

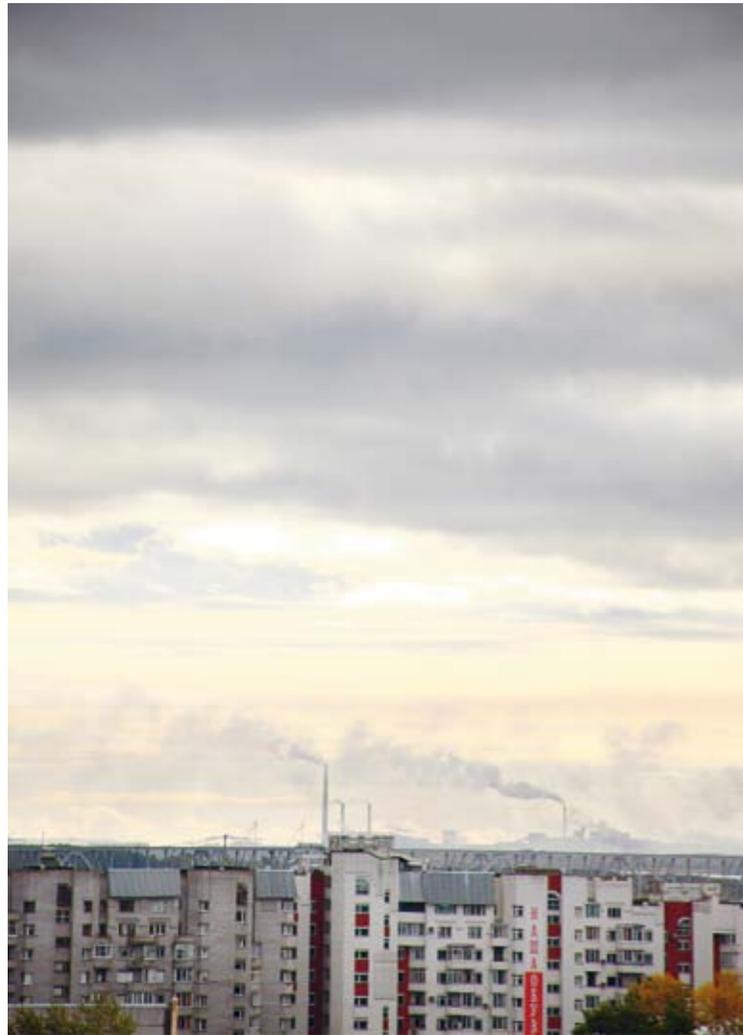
## Hot Spots

## Tackling environmental challenges in the Barents Region



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PATRIK PASTERBERGER

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The city centre of Archangel with Novodvinsk paper mill on the horizon.

# Preface



Thanks to joint efforts, environmental issues are today high on the political agenda

**THE UNIQUE AND HIGHLY** sensitive natural environment of the Barents Region is exposed to a multitude of threats that need to be addressed through extensive international efforts. The accelerating climate change is already visible in the Barents region; moreover, airborne emissions and discharges from industrial facilities have an impact on the ecosystem and cause health problems. Environmental pollution transcends national borders and therefore it is important that environmental initiatives are addressed by international co-operation.

This year marks the 20th anniversary of the establishment of the Barents Euro-Arctic Council and the Kirkenes Declaration signed by Norway, Sweden, Denmark, Finland, Iceland, Russia and the EU. Environmental issues were at the core of the international co-operation from the very beginning.

In 1994, the Barents Region Environment Action Programme was adopted by the Ministers of the Environment of the countries involved. In 2003, a report was released identifying 42 acute environmental problems in the Barents Region requiring urgent action. The report, which introduced the concept of

'environmental hot spots', was prepared by the Arctic Monitoring and Assessment Programme of the Arctic Council (AMAP) and NEFCO. Over the years, the report has served as a frame of reference and compass for tangible projects and measures to address environmental issues..

As we gather in Inari, Finland, for a meeting of the BEAC Ministers of Environment in December 2013, it is time to bring it all together and draw conclusions. What environmental problems have been attended to and what remains to be done to achieve a cleaner environment in the Barents Region? We will approach these issues partly by presenting tangible examples in this brochure of successful environmental projects implemented in the Barents Region with local efforts and within the framework of international co-operation. In addition to this brochure, we will also issue a special assessment providing a detailed analysis of the 42 hot spots singled out in 2003.

International environmental co-operation in the Barents Region is not only about investments, statistics, emission reductions and project portfolios. Thanks to joint efforts, environmental issues are today high on the political agenda. The inventory of hot spots carried out in the Barents Region has prompted similar surveys elsewhere in Russia, showing the power of leading by example.

It is our sincere hope that the examples in this brochure will encourage further environmental improvements in order to upgrade the living conditions and the state of the environment in the Barents Region. ●



MINRE RF

**Sergey Donskoy**  
Minister of Natural Resources and Environment of the Russian Federation



PENTTI HOKKANEN / YHA KUOPANKKI

**Ville Niinistö**  
Minister of the Environment, Finland

# Co-operation on Barents environmental hot spots

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Orthodox wooden chapel in the Kenozero National Park.

**The Barents Euro-Arctic Council (BEAC) is the forum for inter-governmental and interregional co-operation in the Barents region. It gathers together the countries and regional authorities in Northern Europe to promote stability and sustainable development in the Barents Region.**

**THE WORKING GROUP** on Environment (WGE) of the Barents Euro-Arctic Council started to work on environmental 'hot spots' in 1995 and presented a hot spot list for the Ministers of the Environment in the region. Hot spots are sites which are polluted and pose both environmental and health risks. The WGE commissioned the Nordic Environment Finance Corporation (NEFCO) and the Arctic Monitoring and Assessment Programme (AMAP) to update the list of hot spots in 2003. This report evaluated the progress of the work performed during the first years and the updated list.

**THE BARENTS FOREIGN** and Environment Ministers have called for the implementation of environmental measures at all hot spots by 2013. To estimate the achievement of this goal, the WGE ordered an assessment report in order to collect comprehensive information on the status of each of the original 42 hot spots. The Consultancy Agency Akvaplan-Niva carried out the assessment based on reports provided by the Regional Hot Spot Exclusion Groups in the Russian Barents Region.

**THE ASSESSMENT REPORT** concludes that measures aimed at solving environmental problems have been taken at all 42 hot spots identified by the original report from 2003. However, the measures are on different levels. Three hot spots have been entirely excluded from the list to date. Additional hot spots are expected to be excluded from the list by the end of 2013. ●

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E. KREHANGOV

## Fund Manager's Overview

**Since the early days, the Nordic Environment Finance Corporation (NEFCO) has played a central role in international and regional co-operation in the Barents Region.**

**NEFCO IS IN A UNIQUE** position for such a task, acting as an observer not only in the BEAC itself but also having similar roles in the Arctic Council, the Nordic Council of Ministers, the Northern Dimension Environmental Partnership and many other fora for environmental and clean energy co-operation.

As a Nordic financial institution, NEFCO has over 20 years' experience in developing and financing environmental projects in Russia and neighbouring countries. Coordinating and promoting synergies between international initiatives and the funding that comes with them is a natural part of NEFCO's activities.

Already in the early 1990s, NEFCO was involved in the first inventories and reports in the Barents Region. In 2003, they were followed up by the NEFCO-AMAP Report, which defined 42 environmental 'hot spots'. NEFCO chaired the Ad-hoc Task Force that developed the Criteria & Procedures for the exclusion of hot spots that were adopted by the Ministers in Tromsø in 2010.

Since it was set up in 2004, the Barents Hot Spot Facility (BHSF) has been NEFCO's main tool for promoting progress, actions

and projects at the hot spots. Over EUR 4 million has been set off for around 70 various initiatives. There are also other dedicated trust funds such as the Swedish Barents Window. The Project Support Instrument (PSI) that NEFCO manages for the Arctic Council will also be pivotal for the Barents Region.

Besides general institutional support to the exclusion process, the BHSF has contributed to sector studies, inventories, feasibility studies, business plans and other measures related to different hot spots. They range in size and scope from small demonstration projects, such as water and wastewater schemes in the Kenozero National Park, to multifaceted industrial challenges – as seen at the Vorkuta Cement Plant – and major municipal infrastructure investments like the water and wastewater projects in Petrozavodsk.

In order to promote visibility and enhance the experience gained, the BHSF has financed the Barents Hot Spot Information System that will be available at the Barents website (beac.st). NEFCO is the leading co-financier for the Adviser at the International Barents Secretariat in Kirkenes that will facilitate the hot spot progress in co-ordination with the BEAC's broader priorities for climate change and the environment.

NEFCO is proud to have been an instrumental part of the environmental co-operation in the Barents over the last 20 years, and is still looking forward to tackling the challenges that lie ahead in this northernmost part of Europe. ●



**Henrik G. Forsström**  
Senior Adviser,  
Barents Hot Spots  
Facility, NEFCO

# Chair's Overview



ULLA AHONEN

**Henna Haapala**  
Ministerial Adviser,  
Ministry of the Environment of Finland  
—  
Chair of the BEAC  
Working Group on  
Environment 2012–2013

**THIS PUBLICATION ILLUSTRATES** the practical results of environmental protection in the ‘hot spots’ in the Russian Barents Region. Promoting environmental improvements and excluding hot spots from the list have been among the main activities of the Barents Euro-Arctic Council’s Working Group on Environment (WGE). We note that during the last ten years, environmental modernisation is on-going in many places such as in the pulp and paper sector and in the wastewater treatment of some major towns. In some places, the heating systems have been switched from oil or coal to natural gas. The first steps to develop comprehensive waste management plans have been taken in many regions.

There has been significant financing in environmental investments by many companies without any external support – a fact that we have recognized. Some of the most advanced companies have introduced international environmental standards and management systems. There are also Russian federal programmes that provide funding to improve the quality of drinking water and to clean up the accumulated environmental damage from the past, for instance. International financial institutions, like the Northern Dimension Environmental Partnership and NEFCO, have eased the financing arrangements for some of the

main municipal point sources of pollution. There are also success stories of the improvements achieved via bilateral co-operation programmes. Also in these cases, the local funding and commitment has been the main driver for success in the projects.

Our work, however, is not yet accomplished. The principle of environmental management is to aim towards continuous improvements. Companies have set targets on emission and discharge reductions. In addition, further efforts are needed, for example, to improve the quality of drinking water, develop environmentally sound waste management, and to ensure the safe, final destruction of hazardous wastes. Special attention is also to be paid on transboundary impacts, such as the air pollution from the smelters on the Kola Peninsula.

In order to promote the environmental improvements in the hot spots, an intensive network has been built up between the federal and regional authorities, both within Russia and between the environmental pollution experts in all of the Barents countries. This network has facilitated the communication between the hot spot owners and authorities as well as advancing the supervision activities. All stakeholders (working group members, federal and regional authorities, hot spot owners) have shared a great deal of information, which has increased the knowledge of the environmental problems and solutions, as well as enhanced the capacity to introduce best environmental practices and best available technologies. It has been once again proved that the main driving forces for environmental improvements are raising awareness; creating effective legislation, its implementation and control; and taking a proactive approach by all stakeholders, including civil society.

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IRINA NAZAROVA

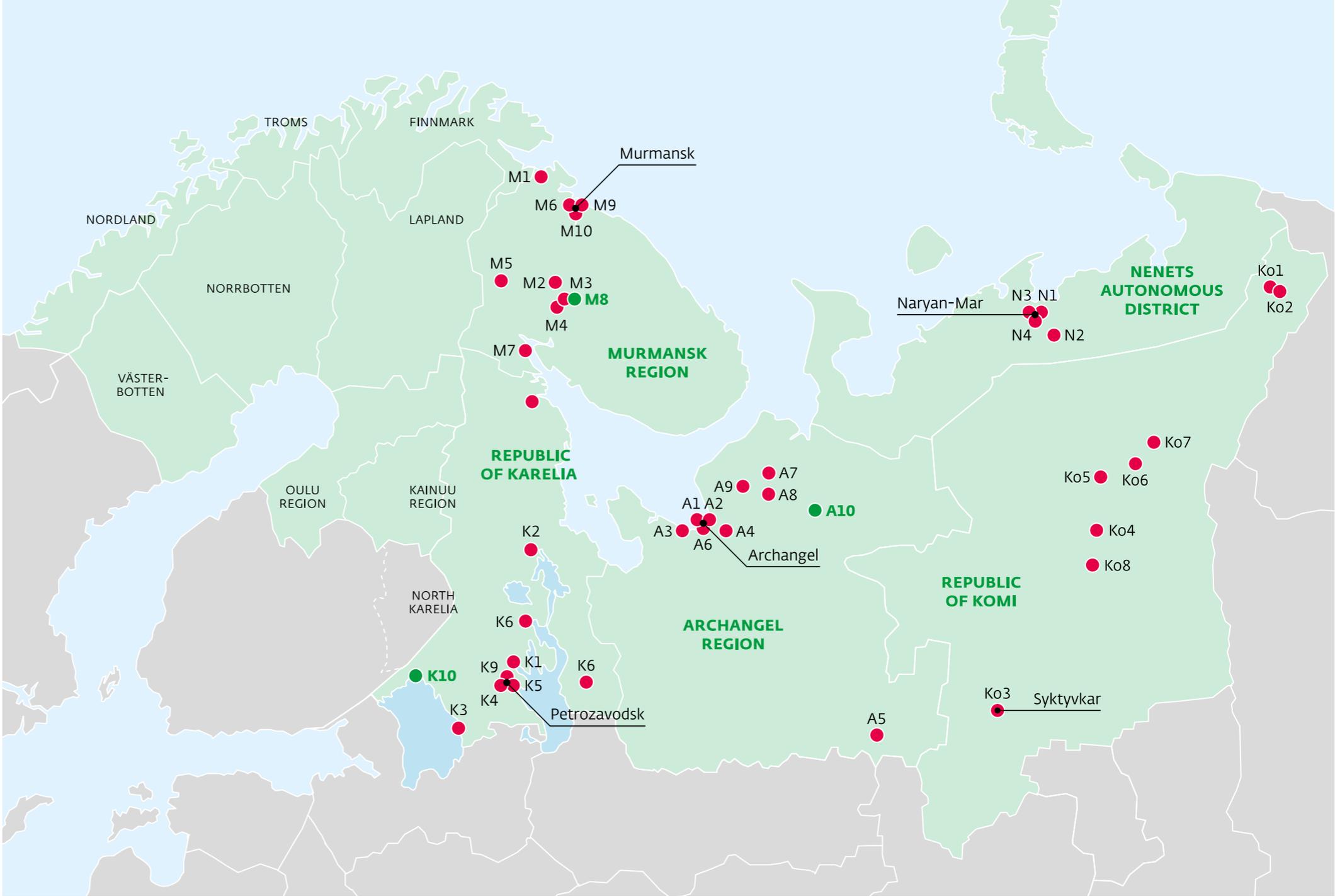
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Various trust funds at NEFCO have been used for wastewater treatment projects in the Russian Barents Region.

# Environmental hot spots in the Barents Region



The map illustrates the geographical locations of the 42 environmental hot spots identified and assessed in 2003.

- Hot spot
- Hot spot, status: excluded
- Barents Euro-Arctic Region



# Environmental hot spots in the Barents Region

Hot spot	Name	Measures taken	2013 status
<b>M1</b>	Pechenganickel MMC of Kola GMK, Nickel and Zapolyarny	Reconstruction with the aim to reduce industrial emissions discharge of contaminants.	AE – in progress VD – in progress
<b>M2</b>	Monchegorsk industrial site of Kola GMK, Monchegorsk	Reconstruction with the aim to reduce industrial emissions of contaminants.	AE – solved
<b>M3</b>	Apatit JSC, Kirovsk	Reconstruction with the aim to reduce industrial air emissions.	AE – in progress VD – in progress
<b>M4</b>	Apatity HPP of TGC-1, Apatity	Modernisation with a reduction in air emissions of contaminants.	AE – solved
<b>M5</b>	Kovdorsky GOK of Eurochem, Kovdor	Organisational and technical measures to reduce water use and wastewater discharge.	VD – in progress
<b>M6</b>	Water quality in the Kola River and Bolshoye Lake	Launch of joint long-term investment programme for drinking water supply in Murmansk.	VD – in progress DV – partly solved
<b>M7</b>	Drinking water supply in Zelenoborsky-1	Reconstruction of water supply pipelines.	DV – partly solved
<b>M8</b>	Mercury-containing waste management	Upgrade of equipment for the recycling of luminescent lamps.	WM – excluded
<b>M9</b>	Sunken and abandoned ships in the Kola Bay	Dump site near Lavna was partly cleaned (20 ships removed).	WM – partly solved
<b>M10</b>	Oil-containing waste management	Elaboration of the long-term target regional programme.	WM – in progress
<b>K1</b>	Kondopoga JSC, Kondopoga	Reconstruction of HPP with conversion to natural gas, reduction of air emission of contaminants.	AE – solved
<b>K2</b>	NAZ-SUAL branch, Nadvoitsy	Reconstruction and modernisation of production with the reduction of industrial air emission of contaminants.	AE – partly solved
<b>K3</b>	Drinking water supply in towns and settlements of the Republic of Karelia	Elaboration and launch of the long-term republican programme. Launch of a join project in Sortavala.	DV – in progress

## Abbreviations

AE	industrial air emissions
VD	wastewater discharges
WM	waste management
DV	drinking water supply
PD	past environmental damage
EE	energy efficiency issues

Hot spot	Name	Measures taken	2013 status
<b>K4</b>	Drinking water quality in water supply system of Petrozavodsk	Launch of a joint long-term investment project on reconstruction of water treatment facilities.	DV – solved
<b>K5</b>	Sewage treatment in Petrozavodsk	Launch of a joint investment project on reconstruction of sewage treatment facilities.	VD – in progress
<b>K6</b>	Sewage treatment in small towns and settlements in the Republic of Karelia	Elaboration of the long-term republican programme.	VD – in progress
<b>K7</b>	HPP burning fuel oil and coal in the Republic of Karelia	Conversion of boilers from heavy fuel oil to natural gas at Petrozavodskmash. Conversion of boiler to biofuel in Ledmozero. Development of a regional programme for local biofuel production.	AE – in progress EE – in progress
<b>K8</b>	Waste management in the Republic of Karelia	Elaboration of the long-term regional investment programme.	WM – in progress
<b>K9</b>	Waste dumping ground Gorelaya Zemlya in north Petrozavodsk	Launch of a project on the restoration of Gorelaya Zemlya waste dumping ground.	WM – in progress PD – partly solved
<b>K10</b>	Stocks of obsolete pesticides	Removal and incineration of 22.1 tonnes of obsolete and unused pesticides.	WM – excluded PD – excluded
<b>A1</b>	Solombala PPM of Solombalales, Archangel	Reconstruction with the aim to reduce industrial air emissions of contaminants.	AE – partly solved VD – urgent
<b>A2</b>	Archangel HPP of TGC-2, Archangel	Reconstruction and conversion of boilers from heavy fuel oil to natural gas with the aim of reducing air emissions of contaminants.	AE – solved
<b>A3</b>	Severodvinsk HPPs of TGC-2, Severodvinsk	Reconstruction at SHHP-1 and 2 with the aim of reducing air emissions of contaminants. Conversion of SHPP-2 to burning natural gas.	AE – solved

Hot spot	Name	Measures taken	2013 status
<b>A4</b>	Archangel PPM, Novodvinsk	Reconstruction of boilers, SRB and wastewater treatment facilities with the aim of reducing air emissions and water discharges of contaminants.	AE – solved VD – solved
<b>A5</b>	Koryazhma branch of Ilim Group, Koryazhma	Reconstruction of SRB and wastewater treatment facilities with the aim of reducing air emissions and water discharge of contaminants.	AE – solved VD – solved
<b>A6</b>	Waste management in the Archangel region	Elaboration of the long-term target regional programme.	WM – in progress
<b>A7</b>	Areas of past environmental damage in the Archangel region	Launch of the long-term federal programme on the clean-up of the Arctic. Clean-up of Alexandra Land and the Hooker islands at FJL.	PD – in progress
<b>A8</b>	Spent motor oil management in the Archangel region	Elaboration of long-term regional programme on waste management. Signing agreement on handling spent motor oil.	WM – partly solved
<b>A9</b>	Dioxin pollution in the Archangel region	Change of production processes. Clean-up of dumping grounds.	WM – solved
<b>A10</b>	Stocks of obsolete pesticides in the Archangel region	Removal of 67.53 tonnes of pesticides from the Archangel region.	WM – excluded PD – excluded
<b>N1</b>	Kumzhinskoye gas and condensate field	Restoration and clean-up of polluted area. Decision to start-up gas and condensate production.	PD – in progress
<b>N2</b>	Drinking water supply in the Nenets Autonomous District	Elaboration and launch of the long-term regional programme. Geological research in 17 settlements. Construction of two water intakes.	DV – in progress
<b>N3</b>	Wastewater treatment in Naryan-Mar in the Nenets Autonomous District	Reconstruction of sewage treatment facilities in Naryan-Mar. Elaboration of projects and start of construction of sewage treatment facilities in Kachgort and Bondarka.	VD – in progress
<b>N4</b>	Mercury-containing waste management	Collection of used luminescent lamps. Installation and launch of demercuration equipment.	WM – solved

**Abbreviations**

AE	industrial air emissions
VD	wastewater discharges
WM	waste management
DV	drinking water supply
PD	past environmental damage
EE	energy efficiency issues

Hot spot	Name	Measures taken	2013 status
<b>Ko1</b>	Vorkutaugol JSC coal mines, Vorkuta	Installation of equipment for methane utilisation with the aim of reducing air emissions of methane and using methane as an energy source.	AE – in progress EE – in progress
<b>Ko2</b>	Cement Northern Company and Vorkuta HPP, Vorkuta	Elaboration of the action plan for the cement plant and reconstruction of the boiler unit at HPP with the aim of reducing air emissions of contaminants.	AE – partly solved, in progress
<b>Ko3</b>	Mondi Syktyvkar JSC, Syktyvkar	Launch and implementation of the large-scale reconstruction and modernisation project (STEP) with the aim of reducing air emissions and water discharges of contaminants.	AE – solved VD – in progress
<b>Ko4</b>	Sewage treatment in small settlements in the Republic of Komi	Elaboration and launch of the long-term republican target programme.	VD – in progress
<b>Ko5</b>	Drinking water supply in the Republic of Komi	Elaboration and launch of the long-term republican target programme.	DV – in progress
<b>Ko6</b>	Waste management in the Republic of Komi	Elaboration of the long-term republican target programme, regional concept, and municipal plans.	WM – in progress
<b>Ko7</b>	Wood processing industry waste management	Elaboration and launch of the republican programme. Construction of HPP burning wood waste.	WM – in progress EE – in progress
<b>Ko8</b>	Coal mining industry waste management	Elaboration of the long-term republican target programme and concept on waste management.	WM – in progress EE – to be launched

Footnote:  
This table has been derived from the Assessment of the Barents Hot Spot report prepared by the Consulting Agency Akvaplan-Niva.

CASE STUDY

## It all depends on Lake Onega

**The residents of Petrozavodsk in the Republic of Karelia enjoy pure drinking water at the same time as Lake Onega continues to be plagued by unclean wastewater.**

**A STROLL ALONG THE** waterfront in Petrozavodsk is dangerously idyllic. Lake Onega, the second largest in Europe, spreads out as an impressive mirror of silver with soft-lined trees swaying in the background, but murkier waters lurk under its surface.

“I consider myself lucky as an engineer to be involved in this modernisation project. When it started, we sometimes used to sleep here at the plant, just to be able to tackle all the challenges.”

Deputy Chief Engineer Yuriy Bobkov is standing in front of a large PI diagram in the city water purification plant. He gestures excitedly as he explains how the plant has been modernised over the past ten years.

Located in the western district of the city, the purification plant stands on a large lakeside site where the old brick buildings blend in nicely with the new white-grey halls.

Petrozavodsk, the capital of Karelia with a population of 270,000, lies in a bay from

which the city draws its drinking water. But the water has always been rich in humic substances (rotting plants) and it contains high levels of copper, nitrogen oxides, bacteria and iron. Moreover, the humus condition of the River Shuya has deteriorated in recent years. In winter, the river’s water clarity index may increase up to 250.

“The drinking water was simply dirty,” says Yuriy Kachamin, Head of the facility. “Government regulations stipulate that water boards should deliver drinking water with a colour index of 20, but in the past the ratio used to be 80.”

“It used to be scary to draw a bath at home,” adds Bobkov. “The water smelled bad and it was impossible to see the bottom of the tub.”

At that time, raw water underwent only one purification stage. Now, ten years and EUR 30 million later, the situation is completely different.

Work to modernise the facility commenced in 2006 when PKS, a private company, took over water supply in the city. New pumps, an additional purification cycle with carbon filtering, disinfection with UV light and automatic dosing of additives were installed in quick succession.

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IRINA NAZAROVA

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Lake Onega is the second largest lake in Europe covering some 9,700 square kilometres.



The international co-operation has been a highly rewarding process, says Development Director Natalia Klemesyeva.

“It was difficult to upgrade the facility because we couldn’t just close it down,” explains Bobkov.

“We took one step at a time,” continues Kachamin. “For many years, the pace of work was excruciating, but happily things are less hectic now.”

Both Bobkov and Kachamin are veterans at the facility. They have worked here for over 15 years and are known as ‘heroes of labour’ among their colleagues.

The investment programme was launched as part of an international co-operation that continues up to the present day. The main goals of the project are to upgrade the wastewater treatment plant, construct a facility for recycling and dewatering sludge, and install equipment for the chemical removal of phosphorus.

“The international co-operation has been a highly rewarding process,” observes Development Director Natalia Klemesyeva. “We’ve had the opportunity to draw upon the experiences gained in Europe and learn about the available technologies.”

“The first of June 2010 was a fantastic day,” exclaims Bobkov. “That’s when our Republic of Karelia celebrated its 90th anniversary and on the very same day we started supplying clean drinking water to Petrozavodsk. You can imagine what a celebration we had in town.”

When 41.5% of the drinking water failed to meet the hygienic standard in 2003, the corresponding figure for 2011 was down to 2.4%.

**THE SMIRNOV FAMILY** lives on the first floor of a modern high-rise building just outside the city centre. On the opposite side of the street old wooden houses are giving way to new shopping centres.

“You must understand that we Russians love baths,” declares Anna Smirnova. Her 12-year-old daughter Liliyana, sitting next to her on the sofa, nods in agreement.

When the family moved in two years ago, it was clear that the bathroom would be fitted with a bathtub instead of a shower cabin.

“But it used to be a tragedy because the water was so dirty,” admits Anna. “You wanted to have a bath but the water was so murky...and it smelled!”

Back then, people worked out various strategies to be able to bathe. Some poured bath salts into the water; others tried aromas, while many relied on lemon.

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IRINA NAZAROVA

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IRINA NAZAROVA

01  
Deputy Chief  
Engineer Yuriy  
Bobkov at PKS.

02  
Development  
Director Natalia  
Klemesyeva  
at PKS.

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IRINA NAZAROVA

03  
The pumping  
house at PKS has  
been refurbished  
as a result of  
the investment  
package agreed  
upon in 2012.



Thanks to cleaner water, people nowadays have fewer illnesses here in the city.

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IRINA NAZAROVA

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IRINA NAZAROVA

“And it took a real effort to wash the bathtub,” sighs Anna. “You just couldn’t get it clean. But thank heaven it’s history now.”

We walk into the family’s spacious bathroom. To show how clean the water is now, Anna turns on the tap to fill the large bathtub. Sure enough, you can see the bottom now.

But do they also drink tap water?

“Many people still cook the water before drinking it, from force of habit,” explains Anna. “Others have installed filters in the kitchen – something we’re also planning to do.”

The quality of water is not maintained high all the way from the purification facility to homes as it is affected by the city’s old and worn-out pipes.

**THE BROWN WATER** bubbles as if in a Jacuzzi. We are standing in a big hall where water is filtered in a long row of basins. All in all, the purification plant has 22 filters in two halls.

The plant is capable of processing 145,000 m<sup>3</sup> of water in 24 hours. In reality, the daily volume is 80,000 to 110,000 depending on the season.

“Thanks to cleaner water, people nowadays have fewer illnesses here in the city,” notes Kachamin. “It’s with a clear conscience that we pump this water to day-care centres and schools.

When we started supplying pure water, people used to ring to thank us,” says Bobkov.

Vivid in his memory is a call from an amazed lady who wondered what exactly they had done with the water – she was shocked to see her whole body when sitting in the bath!

Development Director Klemesyeva assures that the company has done a lot to inform the local residents of how the purification process has been modified, and how it works in reality. As part of these efforts, the company has overhauled its website to provide extensive information.

Petrozavodsk is dominated by Lake Onega. Sooner or later, all the roads in the city will lead down to the idyllic waterfront – a route that the city’s wastewater pipes also take.

The wastewater treatment plant is located in a run-down industrial estate in the southern district of the city.

03



IRINA NAZAROVA



The plant is to have a chemical phosphorus removal system.

01 Liliyana Smirnova enjoys a glass of tap water.

02 “Before, the water used to be dirty and smelly, but now it’s clean”, says Anna Smirnova

03 Bubbling water in one of the filtering basins at PKS.

The narrow asphalt-paved road leading up to the facility has seen better days.

“We’ve done well with the drinking water,” says Klemesyeva as the car zigzags to avoid potholes. “But wastewater is a different story.”

**THE PLANT MANAGEMENT** receives us in front of a grey brick building dating back to 1979. “The treatment plant is in bad need of repair,” admits Chief Engineer Svetlana Gorina. “Our equipment is seriously outdated and radical modifications are required.”

The plant has a capacity of 124,000 m<sup>3</sup> per 24 hours. At present, the plant receives 80,000 m<sup>3</sup> per day. Since the plant is only equipped with a biological treatment system, 208 tonnes of phosphorus is discharged directly into Lake Onega every year.

We are given a guided tour of the overgrown plot dotted with isolated firs in sharp contrast to the run-down brick buildings. In the building where the first stage of treatment takes place, Plant Manager Vladimir Borisov points to a row of intake pumps:

“Almost all of them are 30 years old and it’s a miracle they’re still running. And it’s the same with the pipes.”

“It took us a long time to raise the money required for the modernisation,” declares Viktor Maksimov, a member of the company’s management team. “And when NEFCO came with its proposal, it was easy to take them up on the offer.”

The financial package for the project provides an infusion of EUR 32 million from the Nordic Investment Bank, NEFCO, NDEP, the Finnish Ministry of the Environment,

the Russian Government, the Republic of Karelia and PKS itself. The investment is co-ordinated by the Nordic Environment Finance Corporation NEFCO.

“We’re receiving offers for modern equipment and are planning to start building next summer,” says Maksimov.

According to the plan, the plant is to have a chemical phosphorus removal system and the construction work is scheduled to be completed in three years, by which time the facility will meet the requirements specified by HELCOM for wastewater quality. Here in Petrozavodsk, the amount of phosphorus is to be cut by 60 tonnes per year.

A row of large basins leads down to Lake Onega. The concrete is cracked and the metal surfaces corroded. More than anything else, the plant brings to mind a museum.

Way down on the beach, seagulls flock around a small basin, one in which chlorine is added to kill bacteria.

“I avoid adding chlorine unless lab tests show that it’s necessary,” concludes Chief Engineer Gorina. “I prefer to protect the environment and our Lake Onega.” ●



IRINA NAZAROVA

01 Galina Mokeykova has worked in the Derzyavikiy Lyceum in central Petrozavodsk for 40 years.

## CASE STUDY

## More heat with less energy



At long last, the temperature inside the school is stable.

**For the past decade, energy-efficiency programmes have been a topical theme in the Republic of Karelia. And the results have not been late in coming.**

**“THIS HERE IS THE HEAT** distributor. Everything works automatically.”

Galina Mokeykova has worked in the Derzyavikiy Lyceum in central Petrozavodsk for 40 years, first as a teacher and now as the administrator responsible for property maintenance.

Standing on the ground floor, we admire the school’s heating system installed eight years ago. A hotchpotch of pipes, gauges and taps fill the little room to capacity.

“At long last, the temperature inside the school is stable and we’re happy with the system,” says Mokeykova. “All the trouble we had with leaks and accidents is now over.”

“But have you remembered to service the heat distributor properly? Otherwise it might stop working,” asks Alexey Smirnov, Head of the Centre for Energy Efficiency, which served as the consultant for the school when the programme was implemented. “Of course,” replies Mokeykova. “We

do everything it takes, and then some more!”

The Lyceum is a four-storied grey-red building made of brick. The school specialises in biology and information technology and has 559 pupils.

It is pretty quiet in the school this Friday afternoon. Most of the pupils have already gone home but three boys with guitars are standing in the corridor: “We’re celebrating the school’s 21st anniversary tomorrow with a concert and a theatre performance,” clarifies Mokeykova.

But the school has been operating on the property much longer than this. The old school building was inaugurated as early as 1940 and the new brick edifice in 1986. Earlier, there used to be big differences in temperature between the two buildings. While pupils in the old building had to wear coats in class, a T-shirt was enough in the new section. Mokeykova and Smirnov give us a guided tour along the Lyceum’s long corridors. All heating panels are provided with state-of-the-art thermostats.

“We found it advisable to make the thermostats face the wall to prevent pupils from kicking them by accident,” explains Mokeykova.



School No. 3 is a prime example. Energy costs were cut by 70 per cent.

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IRINA NAZAROVA

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Alexey Smirnov,  
Head of the  
Karelian Energy  
Efficiency Centre  
in Petrozavodsk.

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The school's  
heating system  
was upgraded  
in 2005.

**THE STEADY TEMPERATURE** in the school is a result of NEFCO's energy-efficiency programme launched already in 1997. Initially, funds for municipal energy projects were made available in the form of donations, but in 2006 the policy changed and the grants were replaced by loans on favourable terms.

A total of 113 municipally owned buildings were included in the project in Petrozavodsk. All properties were fitted with new metering devices. In the second phase, five buildings with the most serious problems were singled out.

"School No. 3 is a prime example," says Smirnov. "Energy costs were cut by 70 per cent."

We look into a classroom with chairs placed upside down on the desks. The windows face north and everything is bathed in a blinding white.

"We're replacing all the school windows in stages," says Mokeykova. "Last year we replaced 36, and this year 12."

The window project is financed by the city school administration. Eight years ago

when the project was launched, the windows on the south side were sealed using Swedish technology.

Thanks to the programme, the pupils enjoy better health today. Those sitting next to windows are no longer exposed to a constant draught. And because of the steady temperature, it is no longer necessary to open the windows – and catch a cold.

A single school project may well be a drop in the ocean but the environmental gain is impressive.

"The annual carbon dioxide emissions from School No. 4 fell by 111 tonnes as a result of the programme," Smirnov points out with emphasis. Another school was able to reduce emissions by 218 tonnes while energy costs fell by 59 per cent.

Russian municipalities have been able to save up to RUB 2 million per year as a result of similar energy efficiency projects – money that could be invested otherwise. At Derzavinkiy, the savings have resulted in new sports grounds.

"Previously we had no real facilities for sports," confesses Mokeykova. "But look at it now – everything is new and fine!"

She points out of the window at a group of boys playing football on a fenced-in field with a plastic turf.

02



IRINA NAZAROVA

**THE KARELIAN ENERGY** Efficiency Centre has operated in Petrozavodsk since 1998. Today, the centre designs and implements various energy-efficiency concepts for both public and private entities.

"This project to improve energy efficiency in schools, day-care centres, hospitals and sports halls was extended to other regions in the Republic of Karelia," declares Director Alexey Smirnov as we sit at the Centre's office in the city centre.

The programme achieved a great deal, for example with the water and heat supply systems in the Segezha region.

"NEFCO has an excellent screening toolkit for identifying major projects with future potential. It provides ready-made tools to determine what technology is required and how much it will cost, where to raise the funds and when the investment will pay for itself. This paves the way for solid and carefully thought-out projects," maintains Smirnov.

A fairly fresh piece of Russian legislation obligates municipalities to work out concrete plans for improving efficiency in energy consumption. According to the International Energy Agency (IEA), Russia could save up to 45 per cent in energy through determined efforts to improve energy efficiency. "The process to move away from oil as a fuel is just beginning but it's under way," he emphasizes. General understanding of the importance of energy efficiency is growing from year to year.

A number of various projects are also in progress in Karelia. An 18 MW woodchip-fired power plant is being planned in Suojärvi and a 700 kW gas-fired plant in Sortavala.

"As the environmental requirements become increasingly stringent, we're getting closer to energy-efficient solutions," concludes Smirnov. "I believe that the most the dynamic progress will be made with thermal power plants. Now, nine out of ten of the plants are obsolete." ●



01  
The new recovery boiler is one of the biggest in Russia.

## CASE STUDY

# Towards a cleaner Komi

**More advanced and efficient waste management. This is the biggest challenge facing the Komi Republic right now – a task that affects both industry and households.**

The odour is what it should be: both acidic and strong. And there is no mistaking it. The Mondi Paper Mill lies 20 km outside Syktyvkar. Over 400 buildings are spread across the gigantic site down by the River Vycheгда. The landscape is dominated by a cluster of 80-metre-high stacks billowing out thick white smoke – a visible result of water-steam production.

“The mill is now in its forties and we are constantly investing across all areas,” says Managing Director Jorma Turpeinen as we drive around the mill grounds.

The pulp and paper mill in Syktyvkar was opened in 1969. One of the largest mills in Russia today, it produces close to one million tonnes of paper products per year. At present, it is owned by the international forest group Mondi that has a presence in 30 countries.

An extensive modernisation programme called STEP was carried out during 2008–2010. Mondi spent a total of EUR 545 million to create a more environment-friendly,

efficient and safer mill. In the course of the project, the paper machines were upgraded, boilers replaced, new filters installed, a timber yard rebuilt and new cooling towers erected.

“As far as waste management is concerned, the challenge was to make more efficient use of the wastes,” explains Turpeinen. “And we’ve done just that. Previously, we re-used 85 per cent of the waste and now it’s 100.”

We park the car down by the river to take a look at a mountain of woodchips – all 30,000 tonnes of it. Thanks to the STEP programme, the mill has managed to reduce waste by 20 per cent.

“The peak of this stockpile will be down in the boilers in just five days,” says Turpeinen. Inside the thermal power plant, it is almost exclusively women sitting in front of a row of computer displays monitoring all the systems. One of the displays shows the fire burning down in the boiler.

“We burn all the waste in the boilers,” says Turpeinen.

The mill’s pride and glory is the new recovery boiler capable of incinerating 3,560 tonnes of dry solids at 500 degrees. The largest in Russia, it replaced three old boilers at

01  
Sergey Geraymovich,  
Vice-Minister at  
the Ministry of  
Natural Resources  
and Environmental  
Protection of the  
Republic of Komi.

02  
Tatyana Tyupenko,  
Head of Division,  
Ministry of Natural  
Resources and  
Environmental  
Protection of the  
Republic of Komi.



the mill. As part of the same project, new filters were installed to reduce emissions of gases hazardous to health.

Thanks to the new technology, carbon monoxide emissions are down from 13,187 tonnes per year to 4,484 tonnes; sulphur dioxide from 672 to 57; and dust particles from 2,284 to 197 tonnes.

“As we speak we’re installing new carbon filters to improve the system’s performance even further,” points out Turpeinen.

The mill’s power plant generates a total of 500 MW of electricity. Part of this bio-energy is sold to the Republic of Komi.

**WASTE MANAGEMENT IS** one of the biggest problems facing the Komi Republic. While the total amount of waste per year has fallen to 25 million tonnes during the past decade, practically none of it is sorted and re-used. As a result, a total of 114 million tonnes remains buried in Komi’s landfills. Most of it comes from the coal, timber, oil and gas industries.

“Our problem is that we’re lacking in modern landfills,” says Sergey Geraymovich, Vice-Minister at the Ministry of Natural Resources and Environmental Protection of the Republic of Komi. “There’re plenty of old-fashioned sites where wastes are dumped. What we need are modern facilities based on advanced engineering.”

A fair amount of progress has already been made in Komi in the efforts to address the problem.

“First, we carried out a thorough survey to determine the current state of affairs throughout the republic,” explains Tatyana Tyupenko, responsible for international projects at the same ministry.

The efforts to arrive at a definite concept took EUR 90,000. The costs were split fifty-fifty between the ministry in Komi and NEFCO. Based on this survey, the republic now has a long-term programme in place covering the whole of Komi. Its goal is to create a uniform system for waste management with a focus on hazardous waste. At the same time, there is an ambition to improve performance in waste sorting.

“This year, we’ve already managed to collect and dispose of the chemical pesticides used in the republic. It’s one of the problems that we’ve already taken care of.”

“  
Previously,  
we re-used  
85 per cent of  
the waste  
and now it’s 100.”

Of all the republics in north-western Russia, Komi is making the greatest effort to improve efficiency in waste management. It is committed to spending RUB 1 billion over the next four years to achieve this goal.

“We’ll start building new landfills next year,” affirms Geraymovich. “We’re not going to set up landfills in every locality; instead, we’ll focus on creating a centralised system.”

The programme will also affect the existing landfills as well as illegal landfills which will be closed down. All the municipalities are obligated to establish waste management systems of their own. The most active of them have been rewarded in the form of quick financial support.

**NEFCO WILL FUND** concrete projects included in the programme framework. Two pilot projects have already been launched. Norway’s Environment Centre takes part in the project through the dissemination of information and sorting.

“Co-operation with international partners has been extremely positive,” stresses Geraymovich. “It’s been highly useful for us to be able to draw upon the experiences gained in Scandinavia. The biggest problem for us in Russia is psychological – the attitude towards environmental problems and how they should be tackled.”

“When I first went through NEFCO’s application procedures, it was both hard and complicated,” admits Tyupenko. “But we did gain very important experience. We learnt a great deal about the detailed requirements imposed by a major financial institution, something that is very useful for us in this line of work.” ●



03  
PM-14 was one of  
two paper machines  
modernised within  
the STEP project.

04  
“We are re-using  
all of the waste  
generated here  
at the plant,” says  
Managing Director  
Jorma Turpeinen.



“  
It’s been  
highly useful  
for us to draw  
upon the  
experiences  
gained in  
Scandinavia.”

CASE STUDY

## The hunt for clean water



In Komi, almost half of the population has access to pure drinking water.

**Komi has launched an ambitious programme to improve its water supply system. Over the next four years, it is committed to spending close to RUB 16 billion to achieve this goal.**

Water consumption has declined in the Komi Republic by 36 per cent over the past 20 years. The main reasons for this are depopulation, lower demand by industry and increased tariffs.

In 2012, the treatment plants in the republic processed a total of 454 million m<sup>3</sup> of wastewater. At the same time, the quantity of non-treated or partially treated wastewater amounted to 119 million m<sup>3</sup>. During the past decade, the amount has clearly fallen as indicated by the corresponding figure for 2002 of no less than 145 million.

The quality of drinking water in the republic remains unchanged from the early 2000s. Today, 63 per cent of the potable water meets the applicable quality requirements.

In many localities, however, drinking water remains a problem with high concentrations of substances hazardous to health. No wonder that the new water programme launched by the Republic foresees major investments in a new water intake, a waste-

water treatment facility and water pipes in the city of Uhta. New developments are also under way in the city of Usinski as well as in a number of smaller municipalities.

“Water supply systems are heavily stretched across Russia,” says Sergey Geraymovich, Vice-Minister for the Environment of the Republic. In Komi, however, almost half of the population has access to pure drinking water – a feat matched by few other republics.

The Republic’s new programme does not include the capital city Syktyvkar and its 250,000 inhabitants. Here, the modernisation process was initiated many years ago.

Syktyvkar’s water supply plant is located in a wooded area to the east of the city. Even though the facility was built in the 1970s, the blue-and-white industrial buildings on the site look much more modern – mainly thanks to a major modernisation project in 2002. Today, the plant has a capacity of 60,000 m<sup>3</sup> per 24 hours.

“Now all the processes are fully automated,” says Engineer Denis Bozhenov as we stand in a hall where sodium hypochlorite is manufactured. The personnel monitor the process by computers, only leaving their desks to venture into the production area when necessary.

01



ANDERS MARD

01 Today, 63 per cent of the potable water meets the applicable quality requirements.

**ALL IN ALL, IT TOOK AN** investment of around EUR 20 million to reach the European standard of quality. Most of the funding was provided by Vodokanal and the remaining part by the financial institutions EBRD and NDEP as well as by Sweden, Finland, Canada and the EU.

“We’ve had smooth co-operation since the project launch in 2001,” says NDEP Director Jaakko Henttonen. “Vodokanal in Syktyvkar has been active in taking the initiative and is keen to work with us, and they’ve also had a constant drive to improve efficiency.”

Next we enter a colourful industrial hall where raw water is flocculated.

“What I’ve been most impressed by is the complete automation of the process – something that’s still relatively new here in Russia,” says Bozhenov.

Here, the water passes from basin to basin and from filter to filter. The whole process takes almost two hours before entering the next stage.

“Nowadays, we’re using new agents for flocculation to improve quality,” explains Bozhenov.

“In the past, we used to have a designated person to prepare the additives. Now, it’s all automatic so you always get the right concentration and the quality remains uniform.”

It is not only the quality of drinking water that has improved as a result of the new technology: the purification plant is also consuming less energy.

“We meet all the European standards. It benefits the city in many ways. And the people have stopped complaining about the water,” says Bozhenov.

The biggest single polluter of the republic’s water resources is industry as there are several large entities engaged in the forest, coal, gas and oil businesses. But even here, positive developments are taking place.

The Mondi Pulp and Paper Mill in Syktyvkar, one of the largest in Russia, consumes vast quantities of water to keep production going.

01



ANDERS MARD

02



ANDERS MARD



We’ve been able to reduce water consumption by 15 per cent.

“Thanks to the EUR 545 million modernisation project the company carried out here a couple of years ago, we’ve been able to reduce water consumption by 15 per cent,” says Managing Director Jorma Turpeinen.

Before that, the mill used 130 million m<sup>3</sup> of water per year, most of which is required by the mill’s thermal power plant.

The mill has a wastewater treatment plant of its own, which also takes care of 90 per cent of the wastewater from Syktyvkar city. In 2012, the treatment plant processed a total of 84 million m<sup>3</sup> of wastewater. While the concentrations of hazardous substances fell by 12 per in the same year, the problem with the high level of phenol in the River Vychegda remains.

“We’ve recently launched a project to increase the capacity of the treatment plant,” says Turpeinen. “The work started last year and the first phase is due for completion in 2014”.

Among other things, the programme foresees a technology upgrade, equipment replacements and the construction of new basins.

“Our ambition is to always meet the requirements imposed by Russian legislation,” concludes Turpeinen. ●

01  
“We have a complete process automation for treating drinking water,” says Engineer Denis Bozhenov.

02  
Mondi’s wastewater treatment plant takes care of 90 per cent of Syktyvkar’s wastewater.



The Russian authorities have removed tens of thousands of cubic metres of hazardous waste from Franz Josef Land.

## CASE STUDY

# Arctic Russia being cleaned up

**A mammoth clean-up operation is under way in Franz Josef Land to remove 18,000 tonnes of metal products, 7,300 cubic metres of oil products as well as 80,000 cubic metres of buildings materials and household wastes. Everything must go.**

“No reason to beat about the bush. We’ve made a major effort. And the operation that’s going on is both massive and efficient.”

The Franz Josef Land National Park has its head office in downtown Archangel; and it is here that Aleksandr Kirilov, Deputy Director for Nature Conservation, also has his desk. But instead of moving about along the office corridors he prefers to spend his time in the well-known archipelago that lies north east of Svalbard in Arctic Russia and where an intensive clean-up operation has been going on for a couple of years.

“Our goal is to remove 8,000 tonnes of waste and debris every year,” says Kirilov. “At this rate, we’ll get the job done by 2020.”

The 181 islands of Franz Josef Land are administered by the Archangel Region. The national park was founded in 2009 to pro-

tect and develop the archipelago which covers an area of over 16,000 square kilometres.

After the Second World War, the island group was used as a military base by the Soviet Air Force. After the collapse of the Soviet Union, the military left the islands but the environmental problems remained.

An environmental disaster is still brewing on six of the islands. The Soviet military left behind some 30,000–40,000 tonnes of aviation fuel and other oil products in the highly sensitive Arctic environment. In more tangible terms, we are talking about no fewer than 350,000 corroding fuel barrels posing a constant threat of a massive spill.

There is no permanent habitation in Franz Josef Land; instead, it boasts rich flora and fauna. Threatened species such as walrus, whales and ivory gulls all depend on the islands for survival.

**IN 2007, NEFCO** gave EUR 200,000 to co-finance a pilot project to take an inventory of the hazardous substances existing on the islands. Three years later, the then Prime Minister Vladimir Putin paid a visit to the archipelago and ordered an extensive restoration of Franz Josef Land. NEFCO has

continued to co-operate with the Russian Geographic Society and the Polar Foundation, providing funding also to address the elimination of pollutants such as POPs and PCB, which is a particular international concern in the exceptional Arctic environment.

“In 2011, the Russian Ministry of Natural Resources carried out a thorough study of environmental problems on Alexandra Land as well as the Graham Bell, Hooker and Hoffman islands,” explains Kirilov. “They were followed by the Prince Rudolf and Heiss islands in 2012.”

Work to clean up Alexandra Land and Hooker Island commenced the same year. All in all, the project team collected over 4,500 tonnes of metal, 25 tonnes of aluminium, over 1,700 tonnes of oil products and 6,000 tonnes of waste for re-use on the mainland.

“Aside from barrels, there are metal products, scrapped electronics, cisterns, oil pipes, building materials, buildings and ordinary debris out there on the islands,” says Kirilov.

While some of the stuff can be recycled on the spot, most of the waste is shipped to the nearest harbour from where it is taken to various recycling facilities. Large land areas have also been contaminated by oil and need to be restored.

“Last year, we dealt with 50 hectares and this year we’ll be able to handle around 40 hectares,” he says.

The massive project is funded fully by the Russian Government. The annual budget is RUB 600 million.

“Financing is secured for the entire project,” underlines Kirilov. “Money will keep coming from Moscow until the job is done.”

**THIS YEAR, CLEANING** continued on the same islands and on Graham Bell Island. Plans were also in place to extend the operation to the other islands when an impending environmental catastrophe was detected.

In 2012, a reconnaissance expedition discovered a serious threat on Graham Bell Island. The beach was being eroded with large chunks of earth crashing into the sea.

“It’s one of those natural processes that are common in the archipelago, but this was happening ten times faster than normal,” explains Kirilov.

The island was quickly being halved and there was an impending risk of 2,000 tonnes of oil products ending up in the sea. To prevent the catastrophe, all the resources were redirected to the island.

“It was a tough and complicated operation as we had to move over all the equipment and staff,” he says.

Because of the lack of time, a decision was made to throw in all the resources as quickly as possible, and so this year the expedition set out already in May. An atomic icebreaker was chartered to assist the “Mikhail Somov” research vessel because the ice cover is at its thickest in the spring. And it proved extremely difficult to get all the equipment onto the island.

“Our heavy crates couldn’t be left on the ice near the shore for more than 40 minutes otherwise there was a big risk of the float breaking up,” he recounts.

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Franz Josef Land was used as a military base by the Soviet Air Force until 1991.

01



RUSSIAN ARCTIC NATIONAL PARK



Most of the waste is shipped to the nearest harbour from where it is taken to various re-cycling facilities.

The efforts on Franz Josef Land are not exclusive to old barrels and cisterns – in addition to the environmental project, cultural assets are also involved.

“We’re doing our best to preserve everything that is of cultural value,” says Kirilov. “The idea is to set up several museums on the islands.”

The annual expedition teams also include historians and culturologists who take stock of the cultural assets on the islands.

“Hooker Island is home to the world’s first polar base complete with a meteorological station,” he explains. “And we naturally want to preserve it for posterity.”

Other interesting discoveries include a unique Soviet tractor manufactured in Chelyabinsk and the ‘Finnish house’ – an old wooden cabin built using a special technique native to Finland.

The Franz Josef Land National Park hopes to be able to develop the island group into an area attractive to tourists. At present, the archipelago is visited by around 1,700 people per year.

“Next year, we’ll continue the clean-up and restoration work and extend the efforts to Heiss Island and Hoffman Island where the actual airfield is located,” concludes Kirilov. ●

A temporary camp was set up in a hurry and the staff worked round the clock. Other problems soon appeared in the form of polar bears and weather.

“You’re attacked by a sleet storm which quickly turns into ice,” says Kirilov. “If you stand still for just a little too long, you’ll be immediately covered in a thin sheet of ice as heavy as a medieval knight’s armour!”

Thanks to these special efforts, the catastrophe was averted and all the oil products recovered. However, nature is still taking its course and erosion continues – it has already reduced the island to half of its former size.

CASE STUDY

# Fresh winds in Archangel

**Over the past five years, there has been a clear trend in the Archangel (Arkhangelsk) region: emissions into the atmosphere and discharges into the watercourses have been declining.**

**IN 2003, THE TOTAL** volume of industrial emissions and discharges in the Archangel region reached 259,000 tonnes. By 2011, this figure was down to 215,000 tonnes. The biggest emission sources are companies engaged in the production and distribution of electricity, gas and water.

Archangel, the largest city in the region with a population of 360,000, is the locality hardest hit by the state of the environment. High levels of dust particles and nitrogen oxides were detected in the city still in 2011. Yet the positive trends dominate. More than anything else, this is due to a major upgrade carried out at the city's thermal power plant.

The power plant in Archangel went on stream in 1970. The plant with its gigantic smokestacks billowing out a constant

stream of white smoke dominates the gateway into the city in the east. Equipped with six turbines with a total output of 450 MW, the facility provides the city with heat, hot water and energy.

"We've achieved excellent results," says Kirill Sinitsky, Head of the Agency of Natural Resources and Environment in the Archangel Region. "Emissions declined dramatically when the plant switched from oil to gas as a fuel."

In 2003, the thermal power plant accounted for nearly 45 per cent of all the pollutants in the city. All in all, the plant generated 26,000 tonnes of emissions per year. Now that the boilers run on gas instead of fuel oil, this amount has almost been halved.

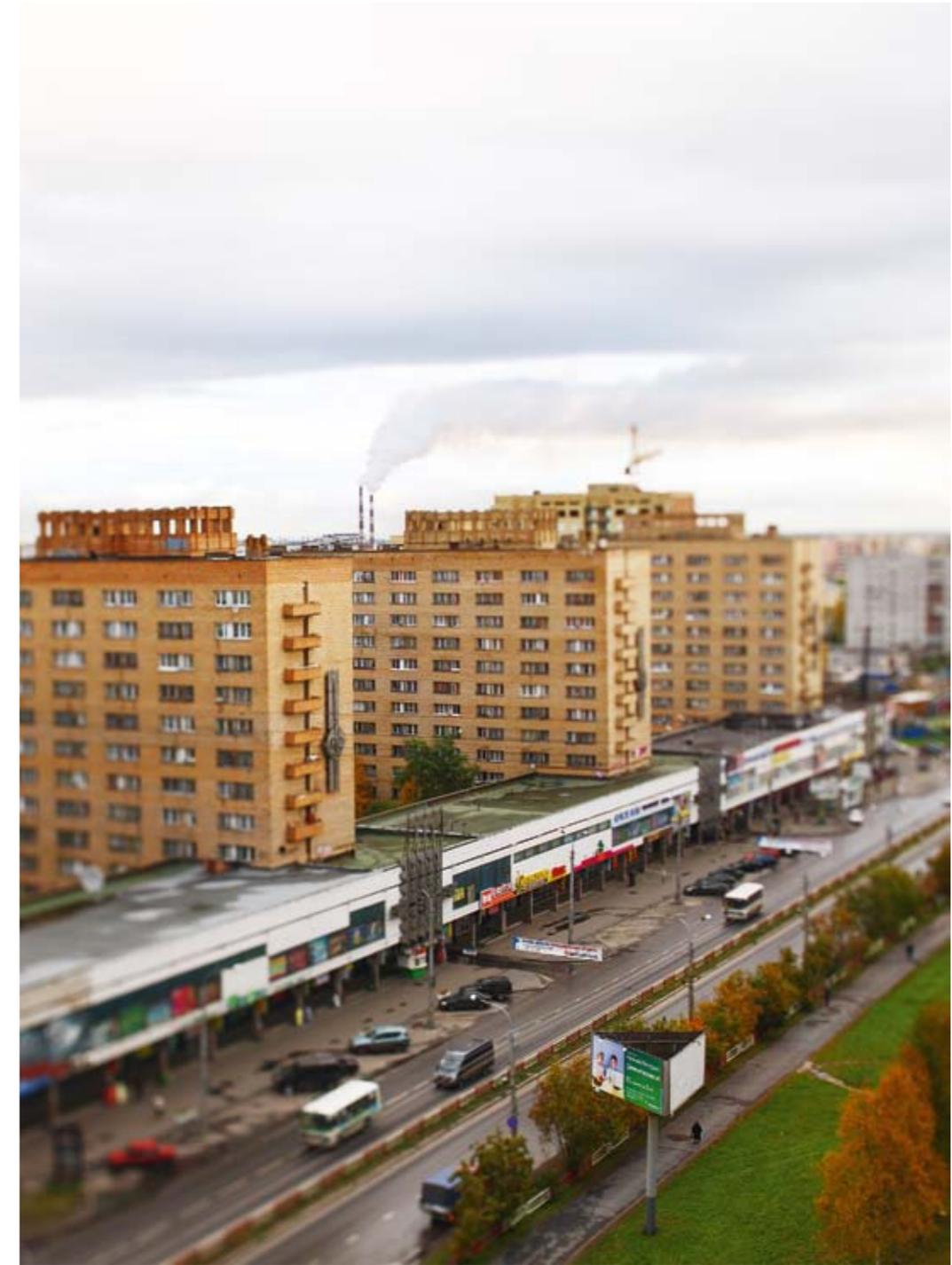
By 2011, the emissions from the plant had fallen to 13,800 tonnes. Sulphur dioxide was down by 64 per cent, carbon monoxide by 59 per cent and ash by 71 per cent. To achieve this, an investment of EUR 12 million was required.

"It improved the quality of life considerably - and not only in the city but across the entire region," says Sinitsky. "A similar



The air quality in the city of Archangel has improved significantly in recent years thanks to reduced emissions from the local thermal power plant.

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PARTNIK BASTENBERGER

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Voskresenskaya Street in the heart of Archangel.

positive development is taking place in the city of Severodvinsk where one of the local thermal power plants has switched to gas. We're upgrading the technology in other localities in the region as well."

The thermal power plant in Archangel plans to move ahead with modernisation. The management's goal is to satisfy at least 90 per cent of the plant's fuel requirements with gas. In doing so, the annual emissions could fall to around 3,000 tonnes.

**THE NOVODVINSK PAPER** mill, located just outside Archangel, is Russia's largest producer of board with an annual output of 350,000 tonnes. All in all, the mill makes over 800,000 tonnes of paper products per year.

"We have two big paper mills in the region, both market leaders in Russia and owned by major international corporations," explains Sinitsky. "The technology that these mills use and the upgrades that have been carried out make it possible for them to achieve world-class environmental performance."

The other big paper mill is Kotlas in the southeast of the region. Thanks to an investment programme of EUR 107 million, the mill has managed to reduce its atmospheric

01  
The paper mill in Novodvinsk.

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"We've achieved excellent results," says Kirill Sinitsky, Head of the Agency of Natural Resources and Environment in the Archangel Region.

01



PATRICK PASTERBERGER



"I don't see any environmental threat being posed by the region's paper industry," says Kirill Sinitsky.

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PAVEL KONONOV

emissions by five per cent at the same time as the quantity of pollutants in the mill's wastewater fell by 91 per cent.

"The third paper mill in the region, Solombala, tends to prompt critical questions among our international partners," acknowledges Sinitsky. "The company is facing a crisis because of the mill's outdated technology – the problem seems to be solving itself, so to speak."

Solombala stopped production at the end of 2012. Last year, the company announced major cutbacks as a result of which almost 1,000 employees lost their jobs.

**DURING THE PAST** few years, the Novodvinsk mill has invested EUR 102 million to improve efficiency in production. And the results have not been late in coming.

In 2003, the mill's atmospheric emissions were close to 50,000 tonnes while discharges of water pollutants amounted to almost 30,000 tonnes. By 2011, the emissions and discharges had fallen to 42,000 tonnes and 14,500 tonnes, respectively. During this modernisation project the mill also managed to solve its dioxin problem.

Boilers were replaced and advanced technology installed to deal with gaseous pollutants more effectively. At the same time, the mill switched to chlorine dioxide bleaching of pulp. Among the problems yet to be addressed are sulphur dioxide and ash.

"I don't see any environmental threat being posed by the region's paper industry," says Sinitsky. "I don't consider the mills as

hot spots. They are companies with large-scale operations and equivalent environmental impacts."

The Novodvinsk mill has made major efforts to upgrade its wastewater treatment plant. Today, the discharges of hazardous substances are under control, except for biological and chemical oxygen demand (BOD and COD).

Now the company has introduced an environmental strategy to improve its competitiveness. For example, the mill is planning to install a new pulp line and recovery boiler capable of processing gas emissions more effectively and to upgrade the wastewater treatment technology.

"The international co-operation focusing on the hot spot issues has been an important process," stresses Sinitsky. "We've got good results and I definitely think that this work should continue. At the same time, however, the tools should be reviewed and renewed."

We should be able to define the criteria for hot spots and understand the mechanisms better. We've had good results from these efforts here in Russia and we'll be happy to share these experiences with our neighbours in the Barents Region." ●

CASE STUDY

## Energy out of pesticides

**Traffic is busy on the access road to Ekokem's facility in Riihimäki, Finland, with a steady stream of trucks passing through the gates. Aside from all the other hazardous waste processed by the company, Ekokem receives annually some 150 tonnes of pesticides that are taken to a special incineration plant where the hazardous substances are burnt at 1,100–1,200°C.**

“MOST OF THE PESTICIDES ending up here are from Finland and the other Nordic countries, but we have also received a fair amount of pesticides from other parts of the world,” says Ekokem’s Production Manager Juhani Alonen.

The incineration process breaks down the hazardous chemical compounds to render them harmless while at the same time generating thermal energy. Ekokem supplies all the heat required by the town of Riihimäki and 70 per cent of that required by the town of Hyvinkää. Last year, Ekokem generated a total of 509 GWh of energy in Finland. The flood of hazardous wastes is impressive – according to Ekokem’s sustainability report, the company received a total of 229,000 tonnes of hazardous wastes in 2012.

The facility in Riihimäki almost stands alone in the Nordic context. There are only two similar incineration plants in the Nordic countries and in Russia this type of incineration technology is completely lacking. This is one of the reasons why Ekokem has received obsolete pesticides from Russian Karelia as part of the international environmental co-operation in the Barents Region.

“At the beginning of the 2000s, the Arctic Monitoring and Assessment Programme (AMAP) commissioned a number of studies on the occurrence of persistent organic environmental pollutants. It was discovered, among other things, that several rivers and watercourses in the Barents Region displayed high levels of DDT and other pesticides,” says Timo Seppälä, Senior Adviser at the Finnish Environment Institute.

DDT is a persistent organic pollutant that accumulates in the food chain. It is associated with a range of conditions such as breast and thyroid cancer as well as hormonal and neurological disorders in humans.

As a result of AMAP’s studies and the ‘hot spot’ report released by NEFCO in 2003, it was possible to pinpoint a number of sources of DDT in the various parts of the Russian Barents Region. Most of the problems were due to

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PATRIK RASTENBERGER

01 The Finnish environmental management company Ekokem in Riihimäki has incinerated obsolete pesticides collected from the Republic of Karelia in Russia.

01  
Senior Adviser Timo Seppälä from the Finnish Environment Institute.

02  
Obsolete pesticides detected in a warehouse in the vicinity of Sortavala, Russian Karelia.

01



PATRIK RASTENBERGER

02



TIMO SEPPÄLÄ



The Barents Euro-Arctic Council was able to cross the pesticide problem in Russian Karelia off the list of 'hot spots'.

past Soviet environmental misdeeds and the pesticides that were used back in the 1960s. Several tonnes of pesticides stashed away in 23 depots spread across the region were discovered in Karelia. Many of them were found near Sortavala and some in large storage facilities near Lake Ladoga.

The Finnish Ministry of the Environment offered to finance most of the collection and packaging of the pesticides and their transport to Ekokem's facility in Riihimäki for proper incineration. The remaining part was funded by the Republic of Karelia.

"Talks with the Karelian and federal authorities were successful, and following a thorough inventory and identification of the substances we managed, together with the Karelian authorities, to organise the transport of 12 tonnes of pesticides from Petrozavodsk to Riihimäki in summer 2008," explains Timo Seppälä.

The cargo contained 21 different pesticides including the Persistent Organic Pollutants (POPs) DDT and Lindane. The packaging and transportation of the pesticides was carried out in accordance with the provisions of the Basel Convention and the United Nations regulations, which impose rigorous requirements regarding their sorting, handling and loading, and the type of bags to be used during their transportation.

**AFTER INCINERATION IN Riihimäki**, the Barents Euro-Arctic Council was able to cross the pesticide problem in Russian Karelia off the list of 'hot spots' identifying 42 acute environmental threats in the Barents Region. In other words, it was a success story.

The project in Russian Karelia was part of a more extensive action programme to manage pesticides in Northern Russian territories in an environmentally sound way. Many regions have sent their pesticides to the hazardous waste facility in Krasny Bor in the vicinity of St. Petersburg. Krasny Bor does not yet meet the international criteria for environmentally sound management.

"We have the technical capability to accept similar deliveries from for example Russia, but for that we need a partner who can handle the logistics and paperwork involved in such projects," says Production Manager Juhani Alonen. ●

03



PATRIK RASTENBERGER

03  
"We have the technical capability to accept similar deliveries for example from Russia," says Production Manager Juhani Alonen.



KNP

01  
Boats moored  
in the Kenozero  
National Park.

Editor:  
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