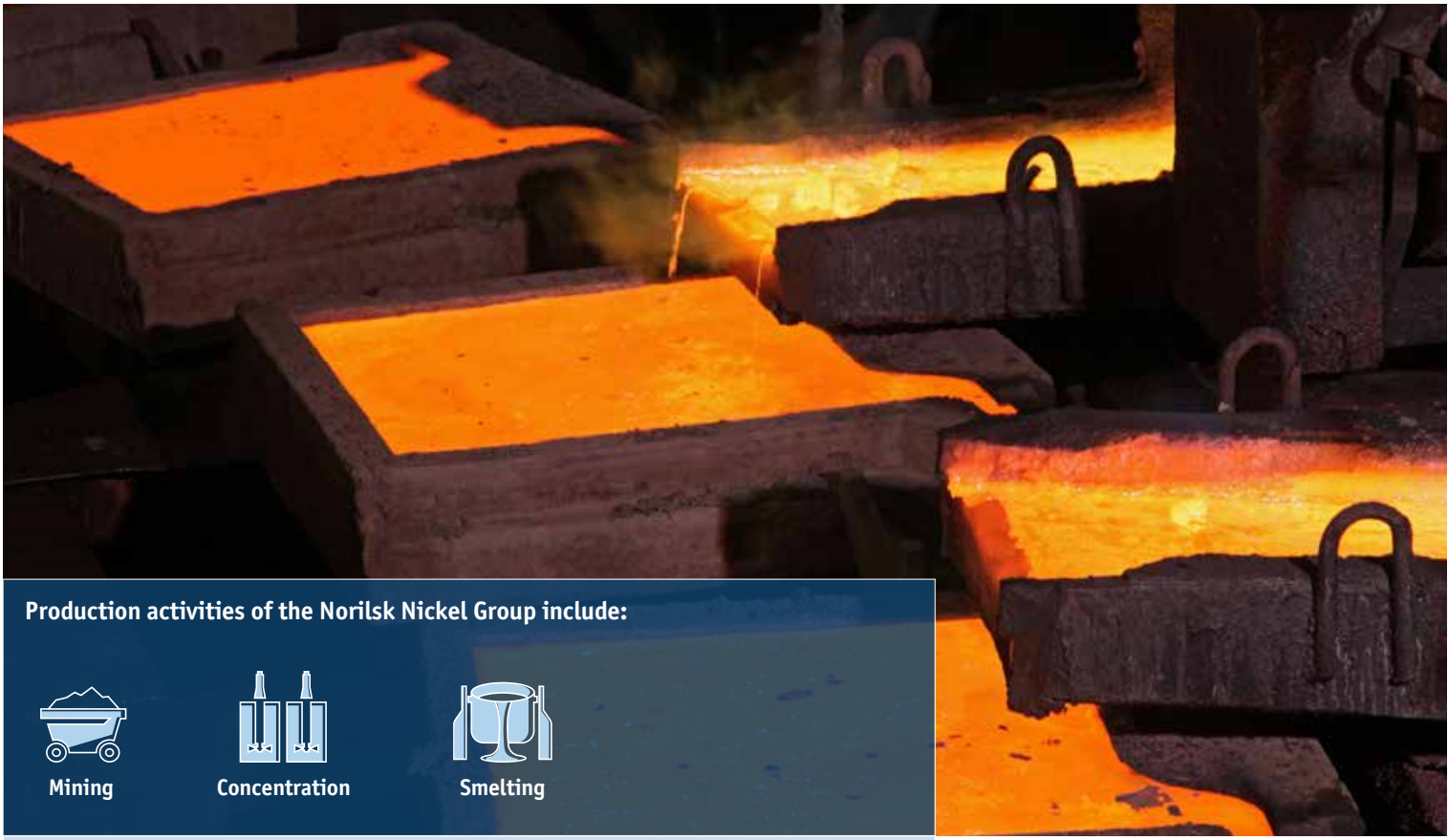
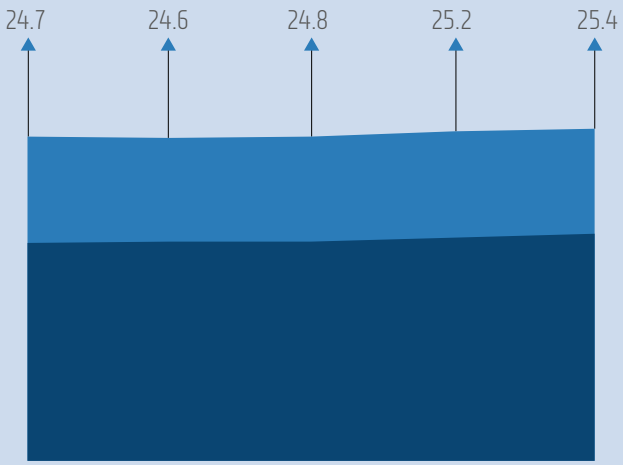
Production: Mining, Concentration, Smelting



Production activities of the Norilsk Nickel Group include:

Mining **Concentration** **Smelting**

ORE MINING BY THE COMPANY'S RUSSIAN BUSINESSES



	2011	2012	2013	2014	2015	mt
Polar Division	16.6	16.7	16.7	17.0	17.3	
Kola MMC	8.1	7.9	8.0	8.1	8.0	

Production volume of ore in 2015

17.3 mt
Polar Division

8.0 mt
Kola MMC

In 2015, the ore mining operations in Polar Division and Kola MMC were performed in accordance with the approved mining plans and schedules

MINING

Polar Division

■ Output and metal content in ore, **mt**

	ORE TYPE	2015	2014	2013
OKTYABRSKOYE FIELD				
Oktyabrsky Mine	Rich	1.7	1.9	2.1
	Cuprous	3.0	2.9	2.8
	Disseminated	0.5	0.3	0.08
	Total	**5.1**	**5.1**	**5.0**
Taimyrsky Mine	Rich	3.7	3.6	3.4
TALNAKHSKOYE AND OKTYABRSKOYE FIELDS				
Komsomolsky Mine	Rich	1.1	1.0	1.0
	Cuprous	2.4	2.5	2.6
	Disseminated	1.5	2.0	2.0
	Total	**5.1**	**5.6**	**5.6**
TALNAKHSKOYE FIELD				
Mayak Mine[1]	Rich	0.03	0	0
	Disseminated	0.9	0	0
	Total	**0.9**	**0**	**0**
NORILSK-1 FIELD				
Zapolyarny Mine	Disseminated	2.5	2.7	2.7
TOTAL FOR POLAR DIVISION				
	Rich	6.5	6.5	6.5
	Cuprous	5.4	5.4	5.4
	Disseminated	5.4	5.1	4.8
	Total	**17.3**	**17.0**	**16.7**
Average metal content				
Nickel, %		1.27	1.29	1.30
Copper, %		2.06	2.08	2.10
PGM, g/t		6.85	6.77	7.13

The increase in ore output y-o-y was in line with the annual production plan and resulted from:

- growth in production of disseminated ores by 308 kt, or 7% (including +168 kt (+58%) from Oktyabrsky Mine and +398 kt (+20%) from Komsomolsky Mine);
- reduced production at Zapolyarny Mine (by 258 kt, or –9%).

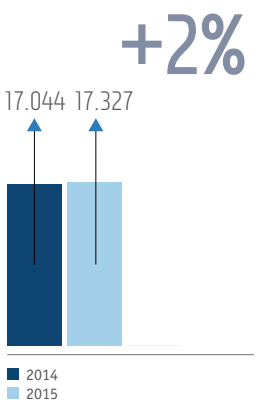
The production of rich and cuprous ores remained broadly flat compared to 2014.

[1] *In 2013–2014 part of Komsomolsky Mine*

■ 2015 ore production breakdown by metal content, **%**

MINES	ORE OUTPUT	METAL CONTENT IN ORE		
		NICKEL	COPPER	PGM
Oktyabrsky	30	28	43	38
Taimyrsky	21	42	28	19
Komsomolsky	29	25	23	28
Komsomolskaya mine	23	11	15	21
Skalistaya mine	6	14	8	7
Mayak	6	2	3	4
Zapolyarny	14	3	3	11
Total	**100**	**100**	**100**	**100**

■ Total ore output, **mt**



Business Overview

Kola MMC

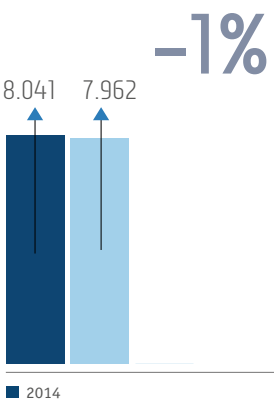
■ Output and metal content in ore, **mt**

	ORE TYPE	2015	2014	2013
ZHDANOVSKOYE FIELD				
Severny Mine's open pit section	Disseminated	0.6	0.7	0.5
Severny Mine's underground section	Disseminated	6.1	6.1	6.1
	Total	**6.7**	**6.9**	**6.6**
ZAPOLYARNOYE FIELD				
Severny Mine's underground section	Disseminated	0.5	0.6	0.7
KOTSELVAARA AND SEMILETKA FIELDS				
Kaula-Kotselvaara mine	Disseminated	0.7	0.7	0,8
TOTAL FOR KOLA MMC		**8.0**	**8.1**	**8,0**
Average metal content				
Nickel, %		0.62	0.65	0,67
Copper, %		0.25	0.27	0,28
PGM, g/t		0.07	0.08	0,09

■ 2015 ore production breakdown by metal content, **%**

MINES	ORE OUTPUT	METAL CONTENT IN ORE		
		NICKEL	COPPER	PGM
Severny Mine				
Severny Mine's open pit section	7	4	4	4
Severny Mine's underground section (Zhdanovskoye Field)	78	68	64	55
Severny Mine's underground section (Zapolyarnoye Field)	6	19	20	33
Kaula-Kotselvaara mine (part of Severny Mine since December 2013)	9	9	12	8
Total	**100**	**100**	**100**	**100**

■ Total ore output, **mt**



The decrease in total production volumes resulted from reduced production at Zapolyarny Mine and Kaula-Kotselvaara mine, both in accordance with the mining plan for 2015:

- production increase by 181 kt, or 5%, at Zhdanovskoye Field by Severny Mine (82 kt by open pit and 100 kt by underground mining);
- production decrease by 206 kt (–30%) at Zapolyarny Field by Severny Mine due to additional development of balance reserves at the field;
- production decrease by 54 kt (7%) at Kaula-Kotselvaara mine.

CONCENTRATION

Polar Division

In 2015, the Polar Division concentrators processed **16.9 mt** of all types of ore (rich, cuprous and disseminated).

Norilsk Concentrator

In Q4 2015, the disseminated ores branch of Norilsk Concentrator processed the Copper Plant's low-grade ores as part of a pilot project.

Talnakh Concentrator

In January 2015, Stage 1 of Talnakh Concentrator upgrade project was launched.

Kola MMC

In 2015, the Kola MMC concentrators processed **7.8 mt**.

Kola MMC Concentrator

In 2015, the plant reported a decrease in the output of nickel and copper in the plant's concentrate compared to 2014, which resulted from the overall deterioration in the processed ore quality due to deeper mining levels. In the second half of the year, the second line of the briquetting section was launched.

SMELTING

■ Metals production by the Company's Russian businesses

For more details, see p. 227.

	2015	2014	2013
Nickel, kt	222	228	232
Copper, kt	356	355	359
Platinum, '000 oz t	622	627	628
Palladium , '000 oz t	2,606	2,660	2,580

Polar Division

■ Metals production

	2015	2014	2013
Nickel, kt	97	122	123
Copper, kt	293	298	297
Platinum, '000 oz t	488	500	504
Palladium, '000 oz t	1,935	2,065	2,006

■ Metals recovery, %

	2015	2014	2013
Metals recovery in concentration			
Nickel	81.32	82.01	81.97
Copper	95.49	95.83	95.97
Metals recovery in smelting			
Nickel	93.06	92.38	91.55
Copper	94.17	94.74	94.10

In 2015, the electrolytic nickel output exceeded the target, but decreased by 26 kt y-o-y (–20%) due to reconfiguration of production facilities.

Copper cathode production was below the target as metal content in ore was lower than planned, causing the output to decline by 5 kt (–2%) y-o-y due to reconfiguration of production facilities.

The output of platinum and palladium was at the target level, but below the 2014 level by 142 thousand oz t due to the increase of work-in-process inventories at Krasnoyarsk Gulidov Non-Ferrous Metals Plant.

Kola MMC

■ Metals production

	2015	2014	2013
Nickel, kt	**125**	**106**	**109**
from Russian feed	123	101	97
from 3d parties feed	2	5	12
Copper, kt	**63**	**57**	**62**
from Russian feed	60	48	49
from 3d parties feed	3	9	13
Platinum, '000 oz t	**134**	**127**	**124**
from Russian feed	122	95	100
from 3d parties feed	12	32	23
Palladium, '000 oz t	**671**	**595**	**574**
from Russian feed	640	517	523
from 3d parties feed	31	78	51

■ Metals recovery, %

	2015	2014	2013
Concentration cycle (ore to concentrate)			
Nickel	72.69	72.42	72.51
Copper	76.04	75.22	74.88
Refining			
Nickel	97.80	97.79	97.73
Copper	97.28	97.16	97.29

In 2015, the output of nickel metal exceeded the target, increasing by 19 kt y-o-y (+15 %) due to reconfiguration of production facilities, while the output from own feedstock shrank by 4% y-o-y.

Copper cathode production was not as high as planned due to the decrease in low-margin tolling operations and copper content in Polar Division's matte below the target. In 2015, copper output grew by 6 kt y-o-y (+9%) due to reconfiguration of production facilities, while the output from own feedstock remained at the last year's level.

The output of platinum and palladium was at the target level, growing by 84 thousand oz t y-o-y due to reconfiguration of production facilities.

Norilsk Nickel Harjavalta

■ Metals production by Norilsk Nickel Harjavalta

	2015	2014	2013
Commercial nickel, kt	43	43	44
Copper in copper cake, kt	13	11	7
PGM in copper cake, kt	3.5	3.2	4.1

In 2015, feedstock supply mainly included nickel concentrate from Nkomati (South Africa, internal supply), nickel concentrate from Mirabela (Brazil), nickel concentrate from Titania (Norway), nickel concentrate from CRI (Canada), nickel sulphide concentrate from Talvivaara (Finland), converter matte from BHP (Australia) and BCL (Botswana), and nickel matte from Kola MMC.

Concentrates processed at the facilities of Boliden Harjavalta Smelter (BOHA) totalled 140 kt. Concentrates were processed under a tolling agreement until its termination on 1 July 2015. Harjavalta processes nickel-containing semi-products from third-party suppliers and is in the process of transition to feedstock of Polar Division.

Business Overview

Under the agreement, concentrates undergo preliminary processing at Boliden AB's Harjavalta Smelting Plant, which shares the grounds of the Finnish Suurteollisuuspuisto Industrial Park with Norilsk Nickel Harjavalta Oy. Other semi-products with high nickel content are delivered directly to Norilsk Nickel Harjavalta Oy.

Starting 2H 2015, NNH processes BOHA's nickel matte produced from the plant's own feedstock.

Higher y-o-y recovery rates in 2015 are due to better quality of copper and ferrous cake.

In 2015, Norilsk Nickel Harjavalta produced 44 kt of commercial nickel, including 15 kt of cathodes, 22 kt of briquettes, 236 t of nickel powder, 7 kt of nickel salts, and 129 kt of nickel solution. The sales of copper cake to third parties totalled 13 kt.

The main driver behind the nickel production growth is the increased feedstock supply from third parties.

In 2015, copper and PGM sales grew y-o-y as a result of improved sales to third parties.

The y-o-y growth in commercial nickel output in 2015 was driven by the increased supply of feedstock for refining.

■ Capacity utilisation

	2015	2014	2013
Concentrates and pyrite smelting, kt	140	241	255
Refining capacity utilisation, % of max	67	66	70

■ Recovery, %

	2015	2014	2013
BOHA-NNH			
Nickel	97.7	97.1	96.4
Copper	97.4	95.4	96.4
Platinum	–	–	–
Palladium	–	–	–
Harjavalta[1]			
Nickel	97.8	97.1	97.5
Copper	99.6	99.3	99.3
Platinum	99.6	99.3	99.3
Palladium	99.6	99.3	99.3

[1] Recovery (loss) rates of NNH refining capacities.

Nkomati

Nkomati is a 50/50 joint venture of the Norilsk Nickel Group and African Rainbow Minerals. In October 2014, the Group signed an agreement with BCL Limited to sell its African assets – Tati Nickel Mining Company and Nkomati. The sale of Tati Nickel Mining Company was completed on 2 April 2015. The sale of Nkomati is yet to be closed.

In 2015, total ore mined by Nkomati reached 4.2 kt (attributable to the Group's 50% shareholding) with the average nickel content of 0.34%. The Group accounts for 11.4 kt of nickel concentrate produced, flat against the previous year.

■ Average metal content, %

	2015	2014
Nickel	0.34	0.36
Copper	0.14	0.13

■ Enrichment recovery, %

	2015	2014
Nickel	74.1	75.9
Copper	86.1	90.8

■ Metals production for internal processing

	2015	2014
Nickel, kt	11	11
Copper, kt	5	5
Platinum, '000 oz t	54	49
Palladium, '000 oz t	21	19