

BELLONA

NORNICKEL AND THE KOLA PENINSULA

CHARTING ECOLOGICAL
PROGRESS WITHOUT A COMPASS

2018

Photo: Nils Bøhmer

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Authors:

Oskar Njaa

Contributors:

Charles Digges

Anna Kireeva

Andrey Zolotkov

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Contact: oskar@bellona.no

Web page: www.bellona.org

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1. INTRODUCTION:

The issue of pollution from the industry of the Northwest region of Russia in general, and perhaps on the Kola Peninsula in particular, has been a worry for both environmentalists and the public for decades.

Both the companies responsible for the pollution, as well as the government of Russia, have promised to put measures into force to reduce this pollution. The Nordic countries have also pledged to contribute to this effort. Still, the pollution remains considerable, albeit lower than it was during Soviet times.

Much attention has been devoted to the issue over the years, leading to many a report and plenty of material on the subject. In 2003, Geir Hønneland and Anne-Kristin Jørgensen wrote the following, describing the symbolic value of the particularly pressing pollution issue in the Murmansk region:

If asked to characterize the northwestern part of the Russian Federation in one or two phrases, it would be difficult to avoid a depiction of the region as both blessed with extremely bountiful natural resources and, at the same time, bedeviled by grave environmental problems. (...) Since the 1990s, Northwestern Russia has been more renowned for its environmental degradation than for its abundant resources. Since Western journalists were gradually given access to this heavily militarized region from the mid-1980s, the black tree stumps of the dying forests around Nikel and Monchegorsk have come to symbolize the sullen environmental state of Russia to many in the west. (Hønneland and Jørgensen, 2003)

The present report aims to summarize the development of the issue of industrial pollution on the Kola Peninsula since the turn of the decade, using the Kola Mining and Metallurgical Company (KMMC), a daughter-company of the giant Norilsk Nickel, as an example. Although both general and specific promises for reduction in pollution have been plentiful from the industry during the last few decades, recent events have opened the door for actual measures to potentially be implemented on a large scale.

The report takes form as a working paper, which is updated yearly to show the progress of efforts to reduce pollution, particularly from the facilities owned by the KMMC. So far, this report has been updated in 2017 and in 2018.

The year 2017 was declared as the “Year of the Environment” in Russia by President Vladimir Putin. During the final months of 2016, and throughout 2017, several measures for and outlooks on pollution reduction were presented by the industry in general, Nor Nickel in particular, as well as by the Russian government. This report will discuss these developments, their potential, the context of which they are a part, and the way forward for an industry that is under increasing pressure to provide products produced in as environmentally friendly a way as possible. The main focus will be Nor Nickel’s activities on the Kola Peninsula, and the company’s well known emissions of Sulphur dioxide (SO₂) into the atmosphere.

2. HISTORY – FROM POLLUTION TO POLLUTION TO PROMISES OF SOLUTION

The Kola Peninsula is part of the Murmansk region in Northwestern Russia. Murmansk is a typical Russian northern region in the sense that major population growth post-dated the Bolshevik Revolution and was based on the construction of a relatively small number of massive industrial enterprises and military complexes. The industrialization policies of the 1920s ushered in a period of mass immigration to the Kola Peninsula, a trend that except for a temporary slump during World War II continued until 1991. (Hønneland and Jørgensen, 2003) Today, these enterprises are still the social and economic cornerstone of both singular communities and of the region as a whole.

One of these enterprises is Norilsk Nickel, a world-leading producer of nickel, palladium and other metals. It has its key company assets in the Russian Arctic, on the Taymyr and Kola Peninsula. On the Kola Peninsula, company assets are operated by subsidiary Kola MMC. Processing facilities are located in Monchegorsk, as well as the towns of Nikel and Zapolyarny near the borders to Norway and Finland (Staalesen, 2016a). The KMMC brought the Murmansk region more than 8,3 billion rubles in tax revenues in 2017 (Nornickel, 2018d).

Kola MMC processes the ore at its plant in Zapolyarny, where the ore is crushed, concentrated and made into briquettes. It is then sent to Nikel, where the briquettes are sent through a smelter, resulting in the end product of nickel matte. That is it then sent by rail to Monchegorsk, near the center of the Murmansk region, where pure nickel is made (NILU, 2017).

Traditionally, the surroundings have been polluted by emissions from these enterprises. The main attention has been directed towards airborne pollution in the form of sulphur dioxide (SO₂) and heavy metals like nickel and copper.

The Kola MMC has a total of eight areas in the Pechenga area, four of which are developed for mining; the Kotselvaara and the Semiletka located near the town of Nikel and the

NORILSK NICKEL, also known as Nornickel (Russian: ГМК «Норильский Никель») is a Russian nickel and palladium mining and smelting company. Its largest operations are located in the Norilsk-Talnakh area near the Yenisei River, in northern Russia. It also has holdings near the Kola Peninsula at Nikel, Zapolyarny, and Monchegorsk; in western Finland at Harjavalta; in southern Africa in Botswana and South Africa; and in western Australia. MMC stands for "Mining and Metallurgical Company".

Norilsk Nickel is headquartered in Moscow and is the world's leading producer of nickel and palladium. It is ranked among the top ten copper producers. (*Wikipedia, 2017*)

Zhdadnovskoye and Zapolyarnoye located further east near the town of Zapolyarny. In 2016, it was announced that the company would open two new mines by 2019, increasing their total production to more than 10,5 million tons of ore, up from 8,1 tons as of 2013 (Staalesen, 2016b). Kola MMC produces 39% of nickel and 42% of the cobalt that Norinickel produces in total (TASS, 2018).

The pollution from the KMMC's activities is monitored by several government agencies, among them the local branch of Rosgidromet. The monitoring agency does indeed show how the KMMC routinely has breached the pollution threshold for SO₂-concentration in the air at their sites on the Kola Peninsula during the latest years. See figure 1 below for an example from their measurements in Nikel during the summer of 2017.

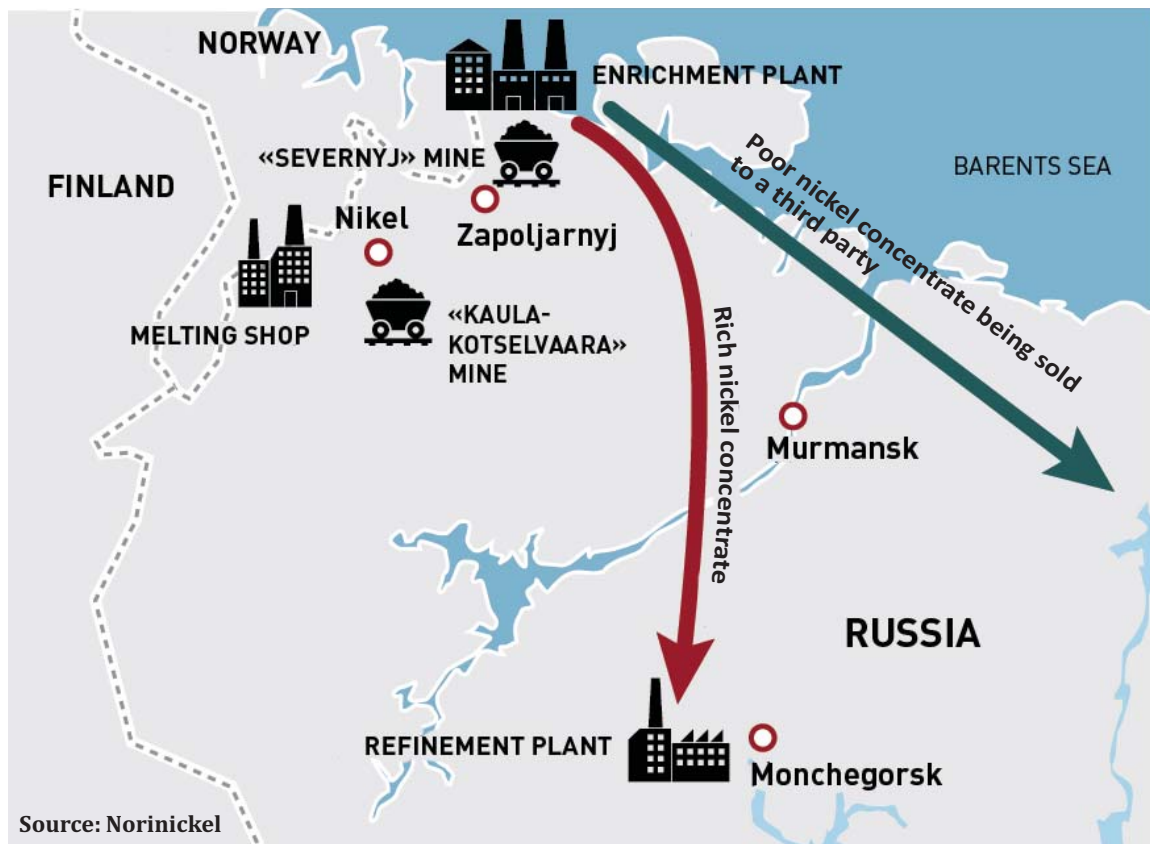


Illustration 1: Map of Norinickel's operations (courtesy of daughter company KMMC) on the Kola Peninsula (Trifonova, 2017)

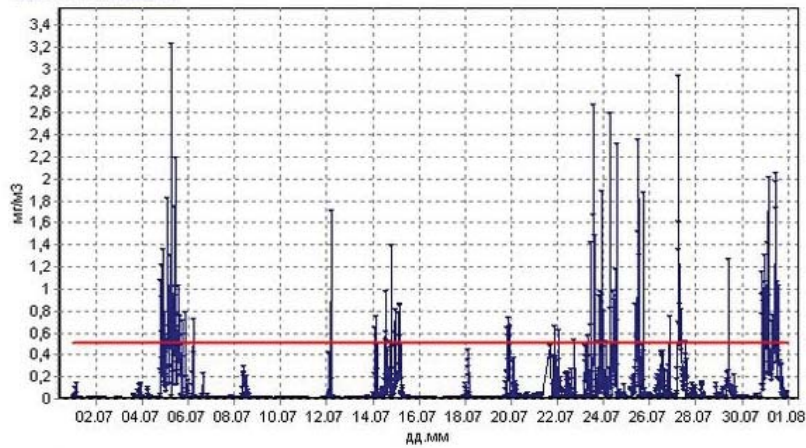


Figure 1: Measurements of SO₂-emissions at a monitoring station in Nikel during July 2017. (Red line represents the threshold) (Kolgidromet, 2017)

The local branch of the Russian Ministry of Natural Resources and Environment in Murmansk also puts the spotlight on the emissions of SO₂ in their yearly reports. Even as an average of SO₂ concentration in the air throughout the year, thresholds are breached in both Zapolyarny and Nikel, and were continually breached every year from 2012-2016. See figure 2 below.

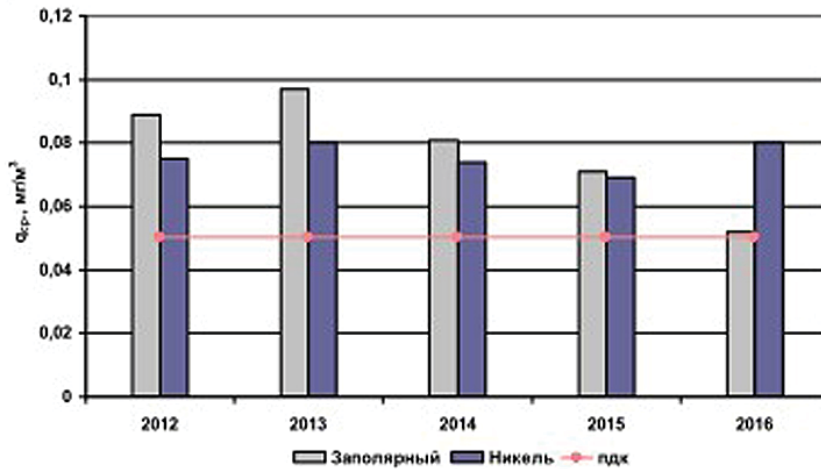


Figure 2: Measurements of SO₂-concentration in the air in Zapolyarny (Grey color) and Nikel (Blue color) as an average per year from 2012-2016. (Red line shows the threshold) (Ministry of Natural Resources and Environment - Murmansk Oblast, 2017)

In addition to indigenous Russian measurements of pollution, Norwegian authorities also monitor conditions near the border area between Russia and Norway. A report from 2016 only shows data up to 2015, but it likewise shows the same breach of thresholds (Figure 3).



Figure 3: Average concentration of SO₂ in the air in Zapolyarny (light yellow) and Nickel (dark yellow), between 2010 and 2015, (Red line represents the threshold) (Miljodirektoratet, 2017)

According to Bellona’s continual monitoring of numbers from amongst others Rosgidromet, breaches of the thresholds have been fewer in 2018 than in 2017. Although, some extremes have been observed, especially during the first half of the year.

Particularly worth mentioning is the incident in Monchegorsk on the 7th of March, 2018. Then, the observed concentration of SO₂ in the air in Monchegorsk was 9 times higher than the threshold limit (Kolgidromet, 2018). In practice, this left the town of Monchegorsk wrapped in a polluted mist so thick that drivers could not see each other on the road, and townspeople were advised to stay inside. Usually, such emissions do not occur in Monchegorsk, and the bigger concentrations are mainly seen in the towns of Nickel and Zapolyarny. The reason behind this particular peak is unknown, but events of a similar nature often happen when there is little to no wind around the facilities on the Kola Peninsula, thus the concentrated pollution stays put around the facilities, and did not get dispersed (Novaya Gazeta, 2018).

3. RECENT DEVELOPMENTS - PUTTING POLLUTION IN PERSPECTIVE

The pollution issue on the Kola Peninsula is but a part of a larger and grim picture of environmental conditions in Russia. In April of 2017, the government of Russia issued a report saying that 74 percent of Russians live in environmental degradation. 40 percent of citizens should not be drinking water from their taps, and that toxic waste and contamination from 340 industrial facilities threaten the lives and livelihood of 17 million of Russia's citizens (Bellona, 2017f).

One of the larger single-contributors to this pollution in Russia is the company Nornickel. Although many would say that the company has not taken its environmental responsibilities seriously in the past, the rhetoric of the company's leadership has changed during the last three years. The CEO of Norilsk Nickel, as it was called until 2016 (RIA Novosti, 2016), went public in late 2016, stating that the company's biggest problem is environmental.

The CEO, Vladimir Potanin, one of the wealthiest men in Russia, further stated in 2016 that the company's emissions of heavy metals and sulfur dioxide in Norilsk, in Northern Siberia, and on the Kola Peninsula in the Murmansk region were problems he knew how to solve. He also stated that he and his company were willing to spend up to \$14 billion in a process he said would take about seven years, with a goal to reduce the negative impacts of operations in these locations (Bellona, 2016b).

This news came in the aftermath of a statement from Nornickel the month before, on proposed SO₂-emission cuts by 50% from the KMMC on the Kola Peninsula, as well as by 75% from its enterprise in Norilsk in Siberia by 2019 (Bellona, 2016a). The company later changed the numbers to 90% reduction by 2023 for the KMMC and keeping it at 75% for their activities in Norilsk, revealing that this reduction would be reckoned against the baseline year of 2015 (Bellona, 2017d).

These ambitious declarations from Nornickel were preceded by another event, earlier in 2016: The closing of the old smelter in Norilsk, resulting in liquidation of a source of 370 000 tons of SO₂ emitted into the air yearly. Built in 1942, the smelter was taken out of operation because "working that way was no longer feasible", according to the company itself (Bellona, 2016a).

This led to speculations about the potential shutdown of the smelter in the town of Nikel, near the Norwegian border. That such a shutdown was up for discussion was even confirmed by Potanin in an interview with the newspaper Vedomosti near the end of 2016 (Vedomosti, 2016).

There are several potential reasons for this apparent turnaround. One being that of the future environmental demands from producers and consumers. As products like batteries for electric cars and energy storage-purposes come in higher demand, the environmental demands for environmentally friendly products will increase in all parts of the production chain, and perhaps especially for electric vehicles (EVs).

The Financial Times writes that this will lead to several challenges for the industry. The environmental impact of mining will be on the agenda due to the “green credentials of EVs”, potentially leading producers like Tesla, Volvo and others to choose raw materials from the most environmentally conscious providers (Sanderson, 2017). This development has definitely got Nornickel’s attention, and was part of their analysis during a presentation made in London in November 2017 (Nornickel, 2017b).

Thus, Nornickel’s sudden turnaround might be due to a realization of the imminent future threat to their competitiveness, should they fail to reduce their environmental impact. Although CO₂ and other greenhouse gases are the main focus for reduction of impact from production of EVs at the current time, other emissions are also under scrutiny. There is little reason to think that extended pollution of bodies of water, rivers, soil or air in the form of other compounds will avoid catching the public’s eye if the metallurgical industry continues to be under the microscope, which it will.

3.1. Promises all around

Nornickel regularly states how much money they spend on measures to reduce pollution. An interesting aspect of this is that they are also in favor of getting tax reductions and credits to compensate them for their investments (Bellona, 2017b).

We have compiled an overview of statements and promises about investments from various representatives of the company on different levels in Table 1 on the next page. The overview covers the years of 2016 and 2017, and are thus most probably closely connected to the year of Ecology in Russia in 2017. Regardless of the context the promises have been made in, there is, as the table shows, little information available on what the funds are actually going to be spent on, and thus how much each project will cost. How much money is spent is no indicator of actual results. The lack of a comprehensive plan with an overview of planned projects and their effect on the environmental impact of the enterprise makes it hard to keep track of the promises, and the same sources state completely different numbers with varying specificity.

3.2. No roadmap available – but that might change

Unfortunately, there is no complete, comprehensive plan available to the public, with concrete measures and projected reductions per measure at the different sites on the Kola Peninsula.

However, several of the singular projects implemented and projected give reason to hope. One concrete measure that has been mentioned by Nornickel is a project together with Canadian SNC-Lavalin Inc that is to be implemented in Norilsk. A contract was signed between the two companies in November 2016, worth \$1.7 billion, with the goal of reducing emissions at the Nadezhda Smelter in Norilsk by capturing SO₂ (Staalesen, 2016d). Although this does not concern the enterprise’s activities on the Kola Peninsula directly, it is possible to imagine that a successful project might lead to implementation of similar measures in the Murmansk region. The so called “Sulphur project” is included presentations made by Nornickel abroad, including one made in London in November of 2017 (Nornickel, 2017b). On the 10th of September 2018, Vladimir Potanin marked the official start of the project in Norilsk. The system is supposed to be in operation by 2023 (Nornickel, 2018b), whether it will work as intended remains to be seen.

Table 1: Overview of promises around the start of the Year of Ecology, for reference

Who?	How much?	On what?	Over how many years?
Vladimir Potanin, CEO, Nornickel¹	\$14 billion	“Making the world’s biggest nickel producer an example of environmental responsibility”.	7 years (from 2016)
Vladimir Potanin, CEO, Nornickel²	RUB 250 billion	“Channeled to environmental activities”	Within the framework of the Modernization Strategy up to 2023
Nornickel³	RUB 300 billion	“Ecological projects”	“Over the nearest years” (from early 2017)
Kola MMC⁴	RUB 27,7 billion	Modernization and development project geared toward environmental “effectiveness”	Over two years (from early 2017)
Yelena Bezdenezhnykh, then VP, Nornickel⁵	RUB 27,7 billion	“Realizing strategic projects for company development, boosting its economic and environmental effectiveness, and renewing technology and equipment.”	2017 and 2018 (stated in November 2016)
CEO Igor Ryshkel of the Kola MMC⁶	RUB 20 billion (\$343 million)	"First of all, those are projects on modernization of nickel production, and besides, in Zapolyarny town we shall begin construction of new treatment facilities at the Severnyi mine."	Late 2017

¹ Source for data on promised spending from Potanin, CEO of Nornickel: <https://www.vedomosti.ru/business/characters/2016/12/20/670501-nravyatsya-zarplata>

² Source for data on promised spending from Potanin, CEO of Nornickel: <http://www.forbes.ru/milliardery/338301-potanin-reshil-vlozhit-1-trln-rublej-v-modernizaciyu-nornikelya>

³ Source for data on promised spending from Nornickel: <http://tass.ru/ekonomika/3949069>

⁴ Source for data on promised spending from KMMC: <http://tass.ru/v-strane/3958242>

⁵ Source for data on promised spending from VP of Nornickel: https://www.nornickel.ru/news-and-media/press-releases-and-news/nornikel-i-murmanskaya-oblast-ukreplyayut-partnerstvo/?sphrase_id=232436

⁶ Source for data on promised spending from CEO of KMMC: <http://tass.com/economy/987118>

What is known is that there are changes ongoing in the federal system in Russia that would require companies to use better technology, which might mitigate emissions in the future, and could make it necessary for the company to present a roadmap for reaching set goals.

3.3. Rules for Best available Technology being implemented in Russia:

During the autumn of 2016, it became known that the Russian government was implementing a law, originally introduced in 2014, for demanding that the best available technology be adopted by the industry within the country.

Such legislation, called BAT for short, has been the norm in several places in the world since before the turn of the millennia. In the European Union, BAT-standards for each sector are defined in so called BREFs, that is, BAT reference documents. This makes it possible for the industry to know what demands are relevant for their own sector (European Commission, 2017)

In Russia, the standards for BAT are under development, and will first be introduced as a pilot project for the 300 most polluting companies in the country, one of which happens to be Nornickel. The Russian BAT-standards will be ready in 2019 (Nilsen, 2016) and might lead to significant changes in how the Russian industry conducts its operations.

As far as we know, the Russian system for BAT will be accompanied by a new reward-system for those companies that do reduce their emissions of pollutants to the environment. The Ministry of Finance of the Russian Federation has stated that it will introduce a new tax-system that should benefit those that conform to the new standards under the BAT-regime. Companies that hold true to the standards will be exempt from a range of taxes on the disposal of pollutants. To be able to monitor whether the industry actually abides by the new demands, the Ministry of Finance proposes that meters be installed that automatically monitor the quantities of waste produced (Davydova, 2018). The main issue is whether the standards will be good enough to have a significant impact on pollution across the board.

3.4. 2017 - The Year of Ecology and its impact:

President Vladimir Putin declared 2017 the Year of Ecology in Russia. However unclear that is, it certainly led to a change in rhetoric about environmental issues in Russian society.

At a meeting in the state Council devoted to environment, Putin stated that pollution and emissions must be cut by “at least 50 percent” (Staalesen, 2017a). He did not specify exactly what types of pollution and emissions he had in mind, but he pointed a finger at industrial enterprises and said that they need to get up to speed: “Our main issue is to get a drastic reduction of emissions [...] by means of technological transformation of industry, the introduction of the best available technology”, adding that: “We know that far from all companies devote sufficient attention to these questions [...] we will allow no more postponement of measures (Staalesen, 2017a).

The initiative has led to a change in rhetoric from several enterprises and organs, among them the Russian Prosecutor General, which opened a special Arctic Department in 2017, stating that violations of environmental laws in the Arctic are numerous and grave (Staalesen, 2017b).

Nornickel has been promising to implement several measures at their sites on the Kola Peninsula to combat pollution, going as far as talking about shutting down the smelter in Nikel, moving some of the production to Norilsk. That would no doubt please many Norwegians, but the measure would threaten many jobs in what is a company town. In addition, moving the problem to Norilsk will not reduce the environmental impact of the operation as such, but just move the problem. What is needed are technical solutions to the core problem (Bellona, 2017d).

Whether the year of Ecology in 2017 was a temporary breather for those looking to put environmental problems on the agenda, or a year actually bringing about more permanent, long term change remains to be seen. In the case of Nornickel, it does indeed seem that they have more than symbolic promises in mind for their enterprise.

4. NORNICKEL TO REDUCE POLLUTION – WHAT WE KNOW

What the Russian BAT will look like is still unclear, but it is important that it is comprehensible and gives the companies something to strive for. Combating pollution through system changes requires a holistic plan, as measures implemented in one place might not be effective without consequent measures being implemented further down the supply chain.

One of the bigger steps made to combat pollution in the Nornickel combine the last years is the smelter closed in Norilsk in 2016. That led to a reduction in SO₂-emissions of around 400 thousand tons (Taymyrsky Telegraf, 2017). Still, production has been increasingly moved from Norilsk to the Kola Peninsula (Zapolyarnaya Pravda, 2017), which is our main area of concern in this report.

4.1. The Kola Peninsula – Three towns and one total

The KMMC is seemingly in the process of making improvements in all parts of the nickel-production process. This started in 2015 and should be finished in 2019, costing RUB 20 billion, according to the press-service of the company (Vinogradov, 2017).

According to the same source, the company has increased production of both nickel and copper over the last years: “In 2013 we produced 107 600 ton of commodity nickel and 61 100 ton commodity copper, the result of last year’s [2016] production was 129 700 ton of nickel and 70 200 ton copper” (Vinogradov, 2017).

In this section, we outline the recent developments within each of the three parts of the KMMC’s activities on the Kola Peninsula, before looking at the total effect of the projects that have been and will be implemented.

4.1.1. Zapolyarny

Reported reductions of emissions at the plant in Zapolyarny, part of the triangle of enterprises on the Kola Peninsula operated by the KMMC, is due to the construction of a briquetting factory connected with the plant. This keeps more of the sulfur contained by using the concentrate to producing cold briquettes instead of roasting material to create pellets, but could have meant that emissions will rise in Nickel, which is where the briquettes are sent for further processing (Bellona, 2017a). The briquetting factory cost the KMMC 2.3 billion rubles (\$40.8 million) (TASS, 2018), and currently consists of two production lines (Bellona, 2018).

The company itself has stated that the briquetting plant has reduced SO₂-emissions from Zapolyarny from 42 000 ton yearly, to around 1 400 ton per year. If that is indeed the case, that is a considerable reduction. For comparison, Norway’s total emissions of SO₂ was at a yearly 14 475 ton in 2016. The percentage-wise reduction in total emissions from KMMC from 2015 to 2016, resulting from the briquetting factory being commissioned, was 22,8% according to the company itself (Nilsen, 2017b).

According to the press service of the KMMC, this will make the job of cleaning emissions in Nikel easier as well. We quote:

In briquettes, the sulfur concentration is higher, and smelting produces a more saturated sulfur gas that is easier to dispose of. If earlier in the production of one ton of matte we received about 600 kg of sulfuric acid, then in 2017 the extraction rate was already more than 800 kg. In general, with the planned degree of utilization of sulfur dioxide at 60 percent, in 2017, the floating shop reached 67.5 percent (Bellona, 2018).

4.1.2. Nikel

As of their annual report for 2017, Nornickel says that the Kola MMC has partially implemented a set of measures aimed at reducing sulfur dioxide emissions from the smelter at the Nickel site. The reduction will occur due to the modernization of equipment (reconstruction of the loading systems and sealing of ore-thermal furnaces, replacement of gas ducts, preparation of the charge for smelting, etc.) and reduction of the smelter's load with the sale of part of the concentrate of the beneficiation plant to third-party consumers (Bellona, 2018).

While promising to keep up production, Nornickel's First Vice President, Sergey Dyachenko, has presented plans to close two out of three furnaces in the smelter in Nickel by 2019. The output will be kept at a high level using only one furnace, by providing high-grade concentrate instead of bulk concentrate for further production in Monchegorsk. What low-grade products they still end up making as a result of the process in Nickel will be directly shipped to markets. Reduced volume of smelting will lower the emissions in Nickel (Nilsen, 2017a). Indeed, emissions in the town of Nickel will be reduced by 50% from the levels in the base year of 2015 of 80 000 tons, to 40 000 tons in 2019 (Nornickel, 2017b, 2018d). There are also plans to move some production to Nornickel's facilities in Finland (Trifonova, 2017).

To mitigate emissions, the KMMC has increased production of sulfuric acid at the smelter in Nickel, thus trapping more SO₂ that otherwise would have been released to the air. This is possible, according to the company, due to the new briquettes from Zapolyarny having more sulfur in them, and thus emitting a more sulfur-rich gas. This development makes it possible to increase production of sulfur acid from 600 kilo per ton smelted nickel matte previously to a current 800 kilograms. Although the company states that this production is not profitable, they say they are doing it because "we are not only working here, we are living here" (Vladimirov, 2017). This is statement to the fact that the company is indeed able to take non-profitable decisions to reach environmental goals. The sulfuric acid production plant in Nickel was commissioned back in 1977, but has not been up and running often. The production process is under constant modernization according to the company (Vladimirov, 2017). Still, it remains to be seen what the future effect of this project will be and whether the company decides to continue this practice.

4.1.3. Monchegorsk

Nornickel is moving increasing amounts of its nickel refining all the way from Norilsk to the Kola Peninsula's industrial town of Monchegorsk, now the center for nickel refining in the company (Vinogradov, 2017). Nornickel opened a new port in April of 2017 in the Murmansk region to accommodate increased annual cargo from their other operational base in Norilsk. The port will make it possible to handle 1.5 million tons of cargo a year, up from

700 000 tons (Bellona, 2017c). The KMMC has promised emissions in Monchegorsk won't rise, but hasn't specified exactly how that will work, saying only that "different technologies" will dampen future pollution (Bellona, 2017a).

Even when talking about concrete projects, concrete reduction numbers are not stated. A new technology for producing nickel using electrical extraction technology, developed jointly by the Gipronickel Institute and the Kola MMC engineers, was installed in Monchegorsk in late 2017. According to the company, the elimination of the melting stage leads to a decrease in emissions of harmful substances into the atmosphere, as well as to a reduction in energy consumption (B-Port, 2018; TV-21, 2018).

4.1.4. Total emissions dropping

Nornickel and KMMC do not necessarily speak the same language when it comes to the numbers they use. The facilities on the Kola Peninsula emit not only SO₂, but also nitrogen oxides (NO_x) and solids in the form of heavy metals. When talking about emissions, it is sometimes unclear whether the company has only the SO₂ in mind, or if the numbers also include some or all of the other emissions. If one looks at the Corporate Social Responsibility report of the company for 2017, they show their total emissions in different ways in different parts of the report. If we look at their graphs showing air emissions on page 89 we see the following:

Air pollutant emissions, kt 305-7

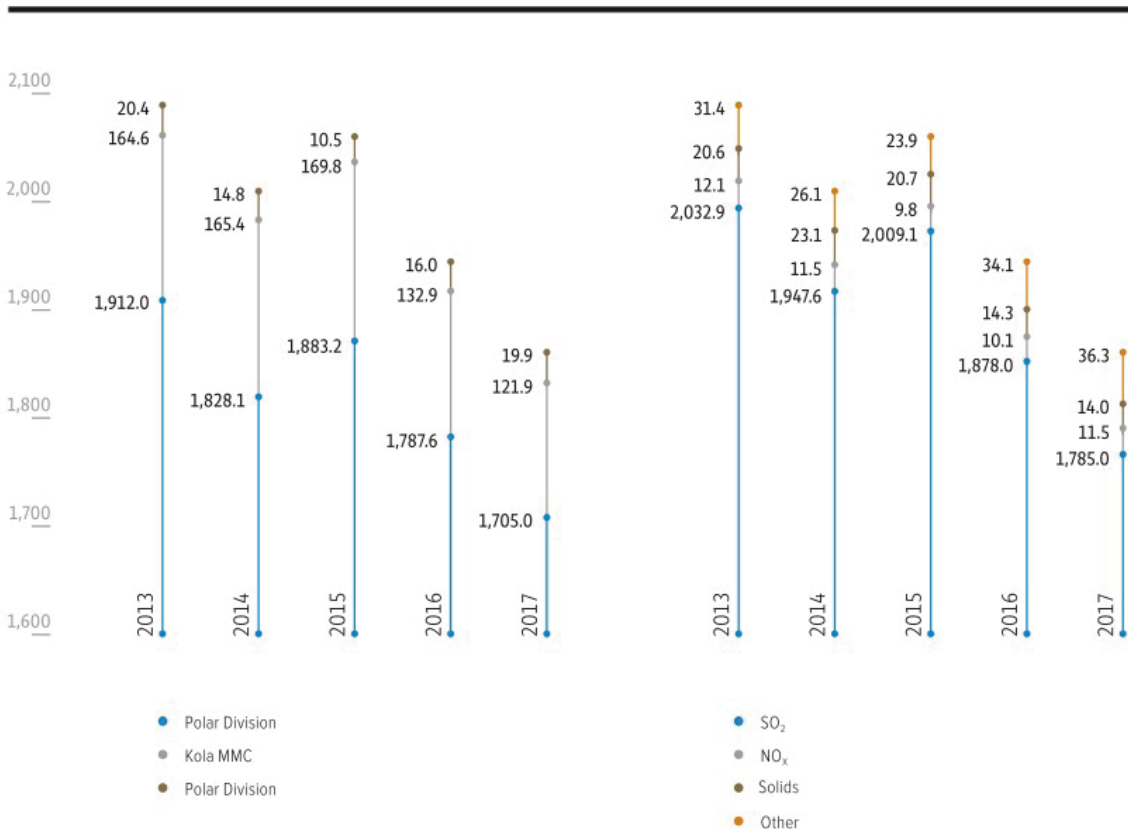


Figure 4: Yearly air pollutant emissions in kilotons (Nornickel, 2018a)

Air emissions are divided up between SO₂, NO_x, solids and other. What “others” includes, is not specified here. It is also hard to understand how “others” is divided between the Polar Division of Nornickel and the KMMC on the Kola Peninsula.

If we look at the total emissions for the KMMC for the latest years, according to the Corporate Social Responsibility reports of Nornickel, we see the following numbers:

Table 2: Yearly air emissions of SO₂, NO_x and solids in tons from the KMMC (Nornickel, 2017a, 2018a)

Year	2012	2013	2014	2015	2016	2017
Emissions in tons	148 580	164 620	165 440	169 790	132 900	121 900

Here, it is obvious that the numbers in question show the total emissions, including both SO₂ and other emissions. In addition to these overall numbers, the report shows the specified amount for SO₂, NO_x and solids. For 2017, these three summarized account for 117 200 tons of emissions to air. That means, that there is 4 700 tons unaccounted for, compared with the total air emissions shown in table 2 above, and taken from the same report. Whether this is the above mentioned “others”, and what that consists of, is not accounted for.

According to their yearly report, Nornickel emitted a total of 109 100 tons of SO₂ on the Kola Peninsula in 2017. Unfortunately, the Corporate Social Responsibility Report of Nornickel does not show the SO₂-air emissions divided up by the different facilities on the Kola Peninsula. Thus, we base the following table on our own correspondence with the KMMC directly.

Table 3: Yearly emissions of SO₂ from each of the KMMC facilities for baseline year of 2015 and 2017 (Bellona, 2016a, 2018)

Total emissions to air	Zapolyarny	Nikel	Monchegorsk	Total for KMMC
2015	40 000 tons	79 980 tons	37 000 tons	156 980 tons
2017	1 600 tons	68 076 tons	36 963 tons	106 639 tons

The total sums of emissions in the table above is based on the combined amount cited for the three different company locations. For 2017, the total we get if we summarize the three does not fit with the total number reported in Nornickel’s Corporate Social Responsibility report for 2017 – 109 100 tons of SO₂.

We can, based on the table above, discern one of the two following phenomena: Either, the numbers reported by the KMMC in table 3 regard only SO₂, or there is a real difference between the numbers reported by Nornickel in their Corporate Responsibility Report, and the numbers provided by the KMMC. Since we have no way of cross checking these numbers in the Corporate Social Responsibility Report, we have to guess at the reality.

Although we have no total, comprehensive explanation as to why and how, emissions from the KMMC's activities on the Kola Peninsula dropped by more than 20% from 2015 to 2016, and continued by dropping 8.3% from 2016 to 2017. (See Table 2 above). Before this, there was an increase in from 2012 to 2013, and stable emissions from 2013 to 2015.

The reduction from 2015 to 2017 might be a consequence of the implementation of the briquetting factory in Zapolyarny, as well as the increase in sulfur acid production in Nikel. But as long as the company does not give any projections, except a drop of emissions in Zapolyarny of 35 000 tons due to the new technical solutions there, and propose a 50% drop in emissions in Nikel by the end of 2019, it is rather hard to pinpoint the actual source of reduction. If we deduct the predicted drop in emissions from the briquetting technology implemented in Zapolyarny from the emissions in 2015, we get 134 790, which is quite close to the actual emissions reported for 2016. But that does not tell the whole story. It is also unclear what the real reduction might be, as some sources state that it is not 35 000 tons a year, but between 35 000 and 40 000 tons (Vladimirov, 2017). This inaccurate number also makes it hard to tell what the consequent reduction of 11 000 tonnes from 2016 to 2017 might be credited to.

The KMMCs goal of a 50% cut in emissions in Nikel by the end of 2019, compared to the baseline year of 2015 is also worth looking more closely at. The total emissions in Nikel in 2015 were at approximately 80 000 tons of SO₂. That would mean a total reduction of 40 000 tons by the end of 2019. In turn, this would mean a reduction from 68 000 tons in 2017, to 40 000 tons by 2019, which is also a significant drop. The question is: Is that enough? If the KMMC and Nornickel are satisfied with yearly emissions of 40 000 tons from the facility in Nikel, that still leaves this single facility emitting almost 3 times the total SO₂ emissions of the whole country of Norway.

In any case it's obvious, according to the numbers provided by both mother and daughter companies, that emissions are going down on the Kola Peninsula. There is no question that this is a positive development. There are, however, several issues to be solved, a few of which we will point out in chapter 5.

4.1.5. Becoming green, and making money?

Before we look at the big picture, we'd like to have a look at a couple of initiatives of the KMMC are implementing, that might make them able to get some revenue directly through their efforts to reduce their environmental impact.

A facility for refining and utilization of salt from the nickel electrolysis process has been installed on the Kola Peninsula by the KMMC. This enables the company to dry, package and sell salts from the process, while at the same time avoiding the former practice of discharging waste water from the electrolysis process. Instead, the salt is now being derived from the waste water, and the water is then reused in the electrolysis process (TV-21, 2018).

In March of 2018, the KMMC initiated a project that will make them able to discern between rich and poor copper-nickel concentrate. This will in turn enable them to send only the raw material that is rich to their smelter in Nikel, resulting in less capacity being spent on treating poor raw materials. The poor concentrate will be sold to third party consumers, although it is not clear who would be the buyers. According to KMMC, this is one of the steps that will enable a 50% cut in emissions from the facility in Nikel by 2019, compared to the

numbers of 2015, but will not have a negative impact on production (TV-21, 2018). The capacity of the facility being built is to be at 400 000 tons of concentrated ore a year (Bellona, 2018).

In Bellona's eyes, measures that facilitate both emissions reduction and added revenue are the ideal solution to environmental problems. It gives the right motivation for companies to change their ways. In Nornickel's case, there is the added benefit of having a green image when catering to a market that increasingly demands environmentally friendly production of raw materials.

Indeed, the company is making more money. The following data on revenue from the Corporate Social Responsibility Report of Nornickel for 2017 shows that things are pointing up for the company as a whole:

Table 4: Yearly revenue, Nornickel, in billion RUB (Nornickel, 2018a)

2013	2014	2015	2016	2017
366,2	456,0	506,1	548,6	536,8



5. CHALLENGES FOR THE COMPANY, THE STATE AND THE GENERAL PUBLIC

One of the main challenges for monitoring the emissions, even on a yearly basis, is lacking or non-overlapping reports from a range of different sources.

An example: Russian Rosgidromet and Norwegian NILU report on concentration of SO₂ in the air throughout the year. That is an indication of the toxicity in the vicinity of the plants operated by KMMC. The measurement stations are mainly located in the settlements near the plants. These settlements are, fortunately for citizens, but unfortunately for measurement purposes, built in locations towards which the wind seldom blows. Thresholds for pollution continue to be breached around the measurement stations on a regular basis despite this.

At the same time, the company itself, as well the Nornickel-structure that it is a part of, report mostly on its activities as a whole by giving numbers for total SO₂ emissions throughout the year, not counting breaches of environmental thresholds. That means that it is hard to follow the reductions in emissions at the single plants within the enterprise on the Kola Peninsula and connect them with concrete measures the company implements.

Data from other sources can be a great tool to cross-check whether company-reported numbers are to be trusted, but in this case difficulties of directly comparing the data offered by different source make such an effort into a puzzle that ultimately plays to Nornickel's disadvantage. The company will have to deal with the question: How can the public trust the data they offer on emission reduction?

5.1. Issues to solve moving forward:

Bellona is of the opinion that Nornickel's environmental turnaround the last couple of years is a very positive sign. Still, there are several issues at hand that need to be solved for Nornickel and the Russian state, if they are to convince those of us who for years have observed their words and promises seldom leading to action.

5.2. State control with polluters

The last years there have been cases when Bellona has questioned the actual value of state control with polluters.

In the spring of 2016, the Russian environmental oversight agency, Rosprirodnadzor, evoked the emission license of the KMMC's smelting facility in the town of Nikel, near the Norwegian border. The agency stated that it would not reinstate the license because the company has failed to meet its environmental obligations. More specifically, KMMC had not followed up promises to implement additional measures to reduce pollution. In addition, their reporting to Rosprirodnadzor included invalid information and corrupted data (Staalesen, 2016c). A few weeks later, the license was renewed by the agency. Rosprirodnadzor stated that they

had been convinced that all announced emission reduction plans had been implemented after a visit to the facility in Nikel, and decided to reissue the emission license previously revoked. This coincided with a press release about the completed briquetting factory in Zapolyarny, which replaced an older pelletizing and kilning workshop (Bellona, 2016c).

Questions can also be raised regarding state reactions to violations of the regulatory framework. Nornickel itself states in its Corporate Social Responsibility Report for 2016 that it paid a total of RUB 1 492 000 in fines, and received 15 environment-related notices from regulators (Nornickel, 2017a). In 2017, the company paid RUB 40,7 million in fines in total, and received 18 environmental notices from regulators (Nornickel, 2018a). Still, Bellona could report in 2017 that Russian prosecutors say that Rosprirodnadzor has failed to chase down \$70 million in fines from polluters in the North of Russia, further stating that Rosprirodnadzor in the Murmansk region has not been keeping adequate track of the polluting industries they are supposed to control. The agency itself has stated that it handed out fines totaling \$242 million in fines in the Murmansk region in 2016, but were only able to collect a little over half of that sum (Bellona, 2017e).

Together, this means that pressure from the government to stay within the limits of regulations is not sufficient to make enterprises comply. The fines are just too low to make it worthwhile investing in mitigation projects. It is easier to pay the fines. Thus, reduction of pollution is dependent on companies' own goodwill. The new BAT-system might change this (see chapter 3.3), but it has to have sufficiently strict demands, and proper carrot-and-stick measures included, to give any effect.

5.3. Transparency

Although Nornickel has taken several steps to reduce pollution the last years, it is unclear how these fit into a bigger plan. There is, as far as Bellona is aware, no roadmap that takes a holistic account of the mitigation projects and their potential effects down the production and emission chain.

When asked about, e.g. the perceived chance of emissions increasing from the refining plant in Monchegorsk due to production being moved there from Norilsk after the closing of the older smelting plant there, company representatives state that emissions will not increase, but do not specify how or why. They state only that "different technologies" will reduce further pollution (Bellona, 2017a), and that "we are doing everything possible from the point of view of science to make metallurgy green and clean" (Bellona, 2017b). What is known is that the current plant for electrolysis of nickel in Monchegorsk will be accompanied by another. Construction was started in 2016 and it will reach maximum capacity in 2019, according to plan (Trifonova, 2017).

Even regarding previous investments, there is little chance to do more than guess at the actual consequences of them. All we know is that the company says it is spending big sums, and that they report emission reductions. Sometimes credited to specific measures being implemented, sometimes not. At a conference in Arkhangelsk in March 2017, the vice president of Nornickel, Yelena Bezdenezhnykh, stated that the company has spent "about

a billion dollars on improving the ecological conditions in the regions where we operate” between 2014 and 2016 (Bellona, 2017b). What exact improvements they have made, and what the result is, seems less important to communicate.

This is not ideal, not for the public, the state or the company. If Nornickel wants to change its ways, it has to do so not only by implementing projects, but by communicating their efforts in a different way. The public requires understanding of the project plans, how much emission-reduction each singular project will lead to, and the total effect of all projects combined towards the goal.

Further, for real trust to be achieved, any company developing such plans should report on them in a manner that is understandable and easy to follow, and that gives answers to whether the comprehensive plan, or roadmap, for development and emission reduction is actually followed. The Corporate Social Responsibility report from Nornickel is a step forward, but still requires additional information and more specifics. If Nornickel could make sure that independent actors also could reaffirm their data, this would increase the integrity of their project to reduce emissions.

Another step Nornickel could take to increase the legitimacy of its turnaround is to let independent environmental organizations take part in the process to modernize and reduce emissions. One way of doing this is to organize a working group, in which independent experts and organizations can participate. Such a working group would ensure dialogue and transparency, and Nornickel itself has already announced that such an initiative would be helpful (Nornickel, 2018c).

5.4. Conclusion

The conclusion as of early 2019 is that we see a change in mentality with Nornickel and reported reductions in emissions. Bellona believes that there has to be a roadmap that shows the big picture, and how each measure affects the total, as well as independent reports that can confirm the actual reduction in emissions. Without these two significant elements it will be hard to convince the public. An understanding of the way forward might very well be obvious to those inside the company, but to outsiders, it seems Nornickel is navigating without a compass.

2019 will be a key year for the KMMC. The investments made by the company on the Kola Peninsula to reduce emissions will reach a milestone: By the end of the year, the emissions of SO₂ in Nikel should be 50% of what they were in 2015. This was confirmed by Vladimir Potanin at a meeting with President Putin in December of 2018 (Kremlin, 2018). 2019 is also the year that the BAT-system is supposed to be implemented in Russia, the consequences of which are still shrouded in mystery. Bellona is eagerly awaiting Nornickel’s next move.

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