Financing Options for Black Carbon Emissions Reduction Projects

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Nordic Environment Finance Corporation (NEFCO)
NEFCO in brief

- IFI (est. 1990) – Denmark, Finland, Iceland, Norway, Sweden
- Loans, equity investments, grant financing for environmental projects
- Funds in the total amount of 549 MEUR
- Russia (North West, Arctic), Ukraine, Belarus
- Project pipeline ~ 400, in Russia ~ 150
Focus on climate change mitigation, efforts for cleaner marine environment and elimination of toxic pollution
Key Pollutants and Sectors

- Climate forcers (CO2, SLCP incl. Black Carbon, CH4, HFC, terrestrial Ozone)
- Ozone Depletion (CFC, HCFC, Methyl Bromide, CCl4)
- Acidification (SO2, NOx, CO2)
- Long Range Trans-boundary Pollution (POPs, PCB, HM, Hg etc.)
- Eutrophication (P, N)

- Industry (mining, metallurgy, oil, coal, gas, paper/pulp, food, engineering, construction)
- Housing (private, public, industrial) and Services (water and waste management, district heating, maintenance)
- Transportation (land based, river and marine)
- Agriculture
- Cross cutting: complex/combines, energy efficiency
NEFCO – funds and resources

• Own funds (Investment Fund)
• Nordic Funds (Nordic Environmental Development Fund)
• Barents Euro-Arctic Council (Barents Hot Spots Facility)
• Arctic Council (ACAP and AMAP SG, PSI Fund Manager)
• Northern Dimension Environmental Partnership (NDEP)
Loan Programmes and Funds

- **Investment Fund**
  - up to 5 MEUR
  - market financing conditions
  - modernization and reconstruction of heating/energy supply systems, RE, upgrade and replacement of vehicles

- **Cleaner Production Facility**
  - modernization of production processes and equipment (including replacement of vehicles)
  - up to 500,000 EUR
  - favourable financing conditions

- **Energy Saving Credits**
  - energy saving measures at the social sphere facilities (schools, kindergartens, hospitals)
  - rehabilitation of the heating supply sources and systems
  - subsidized lending rates
Replacement of buses at the Autoline Company (Moscow, 2004)

**Description:** replacement of 20 of 175 buses at Autoline company through a leasing scheme with Scania Leasing. “Gazel” buses were replaced by Scania Omni Link buses, corresponding to Euro 3 standard

**Partners and financing scheme:**

- Scania: 3 MEUR (loan for Scania Leasing)
- NEFCO: 3 MEUR (loan for Scania Leasing)
- Swedfund: 3 MEUR (loan for Scania Leasing)
- Autoline: 3 MEUR (equity)
- EBRD: 12 MEUR (loan for Autoline)
- **TOTAL:** 24 MEUR

**Environmental effect:** reduction of NOx, solid particles and hydrocarbons emissions, including black carbon, by 70-80%; CO2 reduced by 10-12%.
Replacement of buses at the Autoline Company (Moscow, 2004)

<table>
<thead>
<tr>
<th></th>
<th>CO</th>
<th>HC</th>
<th>CO2</th>
<th>Nox</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gazel’</td>
<td>g/kWh</td>
<td>48.5</td>
<td>6.2</td>
<td>823</td>
</tr>
<tr>
<td>Scania OmniLink</td>
<td>g/kWh</td>
<td>0.6</td>
<td>0.5</td>
<td>670</td>
</tr>
<tr>
<td>Mitigation</td>
<td>%</td>
<td>98.9</td>
<td>91.9</td>
<td>18.6</td>
</tr>
<tr>
<td>Prevention</td>
<td>t/y</td>
<td>600</td>
<td>75</td>
<td>2000</td>
</tr>
</tbody>
</table>
Barents Hot Spots Facility (BHSF)

- Financial mechanism of the Barents Euro-Arctic Council (20 years anniversary in 2013, Minister Meeting in Inari)
- 2003 – Joint report by NEFCO and AMAP, 42 Barents “hot spots”, establishment of BHSF
- 4 MEUR, above 70 initiatives
- Minimization of black carbon emissions as result of the improvements in the heat and energy supply systems
NEFCO-AMAP Barents Environmental Hot Spots
Arctic Council - ACAP
Black Carbon Projects in ACAP pipeline

ACAP Projects Under preparation (Reykjavik Sept. 2013):

• Russia – System for Black Carbon Emissions Impact Management from sources in the Russian Arctic
• NEFCO – Russian Arctic-Barents Region Short-lived Climate Pollutants Mitigation Project
• US – Arctic Black Carbon Case Studies Platform
• Sweden- SLCF Trust Fund with NEFCO in Russian Federation
• NEFCO- “Early Start” Projects: BC Reduction from Heat and Power
Arctic Council – Project Support Instrument (PSI)

• 2011 – Russia pledges 10 MEUR

• Current pledges, deposits & allocations currently stand at EURO 15.9 million

• Finland, Iceland, NEFCO, Norway, Saami Council/Parliament, Sweden, United States and Russian Federation
## PSI Projects - Strategic Planning

### Table 1 - PSI Resource allocation [2012-2015] strategic business plans*.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>Integrated Hazardous Waste Management demo incl. POPs**</td>
<td>[40]</td>
<td>[6 345 200]</td>
</tr>
<tr>
<td>Mercury demonstration project***</td>
<td>[25]</td>
<td>[3 965 750]</td>
</tr>
<tr>
<td>Clean Production/Energy Efficiency/SLCF-Black Carbon</td>
<td>[20]</td>
<td>[3 172 600]</td>
</tr>
<tr>
<td>Other areas</td>
<td>[6]</td>
<td>[951 780]</td>
</tr>
<tr>
<td>Standard Costs</td>
<td>[9]</td>
<td>[1 427 670]</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>15 863 000</td>
</tr>
</tbody>
</table>

*This represents NEFCO’s understanding of the priorities of the Contributors

** Persistent Organic Pollutants (POPs) are hazardous substances such as Polychlorinated Biphenyls (PCBs), pesticides and the allocation for demonstration project includes destruction of POPs.

*** Mercury demonstration project is to address concrete mitigation of mercury release to the environment.
The FM is currently preparing a pipeline of proposals for processing with an AC subsidiary body & taking into account the tentative resource allocation 2012-2015 for the 1st PSI COM. The pipeline includes:

<table>
<thead>
<tr>
<th>Project Description</th>
<th>EURO, M</th>
<th>Estim</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SLCP Projects (Black Carbon, Methane and HFC)</td>
<td>57-77</td>
<td>Table 1</td>
</tr>
<tr>
<td>2. NEFCO Early Action SLCP Projects</td>
<td>12</td>
<td>CP/EE</td>
</tr>
<tr>
<td>3. Non-ferrous Zinc Smelter Mercury Project</td>
<td>3.5</td>
<td>CP</td>
</tr>
<tr>
<td>4. PCB/Pesticide/POP Waste Management, RF</td>
<td>3</td>
<td>WM</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Up to 95</strong></td>
<td></td>
</tr>
</tbody>
</table>
## SLCP Project - Work Underway

### Table 1: Summary of NEFCO SLCP Project Initiative in NW Russia

<table>
<thead>
<tr>
<th>Project</th>
<th>EUR, Mio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project 1-M: Reduction of Methane Emissions</td>
<td></td>
</tr>
<tr>
<td>Sub-pr* 1.1-M-K</td>
<td>10</td>
</tr>
<tr>
<td>Sub-pr. 1.2-M-L</td>
<td></td>
</tr>
<tr>
<td>Project 2-BC: Reduction of Black Carbon Emissions</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.1-BC-K: Kostomuksha</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.2-BC-K Nadvoitsy</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.3-BC-K Sortavala</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.4-BC-K Suojärvi</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.5-BC-K: 8 Karelian settlements with diesel power</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.5.1-BC-K: Valdai</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.5.2 to 2.5.7-BC-K: The remaining 7 Settlements:</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.5.8-BC-K Kemi</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.5.9-BC-K Louhi</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.6-BC-N Kolguyev Island Nenets</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.7-BC-Komi: District Heating Upgrade in Komi</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 2.8-BC-NWR: Assembly Plant for Special Transportation</td>
<td></td>
</tr>
<tr>
<td>Project 3-HFC: Mitigation of HFC Emissions</td>
<td></td>
</tr>
<tr>
<td>Sub-pr. 3.1-HFC-NWR: Management of End-of-Life Equipment</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Total (rounded off)</strong></td>
<td>57-77</td>
</tr>
</tbody>
</table>

*Sub-pr. = Sub-project
Komi District Heating Rehabilitation Project

- **Current situation**
  - Large region with sparse population
  - One company, Komi heating company provides heating services for 80% of rural districts
  - Inefficient operations and heavy use of coal subsidized by the regional authorities
Komi Project Objectives / Investments

• **The main goals** of the Project are
  – (i) to improve heat supply and increase efficiency of systems
  – (ii) to stimulate fuel switch to biofuel.
  – (iii) to reduce emissions of CO2 and black carbon (BC)

• **Investment components**
  i. Installation of biomass boilers
  ii. Reconstruction of distribution networks
  iii. Installation of water treatment systems
  iv. Installation of individual heat substations at consumer level

**Total estimated cost 8.2 MEUR (NEFCO, NDEP, Sweden, local financing)**
Komi Project Environmental benefits

- Reduced 10 400 t CO$_2$/a
- Reduction of Black Carbon 2300 kg/a
- Negative Unit abatement cost considering real, non-subsidised fuel prices
Optimization of the heating supply system and energy efficiency increase in the Republic of Karelia

- Development and implementation of energy efficiency investment projects in 4 settlement in the Republic of Karelia
  - Kostomuksha city;
  - Nadvoitsy settlement;
  - Sortavala city;
  - Suoyarvi city

- Potential technological solutions: new biofuel boilers, networks replacement, installation of individual heat substations (IHS)
Optimization of the heating supply system and energy efficiency increase in the Republic of Karelia

- Current status: preparation of a Feasibility Study (AF Industry AB, Sweden)

- According to preliminary estimates, priority investments in the district heating supply system in Kostomuksha could comprise up to 4 MEUR. Investments for the heating supply system in Nadvoitsy, Sortavala and Suoyarvi to be clarified.

- Considerable reduction of CO2 and black carbon emissions (to be clarified)
Reconstruction of Energy Supply Systems in 8 settlements in the Republic of Karelia

- The Project includes 8 remote settlements supplied with energy generated by diesel power stations of OJSC “Prionezhskaya Network Company”:
  - Valdai
  - Polga
  - Vozhmozero
  - Reboly
  - Kimovaara
  - Lindozero
  - Yustozero
  - Voinitsa
Reconstruction of Energy Supply Systems in 8 settlements in the Republic of Karelia

- Possible technological solutions:
  - replacement of diesel generators and energy load management
  - combination of photovoltaic power systems and wind generators with existing diesel generators
  - construction of small hydropower plants
  - biomass gasification
  - heat recovery of the diesel generator exhaust gases

- Required investments and reduction of black carbon emissions (and other environmental benefits) under clarification
Thank you!

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