The purpose of the municipal water and wastewater financing strategy for the Pskov region of the Russian Federation is to determine a realistic, agreed and affordable service and to demonstrate how environmental expenditure can be financed. The water and wastewater financing strategy has been developed in an iterative process in a dialogue with the finance, environmental and other relevant authorities. This report presents the final contribution by the consultant.

Short Justification for the Municipal Water and Wastewater Financing Strategy, Pskov

Submitted to the Administration of Pskov Oblast, the Russian Federation
This report has been prepared by COWI AS in association with COWIconsult International Ltd.,
Russian Federation.
The work was financed by the Danish Environmental Protection Agency (DEPA) as part of the
Danish Cooperation for Environment in Eastern Europe (DANCEE).
The work has been coordinated by a DEPA steering committee also comprising representatives
of the Organisation for Economic Cooperation and Development (OECD) and the beneficiary
ministries.
The opinions expressed are those of the consultant. The Danish Ministry of Environment
– Danish Environmental Protection Agency (Danish EPA), the OECD EAP TF and the
beneficiary ministries may not agree with these opinions.
Short Justification for the Municipal Water and Wastewater Financing Strategy, Pskov
Submitted to the Administration of Pskov Oblast, the Russian Federation
Background

The Danish Ministry of Environment and Energy, The Danish Environmental Protection Agency, (The Danish EPA) has decided to fund a number of projects to provide assistance to the OECD Environmental Action Plan Task Force (EAP TF) Secretariat and directly to selected Ministries of Environment in the NIS.


The projects will:

- Provide assistance in elaborating national environmental financing strategies in four selected countries in the NIS, viz.: Georgia, Kazakhstan, Moldova and Ukraine.

- Provide assistance in elaborating regional environmental financing strategies in two selected regions in the Russian Federation, viz.: Novgorod and Pskov regions.

- Provide assistance to the EAP TF in the preparation of a survey on the use of economic instruments for pollution control and natural resources management in the New Independent States.

- Conduct a study of the suitability of the OECD methodology for assessment of environmental expenditure based on case studies in Georgia and two regions in the Russian Federation, viz.: Novgorod and Pskov.
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<td>Annual financing gap, reduced water demand and increased energy efficiency (RUR thousand)</td>
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<td>9.7</td>
<td>Annual financing gap (RUR thousand), reduced water demand and reduced maintenance of storm water systems with and without supply of finance supply measures</td>
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<td>9.8</td>
<td>Accumulated financing gap (RUR thousand), reduced water demand, reduced maintenance of storm water systems and MBN to MB in wastewater treatment with or without supply of finance policy measures</td>
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1 Introduction

COWI has been entrusted by DANCEE and the OECD EAP TF Secretariat to elaborate the regional Environmental Financing Strategies (EFS) for Novgorod and Pskov Oblasts. In the latter oblast, the focus has been entirely on the municipal water and wastewater sector and the financing strategy has been re-named accordingly.

The short justification for the municipal water and wastewater financing strategy for Pskov Oblast is presented in this paper. Following the methodology approved by the Clients (OECD EAP TF Secretariat and DANCEE), the financing strategy has been elaborated for a period of 20 years, focusing on the environmental problems within the municipal water supply and wastewater sector. The methodology includes: survey of the existing situation in the selected sectors, costing of maintaining the existing service level, assessment and forecast of available environmental financing, formulation of environmental targets and costing of targets, assessment of whether the targets are affordable for the population in the region and for the public budget, assessment of the financing gap(s) and identification of realistic policy options to bridge the gap(s).

The present strategy is a step in policy development and implementation within the water supply and wastewater sectors in the Pskov region. A continued dialogue between financiers, the administration of the Pskov region and other oblast stakeholders in order to agree on a sustainable long term policy is foreseen in the future. It is anticipated that this strategy will be a useful instrument for this dialogue, as well as for planning public environmental investments to maintain, rehabilitate and develop municipal water supply and wastewater infrastructure in the Pskov region. It would help to select projects and activities which are in compliance with environmental priorities and targets to provide an overview of the implementation cost of the projects, and to equalise the demand for financing with the available funding. This would assist in improving the quality of public capital expenditure budgeting and planning, regional environmental action plans, as well as municipal infrastructure development, rehabilitation and modernisation plans and, finally, will help to attract more funds to the environmental sectors.
1.1 Acknowledgements and disclaimer
The opinions expressed are those of the consultant. The Danish Ministry of Environment and Energy - Danish Environmental Protection Agency (DEPA), the OECD EAP TF and the beneficiary authorities may not agree with these opinions.
2 Methodology

The consultants have proposed and applied the following methodology, which was approved by the Clients (OECD EAP TF Secretariat and DANCEE):

**Survey of the existing situation in the water supply and wastewater sectors**
The following issues were examined: service coverage of population; volume and quality of products/services provided; status of the fixed assets, environmental performance indicators and main environmental problems; historical data on the recurrent and capital expenditure financed from all sources, etc.

**Development of the costing model (the Decision Support Tool)**
The consultants have developed a computer model which estimates the recurrent expenditure needed for sustainable maintenance of existing infrastructure, as well as for the capital investments needed to achieve specific environmental targets. The model has been used in Pskov jointly by the consultants and experts of the regional environmental administration. It is anticipated that the model will be used as a support tool in the future decision-making process.

**Input data** for the costing model includes numerous indicators, characterising the technical status of the existing infrastructure, demand for water and wastewater services, structure of the production costs, etc.

**Generic cost functions** were elaborated using regression analysis methods applied to historical data on the cost of establishing, operating and maintaining specific infrastructure in specific urban areas. The empirical cost functions were elaborated on the basis of data from various countries, and the functions provide estimates in average north-western European prices.

To apply these cost functions to another country it is necessary to adjust for differences in price and productivity levels. A method for cost function adjustment applying price correction factors was developed, allowing the user to obtain reliable estimates for any country/region.

**Formulation of environmental targets and targets costing**
The costing model was first used to estimate the demand for expenditure needed to provide sustainable maintenance of the existing infrastructure (the so-called baseline expenditure).
As a result of a dialogue between the consultants, the Pskov Oblast Administration and other oblast stakeholders, environmental targets for the municipal water and wastewater sector were formulated. The expenditure needed to achieve the environmental targets suggested by the Oblast Administration has been calculated.

**Assessment and forecast of available environmental funding**

Based on a historical data analysis, a forecast for some variables/indicators was made, which inter alia includes:

Main macro-economic indicators; population, living standard, household revenues and structure of the households expenditure; the Oblast consolidated public revenue and expenditure budgets; demand for goods and services produced by the selected sectors; financing of the sectors, etc. Based on this data, a forecast of available environmental recurrent and capital expenditure financing is made.

**Financing gaps assessment. Identification and analysis of options for closing the gap(s)**

By comparing the demand for recurrent and capital expenditure with the funds available from all sources, two gaps are estimated. Firstly, the financing gap which should be closed to achieve sustainable maintenance of the existing infrastructure. Secondly, the financing gap, which should be closed to achieve the established environmental targets.

To assess whether or not the targets are affordable, assessments have been prepared of the maximum share of public expenditure allocated to water services and an estimate of the maximum share of an average household budget that can be allocated for water services.

Economic, financial, social and environmental policy options which could close (reduce) the financing gap(s) are identified and analysed, and different policy scenarios are proposed.

Firstly, the gaps could be closed by increased funding including finding funds from the user charges/tariffs. This would require a change in tariffs and tariff policy.

Secondly, there are also options to reduce the gap by reducing recurrent expenditure through increased efficiency, and/or a reduction of the demand for capital investments by sacrificing/reducing the environmental service level. The last option becomes necessary if the cost of achieving the environmental targets turns out to be socially or economically unacceptable and/or if the identified options are not sufficient to close the financing gaps. Scenarios which include a combination of several options (raising funds and simultaneously sacrificing/reducing the targets) are also identified and analysed in the report.
Co-operation with administration and other stakeholders
The background analysis for the environmental financing strategy was developed in close co-operation with the authorities, committees and departments of the Pskov Oblast Administration and other stakeholders. The Advisory Committee was established to co-ordinate the project implementation in the region. Following the approved methodology, the status of the oblast economy and the public finances was examined, as well as status and performance of the municipal water supply and sanitation services. Necessary input data was collected, and the regional environmental targets were formulated.

On the basis of the collected input data, the consultants first estimated the cost of maintaining existing municipal water supply and sanitation infrastructure, and then assessed the supply of finance and the resulting financing gaps. To close the gaps, different economic, financial, social and environmental policy options were identified and analysed. The main results and findings of the analysis are presented in this paper.
3 Economic and financial overview of Pskov Oblast

3.1 Background of the regional economy

Over the period 1991-1998 the real gross regional product (GRP) in the Pskov region declined by more than 60%. After this period of substantial contraction, the Pskov Oblast real gross regional product (GRP) increased by 8.8% in 1999. The per capita GRP in the region amounted to USD 540 in 1999, which is less than 50% of the average for Russia.

The main contributors to GRP are services, industry, agriculture and construction.

Compared to the neighbouring regions in Russia and the Baltics, where foreign direct investment amounts to USD 60-100 per capita per year, foreign direct investment in the region is very low and amounted to less than USD 4 per capita in 1999.

3.2 Population and household revenues and expenditure

By the beginning of 2000, the total population in the region amounted to 807,000, but has declined in recent years. No major changes in the total population are expected in the medium term. 2/3 of the population lives in urban areas. The two main cities account for 40% of the total population.

The labour force amounts to about 46% of the total population. The unemployment rate (calculated according to the ILO methodology) is reported to 14%. Real salaries have declined for the last three years. The average gross monthly nominal wage/salary amounted to RUR 1,002 in 1999, and it is estimated that 51% of the population lives below the official minimum living standard.

Household expenditure on water and wastewater constitutes on average about 2% of the disposable income. However, for a large part of the population with incomes below the official minimum income level, the water and wastewater bill amounts to at least 3.7% of their disposable income.
3.3 Consolidated public budget

In 1999, the Pskov Oblast consolidated public revenue budget amounted to RUR 1,979 million, corresponding to 17% of GRP compared to 38% in 1997 before the crisis in 1998. This decrease largely reflects declining federal transfers. Public own revenues as a percentage of GRP remained fairly stable at 11-12% over the period 1996-1999.

In 1999, the main sources of the public budget own revenue were as follows: profit tax (24% of total own revenues), personal income tax (17% of total own revenues) and various turnover and sales taxes accounting for 31% of own revenues in 1999. Natural resource taxes accounted for only 5% of own revenues in 1999.

Public budget expenditure for the environment and water supply accounted for less than 10% of total public expenditure in 1999, amounting to RUR 90 million. Public budget expenditure relating to the water and wastewater sector amounted to RUR 46 million. However, only 10% of this, or less than RUR 5 million, was used for asset rehabilitation and capital development.

According to the methodology of the Russian Ministry of Finance, the creditworthiness of Pskov Oblast is considered "low" reflecting the substantial public debt which has been accumulated in recent years.

3.4 Financial markets

The local financial markets are not sufficiently developed. By the end of 1999, total deposits of regional banks amounted to about 650 million RUR, which corresponds to 6% of GRP\(^1\). Interest rates as well as interest spreads are high.

3.5 Non-monetary transactions

Non-monetary transactions are widespread in the region. In the water sector in Pskov, it is estimated that 20% of household bills and 65% of non-household bills are settled by non-monetary means. Usually, the actual value of non-monetary revenue is lower than its face value. Analyses made by COWI specialists as part of another project indicate that on average the face value of non-monetary payments should be discounted by 30-35% in order to arrive at the cash value.

\(^1\) The figure indicates that it will take some time before the region reaches a degree of financial intermediation comparable to e.g. CEB countries, where the ratio generally is 40 - 70%. For Russia as such the ratio was about 25% in 1999 (EBRD Transition Report 1999, p. 94 chart 4.7) and substantially lower than what would have been expected from its overall level of development.
3.6 **Current financing of municipal water and wastewater**

The main source for covering operation cost is the user charges from consumers of water and sanitation services.

Operational deficits are to some extent compensated by the consolidated public budget. The public budget and environmental funds also cover some investment and maintenance needs of vodokanals.

In 1999, the actual operation and maintenance expenditure in the water sector amounted to RUR 138 million. However, it should be noted that this level of actual expenditure is approximately 28% (or less than one third) of the consultant’s estimate of the sustainable level of operation and maintenance expenditure, cf. below.

As illustrated below total financing (cash) amounted to RUR 118 million in 1999. The (cash) financing originated from public budget subsidies (RUR 45 million), the Environmental Fund (RUR 0.8 million) and user charges (RUR 72 million). Furthermore, water utilities were running a significant cash deficit.

<table>
<thead>
<tr>
<th>Source</th>
<th>Contribution</th>
<th>Financing of operations</th>
<th>Financing of capital expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consolidated regional budget</td>
<td>45</td>
<td>36</td>
<td>9</td>
</tr>
<tr>
<td>Environmental funds</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>User charges billed</td>
<td>121</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>- of which collected</td>
<td>91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- cash value including 35% discount for non-cash collection</td>
<td>72</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>118</td>
<td>108</td>
<td>10</td>
</tr>
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Source: Pskov Regional Committee of Housing and Communal Services
4 Macroeconomic forecast

The supply of environmental finance as well as the demand for environmental expenditure depends inter alia on the development in a number of key macroeconomic indicators such as real GDP, population etc.

Table 4.1 and Table 4.2 present the projected developments in the key macro variables. 1999 is the base year in the projection. Indicators are depicted in the table for the projection period, which covers 2000-2020.

The forecast assumes that the Russian economy enters into a stable growth scenario where inflation and exchange rates are stabilised and the economy is not hit by major external shocks or enters into vicious cycles.

Key assumptions

The following main assumptions have been applied in the forecast:

Real GDP (GRP): It has been assumed that growth rates, after rates above 5% p.a. in 2000 and 2001, will approach 3-4% per year from 2003 and onwards.²

Population: The population is expected to remain constant over the projection period.

Unemployment: Unemployment is assumed to remain at the present level of 14% throughout the projection period.

Household incomes: It is assumed that household income follows the developments in GRP.

Inflation: Domestic inflation is expected to come down from its very high levels in 1998 and 1999, gradually achieving a long-term level of 8%. Foreign inflation is assumed constant at 2.5% throughout the projection period.

Exchange rate: A further depreciation in the nominal exchange rate is assumed. The exchange rate is assumed to follow the difference between domestic and

² Note that IMF (1999) projects a 4.6% average real GDP growth per year in transition economies over the period 2001-2004.
foreign inflation rates. The assumed exchange rate for year 2000 is 25 RUR/USD.

This forecast is used in the policy scenarios in the subsequent sections.

---

3 which is equivalent to assuming an unchanged real exchange rate.
Table 4.1  Macro-economic projections

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<tbody>
<tr>
<td>Real GDP growth Russia</td>
<td>3.2%</td>
<td>3.8%</td>
<td>3.4%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>4.0%</td>
<td>5.0%</td>
<td>6.0%</td>
<td>6.0%</td>
<td></td>
</tr>
<tr>
<td>Real GRP growth Pskov</td>
<td>8.8%</td>
<td>7.0%</td>
<td>5.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>3.0%</td>
<td></td>
</tr>
<tr>
<td>Population growth (%)</td>
<td>-1.0%</td>
<td>-1.4%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
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</tr>
<tr>
<td>Unemployment</td>
<td>16.1</td>
<td>14.1</td>
<td>14.0%</td>
<td>14.0%</td>
<td>14.0%</td>
<td>14.0%</td>
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<td>14.0%</td>
<td>14.0%</td>
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</tr>
<tr>
<td>Nominal GRP per capita</td>
<td>14,255</td>
<td>19,654</td>
<td>24,040</td>
<td>28,374</td>
<td>32,903</td>
<td>37,811</td>
<td>43,256</td>
<td>49,485</td>
<td>56,353</td>
<td>62,977</td>
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<tr>
<td>Real GDP growth Russia</td>
<td>6.0%</td>
<td>6.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>4.0%</td>
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<tr>
<td>Real GRP growth Pskov</td>
<td>3.0%</td>
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<tr>
<td>Population growth (%)</td>
<td>0.0%</td>
<td>0.0%</td>
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<tr>
<td>Unemployment</td>
<td>14.0%</td>
<td>14.0%</td>
<td>14.0%</td>
<td>14.0%</td>
<td>14.0%</td>
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<td>14.0%</td>
<td>14.0%</td>
<td>14.0%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Nominal GRP per capita</td>
<td>58,589</td>
<td>65,174</td>
<td>72,500</td>
<td>80,649</td>
<td>89,714</td>
<td>99,798</td>
<td>111,015</td>
<td>123,493</td>
<td>137,374</td>
<td>152,815</td>
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</table>

Source: Consultant’s calculations based on the assumptions presented above.
### Table 4.2 Development in inflation and real salaries

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<tbody>
<tr>
<td>Average annual inflation RUR</td>
<td>42%</td>
<td>59%</td>
<td>27%</td>
<td>16%</td>
<td>13%</td>
<td>11%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>Real RUR wages (% growth)</td>
<td>-20.5%</td>
<td>3.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>4.0%</td>
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<tbody>
<tr>
<td>Average annual inflation RUR</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Real RUR wages (% growth)</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
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</tr>
</tbody>
</table>

Source: Consultant’s calculations based on the assumptions presented above
5 Environmental policy, problems and priorities

5.1 Environmental policy context

The Oblast administration provides the overall co-ordination of environmental policy preparation and implementation. The main environmental programmes in Pskov Oblast are:

- The Regional Environmental Action Plan (REAP) – the preparation has been halted due to disagreement over the funding and the recent re-organisation of the environmental protection system in Russia;
- The "State Program on Environment Protection and Rational Use of Natural Resources for 1991-2005";
- The “Federal Targeted Program of Socio-Economic Development of Pskov Oblast”;
- The Regional programme “Provision of Drinking Water to the Population of Pskov Oblast 1999-2010”
- The federal programme "Waste"

Programme implementation is delayed due to lack of funds. Further, the funding history of the programmes indicate a need to establish credible budgeting procedures and clear links between environmental targets and their financing.

5.2 Key service parameters in the water and wastewater sector

Water supply

The number of tests that are not in compliance with drinking water quality standards indicates that tap water quality is a problem, particularly in the two largest cities with respect to chemical standards.

The main cause of the poor water quality is secondary pollution in the deteriorated water distribution network.
Regularity of water supply is very close to 100%, while service coverage is close to 90% in the larger cities, declining to less than 50% in most of the smaller town settlements.

Reported water losses amounted to 46% in the city of Pskov in 1999 and less than 30% in all other cities.

**Wastewater treatment**
Generally, the wastewater treatment facilities have mechanical-biological treatment in the larger towns and the present design capacities are considered sufficient, but the operating efficiencies are considered low. Though the reported current treatment efficiency does not comply with Russian wastewater emission standards, the efficiency appears to be close to or in line with the minimum efficiencies defined by the EU, except for a few cities.
### Table 5.1 Summary of key service parameters, water and wastewater 1999, two largest cities, medium sized cities and town settlements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Pskov</th>
<th>Velikije Luki</th>
<th>Medium sized cities</th>
<th>Town settlements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>202,600</td>
<td>117,600</td>
<td>10,000-50,000</td>
<td>1,500-10,000</td>
</tr>
<tr>
<td>Water Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Share of bacteriological samples complying with standards</td>
<td>97%</td>
<td>97%</td>
<td>91-98%</td>
<td>86-100%</td>
</tr>
<tr>
<td>- Share of chemical samples complying with standards</td>
<td>60%</td>
<td>70%</td>
<td>39-100%</td>
<td>67-100%</td>
</tr>
<tr>
<td>Regularity of supply</td>
<td>96%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Water losses&lt;sup&gt;5&lt;/sup&gt;</td>
<td>46%</td>
<td>28%</td>
<td>25%</td>
<td>1-25%</td>
</tr>
<tr>
<td>Coverage of centralised water supply</td>
<td>88%</td>
<td>88%</td>
<td>36-69%</td>
<td>16-86%</td>
</tr>
<tr>
<td>Concentration of pollutants in treated discharged wastewater</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- BOD (mg/l)</td>
<td>4.8</td>
<td>10.0</td>
<td>4.0-59.0</td>
<td>-</td>
</tr>
<tr>
<td>- SS (mg/l)</td>
<td>5.5</td>
<td>5.0</td>
<td>3.7-38.5</td>
<td>-</td>
</tr>
<tr>
<td>- N/NH4 (mg/l)</td>
<td>7.6</td>
<td>0.3</td>
<td>2.7-22.9</td>
<td>-</td>
</tr>
<tr>
<td>- P (mg/l)</td>
<td>1.2</td>
<td>1.6</td>
<td>0.8-3.0</td>
<td>-</td>
</tr>
<tr>
<td>Wastewater treatment technology</td>
<td>MBN&lt;sup&gt;6&lt;/sup&gt;</td>
<td>MBN</td>
<td>MBN/MB/M</td>
<td>MB/M</td>
</tr>
<tr>
<td>Share of collected wastewater treated&lt;sup&gt;7&lt;/sup&gt;</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Coverage of wastewater sewerage system</td>
<td>85%</td>
<td>86%</td>
<td>30-69%</td>
<td>4-86%</td>
</tr>
</tbody>
</table>

Source: Department of Municipal Economy Pskov, Pskov Regional Committee on Housing and Communal Services, Center for Sanitary Supervision Pskov Oblast

**Wastewater collection**

The sewerage connection coverage ranges from 85-86% in the two largest cities to 23% in the smallest cities. The average connection rate is 65% for urban settlements with more than 1,500 inhabitants. While the infrastructure is well developed and the service level is better than in most countries of a similar income level, the sector suffers from years of under-investment, lack of systematic maintenance, and the facilities, especially networks, have deteriorated.

<sup>4</sup> Only for two cities out of the eight cities, is the share below 80%.

<sup>5</sup> The losses are estimated by local experts.

<sup>6</sup> Mechanical-biological treatment with nitrification.

<sup>7</sup> All wastewater collected is treated according to local official sources, except during periods of heavy rainfall, when municipal utilities have permission to discharge untreated wastewater. No measurements are available.
5.3 Priorities and targets in the water and wastewater sector

Notwithstanding the above observation that current systems are being underfunded, the authorities have formulated and developed targets for water and wastewater in urban areas in Pskov oblast with more than 1,500 inhabitants.

In water supply, targets have been formulated in terms of tap water quality, regularity and coverage. The main priority of Pskov Oblast is to improve tap water quality and to extend coverage. The existing situation with respect to regularity shows only limited problems. A reduction in the number of failed tests to 20% for chemical tests in the two largest cities, while maintaining the existing situation with respect to other tests is targeted for 2010. In addition, the Oblast aims at improving service coverage to 65-75% in cities with less than 25,000 inhabitants from its present levels of 50% or lower in many cities.

Finally, a reduction of water losses is targeted primarily in the two largest cities and cities with 10,000-25,000 inhabitants, where reported losses are above the 20% target.

In wastewater, the Oblast aims at achieving sufficient and efficient municipal wastewater treatment in 2010 by applying effective mechanical-biological treatment in all cities with more than 1,500 inhabitants. In addition, service coverage is aimed to be expanded to 60% for all cities with less than 25,000 inhabitants by 2010. This means expanding coverage in practically all these cities. A dialogue on the feasibility of financing such an ambitious target has been undertaken. The dialogue needs to be continued and the decision support tool could be an important instrument in underpinning such a dialogue with facts and consistency.
Table 5.2  Summary of environmental targets 2010, Two largest cities, medium sized cities and town settlements

<table>
<thead>
<tr>
<th></th>
<th>Pskov</th>
<th>Velikije Luki</th>
<th>Medium sized cities</th>
<th>Town settlements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>202,600</td>
<td>117,600</td>
<td>10,000-50,000</td>
<td>1,500-10,000</td>
</tr>
<tr>
<td>Water Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Share of bacteriological samples complying with standards</td>
<td>Current level</td>
<td>Current level</td>
<td>Current level</td>
<td>Max 10%</td>
</tr>
<tr>
<td>- Share of chemical samples complying with standards</td>
<td>Min 80%</td>
<td>Min 80%</td>
<td>Min 80%</td>
<td>Min 80%</td>
</tr>
<tr>
<td>Regularity of supply</td>
<td>Current level</td>
<td>Current level</td>
<td>Current level</td>
<td>Current level</td>
</tr>
<tr>
<td>Water losses</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Coverage of centralised water supply</td>
<td>Current level</td>
<td>Current level</td>
<td>65-70%</td>
<td>75%</td>
</tr>
<tr>
<td>Wastewater Treatment Targeted Technology</td>
<td>MBN</td>
<td>MBN</td>
<td>MBN</td>
<td>MBN</td>
</tr>
<tr>
<td>Share of collected wastewater treated</td>
<td>Current level</td>
<td>Current level</td>
<td>Current level</td>
<td>Current level</td>
</tr>
<tr>
<td>Coverage of wastewater sewerage system</td>
<td>Current level</td>
<td>Current level</td>
<td>60-70%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Source: Advisory Committee Pskov
6 Costing

6.1 Costing of maintaining the existing situation

Before aiming at a higher service level and improved environmental performance, the existing water and wastewater infrastructure should be properly maintained (see Figure 6.1).

The experience in many countries demonstrates that sustainable maintenance and preservation of the present infrastructure and service level requires that annual maintenance expenditure on average amounts to 2.5-3% of the assets replacement cost.

In Pskov Oblast, the estimated sustainable operations and maintenance expenditure amounts to RUR 491 million per year, corresponding to RUR 10,300 million over the period 2000-2020. This expenditure is termed baseline expenditure.

The reported actual operations and maintenance expenditure in the municipal water and wastewater sector amounted to RUR 138 million in 1999, or less than one third of the estimated required expenditure for sustainable operations.
6.2 Costing of environmental targets

The total estimated resource requirement in financial terms over the period 2000-2010 in order to reach the environmental targets is RUR 7,500 million or RUR 650-690 million per year. This figure includes investment and reconstruction expenditure in addition to the above mentioned operations and maintenance expenditure required for sustainable maintenance.

Of the total expenditure, the investment expenditure amounts to RUR 2,200 million (USD 75 million) in 1999 prices or on average RUR 200 million per year over the period 2000-2010. 51% of the investment and reconstruction expenditure relates to wastewater, while the remaining 49% relates to water.

About 45% of the total investment expenditure relate to new construction and the remaining 55% to the reconstruction of existing facilities. Of the total investment and reconstructing expenditure, 80% refers to distribution and collection systems, while 20% refers to water and wastewater treatment plants.

It is estimated that the average annual investment expenditure required to reach the environmental targets amounts to about 40% of the annual operations and maintenance expenditure in the baseline, i.e. the annual expenditure required just to maintain the present service level.
7 Baseline supply of finance

The baseline supply of finance reflects a “passive” projection of the supply of finance based on the existing characteristics of the supply adjusted for changes in macro-economic fundamentals.

Public own revenues/GRP
It has been assumed that the “Public own revenues/GRP” ratio remains at the level of 11% after a minor dip to 10% in the short term reflecting the real value of public debt repayment.

Public expenditure/own revenues
In the baseline scenario, it has been assumed that the share of the public environmental expenditure and water supply expenditure as a percentage of own revenues remains unchanged at the level of 1999. Further, the share of this expenditure destined for the municipal water and wastewater sector remains unchanged at 50%.

Environmental Fund
It is assumed that disbursements for the municipal water and wastewater sector remain at RUR 0.8 million in real terms throughout the projection period.

External finance
In the baseline it has been assumed that no foreign grants and loans are attracted. Further, federal budget co-financing has been assumed to be zero.

User charges
It is assumed that the cash value of the collected user charges will remain at the present (1999) level of about RUR 72 million during the projection period.

Aggregate supply
In real terms the aggregated supply of environmental finance for the municipal water and wastewater sector over the period 2000-2020 in the baseline is estimated to RUR 3,400 million or on average RUR 160 million per year.

Additional finance in the future
The Russian banking system and loan financing are not considered realistic financing sources in the short and medium term, while it might be realistic in the longer term.
8 Financing gaps

8.1 Financing gap: Baseline

This financing gap measures the degree to which the baseline supply of finance is sufficient to cover the expenditure related to ensuring that the present service levels are maintained.

Figure 8.1 provides an estimate of this financing gap. It provides an estimate of the gap for each of the years considered between the expenditure need and the baseline supply of finance. It is thus a cash-flow gap.

Figure 8.1 Baseline financing gap 2000 – 2020 (RUR million)

A comparison of the demand and the baseline supply of finance for the water sector shows that the baseline supply of finance is estimated to cover only between 26% and 39% of the total annual sustainable O&M expenditure. The baseline supply of finance does not cover the operational expenditure until 2019 and cannot cover maintenance expenditure at all.
The total available funding of RUR 3,400 million over the period 2000-2020 should be compared to the environmental expenditure requirements of RUR 10,300 million over the same period. The gap amounts to about RUR 6,900 million.

Figure 8.2  Baseline backlog of maintenance 2000 – 2020 (RUR million)

Source:  Decision support tool. Calculations presented in the background report

In other words, without a major shift upwards in the supply of finance, only about one third of the operations and maintenance required to sustain the present service levels can actually be implemented over the next 20 years.
8.2 Financing gap environmental targets

If the environmental targets, described in section 5, are to be achieved by the year 2010, the annual difference between the baseline supply of finance and the demand for environmental finance amounts to RUR 500-570 million per year over the period 2000-2010 as indicated below in figure 8.3.

Figure 8.3 Annual financing gap environmental targets 2000-2010 (RUR million)

Source: Decision Support Tool calculations
9 Options for closing the financing gaps

There are several options for closing the gaps. First, on the supply side, by increasing the available finance. Second, on the demand side, by reducing service levels and targets and, finally, by considering combinations of reduced targets and increased supply of finance.

Sections 9.1 and 9.2 deal with the options for closing the gap(s) by increasing the supply of finance, whereas section 9.3 assesses the options for closing the gap by reducing the demand for finance.

9.1 Increasing the supply of finance

A number of policy options exist for increasing the supply of finance in order to close the gaps identified in section 8. These options are the following:

*Household customers*

- Increase household tariff to a higher, but still affordable level (4% of household income);
- Increase household tariff collection;
- Increase cash share of household collections;

*Industry and other consumers:*

- Increase tariffs (by 100% compared to 1999);
- Increase collection rate;
- Increase cash collections;

*Public finance and donors*

- Increase public revenues as % of GRP;
- Increase share of environmental expenditure in public budget;
- Increased federal transfers;
- Foreign grant financing;
- International (IFI) debt financing;

**Private sector financing**
- Private sector debt and equity financing

The consultant has undertaken a sensitivity analysis on each of these policy parameters (within reasonable values for the relevant parameters). The analysis shows that applying any single policy option in isolation will not be sufficient to close the baseline financing gap. Hence, it is necessary to combine the above policy measures.

### 9.1.1 Supply of finance: combined policy options

The following assumptions have been applied in the combined policy option scenario. The assumptions reflect parameter values which the consultant considers optimistic and demanding.

**Household user charges**

The household charges are increased gradually so that household water and wastewater expenditure amounts to 4% of the average household disposable income in 2004. At present, average household expenditure on water and wastewater amounts to 2% of average household income.

In addition, the household collection rate increases from the present 85% to 90% in 2001 and will remain at this level over the projection period.

Finally, the cash share of collections is assumed to increase from 80% in year 2000 to 85% in 2001 and remain unchanged over the period.

On the basis of data provided by the regional authorities, it is estimated that about 50% of households today use 4% or more of their disposable income on water and wastewater services. A doubling of water tariffs combined with the likely substantial increase in user charges for other utilities (heat, transport and rent) and the low level of absolute incomes for the poor segments of the population give rise to concern about the affordability of such tariff increases. This is strengthened by the norm based tariff system, which means that unless consumers finance and install meters themselves, they cannot mitigate the tariff increase by reducing their consumption (and thus their water bill). A doubling of the tariffs should be considered together with considerations about possibilities to increase metering, compensation schemes for the poor (use of existing schemes) and changes in the tariff structure.

**Charges for other users**

It has been assumed that industrial and other tariffs are gradually increased by 100% compared to the 1999 tariffs by 2004.

It should be possible to increase the tariff collection from its present 60% to 85% in 2003 by applying a strict policy of cutting off bad debtors. On top of
this it has been assumed that the cash share of collections increases from its present very low level of 35% to 80% in 2004.

Inflation adjustment
Furthermore, all tariffs (household and industry) will be adjusted for inflation on an annual basis.

Public revenues
The "public budget own revenues /GRP" ratio is assumed to increase from the current 10% after debt service to 13% in 2020. This ratio depends inter alia on the developments in the local economy, the profitability of key enterprises, changes in tax regimes, tax collection ability, etc. An increase of 3 percentage point over 20 years to a level that is still below the average for Russia is not very ambitious. It does not seem prudent to make too optimistic assumptions about regional own revenues. However, if the region really has ambitions to finance major public expenditure in the water supply, wastewater and other sectors, an increase in revenues is sine qua non.

In addition we have assumed that the share of the public budget reserved for environmental and water supply expenditure (measured by environmental and water supply expenditure as % of own revenues) is increased gradually from 8% in 1999/2000 to 12% in 2015 and then kept constant until 2020.

The share of this expenditure destined for the water and wastewater sector is assumed to increase slightly from 50% for the present to 60% in 2002 and remain constant thereafter.

According to the survey of pollution abatement and control expenditure carried out in parallel with this financing strategy, such expenditure in the Pskov region is low by international standards. There should be room for a significant increase in both environmental and water supply expenditure.

Federal financing
Federal budget transfers as a policy option only consider the possible funding under a follow-up "Program of Social and Economic Development for the Pskov region for 2001-2005". The programme is presently under preparation. The planned funding for 2000 amounted to RUR 80 million with nothing allocated to the water and waste sectors. The Oblast Administration has confirmed the water priority for 2001-2004. Annual funding is expected to remain at least at the committed level for year 2000 and water and waste sector investment is expected to constitute not less than 25%, corresponding to RUR 20 million (in real terms). It should be noted that this funding is highly uncertain.

International grant financing
It has been assumed that Pskov Oblast will receive on average about RUR 20 million of donor funding for water sector projects annually. This is equivalent to assuming a continuation of recent years’ level of support from international donors primarily the Nordic countries.
**International (IFI) debt financing**

Debt financing from the international financing institutions could become of relevance for the Oblast. The implementation of the policy measures identified above, such as cost recovering tariffs and a move towards a cash based economy would facilitate such involvement. The involvement of IFIs such as EBRD and the World Bank would in addition require various supporting municipal and/or federal guarantees. Though the municipal finances are recovering, creditworthiness remains low.

The region is at a disadvantage due to its small size. There are fixed costs associated with preparing bankable investment projects, which gives the Oblast a disadvantage in comparison with other larger and more prosperous regions in Russia if and when the municipal sector in Russia begins to attract more attention from IFIs. This is also likely to affect the opportunities for attracting interest from the international private sector.

**Private sector debt and equity**

Domestic and international equity provided by the private sector either directly, (e.g. international utility specialists) or through the local capital market is not considered realistic in the short to medium term. This inter alia reflects the poorly developed local financial markets, which also reduces the options for domestic debt financing, and the availability of more promising investment opportunities elsewhere.

Private sector involvement is likely to require a more step-wise approach, where mutual trust and partnership are created gradually both from the perspective of the Oblast and the potential investors. No fresh funds can be expected from these sources during the initial stages, which might last from 5-10 years or longer. Risk premiums are also affected adversely by the perceived high country risk of investing in Russia.

However, low-risk involvement of the private sector through management contracts for public utilities would send a strong signal to the international financial institutions and as such might facilitate external finance from these sources.

With these issues, obstacles and uncertainties in mind, we have assumed that the Oblast does not receive debt and/or equity financing from international and domestic sources. However, should such opportunities appear, the authorities could (and should) adjust the projections for the supply of finance using the Decision Support Tool.

### 9.2 Impact on financing gaps

Below we outline the impact of increasing the supply of finance along the lines suggested above on the financing gaps identified in section 8.
9.2.1 New financing gap

The impact from the above measures on the baseline financing gap is assessed by comparing the expenditure requirements, which ensure sustainable operations and maintenance and unchanged service levels, with the new higher supply of finance.

Figure 9.1 and Figure 9.2 outline the new annual financing gap and the development in the accumulated financing gap, if the policy options above are applied in combination.

**Figure 9.1 Annual financing gap under combined policy measures (RUR thousand)**

If all measures are implemented concurrently, the annual financing gap is reduced to nil in 2013/14.

Still, the accumulated financing gap remains substantial by the end of 2020, amounting to about RUR 1.4 billion as indicated in Figure 9.2.

The implication is that even if the region receives external support and implements far reaching policy changes in terms of tariffs, collections and budget priorities, the resulting financial resources will be insufficient to operate and maintain the infrastructure even at the level experienced today. In monetary terms, only 80% of operations and maintenance required to maintain the present service levels and environmental performance might be effectuated.
Figure 9.2 Accumulated financing gap (RUR million)

Source: Decision support tool

Table 9.1 Baseline financing gap and accumulated financing gap including all policy measures (RUR million)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>491.952</td>
<td>491.952</td>
<td>491.952</td>
<td>491.952</td>
<td>491.952</td>
</tr>
<tr>
<td>Household charges</td>
<td>87.456</td>
<td>143.821</td>
<td>174.981</td>
<td>208.816</td>
<td>242.075</td>
</tr>
<tr>
<td>Industry charges</td>
<td>35.032</td>
<td>77.042</td>
<td>77.042</td>
<td>77.042</td>
<td>77.042</td>
</tr>
<tr>
<td>Public budget</td>
<td>52.018</td>
<td>100.408</td>
<td>146.594</td>
<td>206.749</td>
<td>239.678</td>
</tr>
<tr>
<td>Environmental funds</td>
<td>832</td>
<td>832</td>
<td>832</td>
<td>832</td>
<td>832</td>
</tr>
<tr>
<td>Foreign grants</td>
<td>20.000</td>
<td>20.000</td>
<td>20.000</td>
<td>20.000</td>
<td>20.000</td>
</tr>
<tr>
<td>Loans</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other sources</td>
<td>20.000</td>
<td>20.000</td>
<td>20.000</td>
<td>20.000</td>
<td>20.000</td>
</tr>
<tr>
<td><strong>Total financing under policy options</strong></td>
<td><strong>215.337</strong></td>
<td><strong>362.104</strong></td>
<td><strong>439.449</strong></td>
<td><strong>533.439</strong></td>
<td><strong>599.628</strong></td>
</tr>
<tr>
<td>New financing gap</td>
<td>276.615</td>
<td>129.848</td>
<td>52.503</td>
<td>(41.487)</td>
<td>(107.676)</td>
</tr>
<tr>
<td>New accumulated finance gap</td>
<td>631.935</td>
<td>1,314.829</td>
<td>1,754.228</td>
<td>1,746.619</td>
<td>1,344.530</td>
</tr>
</tbody>
</table>

Source: Decision support tool calculations

**9.2.2 Environmental targets**

The annual financing requirement if the environmental targets should be achieved in 2010 amounts to RUR 650-690 million per year over the period 2000-2010, while the realistic supply of finance, as outlined above, amounts to RUR 215-439 million per year.
Hence, in the short term the new annual financing gap will amount to more than RUR 400 million annually, gradually declining to RUR 250 million towards the end of the planning horizon (2010).

The accumulated financing gap over the period 2000-2010 amounts to more than RUR 3,000 million.

If the region is to cover this gap and achieve the environmental targets in 2010, a sensitivity analysis indicates that:

- Public environmental and water supply expenditure as % of the public own revenues would have to increase gradually from its present 8% to 22% in 2005 and 66% in 2010.

- In addition, the share of this expenditure destined for water and wastewater would have to increase from its present level of 50% to 80% in 2005 and remain constant thereafter.

Such adjustments are not considered realistic.

### 9.3 Demand reducing initiatives

The environmental targets established by the regional authorities cannot be achieved by measures only aimed at increasing the supply of finance.

Further, comparing baseline expenditure, which ensure sustainable operations and maintenance, and the financial resources generated under a realistic policy package aimed at increasing the supply of finance indicate that the region is unlikely to be able to finance even the up-keep of the present service levels.

Hence, it is of utmost importance that the region identifies and implements measures which reduce the demand for environmental finance and close the baseline financing gap with the lowest possible adverse impact on environmental performance.

The consultant has identified a number of such options for reducing the demand for finance. The principal options are:

- Reduce water demand;
- Reduce energy consumption;
- Reduce asset maintenance (for selected parts of the infrastructure).

In the following, we describe the estimated impact on the financing gap from applying each of these options alone and in combination. The aim is to identify initiatives on the demand side which, in combination with a realistic package of policies to increase the supply of finance, can close the financing gap. Hence, in the analysis below, we assume that the supply of finance policy measures identified above in section 9.1 are implemented.
9.3.1 Reduce water demand

By reducing water demand, it will be possible to reduce operations and maintenance expenditure, principally energy expenditure.

We assume that household water demand (lcd) declines by 20% and total non-household demand also declines by 20% gradually over the period 2002-2005 compared to 1999 level reflecting the higher tariffs implemented over the period 2001-2004. In addition, we assume that wastewater production declines correspondingly.

Reducing households’ water demand requires that these customers are in a position to respond to higher tariffs by reducing their water consumption. Hence, we have assumed that water meters are introduced gradually in all households over a five-year period starting in 2001. To reflect the corresponding expenditure requirements, we have assumed that each household on average needs two metres of carrying a price of USD 15 each. With 386,000 inhabitants connected to the municipal water supply system and 2.5 persons per household, the aggregated expenditure on meter installation amounts to RUR 129 million over the five-year period.

Furthermore, we have assumed that tariffs are adjusted fully in line with declining water demand such that on average households still spend 4% of their disposable income on water and wastewater services despite reduced water consumption.

Figure 9.3 Accumulated financing gap with reduced water demand and reduced water demand plus policy measures (RUR million)

Source: Decision Support Tool calculations
Adding water meters and water savings to the combined measures to increase the supply of finance will result in an accumulated financing gap (backlog) that still remains, but is now reduced to about RUR 1 billion compared to about RUR 1.4 billion with unchanged water demand.

### 9.3.2 Reduced water demand and increased energy efficiency

Under this option, the assumptions on water demand and wastewater production above have been maintained. In addition we aim at increasing energy efficiency to international levels by replacing pumps, control systems and valves in all system elements (water intake/abstraction, water treatment, transmissions, distribution, wastewater collection and treatment).\(^8\)

Experience from CEE/NIS shows that replacement of selected less efficient pumps in combination with improved control might have high financial and economic returns and short payback periods. The consultant’s specific assessment of the efficiency of selected pumps in the two major cities of Pskov region confirms that such opportunities do exist\(^9\). Whether this is also the case in other cities in the region of Pskov will have to be determined in connection with more detailed (pre-) feasibility studies at the level of each city.

*Figure 9.4* Accumulated financing gap with reduced water demand and general pump replacement with policy measures and without (RUR million)

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\(^8\) This means that we move from a situation where local energy efficiency improves by about 30% and reaches international levels.

\(^9\) Two energy saving project opportunities in water supply have been identified in the two major cities of Pskov and subsequently proposed for DANCEE funding.
However, the model analysis of the financial consequences of replacing all pumps in the region shows that the backlog actually increases to RUR 1.6 billion. The reason is that the average energy efficiency in the water and wastewater sector for the present is estimated to be 40% lower in Pskov than internationally and the resulting energy savings are, based on this assessment, not sufficient to make up for the investment expenditures related to such general replacement of all pumps in the water and wastewater sector.

The annual financing gaps depicted in Figure 9.5 illustrate the “jump” in annual expenditure as a result of the additional investment expenditure in connection with new pumps.

**Figure 9.5 Annual financing gap, reduced water demand and increased energy efficiency (RUR thousand)**

As evidenced above, reduced water demand alone is not enough to sufficiently reduce the demand for financing in order to close the gap and pump replacement actually increases the financing gap. Thus, additional demand reducing measures are required.

These measures fall under the heading “reduced asset maintenance”. We combine reduced water demand and wastewater production with reduced maintenance of selected parts of the infrastructure, implying dis-investment.
We have considered how to achieve this in the most sensible way i.e. which parts of the infrastructure can be “left to itself” with the least negative impact on the service qualities and environmental performance of the overall system.

The immediate proposal is to let double two piped separate storm water systems (DPSS), which constitute 50% of the storm water systems in the two largest cities and 0-20% in the medium sized cities, degrade by keeping operations and maintenance at a minimum\textsuperscript{10}. The resulting impacts on system and environmental performance are considered to be very limited.

\textbf{Figure 9.6} Accumulated financing gap (RUR million), reduced water demand and reduced maintenance of storm water systems with and without supply of finance policy measures

Source: Decision Support Tool calculations

As indicated the backlog is reduced to nil in 2019 and only in this year will the region in principle have recovered the present system performance, except for the advanced storm water system presently in place.

The annual financing gap is positive until 2009, implying that the service level will degrade from its present level over the period 2000-2009. In order to make up for the decline, all cash surpluses generated over the period 2010-2019 must be used for improvements in water and wastewater service levels.

\textsuperscript{10} In model-terms, this means that we assume that these DPSS systems are operated and maintained as single pipe separate system with open canals for storm water (SPOC). The operations and maintenance expenditure of the SPOC are assumed 2.6 times lower than for the DPSS.
With respect to reducing asset maintenance, another option could be to scale down the requirements to the sophistication of the wastewater treatment facilities. In order to assess the financial impact we assume that the applied technology moves from MBN to MB\textsuperscript{11}, while maintaining the assumptions above on water demand and reduced maintenance of storm water systems.

The direct effect of the application of the less advanced technology is that the BOD\textsubscript{5} removal effectiveness is decreased from maximum 15 mg/l to maximum 25 mg/l. The environmental impact may be illustrated by noting that the estimated BOD load under MBN wastewater treatment is approximately two thirds of the BOD load under MB treatment. However, the environmental impact will depend on a large number of factors including, but not limited to, the hydraulic and ecological characteristics of receiving waters. The environmental impact should be assessed prior to any decision to move to a less advanced technology. Furthermore, moving to use MB technology generally may also raise an issue in relation to Russian obligations under the Helcom convention. This would also have to be assessed.

As indicated in Figure 10.8, the backlog disappears in 2017. The financing gap in 2020 is \(-\text{RUR 572 million}\).

\textsuperscript{11} In practical terms this imply that WWT capacity would be reduced.
Comparing with the option above, where we assume reduced water demand and reduced maintenance of the storm water system, this is a marginal gain of RUR 350 million.

Figure 9.8  Accumulated financing gap (RUR million), reduced water demand, reduced maintenance of storm water systems and MBN to MB in wastewater treatment with or without supply of finance policy measures

Source: Decision Support Tool calculations
10 Summary and conclusion

The environmental targets established by the regional authorities cannot be achieved.

Further, the baseline cost for sustainable operations and maintenance compared to the financial resources generated under a realistic policy package aimed at increasing the supply of finance indicate that the region is unlikely to be able to finance even the up-keep of the present service levels.

Part of the infrastructure in the region will have to be left largely to itself with further degradation in service levels as a result. This is likely to have an impact on water supply reliability, the quality of drinking water and the incidence of water related diseases etc.

The regional authorities have to decide on the following two key issues:

1. Which parts of the water and wastewater infrastructure should be left to itself i.e. subject to a bare minimum of operations and maintenance;

2. How far is the region willing to go in terms of necessary policy adjustments to increase the supply of finance along the lines outlined above.

Obviously, the more financial resources that are generated, the less constraining and "unpleasant" do the choices to be taken under item 1 have to be and the less pronounced will the degeneration of the existing infrastructure be.

On the other hand, generating more financial resources also requires substantial adjustments in existing policies. Though the suggested policy measures outlined above are not sufficient to cover the baseline financing gap completely, they are instrumental in ensuring that the sector operates under sound economic and operational principles and that the rapid decline in infrastructure standards are (at least partly) halted.

10.1 Recommended policies

The recommended policies reflect that the Oblast cannot generate sufficient financial resources to achieve sustainable operations and maintenance in the water and wastewater sector.
The review of the public finances, the budgeting procedures and the severe under-funding of the environmental programmes point to an urgent need to establish credible budgeting and planning procedures.

The environmental targets of the Oblast authorities with respect to the water and wastewater sector and the analysis above point in the same direction. The environmental targets established by the authorities cannot be achieved and must be interpreted as guidelines for how to focus available finance for maintenance and operation.

10.1.1 Supply of finance measures

In order to minimise the gap between the baseline financing requirements and the available financing, the implementation of the policies outlined above and restated below with respect to tariffs, public finances and expenditure priorities, is recommended:

**Household customers**

1. Increase average household tariffs gradually to a higher, but still affordable level:
   The average water and wastewater bill presently amounts to 2% of household income. This should be increased to 4% in 2004.

2. Increase household tariff collection:
   From 85% for the present to 90% in 2001 and at least maintain it.

3. Increase cash share of household collections:
   From 80% in year 2000 to 85% in 2001 and at least maintain it.

**Industry and other consumers:**

4. Increase tariffs:
   Gradual increase of 100% in real terms over the period 2000-2004 compared to the level in 1999.

5. Increase collection rate:
   From 65% presently to 85% in 2003 and at least maintain it.

6. Increase cash collections:
   From 35% for the present to 80% in 2004 and at least maintain it.

**Public Finances and donors**

7. Gradually increase public revenues as % of GRP from 10% to 13% or more over the period 2001-2020;

8. Gradually increase share of environmental expenditure in the public budget from 8% of public own revenues for the present to 12% in 2015;

9. Increase federal transfers from its present almost non-existent level to RUR 20 million annually over the period 2001-2020;
10 Maintain foreign grant funding at least at the levels experienced in recent years, i.e. RUR 20 million annually in real terms, over the period 2000-2020.

Domestic and foreign debt and equity financing
The possibilities of attracting domestic and international debt and equity financing are limited. Domestic long term financing is inter alia limited from the supply side. The same is the case with international private long term financing in the form of debt or equity. Country risk ratings and risk premiums are prohibitive.

One option which should be pursued further is international debt financing provided by IFIs. The relative low average income levels in the region, however, limit the ability to service debts. Still, this might be less of a constraint in the two larger cities. A further more detailed assessment should be undertaken in this respect.

While the IFIs are in a better position to cope with country and municipal risks, they usually do require federal and/or municipal guarantees to support environmental and water supply project financing. In this respect, it is important that the Oblast public finances are consolidated further and creditworthiness improved. The following policies should assist in this:

- Introduce measures to save and/or generate additional public financial resources;
- Strengthen tax collection in order to stabilise the public finances of the Oblast, which should facilitate more emphasis on environmental expenditure and investments;
- Review the operating subsidy policy of the Oblast budget. These subsidies could be targeted directly to low-income households instead of utilities, thereby creating fewer distortions in costs and prices of service. This is also crucial when tariffs are increased to the (average) affordable level and a large share of the population will experience very high water and wastewater expenditure;
- Strengthen utility tariff collection. The financial resources in the combined policy scenario outlined above depend crucially on the ability to collect tariffs. This could be improved by implementing enforcement measures towards bad debtors such as service cut-off. This would also lessen the need for operating subsidies from the public budget to the municipal water sector;
- If system coverage is to be expanded, local communities should contribute through connection fees.

Private sector participation
Extended private sector participation in infrastructure provision is not considered realistic for the present. However, political commitment to increase
the efficiency of the water sector, e.g. through the creation of a corporate like framework for utility operations and/or outsourcing management of utility operations to private international utility operators, would send a strong signal to international financial institutions. Thus, the chances of increasing the supply of finance through these sources are likely to improve substantially.

The region is at a disadvantage due to its small size and the low income-level compared to other Russian regions. There are fixed costs associated with preparing bankable investment projects, which gives the Oblast a disadvantage in comparison with other larger and more prosperous regions in Russia if and when the municipal sector in Russia begins to attract more attention from IFIs.

Should opportunities for private sector participation and international financial support appear, the region should adjust the projections for the supply of finance by using the Decision Support Tool.

10.1.2 Demand for finance measures

Given the difficulties of closing the baseline financing gap from the supply side, the Oblast will have to find ways to reduce the demand for finance.

It might be possible to move to a situation with sustainable operations and maintenance for selected cities provided that the large urban areas have higher household incomes than on average in the region. A more detailed (pre-feasibility) study is required in order to delineate such opportunities.

A number of options for closing the baseline financing gap were assessed above. These measures encompassed:

1. Reduction in water demand;
2. Reduction in energy use by increasing energy efficiency;
3. Reduction in asset maintenance (for selected parts of the infrastructure).

The model based assessment above demonstrates that a reduction in water demand cannot in itself close the baseline financing gap.

Selected replacement of less efficient pumps in order to improve energy efficiency and reduce energy expenditures should form part of the financing strategy. Such specific energy saving opportunities will have to be determined in connection with more detailed (pre-) feasibility studies at the level of each city. However, the model analysis indicates that a general replacement of all pumps in the water and wastewater sector is not an effective measure to reduce the financing gap.

A reduction in the maintenance of selected parts of the infrastructure is required in order to close the gap. Two options to achieve this are (1) to reduce maintenance of the present relatively advanced storm water system and/or (2)
accept lower treatment efficiency at wastewater treatment plants by moving from mechanical biological (with nitrification) wastewater treatment to mechanical biological wastewater treatment only.

The model calculations indicate that reduced maintenance of the storm water system, which has little environmental impact, in combination with reduced water demand, will be sufficient to close the accumulated baseline financing gap in 2019.

On the other hand, applying less sophisticated wastewater treatment technology, which will reduce the quality of effluent with respect to BOD$_5$ from a maximum of 15 mg/l to 25 mg/l, will not be sufficient to close the baseline financing gap.

Reducing water demand is very important. The reduced maintenance of the storm water systems will not in itself be sufficient to close the financing gap. If water demand is not reduced, additional measures aiming at reducing the demand for financing are required.

Even if the accumulated baseline financing gap is closed in 2019 by a combination of supply of finance measures and reduced water demand and asset maintenance, the analysis shows that the annual financing gap persists over the period 2000-2009. As a result service levels will degrade over the period 2000-2009. On the other hand, cash surpluses generated over the period 2010-2019 should be used to recover the earlier loss in service levels.
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Publisher:
Ministry of Environment and Energy, Danish Environmental Protection Agency, Strandgade 29, DK-1401 Copenhagen
Telephone int + 45 32660100 Telefax int + 45 32660479
http://www.mst.dk

Year of publication: 2001

Title:
Short Justification for the Municipal Water and Wastewater Financing Strategy, Pskov

Subtitle:
Submitted to the Administration of the Pskov Oblast, Russian Federation

Author(s):
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Performing organisation(s):
COWI AS in association with COWIconsult International Ltd., Russian Federation

Abstract:
The purpose of the municipal water and wastewater financing strategy for Pskov region of the Russian Federation is to determine a realistic, agreed and affordable service and to demonstrate how environmental expenditure can be financed. The water and wastewater financing strategy has been developed in an iterative process in a dialogue with the finance, environmental and other relevant authorities. This report presents the final contribution by the consultant.

Terms:
Russia, NIS, water utilities; water, wastewater; wastewater treatment; national environmental action plan (NEAP); environmental financing strategy; environmental policy analysis; water tariffs; international finance, infrastructure investment

Edition closed: October 2001

Number of pages: 64 Format: A4

Number of copies: 100

Printed by: Kannike Graphic A/S

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