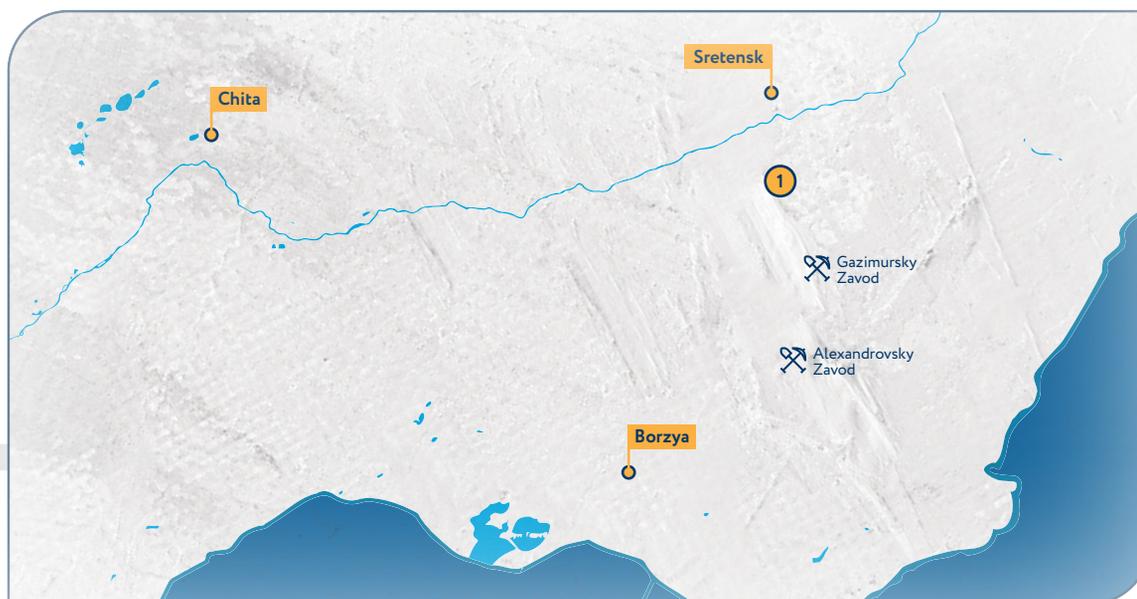
Nornickel's new asset is the largest greenfield project in the Russian metals industry, integrating ore mining, concentration and shipment of end products to customers. The expected volume of ore mined and processed at Bystrinsky GOK is approximately 10 Mtpa.

Nornickel commenced the construction of Bystrinsky GOK in 2013. The construction project includes open-pit mining at the Bystrinskoye deposit, a mining and processing plant (MPP) along with all of the associated infrastructure, including a power

line and a 227-km Borzya–Gazimursky Zavod railway line, and a rotation camp. In October 2017, Nornickel started the pre-commissioning activities, and in September 2019 Bystrinsky GOK was commissioned. The project is expected to ramp up to design capacity by 2021.

In 2019, Bystrinsky GOK accounted for 9% of the Group's total copper end products.

1 Bystrinsky GOK



MINING

Bystrinsky GOK mines gold-iron-copper ores of the Bystrinskoye deposit.

Ore output (mln t)

Mining asset	Mine type	2018	2019
Total ore		7.86	10.49
Bystrinskoye deposit		7.86	10.49
- Verkhneildikansky open pit mine	Open-pit	7.43	8.60
- Bystrinsky-2 open pit mine	Open-pit	0.43	1.89

CONCENTRATION

Concentration facilities

- Concentrator

The concentrator construction commenced in 2015; the facility's purpose is to process ores of the Bystrinskoye deposit into copper, iron ore, and gold concentrates. The key processing stages include crushing, milling, flotation, thickening, filtration and end product packaging. The concentrator has two processing lines. In 2018, Bystrinsky GOK started pre-commissioning of the processing lines, and in 2019 the concentrator was commissioned.

In 2019, it processed 7.5 mln t of ore (2018: 3.8 mln t). The increase was due to scheduled ramp-up to design capacity.

Copper and iron ore concentrates are sold via third parties, while gold concentrates are further processed at the Polar Division.

Products:

- Copper concentrate
- Gold concentrate
- Iron ore concentrate.

Production volumes

Product	2018	2019
Ore processing, mln t	3.8	7.5
Copper (in copper concentrate), t	19,417	43,489
- copper content in the concentrate, %	25.4	25.5
Gold (in copper and gold concentrates), koz	89	177
- gold content in the concentrate, g/t	6,218	4,034
Iron ore concentrate, kt	346	1,311
- iron content in the concentrate, %	64.1	64.6

NORILSK NICKEL HARJAVALTA, FINLAND

Norilsk Nickel Harjavalta is Nornickel's wholly owned subsidiary, acquired by the Group in 2007. The Harjavalta facility processes Nornickel's Russian feedstock and nickel-bearing raw materials sourced from third-party suppliers.

Founded in 1959, it is Finland's only nickel refinery and one of the largest nickel producers in Europe. Harjavalta's capacity is 66 ktpa of nickel products.

The facility uses sulphuric acid leaching with metal recovery rates above 98%, which is a best practice in the global mining and metals industry.

In 2019, Norilsk Nickel Harjavalta accounted for 27%, 3% and 2% of the Group's total nickel, copper and PGM finished products, respectively.

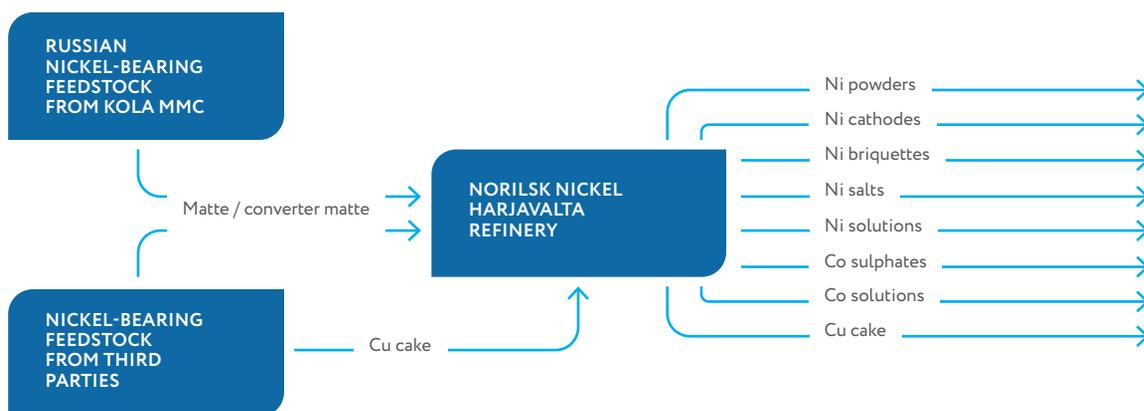
1 Norilsk Nickel Harjavalta Plant



SMELTING

Facility's process chart

In 2019, the refining facilities of Kola MMC were gradually increasing their nickel feedstock supplies to Norilsk Nickel Harjavalta in line with the Group's downstream reconfiguration strategy. Third-party feedstock supplies, i.e., converter matte from Boliden and nickel salts from other suppliers, were regular and marginal in 2019. Metal recovery rates remained flat y-o-y.



In 2019, Norilsk Nickel Harjavalta produced 62 kt of saleable nickel (up 3% y-o-y), an all-time high for the refinery. The growth was driven by the reconfiguration of refining facilities and increased nickel feedstock supplies from Kola MMC. The production of copper in copper cake totalled 13 kt, down 28% y-o-y, while the output of saleable palladium in copper cake decreased by 8% y-o-y and platinum output increased by 5% y-o-y. The decrease in copper and palladium output was due to the start of copper cake shipments to the Polar Division for further processing.

Saleable nickel output by product in 2019 (%)



Products:

- Nickel cathodes and briquettes
- Nickel salts, powders, and solutions
- Cobalt sulphate and solutions
- PGM-bearing copper cake

Refining capacity utilisation (%)



Production volumes

Product	2017	2018	2019
Nickel, t	59,716	60,765	62,422
- from own Russian feedstock	55,021	59,337	58,939
Copper (in copper cake), t	13,441	18,036	12,948
- from own Russian feedstock	12,328	17,980	12,667
Palladium (in copper cake), koz	42	58	54
- from own Russian feedstock	35	58	51
Platinum (in copper cake), koz	10	11	12
- from own Russian feedstock	6	11	9

NKOMATI, SOUTH AFRICA

Nkomati is a joint venture between Nornickel (50% interest) and African Rainbow Minerals. Nkomati's performance is reflected in Nornickel's financial results using proportional consolidation, based on our stake.

In 2019, total ore mined by Nkomati reached 3.5 mln t (attributable to the Group's 50% shareholding) with an average nickel content of 0.26% and copper content of 0.11%.

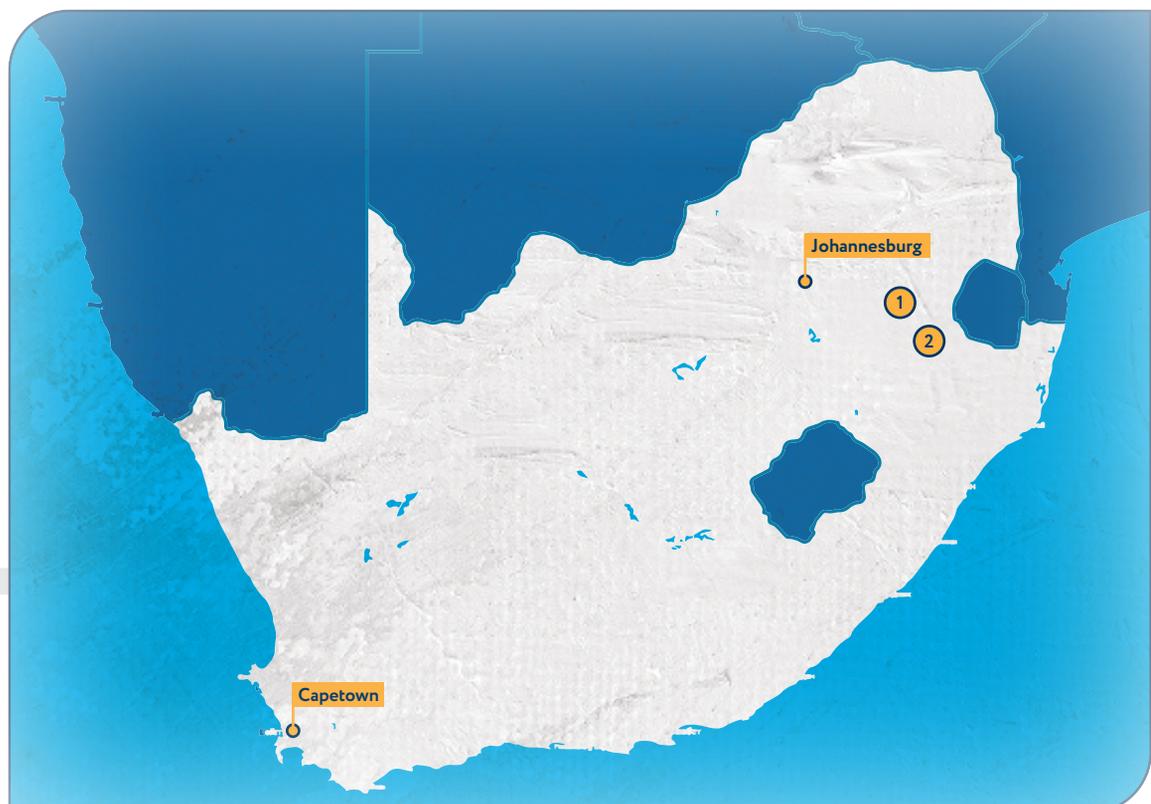
Nkomati is located in the Mpumalanga Province, South Africa, 300 km east of Johannesburg.

It is the only South African company to produce nickel concentrate, which also contains copper, cobalt, and PGMs. Nkomati produces chrome concentrate as well.

MINING

The Nkomati deposit has a substantial resource base represented by disseminated copper-nickel sulphide ores. The deposit consists of several ore bodies. The major ones are a solid sulphide ore body with a high nickel content and a peridotite chromite mineralisation zone with a relatively lower nickel content and a relatively higher chrome content.

① Mine ② Concentrator



CONCENTRATION AND SMELTING

Concentration facilities

- Concentrator for ore mined in the main section, with installed capacity of 375 kt per month.
- Concentrator for ore mined in the peridotite chromite section, with installed capacity of 250 kt per month.

The mined ore is processed at concentrators using the sulphide flotation technology, with the resulting concentrates then sold by Nornickel to third parties.

In 2019, Nkomati produced 6.5 kt of nickel (down 2% y-o-y), 3.4 kt of copper (up 12% y-o-y), 33 koz of palladium (down 1% y-o-y), and 14 koz of platinum (up 6% y-o-y) (attributable to the Group's 50% shareholding). The drop in nickel and palladium production and the increase in copper and platinum output were due to changes in the processed ore composition and the commencement of production ramp-down as part of plans to scale down production at Nkomati Nickel Mine during 2020.

Products:

- Saleable concentrate.

Production volumes¹

Product (in concentrate)	2017	2018	2019
Nickel, kt	8.0	6.6	6.5
Copper, kt	4.5	3.1	3.4
Palladium, koz	46	33	33
Platinum, koz	20	13	14

^{1/} Volumes based on the 50% ownership.

SALES AND DISTRIBUTION

In 2019, Nornickel maintained its long-standing reputation as a reliable supplier of high-quality products. The integrated index of customer satisfaction with the Company's products and services matched the target level.

As a top global producer of base and platinum group metals, Nornickel sees its role as leading the industry on building an improved ecosystem for all market players and to this end launched a project to digitise all metal sale contracts in 2019.

The Company supplies its products to 37 countries and has products registered for delivery against contracts at the London Metal Exchange and the Shanghai Futures Exchange. Registration at the world's top exchanges ensures the liquidity and premium pricing for the Company's products.

PRODUCT RANGE

One of Nornickel's objectives is to make sure its product range matches the current and anticipated global metals demand.

Nickel product diversification is a priority in developing the product range as the Company is implementing a range of initiatives to enhance and expand its existing product range, with a particular focus on changes in the metals demand structure, including the rapid growth in the share of the electric vehicles and batteries. In particular, Nornickel continues active interactions with the battery sector players to expand its product range to meet the new requirements for shape and quality emerging in the market.

Norilsk Nickel Harjavalta is recognised as one of world's foremost producers of nickel used to make precursors (semi-products essential for manufacturing the cathode material that forms part of batteries). Norilsk Nickel Harjavalta's nickel and cobalt sulphates are considered the industry benchmark and are widely used in battery manufacturing. Norilsk Nickel Harjavalta is uniquely flexible when it comes to manufacturing various shape products, which enables it to factor in consumer preferences in developing its product portfolio.

Main consuming industries and sales markets

POLAR DIVISION AND MEDVEZHNY RUCHEY



Copper cathodes



Commercial selenium (powder)



Commercial sulphur



Tellurium ingots



KOLA MMC



Nickel cathodes, nickel carbonyl (powder and pellets), intermediate products



Copper cathodes, copper matte



Cobalt cathodes, cobalt concentrate



Sodium sulphate



Sulphuric acid



Sales markets:

- Russia
- Europe
- Asia
- Americas

Main consuming industries:

- Cables and wires
- Rolled products and pipes
- Metallurgy
- Chemical industry
- Glass making
- Electrical engineering
- Feeds and fertilizers
- Fertilisers, paper and pipes
- Rubber vulcanisation
- Stainless steel
- Alloys and superalloys
- Non-ferrous metallurgy
- Rubber industry
- Photo- and thermoelements
- Special steels and alloys
- Electroplated coatings

¹/100% of shares are owned by the government. Precious metals are refined from raw materials produced by the Polar Division and Kola MMC under a tolling agreement.

NORILSK NICKEL HARJAVALTA

- Ni**

Nickel cathodes, nickel briquettes, electrolytic nickel powder, nickel sulphate, nickel hydroxycarbonate
- Cu**

Copper cake
- Co**

Cobalt sulphate

GRK BYSTRINSKOYE

- Cu**

Copper concentrate
- Fe**

Iron ore concentrate

KRASTSVETMET¹

- Pt**

Platinum
- Pd**

Palladium
- Rh**

Rhodium
- Ir**

Iridium
- Ru**

Ruthenium
- Ag**

Silver
- Au**

Gold



- Welding electrodes
- Synthetic detergents
- Pulp & paper
- Textiles
- Leather goods
- Healthcare and veterinary
- Batteries
- Additives and catalysts
- Rolled products
- Special steels
- Jewellery
- Investments
- Auto catalytic converters
- Electronics
- Electrochemical industry

SALES STRATEGY

Sales, along with production, have traditionally been a key value adding part of Nornickel's business.

When it comes to nickel products, the sales strategy focuses on achieving a balance between supplies to stainless steel manufacturers and other industries. Electric vehicles and batteries are a priority segment in the nickel consumption structure, as its growth rates suggest that in a few years time it will become a key source of demand, second only to stainless steel.

Therefore, the Company is running a programme to support high-growth applications of nickel applications, primarily in the battery sector. Cooperation with the growing battery sector relies on our wide range of nickel products, high reliability of supplies, availability of the Company's own global sales platform and a long track-record of partnering with automotive manufacturers and chemical companies. The Company also maintains an ongoing, proactive dialogue with new leading players. All these factors make Nornickel well-positioned to become a key element in the battery components value chain.

In the battery segment, the Company is set to support the electric vehicles market and related value chains, build long-term partnerships with key industry players, and expand the market and its accessibility for nickel and cobalt products. Nornickel's sales team is closely monitoring changes in the technical requirements for nickel and cobalt products in the sector. The Company is actively engaging major players in the battery segment, as evidenced by its agreement with BASF, signed in 2018. Under the agreement, pilot production facilities were launched, commencing supplies of test product batches for certification by consumers in 2019.

In the alloys and special steels sector, we seek to maximise the benefits of our product portfolio and improve product quality to boost our share in high-quality, premium segments.

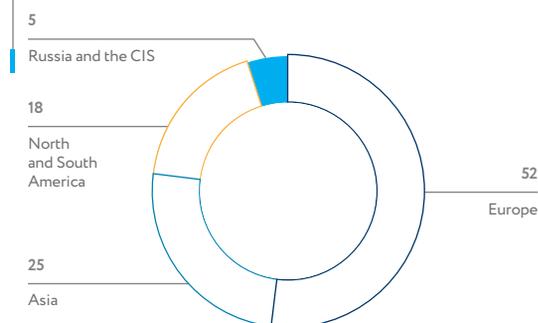
In the electroplating sector, Nornickel is optimising its product offering to better meet customer needs and acquire new customers in China and other markets. The Shanghai Futures Exchange completed the approval procedure for the NORNICKEL brand of electrolytic nickel produced by Kola MMC, with a registration certificate expected to be issued early in 2020.

In 2019, the London Metal Exchange (LME) added the NORILSK I brand of electrolytic cobalt produced by Kola MMC to its list of brands approved for LME delivery.

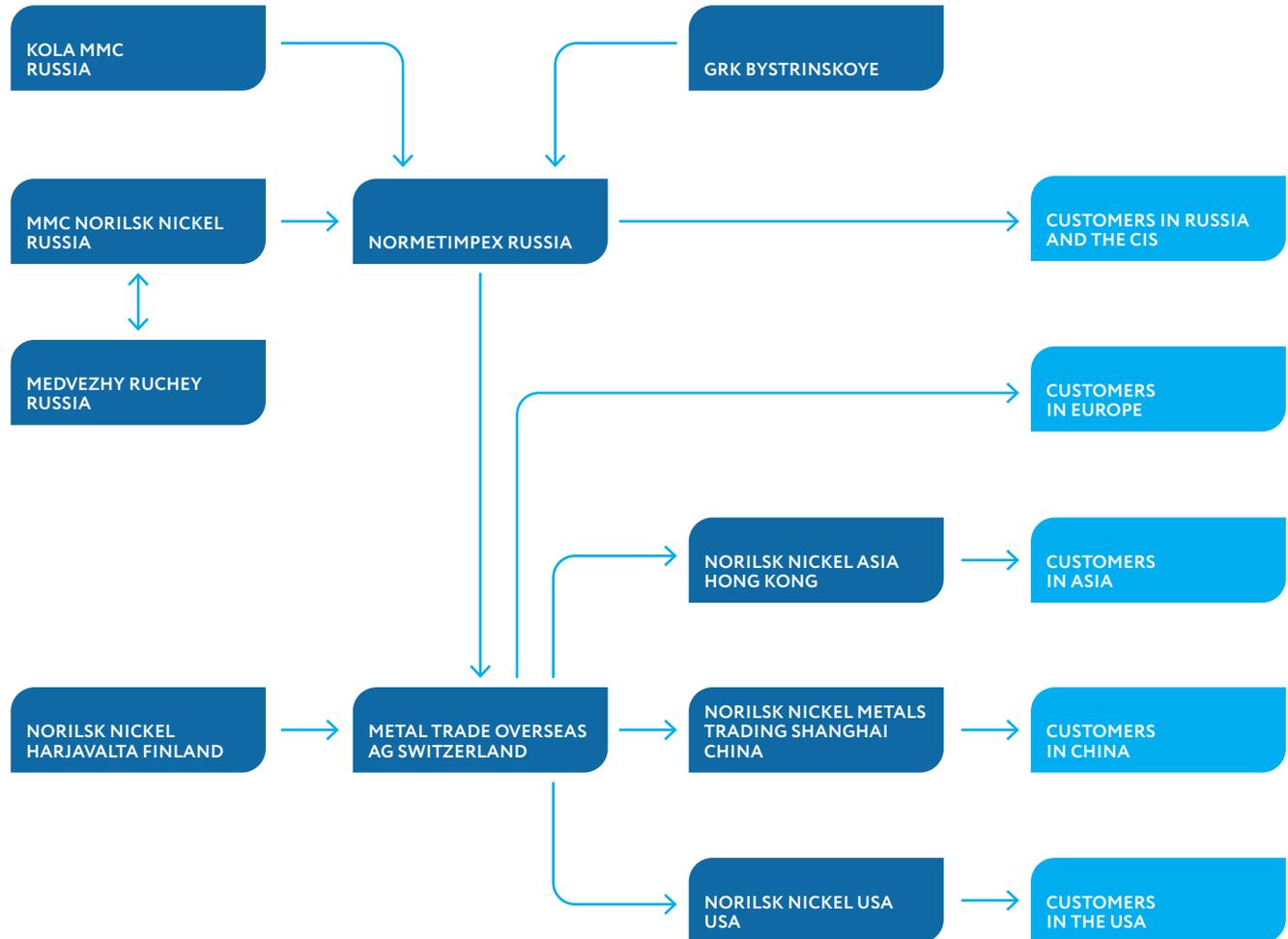
As the world's largest producer of palladium, the Company continues to implement its strategy of entering into direct long-term contracts with end consumers to ensure sustainable and strong demand for platinum group metals.

One of Nornickel's priorities is to ensure stable supply of palladium as the world palladium market remains significantly undersupplied. As the leading supplier of this metal, the Company's strategy includes a number of measures to ensure long-term stability of the palladium market, including greenfield and brownfield expansion project such as the South Cluster.

Sales by region (%)



The Company's product distribution diagram



ENERGY ASSETS

Nornickel owns an integrated network of fuel and energy assets, including four hydrocarbon deposits.

Most of Nornickel's production facilities are located beyond the Arctic Circle, operating in sub-zero temperatures for eight months of the year. It is therefore critical for the Group to ensure energy supplies to its production and infrastructure facilities, as well as to communities in its regions of operation.

Norilskgazprom (100% stake) produces gas and gas condensate at the Pelyatkinskoye, Yuzhno-Soleninskoye and Severo-Soleninskoye gas condensate fields, as well as the Messoyakhskoye gas field. The Pelyatkinskoye gas condensate field was transferred to Norilskgazprom in 2019 following the reorganisation of Taimyrgaz.

2,803.5
mln Mcm

natural gas production

92
kt

gas condensate production

44.5%

electricity generated
from renewable sources

- **Start of production:** 1969
- **Gas reserves:** 246.6 bcm
- **Gas condensate reserves:** 4,727 kt
- **Gas production in 2019:** 2,803.5 Mcm
- **Gas condensate production in 2019:** 92 kt

Production¹

Asset	2017	2018	2019
Natural gas, Mcm	3,014	2,896	2,804
- Taimyrgaz	2,086	2,027	0
- Norilskgazprom	928	869	2,804
Gas condensate, kt	100	90	92
- Taimyrgaz	98	88	0
- Norilskgazprom	2	2	92

^{1/} Data on gas condensate production include production losses (carryover with separation gas).

Norilsktransgaz (100% stake) transports natural gas and gas condensate from deposits to consumers.

The length of gas and gas condensate pipelines totals 1,588 km. The pipelines were commissioned between 1969 and 2018.

NTEK (100% stake) is focused on electricity and heat generation, transmission and sales harnessing the assets of Norilskenergo, a branch of Nor Nickel. Energy is produced from both renewable (e.g. hydropower) and non-renewable (e.g. natural gas) sources. NTEK supplies electricity, heat, and water to households in the city of Norilsk and to all production facilities within the Norilsk Industrial District. In terms of its location and operational mode, the local electricity grid is isolated from the national grid (the Unified Energy System of Russia), which means stricter reliability requirements. NTEK operates five generating facilities – three thermal power plants with installed electricity generation capacity of 1,190 MW, and two hydropower plants (HPPs) with total installed capacity of 1,091 MW. The total installed capacity of all plants is 2,281 MW.

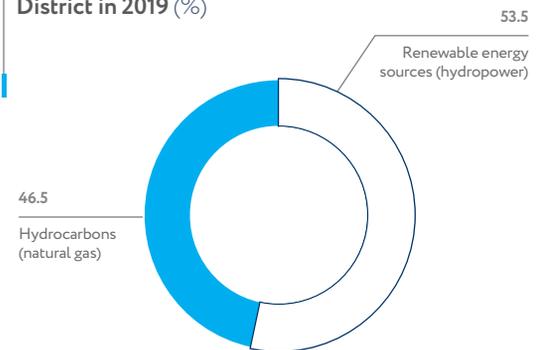
Ust-Khantayskaya and Kureyskaya HPPs (491 MW and 600 MW of installed capacity, respectively) are Nor Nickel's two renewable electricity generation facilities. In 2019, renewables accounted for 44.5% of total electricity consumed by the Group and 53.5% of total electricity consumption within the Norilsk Industrial District.

To boost the share of renewables such as hydropower, capture fuel and energy savings, and improve the reliability of energy and gas supplies, Nor Nickel's investment programme contains a number of large-scale priority projects. In 2019, the spending under the programme totalled about RUB 7.7 bn (USD 119 mln).

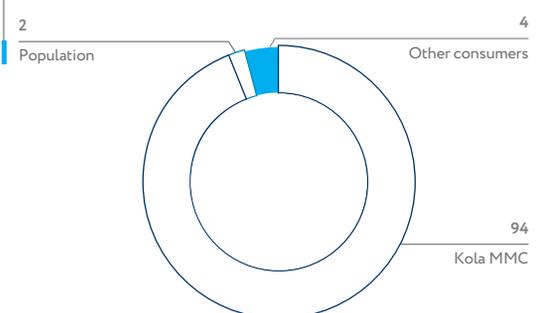
Selected major projects being implemented by Nor Nickel to improve equipment reliability, enhance energy efficiency, and boost product output:

- Replacement of seven hydropower units at Ust-Khantayskaya HPP

Power generation breakdown in the Norilsk Industrial District in 2019 (%)



Arctic-Energo electricity sales breakdown in 2019 (%)



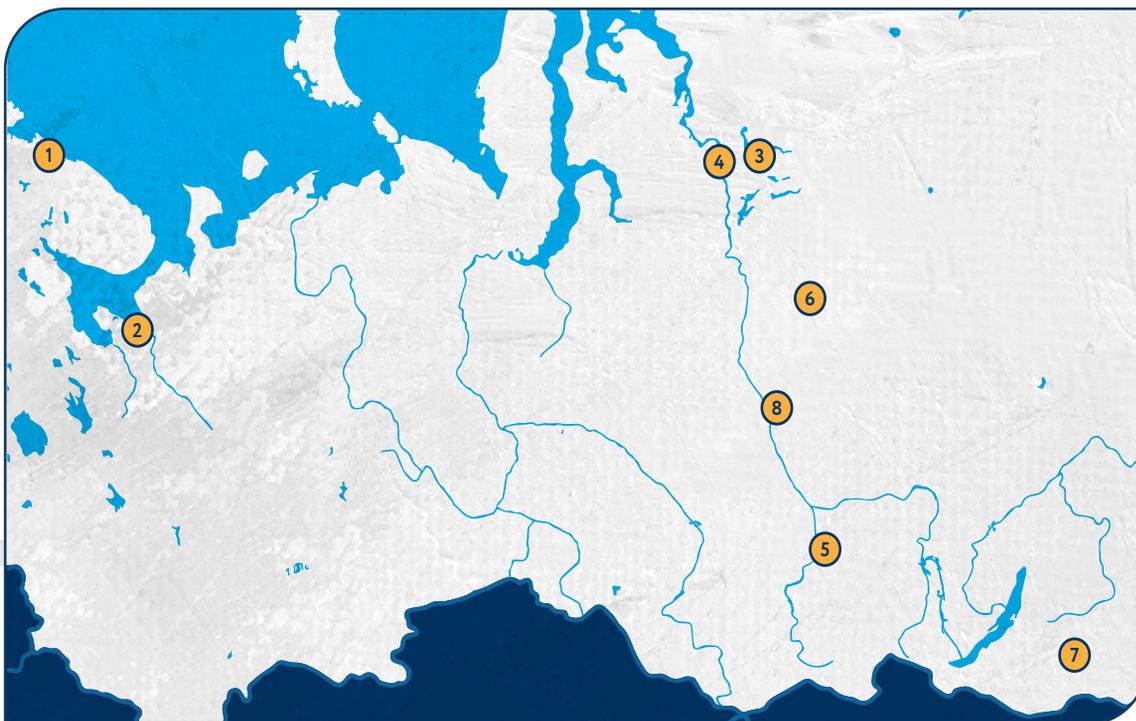
- Replacement of power units at CHPP-2 and CHPP-3 in Norilsk
- Upgrade of power grids, main gas pipelines, and gas distribution networks within the Norilsk Industrial District

Arctic-Energo (100% stake) is a default electricity supplier to Kola MMC in Monchegorsk, established to ensure efficient and uninterrupted electricity supply at cheapest rates to Kola MMC operations. In 2019, it sold 2,719,610 thousand kWh of electricity.

TRANSPORT ASSETS

Nornickel owns a modern transport infrastructure capable of handling most challenging freight logistics tasks and ensuring continuity and sustainability of operations. Nornickel's transportation and logistics assets cover the full range of transportation and freight forwarding services.

- 1 Murmansk Transport Division (Murmansk terminal, 6 heavy-duty ice-class vessels)
- 2 Arkhangelsk Transport Division
- 3 Norilsk Airport, Norilsk Avia, NordStar Airlines (100% stake)
- 4 Polar Transport Division (Dudinka Port)
- 5 Krasnoyarsk Transport Division, Krasnoyarsk River Port (89% stake) and Nornickel-ERP LLC
- 6 Yenisey River Shipping Company (82% stake)
- 7 Bystrinsky Transport Division
- 8 Lesosibirsk Port (51% stake)



FREIGHT SHIPPING SERVICES

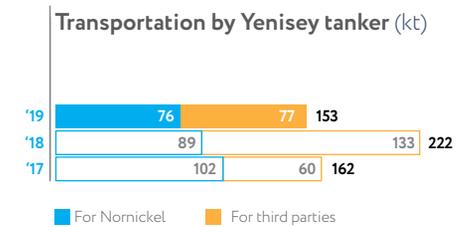
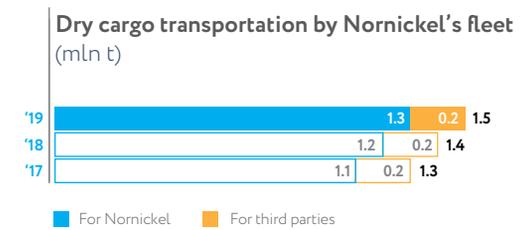
Nornickel has a unique Arctic fleet comprising five dry cargo vessels and one Yenisey heavy-duty ice-class tanker (ARC 7 as per the classification of the Russian Maritime Register of Shipping). The vessels are capable of breaking through Arctic ice up to 1.5 m thick without icebreaker support. The Yenisey tanker carries gas condensate exports from the Pelyatkinskoye gas condensate deposit to European ports, and makes commercial voyages to other destinations.

Nornickel's dry cargo fleet provides year-round freight shipping services between Dudinka, Murmansk, Arkhangelsk, Rotterdam, and Hamburg sea ports while also making commercial voyages to other destinations. In 2019, 68 voyages were made from Dudinka (2018:66), including 11 direct voyages to European ports (2018:10).

AVIATION ASSETS

Norilsk Avia (Nornickel interest 100%) serves the transportation needs of local communities in the Norilsk and Taimyrsky Dolgano-Nenetsky Districts of the Krasnoyarsk Region. The air company has its own fleet of 16 helicopters and provides air services related to the operations of the Norilsk Nickel Group, emergency air medical assistance, search-and-rescue operations, and local passenger traffic.

NordStar Airlines (Nornickel interest 100%) is an aviation project that has been steadily growing since its establishment in 2008. Its fleet comprises 13 aircraft. NordStar Airlines is a major air carrier in the Siberian Federal District and the anchor airline of Norilsk Airport. The air carrier's annual passenger



traffic is in excess of one million people. The airline's current route network covers over 30 cities in Russia and the CIS..

Norilsk Airport (Nornickel interest 100%) is located 36 km away from Norilsk. It plays an essential role in ensuring the region's transport accessibility as it connects the north of the Krasnoyarsk Region with other parts of Russia.

During 2019, the public private partnership between Nornickel and the Federal Air Transport Agency (Rosaviatsiya) renovated the airport's patrol road, security fencing, utility and communication networks; and the renovation of the airport apron's concrete pavement was 95% complete at end-2019.

The renovation programme is scheduled for completion in 2020.

Norilsk Nickel's transportation and logistics assets include:

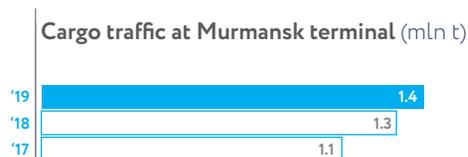
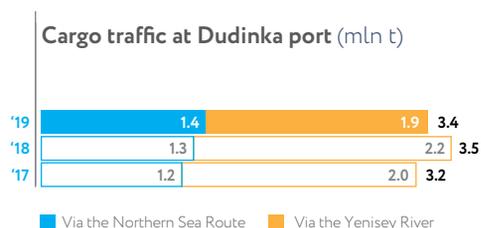
- sea fleet — 6 heavy-duty ice-class vessels;
- river fleet — 556 vessels, including 161 self-propelled and 395 towed vessels;
- rail car and locomotive fleet — 118 container flatcars, 1 switch locomotive, 1 Yermak electric locomotive, and 1 2M62 diesel locomotive;
- aircraft fleet — 16 helicopters operated by Norilsk Avia and 15 planes operated by NordStar Airlines.

TRANSPORT DIVISIONS AND PORTS

The Polar Transport Division and Dudinka Port are the key industrial facilities of the city port of Dudinka, accessible by both sea and river vessels.

Located in the Far North, Dudinka Port is the world's only port that gets flooded every year during the spring thaw. From November to May its water area and the Yenisey River freeze over. At this period, Dudinka Port handles only sea vessels using icebreakers to de-ice the berths and provide support during manoeuvring and mooring operations. In May and June, during the flooding, the service is suspended to be resumed for sea and river vessels when ice flows pass and the water level goes down.

Dudinka Port transships cargoes destined for Taimyr Peninsula, including goods for local residents (except for perishables and mail). In summer, river vessels deliver equipment and materials (sand, round timber, clinker, etc.) for process needs from Krasnoyarsk and Lesosibirsk; sulphur shipments are directed both via the Yenisey River and via sea routes. Converter matte and metal products are shipped by sea from Dudinka throughout the year.



The Polar Transport Division operates its own fleet of port service vessels which includes a river-class icebreaker, towboats, motorboats, a bunker barge, and a floating crane. To reduce its environmental footprint, the division runs programmes to cut fuel consumption and prevent pollution of the Dudinka and Yenisey Rivers, while also investing in bioresource management (e.g. releasing fingerlings).

The year-round ice-free sea port of Murmansk is home to Nornickel's **Murmansk Transport Division**. Murmansk Transport Division's key functions:

- Shipment of Nornickel's finished metal products from Murmansk to European ports
- Receipt of converter matte from Dudinka and its shipment by rail to Kola MMC
- Shipment of empty containers, equipment, and materials to Dudinka

In addition to sea transportation, Murmansk Transport Division is focused on freight forwarding, transshipment and storage of cargoes, and rail transportation between Murmansk and Monchegorsk.

The division's shipping department complies with international maritime conventions by ensuring environmentally friendly and safe sea transportation, with the vessels undergoing regular scheduled repairs and safety inspections. In addition, in 2019, Murmansk Transport Division's Information Security Management System was certified to ISO/IEC 27001:2013.

Arkhangelsk Transport Division is based in Arkhangelsk. The division provides year-round transshipment services for Nornickel's cargo via Arkhangelsk sea port, which is conveniently linked to other Russian and foreign regions by road, air and rail.

Krasnoyarsk Transport Division is based in Krasnoyarsk. This division is responsible for transportation and forwarding of Nornickel's.

In 2019, **Nornickel- Yenisey River Shipping Company** (100%) was established to coordinate operations of Krasnoyarsk port and Yenisey River Shipping Company, which operate a strictly seasonal service due to the Yenisey River getting frozen in winter. When ice flows pass, the Group uses the ports to transship Nornickel's cargoes to Dudinka, including crushed granite, clinker, materials, equipment, and socially significant cargoes (as part of the Northern Deliveries programme).

Yenisey River Shipping Company (82%) carries the bulk of the Group's and third-party cargoes shipped on the Yenisey River. The company owns over 600 river vessels, including self-propelled and towed ones. The fleet operates in the Yenisey, Angara, Nizhnyaya Tunguska and Podkamennaya Tunguska Rivers, and their largest tributaries.

Krasnoyarsk River Port (89%) is one of the largest ports in the Yenisey basin. The port transships cargoes delivered by road, rail and water, provides storage services and transports cargoes using private railway lines. The port has three operating areas – Yenisey, Zlobino, and Peschanka.

Lesosibirsk Port (51%) is located 40 km downstream of the point of confluence of the Angara and Yenisey Rivers and downstream of the hard-to-navigate rapids. This secures the delivery of Nornickel's cargoes at times of low water on the Yenisey and the use of fully loaded ships. The port's unique benefits:

- The only dedicated port on the Yenisey River capable of handling explosives with a storage option

- Offers year-round service (rail-to-road and road-to-rail cargo transshipment services in between the navigation periods)
- Has access to the Baikal (M53) federal highway via the Krasnoyarsk–Yeniseysk highway
- A railway to Achinsk links Lesosibirsk to the Trans-Siberian Railway.

Bystrinsky Transport Division was established in 2017 to support shipments of finished products from Bystrinsky GOK and handle its inventories. Bystrinsky Transport Division provides maintenance services for the 227-km Naryn (Borzya)–Gazimursky Zavod private railway line built through a public private partnership.

INVESTMENT IN TRANSPORTATION AND LOGISTICS ASSETS

In 2019, Nornickel completed scheduled repairs of vessels, overhauled several berths and port cranes, deployed integrated security technologies and solutions, upgraded communications hardware, introduced fuel consumption metering, and launched a programme to replace mobile port cranes at Dudinka Port.

Investment in transportation and logistics assets

Expenditure	2017		2018		2019	
	USD mln	RUB bn	USD mln	RUB bn	USD mln	RUB bn
TOTAL	46.2	2.7	35.1	2.2	55.6	3.6
Capital construction	22.2	1.3	6.4	0.4	3.1	0.2
Equipment purchases	15.4	0.9	12.8	0.8	40.2	2.6
Other	8.6	0.5	15.9	1.0	12.4	0.8

**WHY
WE
DO
THIS**

We develop digital technologies

to deliver
**operational
efficiency gains**

17

SYSTEMS

went live

50

**NEW
INITIATIVES**

slated for rollout
before 2024



Technology Breakthrough

A programme aimed at embedding advanced digital solutions into designing, planning and operational control processes throughout mining operations

RESEARCH AND DEVELOPMENT INNOVATIONS

RESEARCH AND DEVELOPMENT

R&D is a major driver behind the implementation of the Company's strategic priorities. In 2019, Nornickel's R&D and feasibility studies mainly focused on providing research data for the updated Norilsk Nickel Group Strategic Development Plan. Operations. Mining, processing, metallurgy.

Gipronickel Institute is Nornickel's main R&D facility. Part of the Norilsk Nickel Group, it is also one of Russia's largest research and engineering hubs for mining, concentration, metallurgy and processing of minerals, providing a wide range of research and technology services.

PATENTS AND LICENCES

Implementation of uniform approaches to intellectual property (IP) management is a major driver of Nornickel's innovative development.

The Company registers its exclusive rights to inventions and means of identification both in Russia and beyond.

International registration process for Nornickel's Method for Continuously Converting Nickel-Containing Copper Sulphide Materials is now in progress, with a Kazakhstan patent for this invention granted in 2019.

A Certificate of State Registration for 10-day/shift Operations Planning and Control System for Underground Mines software was also granted in 2019. The software solution is being rolled out across the Group as part of its mining automation project.

Also in 2019, the Company completed the registration process and obtained an international certificate of registration for the NORNICKEL trademark in the USA for the first time in its history.

DIGITISATION

Nornickel is the industry's digital leader:

- Nornickel won the first place and the gold award in the Business Transformation Category at SAP Quality Awards in the CIS region for two years in a row – 2018 and 2019 – for its project to roll out SAP ERP
- The Company won the first place for the Machine Vision-Based Detection of Ore Contaminants on Concentrator Conveyors project
- Bronze award was given for the Smart Tailing Dump project leveraging all currently available state-of-the-art dam movement monitoring technologies
- Nornickel's project to optimise flotation processes at Talnakh Concentrator was awarded a BCG Olympics medal in 2019 as the best project internationally to win this highly prestigious annual global competition

Adoption of state-of-the-art technology, including digital solutions, is critical to business competitiveness. Nornickel places considerable emphasis on researching and adopting various digital technologies to optimise production processes, improve overall business performance, and eliminate bottlenecks, resulting in a higher conversion productivity, lower costs and a streamlined organisation. The Company has built a portfolio of various applied technology solutions which can be of interest to other players in the metals and mining industry as well as other industries.

In July 2019, Rosbank and Nornickel migrated the interface between their information systems to a host-to-host digital platform developed by Rosbank and Nornickel's experts supported by BDO Unicon Business Solutions. The host-to-host solution provides a high-speed secure data transfer directly between Nornickel's corporate SAP system and Rosbank's host-to-host service.

It now takes Nornickel's Treasury barely a moment to send payment orders to Rosbank and receive settlement account statements from it. Migration

to the host-to-host solution has not only made payments faster and more secure but also streamlined Nornickel's internal processes and going forward enables fundamentally new, digital business use cases around interfaces with banks and counterparties.

TECHNOLOGY BREAKTHROUGH PROGRAMME

The Company runs the Technology Breakthrough programme to integrate advanced technologies into the design, planning and operational control processes of its mining activities, driving the operational efficiency of its production processes. About 40 IT initiatives were developed during its first phase (Technology Breakthrough 1.0).

The key projects within the programme: development of mining equipment and personnel positioning and communication systems; mining operations planning and dispatch; and deployment of various solutions including geological modelling and mine planning solutions, metals balance calculation, industrial asset management, process data storage, and health and safety systems.

Basic infrastructure building

Nornickel has equipped all of its underground mines with positioning and communication systems. More than 300 kilometres of fibre have been laid, with over 1,000 Wi-Fi access points installed underground. Every day, each person out of more than 6,500 is given special equipment with an RFID tag to track the person's movements within the mine. Similar tracking solutions are installed on moving machinery, totalling more than 500. Video surveillance is provided for key infrastructure facilities underground. A control room operator monitors movements of each employee and can contact them by phone. An anti-collision technology is used to warn drivers of people in the way. The Company has deployed a powerful system providing complete information on people and machinery positions and ore flows in mines by feeding virtually unlimited volumes of data from the surface underground and back.

Geological modelling and mine planning solutions

The deployment of geological modelling and mine planning solutions has enabled the development of a single mining database and 3-D models of underground ore bodies. The software can also be used to design underground workings and obtain survey data. The system enables data preparation and feeding to automated drill rigs, with significant gains to be achieved in drilling and blasting performance. Geological modelling and mine planning software can also accelerate development and analysis of multiple mining options to identify the most effective one and plan mining accordingly.

Simulation modelling system

The software analyses data on underground workings, their geometry, underground transport and ore production plans to calculate an optimal quantity of required underground machinery. The purpose is to optimise ore production and transportation from the mine to the surface. Nornickel's mid-term plans are to use the simulation modelling system to test the use of remotely controlled underground machinery.

Smart digital mines

It took a lot of time and effort to develop underground infrastructure across all mines operated by the Company before operational control centres could launch and assume associated control and management functions. Wireless data transmission system points and fibre links were installed under the Polar Division's machinery tracking and radio communication project, implemented as part of the Technical Breakthrough programme. Each underground working now has Wi-Fi access and is fitted with video cameras.

The Company has also developed a unique 10-day/shift scheduling software to eliminate the decentralised approach and manual planning for certain mine parts. The software allocates tasks and equipment to workings and shifts in accordance with the process cycles and pre-set inputs to create the mine operation 10-day/shift schedule with 10-day increments and task scheduling for each specific shift. Mining plans covering different periods and parts of all underground mines are integrated

into higher-level plans within a single centralised planning system. The operational control centres now operate in accordance with the new mining planning processes. The 10-day/shift scheduling software creates work plans using data from the Micromine geological modelling and mine planning software which creates a 3D model of the mined ore body with a clear representation of beds and seams and helps optimise reserve development sequencing and production techniques.

Process data storage

All data is fed into a process data warehouse, which also collects telemetry data from moving machinery: motor RPM, fuel consumption, working hours, etc. The single process data warehouse collates over 60,000 parameters for all enterprises of Nornickel. The data is then used in other Technology Breakthrough systems such as Production Dispatch, Metals Balance, and in the SAP ERP equipment maintenance and repair management system.

Technical Breakthrough 1.0 has improved total metal recovery and increased the quality of saleable ore by 6.5% between 2016 and 2019, achieving total savings of billions of Russian roubles.

In 2020, Nornickel will launch the second phase of the programme – Technical Breakthrough 2.0, which will include 11 projects. The second phase will mostly focus on Industry 4.0 levers, with certain autonomy embedded in all mine development projects. The Company will now harness big data to improve production planning and overhaul the production process, implementing projects to roll out artificial intelligence, robotics, digital twins, etc.

Nornickel is developing a database enabling it to plan for unmanned production. In particular, mining at depths between 2 km and 2.5 km in the Glubokaya mine (at the Skalisty Mine site) will maximise the use of autonomous mining systems.

DIGITAL LAB

Nornickel actively deploys digital technologies to address local production tasks. Its R&D division Digital Lab has been active for almost two years.

Two initiatives of the Digital Lab won awards at the Mine Digital contest held as part of the Minex Russia geological forum. The gold winner was the Conveyor Contaminant Identification project applying artificial intelligence technology to recognise non-metallic matter on the conveyor which, if entering the concentrator's crusher, can damage the equipment. Bronze award was won for the Smart Tailing Dump project which focuses on the analysis of satellite radiolocation data to track potential strata movements with a millimetre accuracy.

Concentrator conveyor contaminant identification system

The Digital Lab won the gold award for this initiative at the Mine Digital contest held as part of the Minex Russia geological forum.

The system uses artificial intelligence technology to recognise non-metallic matter on the conveyor which, if entering the concentrator's crusher, can damage the equipment. The system will reduce the wear of crushing equipment and the frequency of unscheduled repairs, and is planned to be launched in the mid-term across all of Nornickel's sites.

Industrial exoskeletons

In 2019, Nornickel made its first-ever public presentation of an exoskeleton system developed jointly with the South-West State University. The presentation featured rapid training and testing of exoskeletons on a testing ground, providing the companies in the audience with an opportunity to get a first-hand feel for the new solution. The presentation generated great interest from many companies, and as a result several exoskeletons were shipped for testing to production sites of several Russian metals companies. The exoskeletons were also presented by Nornickel at an advanced project exhibition held by the Agency for Strategic Initiatives.

Industrial exoskeletons are designed for use in harsh environments, helping to resolve health and safety issues and improve operational efficiency. An exoskeleton is put on over the safety workwear and is attached to the person's body by special straps. It can help persons lifting or carrying weights of up to 60 kg by taking up to 90% of the weight. Thanks to its small size, an exoskeleton can be used in hard-to-reach areas inaccessible to specialised machinery. Nornickel's exoskeletons have some smart features: apart from the exoskeleton itself, the system also includes an onboard computer to monitor ambient air pollution concentrations, temperature, illuminance levels, and the user's operating modes in real time.

H&S compliance monitoring solution

Health and safety violations are detected and recorded by video cameras using machine vision and artificial intelligence. The system drives employee accountability, simplifies monitoring and reduces accidents at work.

Short circuit detection in copper electrolysis at metallurgical plants

An integrated hardware/software solution has been developed to detect short circuits in copper electrolysis, stabilising the electrolysis process and increasing the output of copper cathodes.

Drones for aerial surveillance of hard-to-reach areas

Nornickel is developing drones capable of video recording and autonomous movement deep underground without relying on GPS. The drones will be used to inspect the condition of facilities in hard-to-reach areas, enabling faster inspections, reduced diagnostic costs, and most importantly, improved safety. Nornickel has also designed drones for automatic scanning of mine areas that are out of bounds for employees, which will also prevent unscheduled shutdowns and accidents.

Mine surveying robot

Nornickel has piloted a robotic system capable of laser scanning and autonomous movement in workings, which enables high-quality 3D surveying including for hard-to-reach areas. The Company will be able to use the data feed from the robot for integration with its geological modelling and mine planning system.

**WHY
WE
DO
THIS**

We are looking for solutions

to drive operational efficiency within the existing asset portfolio and ease the workload of metallurgists

INITIATIVES

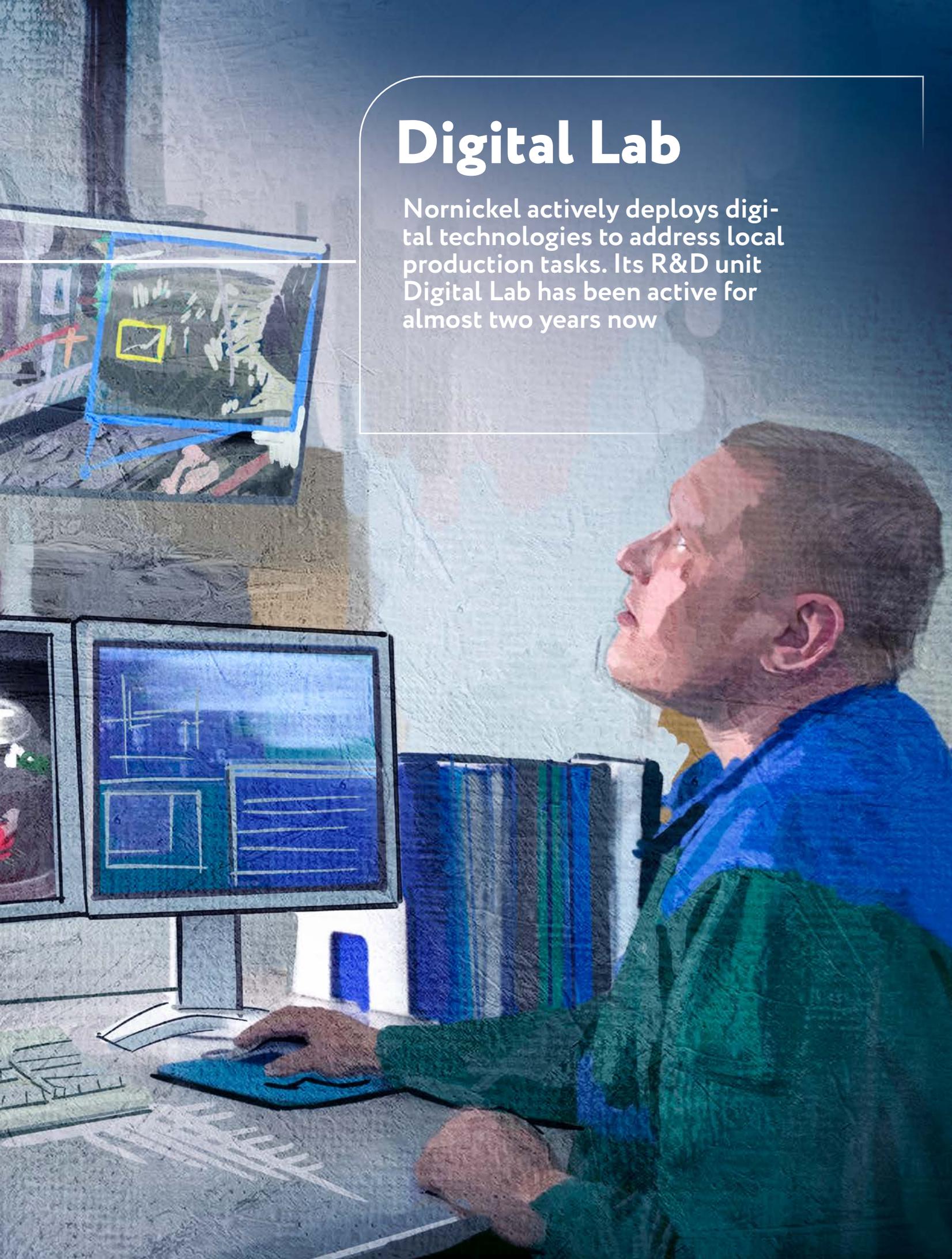
6 moved into large-scale rollout

INITIATIVES

53 Digital Lab worked on

Digital Lab

Nornickel actively deploys digital technologies to address local production tasks. Its R&D unit Digital Lab has been active for almost two years now



FINANCIAL PERFORMANCE (MD&A)

2019 HIGHLIGHTS

- **Consolidated revenue increased 16% y-o-y** to USD 13.6 billion owing to higher production volumes of all key metals and growth of palladium and nickel prices;
- **EBITDA expanded 27% y-o-y** to USD 7.9 billion owing to higher metal revenue and tight control of operating expenses, with EBITDA margin reaching 58%. Reported EBITDA includes negative impact of the USD 190 million provisions accrued in respect of the upcoming shutdown of certain production facilities at Kola Division;
- **EBITDA generated by the Bystrinsky project** that was fully commissioned in September 2019 amounted to USD 349 million;
- **CAPEX decreased 15% y-o-y** to USD 1.3 billion owing to the completion of large investment projects in 2018;
- The Company made **final investment decisions on strategic growth projects** such as the expansion of the Talnakh concentrator (TOF-3 project) and the development of South Cluster mining project and also updated its environmental programme, which is scheduled to go into active construction phase in 1H2020;
- **Net working capital increased to USD 1.0 billion** in line with the medium-term target level;
- **Free cash flow amounted to USD 4.9 billion**, almost unchanged y-o-y;
- **Net debt/EBITDA ratio decreased to 0.9x as of December 31, 2019;**
- **Cash interest paid decreased 17% y-o-y** to USD 460 million owing to the ongoing optimization of debt portfolio;
- **At the annual Capital Markets Day in November, the Company provided its strategic vision until 2030** with the focus on development prospects of Taimyr mining operations, debottlenecking of downstream assets and dramatic reduction of sulfur dioxide emissions at both key operating units in Russia: Polar division and Kola MMC.

RECENT DEVELOPMENTS

- **On January 14, 2020, the Company paid interim dividend** for the nine months of 2019 in the amount of RUB 604.09 (approximately USD 9.9) per ordinary share for the total of approximately USD 1.6 billion;
- **On February 20, 2020, the Company entered into agreement to revise terms and conditions of the USD 2.5 billion syndicated term loan** originally signed in December 2017 with a group of international banks, whereby increasing the total facility amount to USD 4.15 billion, reducing the interest rate and rescheduling the repayment of outstanding amount from the period of December 2020 - December 2022 to the period of February 2023 - February 2025.

Key corporate highlights

USD million (unless stated otherwise)	2019	2018	Change, %
Revenue	13,563	11,670	16%
EBITDA ¹	7,923	6,231	27%
EBITDA margin	58%	53%	5 p.p.
Net profit	5,966	3,059	95%
Capital expenditures	1,324	1,553	(15%)
Free cash flow ²	4,889	4,931	(1%)
Net working capital	985	867	14%
Net debt	7,060	7,051	0%
Net debt, normalized for the purpose of dividend calculation ³	4,952	5,160	(4%)
Net debt/12M EBITDA	0.9x	1.1x	(0.2x)
Net debt/12M EBITDA for dividends calculation	0.6x	0.8x	(0.2x)
Dividends paid per share (USD) ⁴	26.3	21.3	23%

In 2H2019, the Group updated its management accounting system in line with business changes. As a result, the South Cluster segment was separated from GMK Group segment in 2019.

In 2019, revenue of Group GMK segment increased 42% to USD 13,836 million. This was primarily driven by the growth of intersegmental sales revenue due to the launch of direct sales of semi-products to KGMK Group, which was additionally supported by higher refined metals production volumes and palladium price.

The revenue of South cluster segment amounted to USD 864 million.

The revenue of Group KGMK segment increased more than three times to USD 3,115 million due to the launch of direct sales of semi-products supplied by GMK Group segment.

Revenue of NN Harjavalta increased 14% to USD 1,172 million. Higher sales volumes were supported by higher nickel price.

Revenue of GRK Bystrinskoye amounted to USD 201 million, which included sales of semi-products since the full commissioning of Bystrinsky project in September 2019.

Revenue of Other mining segment increased 23% to USD 133 million mostly driven by higher semi-products sales volumes and palladium price.

Revenue of Other non-metallurgical segment decreased 7% to USD 1,412 million. Lower sales volumes of Palladium Fund were partly compensated by higher palladium prices.

In 2019, EBITDA of GMK Group segment increased 44% to USD 9,522 million owing primarily to higher revenue and depreciation of Russian rouble. EBITDA of GMK Group segment included profit from the sale of semi-products to Group KGMK segment, which was eliminated from EBITDA of the Group.

The EBITDA of South cluster segment amounted to USD 475 million.

EBITDA of Group KGMK segment decreased 69% to USD 58 million primarily owing to the start of direct purchases of GMK Group segment semi-products.

EBITDA of NN Harjavalta increased by USD 3 million to USD 74 million.

EBITDA of GRK Bystrinskoye segment increased by USD 253 million and amounted to USD 349 million due to higher production volumes.

EBITDA of Other non-metallurgical segment decreased 38% to USD 31 million following one-off expenses in 2019.

EBITDA of Unallocated segment insignificantly changed 3% to a negative USD 785 million.

1/ A non-IFRS measure, for the calculation see the notes below.

2/ A non-IFRS measure, for the calculation see an analytical review document ("Data book") available in conjunction with Consolidated IFRS Financial Results on the Company's web site.

3/ Normalized on interim dividends (at the rate of the Board of Directors meeting date) and deposits with maturity of more than 90 days.

4/ Paid during the current period.

Key segmental highlights¹

USD million (unless stated otherwise)	2019	2018	Change,%
Revenue	13,563	11,670	16%
GMK Group	13,836	9,742	42%
South cluster	864	-	p.p.
KGMK Group	3,115	911	3x
NN Harjavalta	1,172	1,026	14%
GRK Bystrinskoye	201	8	n.a.
Other mining	133	108	23%
Other non-metallurgical	1,412	1,514	(7%)
Eliminations	(7,170)	(1,639)	4x
EBITDA	7,923	6,231	27%
GMK Group	9,522	6,602	44%
South cluster	475	-	n.a.
KGMK Group	58	190	(69%)
NN Harjavalta	74	71	4%
GRK Bystrinskoye	349	96	4x
Other mining	(31)	(6)	5x
Other non-metallurgical	31	50	(38%)
Eliminations	(1,770)	(13)	n.a.
Unallocated	(785)	(759)	3%
EBITDA margin	58%	53%	5 p.p.
GMK Group	69%	68%	1 p.p.
South cluster	55%	n.a.	n.a.
KGMK Group	2%	21%	(19 p.p.)
NN Harjavalta	6%	7%	(1 p.p.)
GRK Bystrinskoye	n.a.	n.a.	n.a.
Other mining	(23%)	(6%)	(17 p.p.)
Other non-metallurgical	2%	3%	(1 p.p.)

Sales volume and revenue

Index	2019	2018	Change,%
Metal sales			
Group			
Nickel, thousand tonnes ²	230	217	6%
- from own Russian feed	213	208	2%
- from 3d parties feed	3	2	50%
- in semi-products ⁴	14	7	2x
Copper, thousand tonnes ^{2,3}	479	455	5%
- from own Russian feed	433	431	0%

1/ Segments are defined in the consolidated financial statements.

2/ All information is reported on the 100% basis, excluding sales of refined metals purchased from third parties and semi-products purchased from Nkomati.

3/ Includes semi-products, produced by GRK "Bystrinskoye" after ramp-up of Bystrinsky project that was fully commissioned in September 2019.

4/ Metal volumes represent metals contained in semi-products.

Index	2019	2018	Change, %
- in semi-products ⁴	46	24	92%
Palladium, koz²	2,988	2,974	0%
- from own Russian feed	2,890	2,913	(1%)
- in semi-products ⁴	98	61	61%
Platinum, koz²	714	668	7%
- from own Russian feed	698	657	6%
- in semi-products ⁴	16	11	45%
Rhodium, koz²	78	62	26%
- from own Russian feed	69	62	11%
- in semi-products ⁴	9	-	100%
Cobalt, thousand tonnes²	7	4	75%
- from own Russian feed	5	3	67%
- from 3d parties feed	2	1	2x
Gold, koz^{2,3}	235	161	46%
- from own Russian feed	184	155	19%
- in semi-products ⁴	51	6	9x
Average realized prices of refined metals produced by the Group			
Nickel (USD per tonne)	14,355	13,531	6%
Copper (USD per tonne)	6,047	6,566	(8%)
Palladium (USD per oz)	1,524	1,025	49%
Platinum (USD per oz)	862	877	(2%)
Rhodium (USD per oz)	3,948	2,194	80%
Cobalt (USD per tonne)	26,756	68,604	(61%)
Gold (USD per oz)	1,393	1,264	10%
Revenue, USD million⁵			
Nickel	3,388	3,013	12%
- including semi-products	285	175	63%
Copper	2,877	2,977	(3%)
- including semi-products	257	144	78%
Palladium	5,043	3,674	37%
- including semi-products	194	98	98%
Platinum	628	596	5%
- including semi-products	27	20	35%
Other metals	915	702	30%
- including semi-products	172	55	3x
Revenue from metal sales	12,851	10,962	17%
Revenue from other sales	712	708	1%
Total revenue	13,563	11,670	16%

5/ Includes metals and semi-products purchased from third parties and Nkomati. Includes revenue from semi-products, produced by GRK "Bystrinskoe", after ramp-up of Bystrinsky project that was fully commissioned in September 2019.

REVENUE

NICKEL

Nickel sales contributed 26% to the Group's total metal revenue in 2019, down from 27% in 2018. A 1 p.p. decrease was driven by palladium price that outperformed nickel price in the reported period.

In 2019, nickel revenue was up by 12% amounting to USD 3,388 million. The growth was driven both by higher realized nickel price (+USD 188 million) and increase in sales volume (+USD 187 million).

The average realized price of refined nickel increased 6% to USD 14,355 per tonne in 2019 vs USD 13,531 per tonne in 2018.

Sales volume of refined nickel produced from own Russian feed, increased by 2% (or +5 thousand tonnes) to 213 thousand tonnes owing to higher production volumes.

Sales volume of nickel produced from third-party feed increased 50% to 3 thousand tonnes primarily due to the increased processing of third-party feed at Harjavalta refinery.

In 2019, sales of nickel in semi-products increased 63% to USD 285 million primarily owing to higher sales volume of semi-products.

COPPER

In 2019, copper sales accounted for 22% of the Group's total metal sales, decreasing 3% (or -USD 100 million) to USD 2,877 million primarily owing to lower realized price (-USD 227 million) which was partly compensated by higher sales volume (+USD 127 million).

The average realized price of refined copper decreased 8% from USD 6,566 per tonne in 2018 to USD 6,047 per tonne in 2019.

Physical volume of refined copper sales from the Company's own Russian feed remained unchanged at 433 thousand tons.

Revenue from copper in semi-products in 2019 increased 78% to USD 257 million primarily due to the ramp-up of Bystrinsky project that was fully commissioned in September 2019.

PALLADIUM

In 2019, palladium accounted for 39% of total metal revenue, increasing 5 p.p. y-o-y. Palladium revenue increased 37% (or +USD 1,369 million) to USD 5,043 million due to higher realized price (+USD 1,484 million) and increased sales volume (+USD 34 million).

The average realized price of refined palladium increased 49% from USD 1,025 per troy ounce in 2018 to USD 1,524 per troy ounce in 2019.

Physical volume of refined palladium sales from the Company's own Russian feed remained stable y-o-y and amounted to 2,890 thousand troy ounces in 2019. Higher base effect in 2018 (from the sale of metal from stock accumulated in the Company's Palladium Fund in 2017) was compensated by higher sales volume in 2019 due to release of work-in-progress inventory.

Revenue of palladium in semi-products increased 98% to USD 194 million in 2019 primarily owing to higher sales volume of semi-products.

In 2019, revenue from the resale of palladium purchased from third parties amounted to USD 444 million (vs USD 593 million in 2018).

PLATINUM

In 2019, platinum sales increased 5% (or +USD 32 million) to USD 628 million and remained at 5% of the Group's total metal revenue. The higher sales volume (+USD 42 million) was partly compensated by decline of realized platinum price (-USD 10 million).

Physical volume of refined platinum sales from the Company's own Russian feed in 2019 increased 6% (or +41 thousand troy ounces) to 698 thousand troy ounces primarily due to release of PGM work-in-progress inventory.

Revenue of platinum in semi-products in 2019 increased 35% to USD 27 million primarily due to higher sales volume of semi-products.

OTHER METALS

In 2019, revenue from other metals increased 30% (or +USD 213 million) to USD 915 million. This was primarily due to higher revenue from gold (+USD 123 million) mainly due to the ramp-up of Bystrinsky project, higher revenue from rhodium (+USD 155 million) resulting from the increase in price, which was partly negatively compensated by decrease in cobalt revenue (-USD 108 million) primarily due to price decrease.

OTHER SALES

In 2019, other sales increased 1% to USD 712 million. Revenue growth in real terms that was primarily driven by higher fuel sales volumes was offset by the negative effect of Russian rouble depreciation.

Other sales

USD million (unless stated otherwise)	2019	2018	Change, %
Air transport	250	257	(3%)
Fuel-power complex	184	178	3%
Water transport	52	56	(7%)
Food retail	38	38	0%
Zapolyarye Health Resort	19	17	12%
Other	169	162	4%
Total	712	708	1%

COST OF SALES

COST OF METAL SALES

In 2019, the cost of metal sales was unchanged and amounted to USD 4,509 million. Main factors contributing to it were as follows:

- Increase in cash operating costs by 2% (or +USD 75 million);
- Increase in depreciation and amortisation by 13% (or +USD 82 million);
- Change in metal inventories y-o-y leading to cost of metal sales decrease of USD 153 million.

CASH OPERATING COSTS

In 2019, total cash operating costs increased 2% (or +USD 75 million) to USD 3,818 million.

The positive effect of Russian rouble depreciation was fully offset by inflationary growth of cash operating costs.

Cash operating costs related to Bystrinsky project after its full commissioning amounted to USD 62 million in 2019.

Cash operating costs

USD million	2019	2018	Change,%
Labour	1,295	1,283	1%
Materials and supplies	712	727	(2%)
Purchases of refined metals for resale	438	430	2%
Purchases of raw materials and semi-products	402	436	(8%)
Third party services	239	200	20%
Mineral extraction tax and other levies	221	212	4%
Electricity and heat energy	155	143	8%
Fuel	101	87	16%
Transportation expenses	88	70	26%
Sundry costs	167	155	8%
Total cash operating costs	3,818	3,743	2%
Depreciation and amortisation	735	653	13%
(Increase)/decrease in metal inventories	(44)	109	n.a.
Total cost of metal sales	4,509	4,505	0%

Labour

In 2019, labour costs increased 1% (or USD 12 million) to USD 1,295 million amounting to 34% of the Group's total cash operating costs driven by the following:

- -USD 44 million - cost decrease owing to the Russian rouble depreciation against US Dollar;
- +USD 52 million - increase in real terms primarily driven by the indexation of salaries and wages in line with the terms of collective bargaining agreement;
- +USD 15 million - cost increase driven by ramp-up of Bystrinsky project that was fully commissioned in September 2019;
- -USD 15 million - cost decrease following the decrease of production staff headcount primarily due to disposal of a subsidiary.

Purchases of raw materials and semi-products

In 2019, purchases of raw materials and semi-products decreased 8% (or USD 34 million) to USD 402 million driven by the following:

- -USD 15 million - cost decrease owing to the Russian rouble depreciation against US Dollar;
- -USD 73 million - cost decrease owing to lower volumes of Rostec concentrate processing;
- +USD 29 million - cost increase owing to higher volumes of purchased semi-products from Boliden for processing at NN Harjavalta;
- +USD 24 million - cost increase driven by higher purchases of Nkomati concentrate.

Purchases of refined metals for resale

In 2019, expenses related to purchase of refined metals for resale increased 2% to USD 438 million owing to the increase in palladium price, most of which was offset negatively by decrease of purchased volume.

Materials and supplies

In 2019, materials and supplies decreased 2% (or USD 15 million) to USD 712 million driven by the following factors:

- -USD 18 million - positive effect of the Russian rouble depreciation;
- +USD 13 million - cost increase driven by commissioning of Bystrinsky project;
- -USD 10 million - lower materials and supplies expenses primarily related to lower consumption of materials, which was partly offset by inflationary growth of expenses.

Third-party services

In 2019, cost of third party services increased 20% (or USD 39 million) to USD 239 million mainly driven by:

- -USD 7 million - positive effect of the Russian rouble depreciation;
- +USD 15 million - costs increase primarily due to higher PGM refining costs due to release of PGM work-in-progress inventory and tariffs revision;
- +USD 10 million - cost increase owing to the commissioning of Bystrinsky project;
- -USD 13 million - cost increase mainly driven by higher Nkomati stripping costs.

Mineral extraction tax and other levies

In 2019, mineral extraction tax and other levies increased by 4% (or USD 9 million) to USD 221 million driven by the following:

- -USD 7 million - positive effect of the Russian rouble depreciation;
- +USD 13 million - cost increase driven by higher volumes of ore mined.

Electricity and heat energy

In 2019, electricity and heat energy expenses increased by USD 12 million to USD 155 million driven by the following:

- -USD 7 million - positive effect of the Russian rouble depreciation;
- +USD 14 million - cost increase driven by inflationary growth of expenses;
- +USD 3 million - cost increase owing to the commissioning of Bystrinsky project.

Fuel

In 2019, fuel expenses increased 16% (or USD 14 million) to USD 101 million driven by the following:

- -USD 3 million - positive effect of the Russian rouble depreciation;
- +USD 6 million - higher oil price;
- +USD 5 million - cost increase driven by commissioning of Bystrinsky project.

Transportation expenses

In 2019, transportation expenses increased 26% (or +USD 18 million) to USD 88 million driven by the following:

- -USD 1 million - positive effect of the Russian rouble depreciation;
- +USD 9 million - costs increase driven by higher volumes of third-party transportation services in Norilsk industrial region;
- +USD 10 million - cost increase owing to the commissioning of Bystrinsky project.

Sundry costs

In 2019, sundry costs increased 8% (or +USD 12 million) to USD 167 million mainly driven by inflationary growth of expenses and commissioning of Bystrinsky project.

Depreciation and amortisation

In 2019, depreciation and amortisation expenses increased 13% (or USD 82 million) to USD 735 million.

Positive effect of Russian rouble depreciation amounted to -USD 19 million.

Depreciation charges in real terms increased by USD 101 million mainly due to transfers from construction in progress to production assets and full commissioning of Bystrinsky project.

(Increase)/decrease in metal inventories

In 2019, comparative effect of change in metal inventory amounted to -USD 153 million resulting in a decrease of cost of metal sales, primarily driven by accumulation of work -in-process and semi-products in 2019 excluding the changes in Rostec concentrate.

COST OF OTHER SALES

In 2019, cost of other sales increased by USD 62 million to USD 684 million.

Cost of other sales increased primarily due to higher fuel sales, higher repairs and inflationary cost growth, which were partly positively compensated by the Russian rouble depreciation.

SELLING AND DISTRIBUTION EXPENSES

Selling and distribution expenses

USD million	2019	2018	Change, %
Marketing expenses	45	31	45%
Transportation expenses	43	39	10%
Staff costs	15	14	7%
Other	14	8	75%
Total	117	92	27%

In 2019, selling and distribution expenses increased 27% (or USD 25 million) to USD 117 million primarily due to increase in marketing expenses (USD 14 million).

GENERAL AND ADMINISTRATIVE EXPENSES

General and administrative expenses

USD million	2019	2018	Change, %
Staff costs	601	569	6%
Third party services	117	96	22%
Taxes other than mineral extraction tax and income tax	77	103	(25%)
Depreciation and amortisation	69	38	82%
Transportation expenses	15	9	67%
Rent expenses	5	23	(78%)
Other	54	52	4%
Total	938	890	5%

In 2019, general and administrative expenses increased 5% (or USD 48 million) to USD 938 million. Positive effect of Russian rouble depreciation amounted to -USD 24 million. Changes of the general and administrative expenses in real terms were primarily driven by the following:

- +USD 48 million – increase in staff costs mainly due to one-off payments related to management bonuses, as well as salaries indexation;

- +USD 23 million – increase of third party services related to the automatization of production processes and roll out of digital technologies;
- -USD 24 million – reduction of property tax owing to changes in tax legislation in 2019.

OTHER OPERATING EXPENSES

Other operating expenses, net

USD million	2019	2018	Change,%
Social expenses	224	207	8%
Provision on production facilities shut down	190	-	100%
Change in other provisions	39	21	86%
Net income earned during the pre-commissioning stage	(192)	(106)	81%
Other, net	42	(27)	n.a.
Total	303	95	3x

In 2019, other operating expenses, net increased by USD 208 million to USD 303 million driven by the following factors:

- Provision related to shut down of certain production facilities located at Kolskaya GMK (+USD 190 million);
- Net income generated by GRK "Bystrinskoye" from products sale during the hot commissioning stage (-USD 86 million);
- Change in other provisions, primarily including provision for obsolete and slow-moving inventory (+USD 18 million).

FINANCE COSTS

Finance costs, net

USD million	2019	2018	Change,%
Interest expense, net of amounts capitalised	340	382	(11%)
Unwinding of discount on provisions and payables	84	100	(16%)
Changes in fair value of non-current liabilities	64	46	39%
Interest expense on lease liabilities	12	2	6x
Fair value (gain)/loss on the cross-currency interest rate swap	(199)	51	n.a.
Other, net	5	(1)	n.a.
Total	306	580	(47%)

The 47% decrease in finance costs in 2019 was primarily attributed to a change in the fair value of cross-currency interest rate swaps due to appreciation of Russian ruble against the US dollar as of December 31, 2019 as compared to the exchange rate as of December 31, 2018.

Furthermore, despite the increase in total debt, the average cost of the Group's debt portfolio

decreased moderately owing to the monetary policies easing undertaken by the Federal Reserve of the USA and the Bank of Russia, both of which had a positive impact on debt obligations with a floating interest rate.

In 2019, Nornickel continued to optimize its debt portfolio aiming at the extension of debt maturity, which allowed to optimize a number of the Group's bilateral credit facilities totaling USD 962 million.

INCOME TAX EXPENSE

In 2019 income tax expense increased 85% to USD 1 558 million driven mostly by the increase of taxable profit.

The effective income tax rate in 2019 of 20.7% was above the Russian statutory tax rate of 20%, which was primarily driven by non-deductible social expenses.

The breakdown of the income tax expense

USD million	2019	2018	Change, %
Current income tax expense	1,924	812	2x
Deferred tax (benefit)/expense	(366)	31	n.a.
Total	1,558	843	85%

The breakdown of the current income tax expense by tax jurisdictions

USD million	2019	2018	Change, %
Russian Federation	1,883	789	2x
Finland	16	11	45%
Rest of the world	25	12	2x
Total	1,924	812	2x

EBITDA

In 2019, EBITDA increased 27% (or +USD 1,692 million) to USD 7,923 million with the EBITDA margin amounting to 58% (up from 53% in 2018) owing to higher metal revenue and stringent cost control.

EBITDA

USD million	2019	2018	Change, %
Operating profit	7,036	5,416	30%
Depreciation and amortisation	911	765	19%
Impairment of non-financial assets	(24)	50	n.a.
EBITDA	7,923	6,231	27%
EBITDA margin	58%	53%	5 p.p.

STATEMENT OF CASH FLOWS

Statement of cash flows

USD million	2019	2018	Change,%
Cash generated from operations before changes in working capital and income tax	8,226	6,339	30%
Movements in working capital	(307)	941	n.a.
Income tax paid	(1,910)	(787)	2x
Net cash generated from operating activities	6,009	6,493	(7%)
Capital expenditure	(1,324)	(1,553)	(15%)
Other investing activities	204	(9)	n.a.
Net cash used in investing activities	(1,120)	(1,562)	(28%)
Free cash flow	4,889	4,931	(1%)
Interest paid	(460)	(551)	(17%)
Dividends paid	(4,166)	(3,369)	24%
Other financing activities	1,003	(384)	n.a.
Net cash used in financing activities	(3,623)	(4,304)	(16%)
Effects of foreign exchange differences on balances of cash and cash equivalents	130	(91)	n.a.
Net change in cash and cash equivalents	1,396	536	3x

In 2019, free cash flow remained stable at approximately USD 4.9 billion. Lower cash generated from operating activities was almost offset by lower cash used in investing activities.

In 2019, net cash generated from operating activities decreased 7% to USD 6.0 billion primarily driven by comparative effect of working capital increase in 2019 (versus decrease in 2018) and increase in income tax payments due to higher taxable profit and changes in intra-group operations which was partly positively offset by increase in EBITDA in 2019.

Interest paid reduced 17% to USD 460 million as a result of the optimization of debt portfolio.

Reconciliation of the net working capital changes between the balance sheet and cash flow statement is presented below.

In 2019, CAPEX decreased 15% (-USD 229 million) primarily due to adjustment of sulfur project schedule and optimization of certain production projects investment schedules.

Reconciliation of the net working capital changes between the balance sheet and cash flow statement

USD million	2019	2018
Change of the net working capital in the balance sheet	(118)	1,282
Foreign exchange differences	112	(277)
Change in income tax payable	(26)	(5)
Change of long term components of working capital included in CFS	(158)	131
Settlement of tax reserves	(9)	(143)
Other changes including reserves	(108)	(47)
Change of working capital per cash flow	(307)	941

Capital investments breakdown by project

USD million	2019	2018	Change, %
Polar Division, including:	502	696	(28%)
Skalisty mine	58	218	(73%)
Taymirsky mine	67	71	(6%)
Komsomolsky mine	54	44	23%
Oktyabrsky mine	27	40	(33%)
Talnakh Concentrator	14	29	(52%)
Sulfur project	24	36	(33%)
Other Polar Division project	258	258	0%
Kola MMC	221	292	(24%)
Bystrinsky (Bystrinsky) project	103	168	(39%)
Other production projects	489	386	27%
Other non-production assets	9	11	(18%)
Total	1,324	1,553	(15%)

DEBT AND LIQUIDITY MANAGEMENT**Debt and liquidity management**

USD million	As of 31 December 2019	As of 31 December 2018	Change, USD million	Change, %
Non-current loans and borrowings	8,533	8,208	325	4%
Current loans and borrowings	1,087	209	878	5x
Lease liabilities	224	22	202	10x
Total debt	9,844	8,439	1,405	17%
Cash and cash equivalents	2,784	1,388	1,396	2x
Net debt	7,060	7,051	9	0%
Net debt /12M EBITDA	0.9x	1.1x	(0.2x)	

As of December 31, 2019, the Company's total debt increased by 17% (or USD +1,405 million) to USD 9,844 million as compared to December 31, 2018. The increase of total debt owed to new debt raised in the second half of 2019 in the form of two bond issues on the Russian and international debt capital markets, respectively, for a total amount of more than USD 1.1 billion, and recognition of obligations under lease contracts stemming from application of IFRS 16 Leases, which became effective on January 1, 2019.

In spite of the increase in total debt, the Company's net debt remained virtually unchanged due to doubling of the amount of cash and cash

equivalents. Net debt/12M EBITDA ratio decreased from 1.1x as of December 31, 2018 to 0.9x as of the end of 2019 entirely due to an increase in 12M EBITDA.

On February 12, 2019, international rating agency Moody's upgraded the Company's credit rating from "Baa3" with "Positive" outlook to "Baa2" with "Stable" outlook in the wake of change of Russia's credit rating to investment grade "Baa3" with "Stable" outlook. As of December 31, 2019, Nornickel had investment grade credit ratings assigned from all three international rating agencies Fitch, Moody's and S&P Global, and Russian rating agency "Expert RA".