Assessment of regional nutrient pollution load and identification of priority investment projects to reduce nutrient pollution from Belarus to the Baltic Sea

EUSBSR Flagship project

BSAP Fund

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NEFCO in a nutshell

- Nordic financial institution established 1990 in Helsinki by the five Nordic countries
- Financier of environmental projects, climate and environmental expertise
- NEFCO has financed a wide range of environmental projects in Central and Eastern European countries, including Russia, Belarus and Ukraine.
- Fund Manager for the Nordic countries, USA, Germany, the Netherlands, Russia, EU and GEF
- Total value of the funds administered by NEFCO is currently EUR 540 million
- Active role in the Arctic Council, the Barents Council, NDEP and other international organisations

Focus on climate issues, curbing eutrophication in the Baltic Sea as well as mitigation of toxic discharges in the Arctic region.

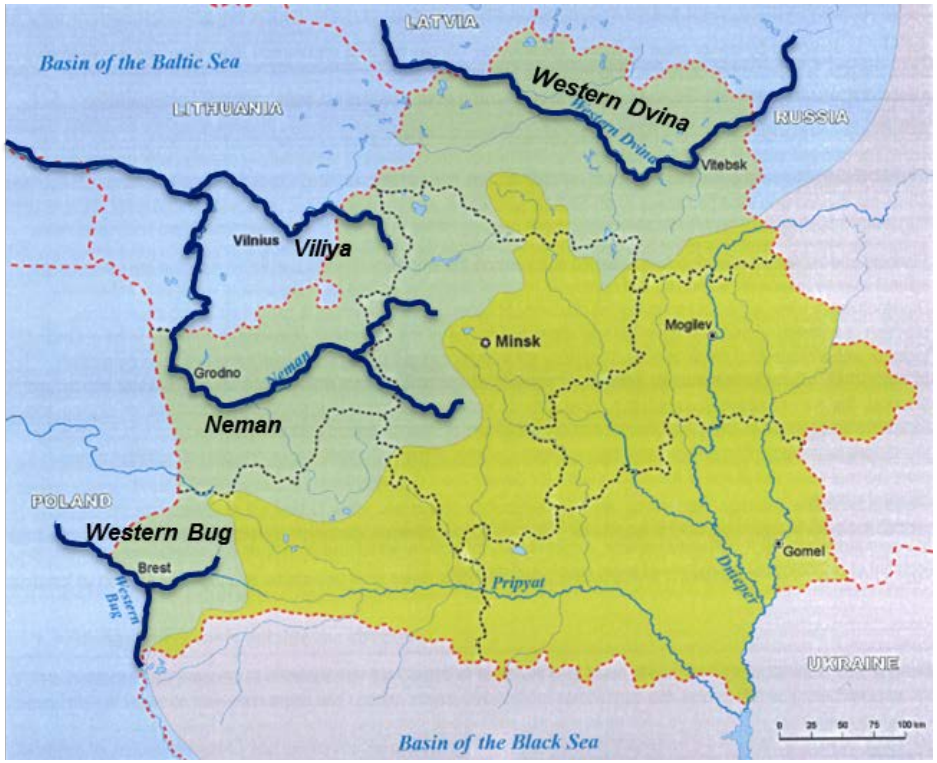
Case: Wastewater treatment in Kaliningrad

- Modernisation of the wastewater treatment plant in Svetlogorsk
- Financiers: OKOS, NEFCO, Sweden and the EU
- Part of an extensive programme covering 20 locations
- Reductions of phosphorus: 9 tonnes per year
- The plant's capacity will be tripled to 35,000 m3 per year

Case: Wastewater treatment in St. Petersburg, Russia

- The South-Western wastewater treatment plant in Saint Petersburg
- Total investment cost: 200 million EUR
- NEFCO's financial share of the equity investment was 20%
- Chemical phosphorus removal
- Reduction: 533 tonnes of phosphorus per year

Rivers and their catchment areas



Nitrogen load ~ 44 000 t/a
Phosphorus ~ 2 800 t/a

Three trans boundary river basins on the territory of Belarus, the Western Bug, the Neman and the Western Dvina discharge to the Baltic Sea

Project

- Project period 14th Nov 2012 – 31th Dec 2013

- Assignment carried out by Pöyry Finland Oy in association with
- Central Research Institute for Complex Use of Water Resources (CRICUWR)
- UNITER Investment Company (future forecasts, inventory of financing resources)
- SWECO (development of priority investments)
- MTT (one member of the agricultural team)

Objectives of the assessment

- Compile and analyse the best available data on major present sources of nutrient discharges
- Provide the best professional estimates on nutrient loads
- Provide an estimate of the impact of the identified major polluters, present and future, on the eutrophication of the Baltic Sea
- Assess the efficiency of alternative measures, investments as well as administrative actions, to reduce nutrient pollution and their estimated impacts
- Prepare a preliminary action plan to provide a basis for decision making on investments and other measures
- Provide a list of specific priority projects

Administrative actions at wastewater treatment plants

- Water pollution control
  - Independent control
- Pre-treatment of industrial wastewater
  - New agreement template
  - Better possibilities to control and to enforce into investments
- Financing of investments
  - Tariff reform
- Institutional reform
  - Regional water utilities
- Enhancement of operations
  - Electric energy savings
  - Reduction of personnel by increasing automation
- Cease infiltration plants

Administrative actions at large scale animal farms

- Water pollution control
  - Start permanent effluent measurements
  - Independent control
- Enforcement into environmental investments
  - Exemption from ecological taxes
- Institutional issues
  - Lack of discipline in following manure utilization regulations
  - Production driven targets
  - Coordination between enterprises in spreading of manure
  - Manure transportation

Prioritization criteria for WWTPs

- Oxygen consumption potential (OCP) method was used
- OCP is a combination of different loading parameters
  - 1 kg BOD results in 1 kg OCP
  - 1 kg N results in 18 kg OCP
  - 1 kg P results in 100 kg OCP
- Depending on the characteristics of wastewater multiplying factors are used
- OCP values before and after investments were calculated
- OCP reduction was divided by life cycle costs and investment costs
- Reduced kg OCP/EUR

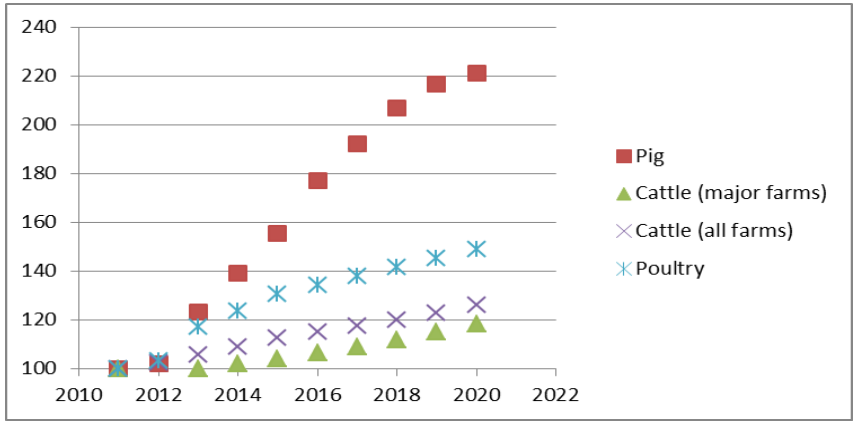
Prioritization criteria for animal farms

About 300 farms (pig, cattle, poultry) screened

Criteria for selecting

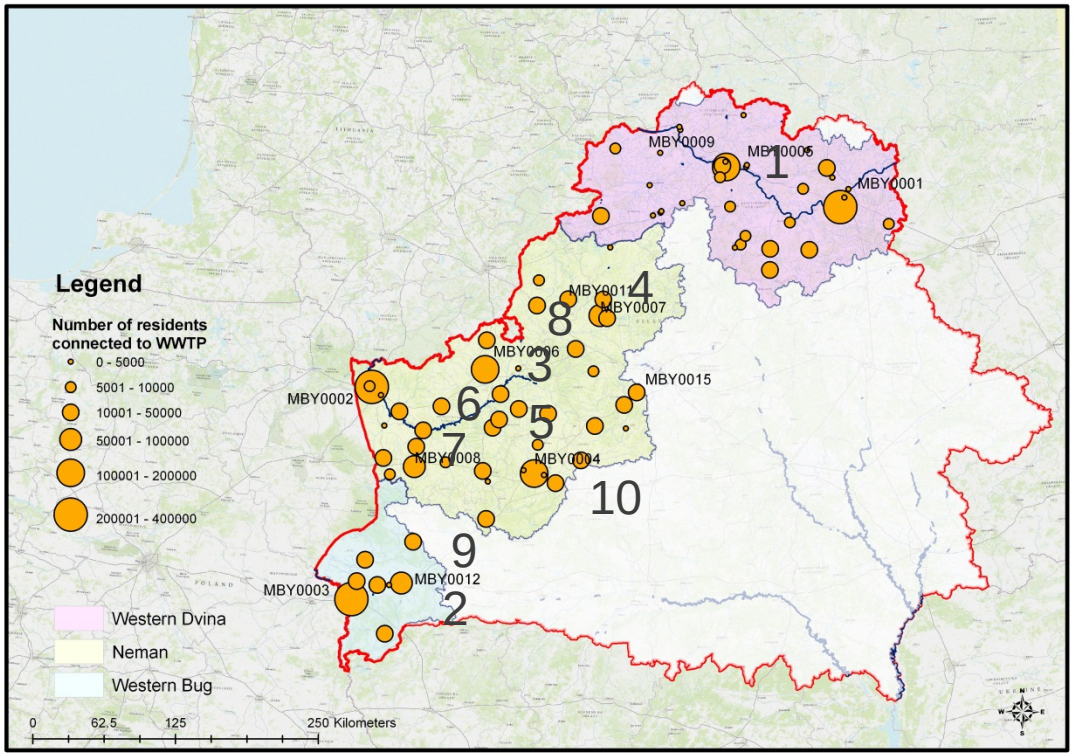
1. Biggest pollution potential based on the size of the farm and its manure production (livestock units LSU) and manure nutrient content (OCP approach)
2. Geographical location
3. Investment capacity and plans

Multiplier 1…1.5 used corresponding forecasted growth by 2020



Final priority list selected

1. WWTP of Polymir Plant
2. Kobrin WWTP
3. Lida WWTP
4. Smorgon WWTP
5. Novogrudok WWTP
6. Skidel WWTP
7. Schuchin WWTP
8. Oshmyany WWTP
9. Pruzany WWTP
10. Lyakhovichy WWTP
11. Skidelskaya poultry farm



Investment project concept notes

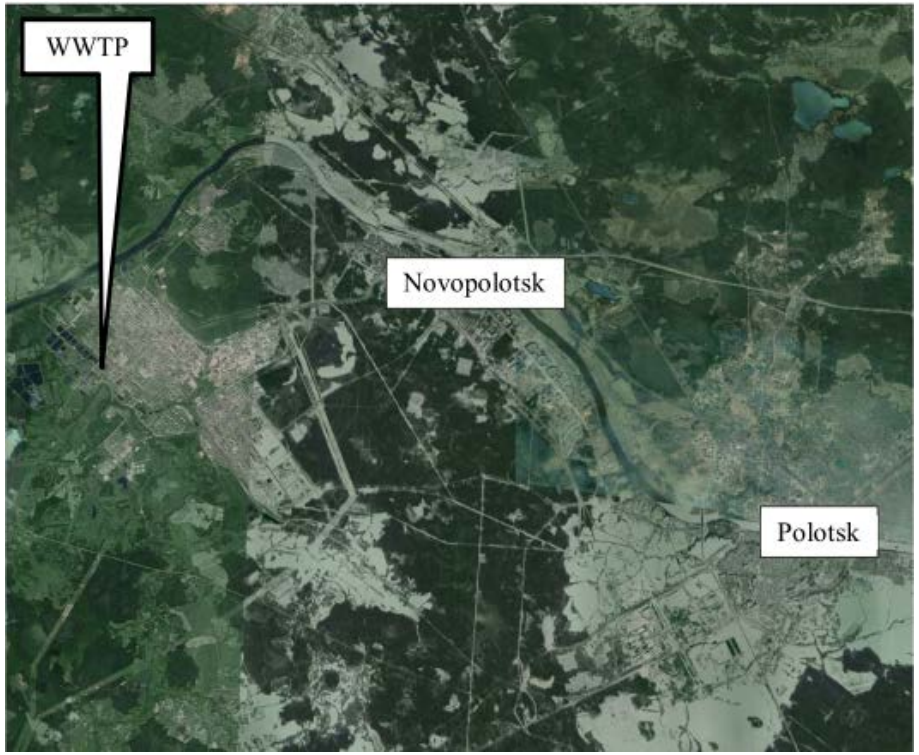
- Investment project concept note (IPCN) reports
- Two different investment projects for municipal WWTP:
  - HELCOM recommendations
  - Affordable priority investments

- Priority investments (phase 1) 17,7 MEUR
- - tot-N 166 ton/year
  - tot-P 176 ton/year

- HELCOM recommendations (phase 2) 60,9 MEUR,
- - tot-N 367 ton/year
  - tot-P 176 ton/year

Polymir plant in Novopolotsk

- Present situation
  - WWTP owned by OAO Naftan
  - Serves Polymir plant, Novopolotsk (50%) and Polotsk (100%)
  - Population served 127,000
  - Mainly in good condition
  - Present flow 55,000 m^3/d
  - Half of capacity is not in use
- Effluent concentrations
  - BOD_5 11.0 mg/l
  - NH_4-N 10.0 mg/l
  - tot-P 3.0 mg/l
- On-going plans and investments
  - New sludge disposal areas are under construction
  - Polotsk is planning own WWTP



Polymir plant in Novopolotsk

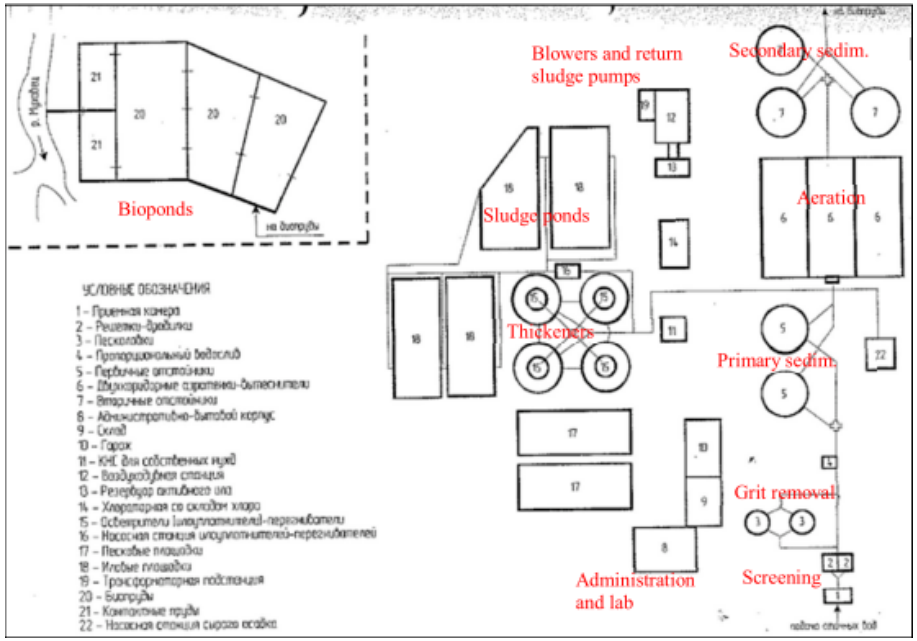
- Investments needed to fulfil HELCOM
  - Process changes in aeration tanks to provide nutrient removal process
  - Chemical dosing station
  - Investment costs 1.3 MEUR
- Priority investment project
  - Same as above for HELCOM
- Effluent concentrations after priority investments
  - BOD_5 11.0 mg/l
  - tot-N 10.0 mg/l
  - tot-P 0.5 mg/l
- Environmental cost efficiency is high
- Recommendation
  - Feasibility study covering the whole area, i.e. Novopolotsk and Polotsk is needed

Kobrin wastewater treatment plant

- Present situation
  - Serves town of Kobrin
  - Population served 48,000
  - Mainly in poor condition
  - Present flow 7,100 m^3/d
- Effluent concentrations
  - BOD_5 7.9 mg/l
  - NH_4-N 57.8 mg/l
  - tot-P 9.3 mg/l
- On-going plans and investments
  - None

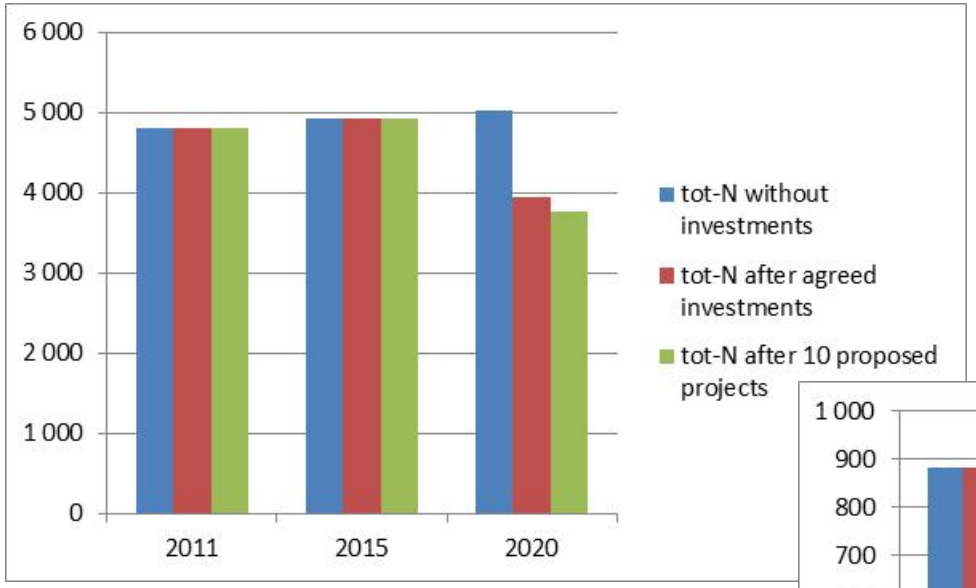
Kobrin wastewater treatment plant

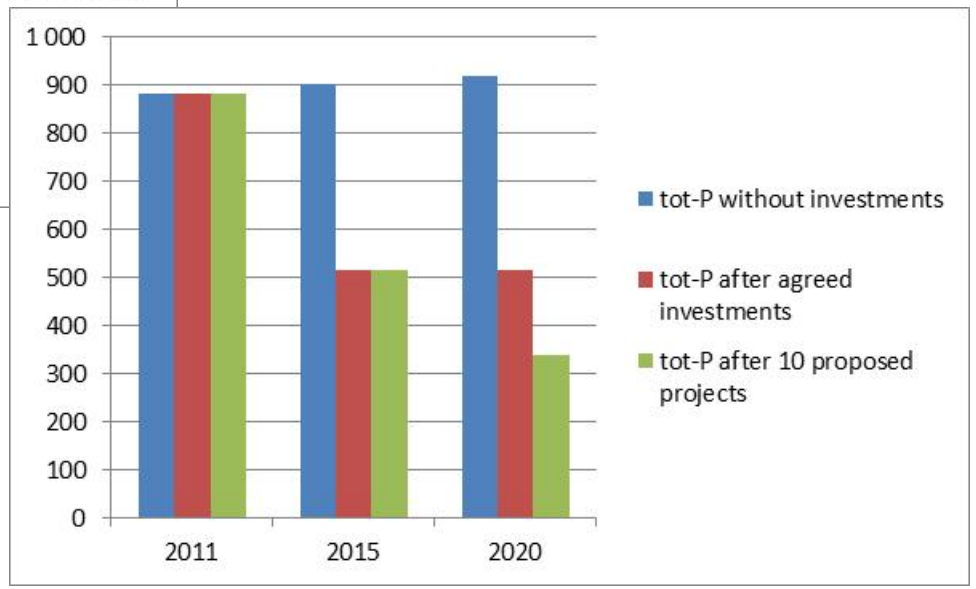
- Investments needed to fulfil HELCOM
  - Process changes in aeration tanks to provide nutrient removal process
  - Chemical dosing station
  - Reconstruction or repair of almost all concrete tanks
  - Replacement of mechanical and electrical equipment
  - Reconstruction of sludge treatment
  - New sludge dewatering plant
  - Investment costs 7.0 MEUR
- Priority investment project
  - Replacement of main mechanical and electrical equipment
  - Process changes in aeration tanks to provide nutrient removal process



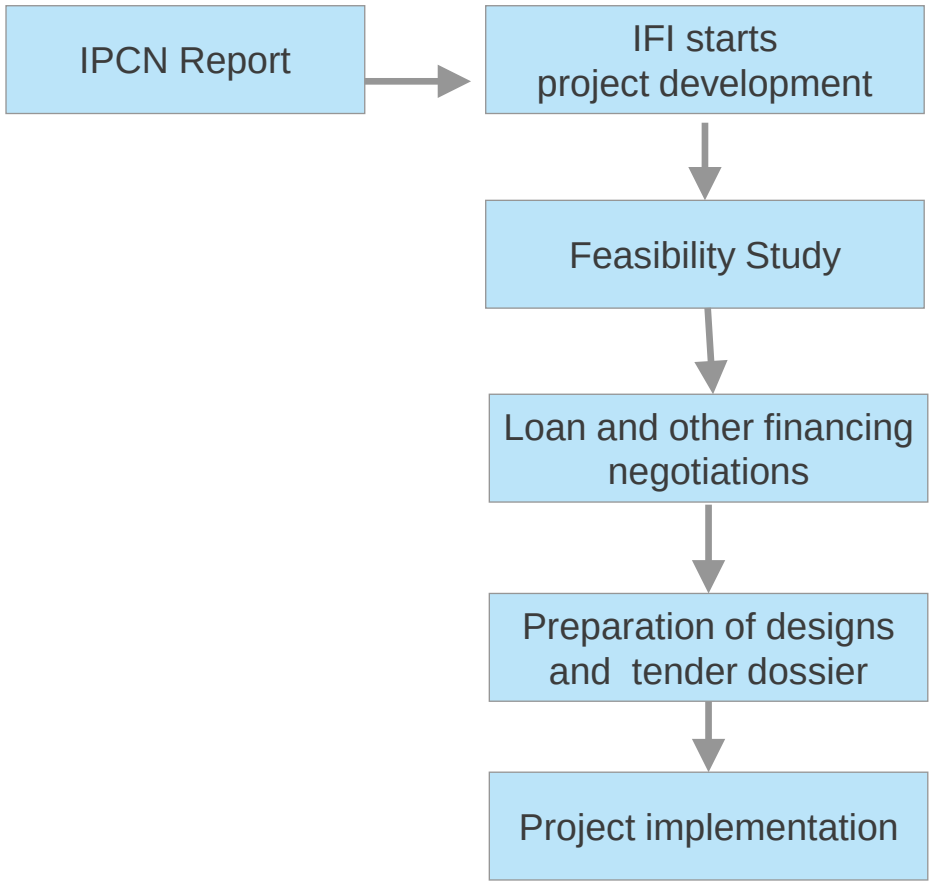
Nutrient load reductions from municipal wastewater treatment plants

2013 – 2020





Next steps in project development



Thank you!