

Final Report

Project:
Preparation of study for
“Implementation of a modern waste management system
according to environmental standards
of the European Union
for the Vardar region (Macedonia)”

In the frame of the Soft-Loan-Preparation-Programme:



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Executive Summary

The purpose of this study is to prepare a proposal for implementation of an integrated waste management system according to European standards in the Vardar region (Macedonia). The study outlines technical, financial and legal aspects for adjustment of the waste management in the region, based on evaluation of the existing waste management. Special emphasis was given to potential realization of the future project with support of an Austrian soft-loan.

The Vardar region is located in the centre of Macedonia and borders Greece to the South. The region consists of 9 municipalities with a total population of 154,535 citizens. The biggest settlement in the region is the city of Veles with 55,108 inhabitants in 16,959 households. Expected annual waste generation in the entire region equals 41,951 tons of household waste per year.

While analysing of the existing waste management system the following problems were identified: (1) the current service coverage, in terms of covered population, is 76% but only 11% of the rural settlements are covered with waste collection service; (2) there is no adequate measurement of the waste generation; (3) used containers/bins and collection vehicles are obsolete and they do not have sufficient capacity for covering the whole region with the waste management service; (4) all existing municipal landfills are in a very poor condition, they do not correspond to any environmental standards thus causing significant danger for human health and the environment; (5) the current waste tariffs in the region are the lowest in Macedonia, and they are insufficient to cover the costs for solid waste management. Also the fee collection rate is on a very low level (only 65% payment); (6) the current fees are levied for waste collection only, waste disposal is free of charge; (7) there are almost no recycling efforts; (8) waste treatment is not applied in the region; (9) beside the biodegradable parts of household waste a significant amount of organic waste is accruing from wine production.

Based on those problems a technical concept was prepared, to be implemented in a step-by-step procedure and include: (1) establishment of a regional landfill; (2) covering of the whole region with the waste collection service; (3) introduction of selective collection of organic, paper and plastic waste at the households; (4) treatment of organic waste in de-centralized open air windrow composting facilities. Additionally, it is concluded that listed problems would be most profoundly and efficiently met by development of a regional waste management system that would embrace all 9 municipalities of the Vardar region.

For identification of a suitable regional landfill location several different sites were evaluated and 4 locations entered into a detailed analysis. From technical and economical point of view the location in the municipality of Rosoman turned out as most suitable one. Located in the middle of the region, accepted by the population as existing landfill location and furnished with perfect geological and hydro-geological conditions it seems to be the most appropriate for landfilling purposes. It is proposed to establish the landfill in sectors, to construct the layers in accordance to the state-of-the art, and to equip the landfill with a leachate water collection and with a landfill gas collection and utilization systems. Also it is recommended to provide a new access (by-pass) road to the landfill, as the

existing one is going right through the Rosoman village. The initial investments into the landfill are scheduled to be ~4.1 M€, partial financing through an Austrian soft-loan is possible.

For improvement of the waste collection system it is proposed to furnish all municipalities with modern waste collection vehicles with capacity of 21m³ and 16m³. For the city of Veles, which is characterized with hilly areas and narrow streets, it is proposed to use 5m³ waste collection vehicles. For storage of waste it is proposed to keep the existing system with 1.1m³ wheeled containers in areas with multi-family-houses, and to use 120l bins in areas with single-family-houses. The investments into the modernization of the waste collection system are scheduled to be 3.4 M€, this investment can also be financed through an Austrian soft-loan.

In order to avoid long transport distances for the municipalities located in the Northern part of the region it is recommended to implement a transfer station in Veles. Thus, the municipalities of Veles, Sveti Nikole, Caska and Lozovo shall transport collected waste to the transfer station, where the waste shall be reloaded into bigger press containers and hook trucks with trailers will transport it to the regional landfill in Rosoman. The annual capacity of the transfer station is 20,000 tons, the initial investments into the transfer station are expected to be 0.77 M€.

In order to fulfil the upcoming legal criteria concerning reduction of biodegradable waste being deposited at landfills, it is recommended to implement selective collection of organic waste and kitchen waste directly at the households. For the organic waste, treatment at de-centralized open-air windrow composting plants is proposed. For the beginning two composting plants with total capacity of 4,000 tons/year should be placed in Veles and in Kavadarci. For the composting process mobile equipment (shredder, windrow turner, screen etc.) shall be applied. The initial investments into the composting facilities are estimated to be 1.49 M€, including investments for mobile treatment equipment. This equipment can be financed through an Austrian soft-loan (volume ~0.9 M€).

Concerning organizational and management aspects related to the future regional solid waste management system, the following is proposed: (1) the existing public enterprises (“JKPs”) should continue to provide waste collection activities within the territories of their municipalities and begin transporting the waste to the new central landfill or transfer station; (2) a new public entity (Regional Waste Management Organization) should be established by the municipalities from the region, that will be responsible for future management and co-ordination of all regional aspects; and (3) daily operation of the new landfill should be delegated to a separate organization, either private or public, specialized in landfill operations.

A willingness-to-pay analysis was carried out, in order to assess the public opinion, availability and readiness of the population in the Vardar region to pay increased tariffs for improved solid waste management service. Based on the analysis it was concluded that affordability of the local population to pay current – even increased, to some extent – fees for the service is not a problem. Furthermore, it is concluded that, given the economic and wider strategic context of the region, an immediate (up to 2012) minimal increase of the current average waste tariff of 25 €/ton to 35 €/ton to be followed by continuous 6% annual increase for the consequent 15 years (thus reaching 84 €/ton in 2027), is

rather realistically achievable. Major driving force for acceptance of the increases is continuous improvement of the service quality.

Detailed financial analysis for the planned project was also carried out following the accepted EU principles of cost recovery and the polluter pays principle; four separate project implementation alternatives/stages and their financial viability have been analyzed. Also, several potential scenarios for financing of the project implementation using different sources of capital (e.g. grant financing, soft loans, commercial loans, private equity funds, etc.) were considered. Based on these analysis, it is concluded that projected tariff structure that is considered acceptable for the local population (an immediate increase of current tariff to 35 €/ton and continuous 6% annual increase to reach 84 €/ton) does not enable financial sustainability of the waste system. In order to accomplish the necessary financial sustainability, the municipalities of the Vardar region should seek grant financing to cover the initial investment of up-to 50-70%. Otherwise, a satisfactory financial performance of the project can be achieved if the waste tariffs are either instantly increased at 40-50 €/ton depending on the financing plan (sources of investment funding) to be followed by uniform annual 6% increase, or in the case the tariffs are instantly increased to 35 €/ton the consequent annual increase should be 7-10%.

Overall, the project is considered to have a moderate to high risk to its success and sustainability. Highest risk represents the aspect of access to finance, i.e. securing sufficient and adequate funding for project implementation.

The project will result in important direct environmental and social effects for the communities in the region. It is recommended that the implementation (development) of the regional waste management system proceeds in a phased manner.