

FINANCING STRATEGY CONCEPT AND METHODOLOGY

A **Financing strategy** is basically a set of strategic sector development targets and the scenarios to achieve them. These scenarios implicate the absence of a financing (cash flow) gap (no deficit). In other words there should be a balance between the expenditure needs and the funds available.

In the water supply and sanitation (WSS) sector, the natural starting point for the development of the financing strategy are the objectives and targets as stated in existing approved national/regional plans, programmes and similar documents.

The development of the financing strategy includes selecting strategic goals for sector development and realisation scenarios that meet the country's priorities, and are technically and financially feasible and affordable.

The financing strategy does not provide final answers to all questions, but it assists in defining priority actions. This strategy could be used as a basis for the creation of a realistic long-term (5-20 years) financing and investment programme in the considered sector for the country (or for the region).

The detailed description and substantiation of the **Methodology for the development** of financing strategies includes over one hundred pages (see works (1), (2) in the list of references). Therefore, only a brief description is presented here. The methodology includes the following elements:

- **Study of the current situation in the defined sector**

With respect to the wastewater collection and treatment sector in particular, the following issues are studied: service coverage of the population; the quantity and quality of services; the technical condition of the fixed assets and the main technical problems in the sector; environmental and sanitary indicators and problems; assessment of the actual amounts of funds to cover current and future costs from different sources. To collect data about the current situation, specially developed **questionnaires** are used (see COWI, 2001).

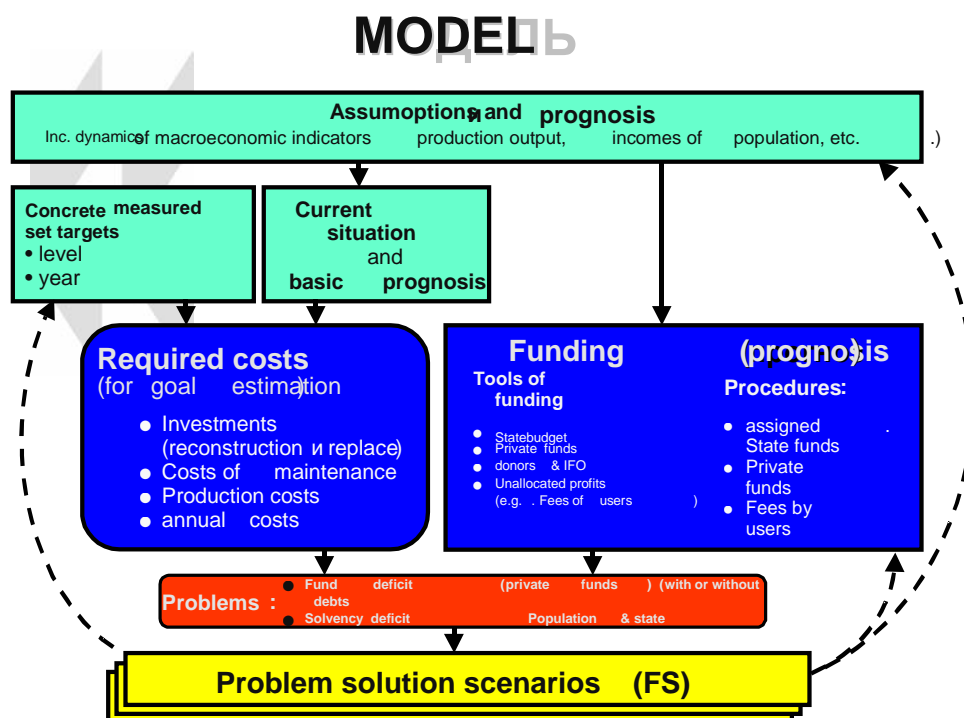
- **Using the computerized model FEASIBLE**

Tools for the development of the financial strategy include the computer **model FEASIBLE**¹, which makes it possible to assess financial results of implementation of different sector development scenarios. **In the model the demand and supply of finance are presented as cash flows**, i.e. depreciation is not taken into account, since in reality it does not result in the outflow of cash (although it is cost item from the economic point of view).

¹ This model was developed by the consulting company COWI using methodological guidelines of the OECD (EAP Task Force Secretariat) and with financial support from the Danish Government.

The financing strategy is determined by interactive use of the computer model FEASIBLE when we apply different assumptions regarding mobilization of additional financial funds or reallocation of the available financial resources. The general logic for the use of the model in analyzing scenarios and developing the strategies is presented below in the figure.

The **input data** for the model used for cost assessment include multiple indicators characterizing the technical conditions of the available WSS infrastructure, the actual and forecasted demand for services, the dynamics and the structure of production costs and other data.



Source: OECD Work group Secretariat for NEAP

- **Setting of targets and cost assessment**

As a result of intensive dialogue and discussions between the Work group experts and representatives of the concerned ministries, departments and Vodocanal, **specific, measurable, agreed, realistic and time-bound (SMART) targets have been defined for the development of the analyzed sector.**

In the model FEASIBLE these targets are defined in terms of: WSS service coverage; the structure of water consumption in a given city (in litres per day per person); the type and quantity of wastewater discharges into the town sewerage system (from a general discharge system to a complete separate discharge); the type, capacity, load and quality of treatment at the exiting wastewater treatment plants. These indicators for the basis year 2002 in Armenia are given in Tables 1 and 2 and in Attachment 4.

The target may, in particular, include simple maintenance of the existing level of services and infrastructure, without its further degradation. This target is an important starting point in the baseline scenario for assessment of the feasibility of more ambitious targets in the development of the WSS .

Then, the FEASIBLE model is used to assess the funding needs to cover costs related to the achievement of the set targets.

- **Use of generalized costs functions**

The FEASIBLE model uses so called **generic cost functions**², derived using methods of the regression analysis to a database on expenditure needs to achieve specific quantitative targets, for example: development of the sewerage networks and increased coverage of the population up to a specified value in a town with XXX people, construction of wastewater treatment plants with a predetermined capacity or rehabilitation of the existing plants with certain treatment capacity, etc.

Some empiric functions for current and capital costs are derived for all main elements of the WSS infrastructure: surface and underground water abstraction points and main structures (including 1st elevation water pump stations, water treatment stations, water de-ironing stations, etc.); re-lift water pumping stations, water ducts and clear water reservoirs (CWR), outdoor water distribution network and sewerage pumping stations (SPS) and boosting pumps; street sewerage systems, sewerage collection systems and wastewater pumping stations (WWPS); wastewater treatment plants (WWTP). The analytical view of all cost functions used in the FEASIBLE model is given in work [2]. Examples of **generic cost functions for capital costs of the most widespread WSS technologies are presented below**. Using price adjustment factors the generalized cost functions are calibrated according to local prices.

Cost calculations can be made individually for each analysed urban settlement or for the group of urban settlements indicating the number of the group members and average parameters for each group. Parameters of the cost functions include: the current and predicted population numbers, the cover of population with services, parameters of the available structures and targets for the development of infrastructures in specific populated localities (of groups of populated centres). For each populated centre (or for a group of populated centres), costs are calculated separately for each type of costs and for each element of the WSS infrastructure. Calculation results are given for water supply and wastewater collection and separately for each type of costs (for maintenance and operation of fixed assets); capital repair and rehabilitation existing facilities; and construction of new facilities, as well as for the WSS as a whole.

It should be noted that **calculation of the financing/expenditure needs** is made on assumption of normal operation, maintenance and capital repair of available and newly built fixed assets and timely replacement of fixed assets. In this case, costs for capital repair and replacement of fixed assets are included in the annual depreciation.

- **Assessment and forecast of available funds**

It includes analysis of the dynamic and a prognosis of some indicators, including: main macroeconomic indicators; the number of population, the standard of living, the level of incomes and the structure of spending of population; the demand for products (services) in the analysed sector; analysis of consolidated budgets; amounts and prospects of loan, etc. All this is used to forecast amounts of available funds for current and capital costs from all sources.

- **Assessment and analysis of the financing gap**

By comparing the need for current and capital costs with the dynamics of actual available funds it is possible to assess the funding deficit. The assessment is based on the required operational safety, reliability and sustainability as well as costs that are required for achievement of the specified development targets.

In this case, not only the amount of total monetary funds is considered, but also its analysis is made in terms of possible coverage of different types of expenditure needs, such as **capital**

² Analytical type of functions of costs and all parameters used in the computer model FEASIBLE, are described in details in works (1) и (2) - see the list of references.

expenditure (new construction, reconstruction and expansion of production facilities, recovery of worn fixed assets) and **current expenditure** for operation, service and repair of fixed assets, knowing the fund deficit structure is important for identification of main problems with funding and determination of priority measures for their solution.

It also includes **assessment of affordability** of the basic scenario and the costs for achievement of the specified sector development targets for the population and the national economy (or the region) as a whole. Affordability means that the share of public expenditure on given sector and share of payment for its services in expenditures of the consolidated budget of the country (region) as well as in the budget of households should not exceed some specified level. Decision about which share (%) is acceptable is a political decision depending on individual preferences of population, and on the levels of income and priorities of specific country.

- **Coverage of the funding deficit**

It includes analysis of opportunities for a reduction or elimination of a funding deficit for various development targets and packages of social and economic, budgetary, tariff and environmental policies. In particular, according to the adopted methodology, the following ways of solving financial problems in the WSS sector are considered that are not mutually exclusive.

- **To ensure more rational use of available resources;**
- **To mobilize additional resources;**
- **To set realistic targets with regards to the quantity and quality of services in the sector and to develop a financial strategy.**

It includes analysis of combined packages of measures (simultaneous increase of funds and correction of targets). The end target of analysis is verification of feasibility of specific targets set for the development of the analyzed sector and defining targets and scenarios for their achievement, where the funding needs coincide with realistic opportunities for funding from all sources.

- **Assessment of costs for achievement of the specified targets and demonstration in what way the respective costs can be funded – all this constitutes a financial strategy *stricto sensu*.**

Advantages of the model FEASIBLE

- Model FEASIBLE allows a rapid pre-feasibility study or development of design and cost documents, assessing financial consequences of selection of specific targets for the development of the WSS sector, as well as using different sources and tools of funding and measures for involvement of additional resources.
- Besides, the model FEASIBLE allows a rapid “sensitivity analysis, i.e. the dependence of the result (the need in funds and the amount of expected funds) when various parameters are changed.
- In particular, this model can help answer the question how much funds may be required if the reconstruction programme includes reconstruction of 15 per cent of worn-out outdoor water supply networks, as compared to relaying of 10 per cent of the networks (of the total length of networks). Or, what will be the decrease of the funding amount if the rate of fees for the population is set at 3 per cent of the average income per capita as compared to the situation when the rates were set at 4 per cent, etc. The thus obtained amount of funding can be compared to the expenditure needs estimates and calculating the funding deficit (or excess).

Experience of development of strategies in other CIS countries (Moldova, Georgia and Kazakhstan) and in Russian regions shows that preparation of the financial strategy helps decision makers to solve the following issues:

- a well documented financial calculations may be important to support the requests submitted for getting funds for the WSS sector from the state budget or from other sources (for example from international financial organizations or donors);
- the analysis results may show the need to increase the level of incomes of Vodocanal enterprises for funding the required investments, without going beyond the limits of tariffs acceptable for population, taking into account the existing income level and distribution;
- determination of the achievable level of services that may be provided by the WSS sector will help involve limited investment recourses into most profitable and high-priority investment projects'; and
- analysis of different measures aimed at optimizing the WSS systems and increasing efficiency of the sector helps focus attention on most promising lines of activities, for example, reducing water losses in the networks and other actions for management of water demand, which, in the long run, allows reducing the need in capital investments in the wastewater collection sector.

Limitations of the FEASIBLE model and methodology

The approach used also has some limitations, in addition to its advantages:

- **The financial strategy cannot substitute the general management plan or the program for development of the WSS** in a country (or region), however, rather it can prove that the targets specified in the plan are feasible or, on the contrary, are overestimated or underestimated, given the financial situation, i.e. it can be very important for the process of target setting. Accordingly, the financial strategy may be considered as an **auxiliary element** for the development of the general plan of WSS management.

The FEASIBLE model is not designed for optimization of the selection of measures in terms of cost effectiveness and environmental requirements. It can only be used to estimate financial consequences of the use of a specific technology. This and other limitations of the model and of financial strategies are summarized in the box below:

Model FEASIBLE and the Financial Strategy cannot substitute:

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| <ul style="list-style-type: none"> • The general plan of the sector management and development (sectoral targeted programme) • Specifying of priorities and targets for the WSS development • Definition of the policy and its effective implementation • The detailed sectoral investment programme and its feasibility • Optimization of the selection of technical solutions and optimization of costs • Analysis of willingness to pay and acceptability of tariffs for different groups of the population |
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When decisions are made based on the results of financial strategies, it is necessary to also take into account that all calculations for the model, first, have a margin for uncertainty, secondly, are based on a number of assumptions that can deviate from actual conditions and thirdly, assume proper operation, maintenance, repair and timely replacement of assets. If these assumptions are not correct, then actual costs may significantly deviate from the assessments made using the model.

Since the model represents an aggregated result for the analyzed 19 populated centres of the Republic of Armenia, absence of a funding deficit for some period does not mean that funding needs in every town and for every year will be met.

Empiric functions of capital costs for separate water supply and communal wastewater treatment technologies

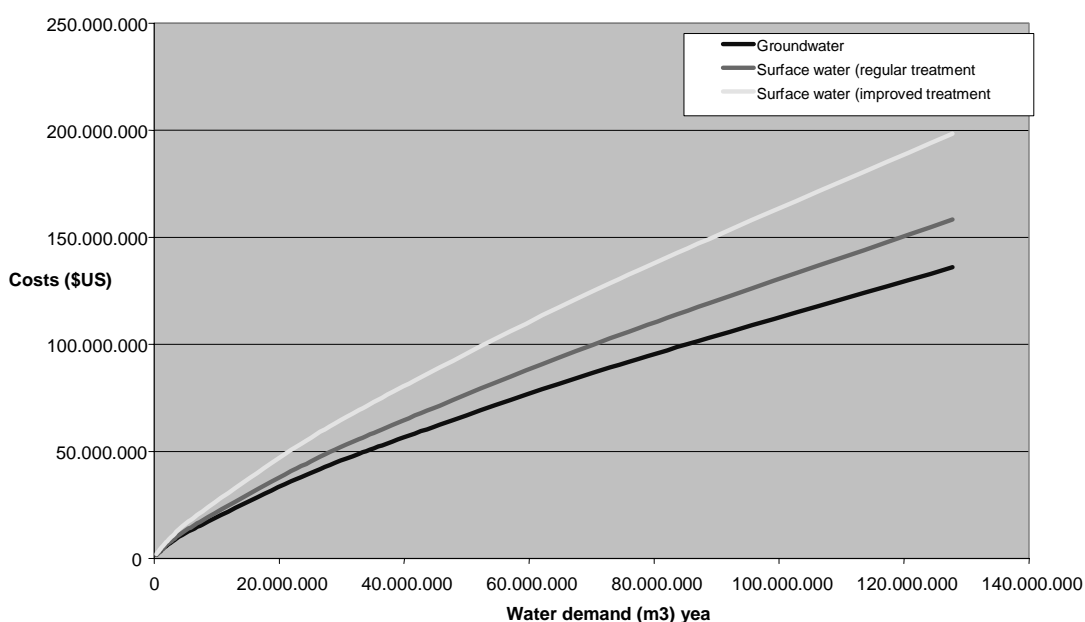
The cost functions given in this Attachment are used in the computer FEASIBLE model for assessment of costs for operation, maintenance, capital repair, reconstruction and new construction of municipal water supply systems and water conditioning technologies.

For water production, three functions of capital costs were built depending on the source of water supply and water conditioning technologies:

- Groundwater abstraction and water conditioning;
- Surface water abstraction and regular water conditioning;
- Surface water abstraction and improved water conditioning.

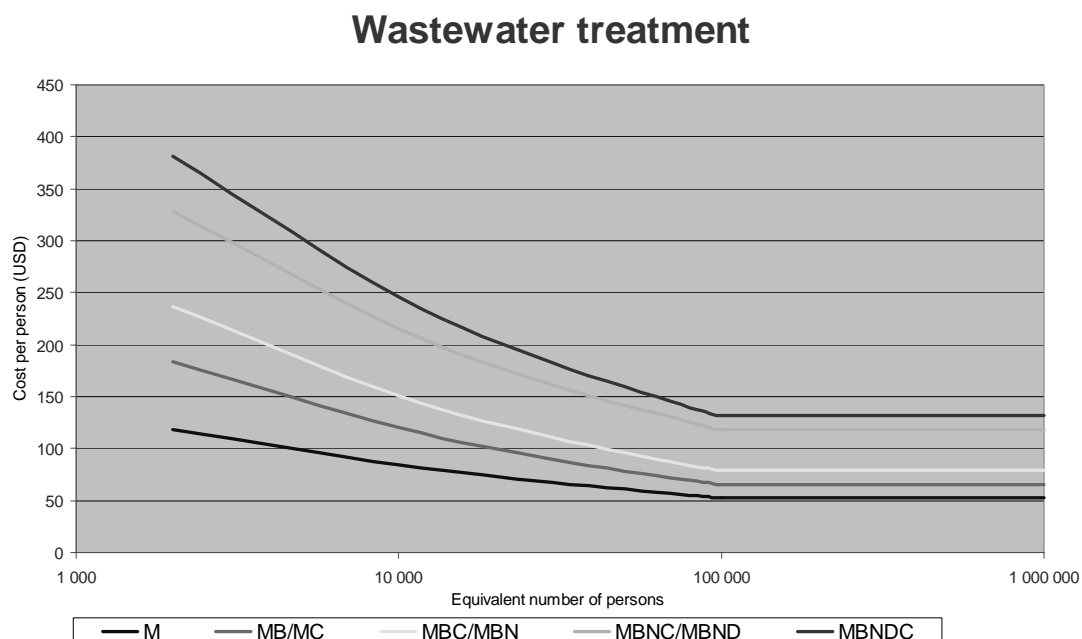
Three resultant cost functions for water supply are shown in Fig 1.

Figure 1 Generic capital/investment cost function for some sources of water supply, including water abstraction, water conditioning and water transportation



Also, empiric cost functions were built for different communal wastewater treatment methods, see Fig. 2. The abbreviations there mean different technologies used for treatment of communal wastewater: from the simplest (M – mechanical treatment) and most common (MB/MC – mechanical-biological and mechanical-chemical, applying for instance flocculants), to most advanced and, hence, most expensive technologies (MBNDC – removing nitrogen and phosphorus).

Figure 2 Generic capital cost functions (per serviced person) for different communal wastewater treatment technologies



Although the built cost functions³ give assessment of costs in prices of Western Europe, a **method is developed for price adjustment**, which allows assessing costs in local prices of any country or region.

Since these calculations in the model are made using generic cost functions, these calculations can be justified only at the aggregated level (the country or the region level). To get a more detailed pattern at the level of the facility or a more precise definition of costs related to a specific project, it is also necessary to make a detailed feasibility study and analysis.

More detailed information about empiric cost functions for municipal system of centralized water supply, sewerage and wastewater treatment, see:

COWI, 2001, Model FEASIBLE, Technical Guide, Beta version -1, Ministry of Environmental Protection and Energy, Denmark / DANCEE and OECD/EAP Task Force Secretariat, Copenhagen, 2001.

³ Analytical type of functions of costs and all parameters used in the computer model FEASIBLE, are described in details in COWI, 2001.