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Directorate-General for Regional and Urban Policy
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Contact: [Annette Mengel](#)

E-mail: REGIO-EVAL@ec.europa.eu

European Commission
B-1049 Brussels



Ex post evaluation of Cohesion Policy Programmes 2007-2013 Co-Financed by the ERDF/CF. Work Package 6: Environment

Revised Second Interim Report

September – 2015



CONTENTS

1	Introduction	1
2	Results from Task 3	3
2.1	Introduction	3
2.2	Comparison of planned and actual figures	4
2.3	Conclusions	10
3	Pilot case study report: Municipal waste management in Gdansk	13
3.1	Introduction	13
3.2	Executive summary	14
3.3	Project description	15
3.4	Relevance of the project	17
3.5	Project performance	19
3.6	Technical and Financial Sustainability	21
3.7	Good practises and possible policy implications	24
4	Pilot case study report: Sludge Treatment Facility in Vilnius	26
4.1	Introduction	26
4.2	Executive summary	27
4.3	Project description	28
4.4	Relevance of the project	30
4.5	Project performance	31
4.6	Technical and financial sustainability	33
4.7	Good practises and possible policy implications	34
5	Lessons learned from pilot case studies	36
5.1	Interview guide	36
5.2	Verification of the case study reports	36
5.3	Identifying the correct interview persons and arranging interviews	36

APPENDICES

Appendix A	Persons met and Itinerary - Vilnius	38
Appendix B	Pictures from the project site - Vilnius	39

Appendix C	Persons met – Gdansk	42
Appendix D	Pictures of the facility - Gdansk	43
Appendix E	Activities, tasks, and consistency with programming documents - Gdansk	47

1 Introduction

This is the second interim report for the project *Ex post Evaluation of Cohesion Policy Programmes 2007-2013 Co-Financed by the ERDF / CF. Work Package 6: Environment*.

The study aims to analyse the progress and achievements of Cohesion Policy in selected areas of environment related infrastructure: drinking water, wastewater treatment, and solid waste management. Special emphasis is given to the financial sustainability of investments, which is examined through the financial data of a small number of major projects and several case studies. The project includes seven tasks:

- Task 1: Summary of achievements. This task provides an analysis of the achievements of Cohesion Policy to meeting the requirements of the *aquis communautaire* in the fields of drinking water supply, wastewater treatment, and solid waste management and treatment. Essentially, the results of this task was documented in the first interim report. This will be updated with data becoming available later in 2015.
- Task 2: Review financial analysis. This task reviewed the financial analysis of 20 selected projects. The results of the task were documented in the first interim report.
- Task 3: Verifying assumptions: This task focused on comparing planned and actual values for 11 operational projects. The results are documented in this report.
- Task 4: Case studies. This task includes case studies of ten projects and this report concerns two pilot case studies, which have been implemented to test and further develop the tools for data collection in the case studies. The remaining eight case studies will be conducted in the period June to 18 August 2015 and will be documented in a report to be submitted 18 August 2015.
- Task 5: Catalogue of challenges. This task will provide a note on the most common problems encountered in financial analysis and solutions to avoid them. The catalogue is due to be submitted on 18 September 2015.
- Task 6: Seminar. This task will gather relevant stakeholders from the Member States, IFIs and the Commission to discuss and deepen the analysis of emerging findings. The seminar is scheduled for 8 October 2015.
- Task 7: Final report. This task will summarise the evaluation in a report. The draft final version of this report is due on 10 November 2015.

The structure of this report is such that:

- Chapter 2 presents the results of task 3
- Chapters 3 and 4 report on the two pilot case studies (taking into account the requirement in the tender specifications that the reports should have a maximum length of 14 pages).
- Chapter 5 provides the lessons learned from the case studies in respect to instructions and interview guide to be applied (interview guide and instructions included in Appendix F)

The report was discussed with DG REGIO at a progress meeting on 4 June 2015 and written comments were subsequently also provided by DG REGIO. This revised version of the report responds to these comments.

2 Results from Task 3

2.1 Introduction

This chapter provides the results of the implementation of Task 3 in the tender specifications. Whereas Task 2 analysed the demand and financial analyses for 20 selected major projects, Task 3 focused on comparison of planned and actual data for those of the 20 projects that were categorised as operational. This means that Task 3 has analysed 11 projects as listed in Table 2-1.

Table 2-1 *Eleven operational projects analysed in Task 3*

Country	CCI	Title	JASPERS support
Waste management projects			
Portugal	2008PT161PR004	Treatment Project. Valorisation and final disposal of urban solid waste of the inter-municipal system of the Litoral Centro	No
Poland	2007PL161PR002	Modernization of municipal waste management in Gdansk	No
Water and wastewater projects			
Czech Republic	2009CZ161PR005	Improving water quality in rivers Jihlava and Svratka above tanks of Nové Mlýny	Yes
Estonia	2009EE161PR003	Renovation of water supply systems in Kohtla-Järve area	No
Poland	2009PL161PR004	Comprehensive organization of water - sewage management in Żory	Yes
Poland	2007PL161PR005	Water and wastewater management in Nova Sol and neighbouring municipalities	No
Portugal	2009PT162PR001	SIMARSUL – Sanitation sub-systems of Barreiro/Moita and Seixal	No
Czech Republic	2009CZ161PR009	Renovation and construction of sewerage system in Brno	Yes
Lithuania	2009LT161PR001	Sludge Treatment Facility at Vilnius WWTP	Yes
Malta	2007MT161PR001	Malta South Sewage Treatment Infrastructure	Yes
Poland	2007PL161PR003	Construction of sewage and storm water collection systems and municipal WWTP in Tarnow Mountains - phase 1	No

Task 3 aimed to¹:

- **Gather information on actual data which can be compared to the assumptions from the planning phase of each project.** For this purpose, the beneficiaries of all eleven projects were contacted and asked to provide the actual figures in a spreadsheet, which contained the relevant baseline data and assumptions from the application documents.
- **Compare planned and actual figures** in order to reach conclusions on 1) the reliability of the assumptions, demand and financial analysis; and 2) on the financial sustainability of the investments. For this purpose, the data gathered from each project was analysed and the results of this analysis is presented in this report.
- Identify **systematic biases** in making assumptions

During data collection, it emerged that the project in Estonia is not operational, despite the fact that it was listed as such in the project lists received from DG REGIO when the study was initiated. For this reason, the project is not analysed to the same extent as the other projects. However, it is still considered relevant to include the project in the report as some ex-post data is available as the project is almost finalised (e.g. implementation plan and investment cost budget).

This chapter consists of two main sub-chapters:

- Chapter 2.2 provides the results of the comparison of planned and actual figures.
- Chapter 2.3 provides the conclusions on the reliability of the assumptions and the financial sustainability of the investments.

2.2 Comparison of planned and actual figures

This chapter presents the comparison of planned actual figures relating to demand analysis (section 2.1.1) and financial analysis (section 2.1.2). The chapter comments on the extent to which there are any deviations between planned and actual figures and the magnitude of these deviations. Finally, conclusions on the reliability of assumptions are presented.

2.2.1 Demand analysis

Table 2-2 presents a qualitatively oriented summary of the comparison of forecast and actual data for the main elements of the demand analysis in each of the 11 projects.

¹ According to the tender specifications, Task 3 also encompassed recalculation of the financial model in those cases where methodological errors had been identified in Task 2. However, no such errors were identified (ref. interim report, which contained the results of Task 2).

Table 2-2 Demand analysis: Summary of comparison by project

Country	Title (short)	Demographics	Service demand	Tariffs	Affordability (% of disposable income)	Tariff collection rate
Waste projects						
Portugal	Urban solid waste of the Litoral Centro	Population some 5% lower than forecast but not used in projections	Demand some 10% higher than projected	Tariff 20% lower than expected (project changed)	Not relevant	Not relevant
Poland	Municipal waste management in Gdansk	Population 25% higher	Waste deliveries to project as foreseen	Tariff 10% higher	From 0.56% to 0.70%	Not mentioned in application
Water and wastewater projects						
Czech Republic	Improving water quality in rivers Jihlava and Svatka	Population 6% higher	Water sales 1% higher. Wastewater down 4%. Infiltration an issue.	As planned for water, 12% higher for wastewater	From 1.5% to 1.7%.	100% (planned and realised)
Estonia	Water supply systems in Kohtla-Järve area	(Operation start only end 2015)	(Operation start only end 2015)	(Operation start only end 2015)	(Operation start only end 2015)	100% (planned and realised)
Poland	Sewage management in Żory	Population 3% lower	Water sales 5% up, wastewater billings down 12% so infiltration an issue	Households tariffs 5% lower	Down from 3.1% to 2.6% on average	100% (planned and realised)
Poland	Water and wastewater management in Nowa Sol	Population 2% lower	Water sales 4% up, wastewater billings down 9% so infiltration an issue	Households tariffs 39% higher in spite of much lower operating costs	Because of significant wage increase the affordability ratio is 2% lower	100% (planned and realised)
Portugal	SIMARSUL – Sanitation sub-systems of Barreiro/Moita and Seixal	Population 14% lower	Wastewater billings 15% lower	Households tariffs 18% higher	Not addressed in application	Not mentioned in application

Country	Title (short)	Demographics	Service demand	Tariffs	Affordability (% of disposable income)	Tariff collection rate
Czech Republic	Renovation and constr. of sewerage system in Brno	Slightly lower than projected	Slightly lower than projected	As planned	As planned	99.9% planned and realised
Lithuania	Sludge Treatment Facility at Vilnius WWTP	As planned	As planned	As planned	As planned	100% planned and realised ²
Malta	Malta South Sewage Treatment Infrastructure	Population 5% higher and growing	Billed water sales 12% lower, WWTP load some 20-25% higher	Water tariff the same, no information from promoter on wastewater tariffs (cost recovery tariff much higher than charged)	Methodologically incorrectly addressed in application	N.a. (to be clarified during task 4 case study)
Poland	Sewage and storm water collection systems and municipal WWTP in Tarnow Mountains - phase 1	Population 5% higher	Water sales 3% down, wastewater billings down 13% so infiltration an issue	Households tariffs 4% lower (population increase)	Reduced from 4.8% to 2.9% on average (tariffs lower, incomes updated to present levels rather than old survey data)	100% planned. 98.67% realised.

In the majority of projects, the trend towards declining populations has not been fully reflected in the projections. This is most markedly so in the Portuguese water/wastewater projects. As will be seen in the financial analysis 'comparison summary' that follows, capacity has not been reduced correspondingly.

A common feature for the Polish water/wastewater projects is that wastewater discharged and billed has been some 10-15% lower than projected. This is likely to be due to population dynamics lower than forecasts and the elasticity consumption to tariffs that are larger, while remaining affordable on average. Generally, the tariff collection rates are high (as assumed), which indicates that tariff levels are affordable. However, the issue of affordability and impacts on connection rates should be explored further in the case studies (Task 4). Treatment capacity constructed is lower in only one of the three projects.

² Based on information from the case study (Task 4)

The project on Malta is the only one where service demand has turned out significantly higher than projected. As discussed also in the section that follows, the risk is that wastewater treatment capacity will be exhausted earlier than expected.

2.2.2 Financial analysis

Table 2-3 presents a summary of the comparison of assumptions and actual data in financial analysis in each of the 11 projects.

Table 2-3 *Financial analysis: Summary of comparison by project*

Country	Title (short)	Implementation plan	Investment cost budget	Capacity constructed	Financing plan	Operating costs	Tariff covers O&M costs
Waste projects							
Portugal	Urban solid waste of the Litoral Centro	Constr. start as planned, 19 months delay (75%)	25% below budget	Capacity only 3% less than planned	Cost savings meant no national grant and less EU grant	Not possible to determine based on current information ³	Yes (cost coverage assumed and achieved)
Poland	Municipal waste management in Gdansk	Construction start as planned, 10 months delay (20%)	On budget	As planned	National grant and soft loans replacing own funds and market loans	Operating costs 5 % lower	Yes, even to larger extent than what ex-ante analysis provided for cost coverage
Water projects							

³ To be addressed as part of task 4

Country	Title (short)	Implementation plan	Investment cost budget	Capacity constructed	Financing plan	Operating costs	Tariff covers O&M costs
Czech Republic	Improving water quality in rivers Jihlava and Svratka	Construction start delayed by 1 year. Construction end 1 month delayed.	4% above budget	As planned (with slight increase in water pipes – not related to budget increase)	According to data from the project, EU grant financing was lower than planned (in spite of higher investment costs) and it is not clear how additional investment needs were covered	Operating costs appear considerably higher than anticipated (approx.. 20%)	According to application O&M costs were covered by tariffs
Estonia	Water supply systems in Kohtla-Järve area	As planned	Slightly below budget	Mains length 10% shorter	As planned	(Operation start only end 2015)	(Operation start only end 2015)
Poland	Sewage management in Żory	Construction start delay of 16 months, overall delay about 30 months (50% longer implementation period)	1/3 below budget (cost of works and supervision)	WWTP capacity 7% lower, otherwise no changes	Lower EU grant, national soft loans and in particular own funds	Operating costs almost 10% lower	Yes, even to larger extent than what ex-ante analysis provided for cost coverage
Poland	Water and wastewater management in Nova Sol	Construction start 4 months early; implementation period 25 months longer (125%)	1/3 below budget (land, pipe laying, other works /equipment , supervision	Treatment capacity unchanged, pipe length only little shorter	EU grant needs reduced in line with lower investment costs	Water treatment costs 75% below budget, wastewater treatment 40% lower	Yes, even to larger extent than what ex-ante analysis provided for cost coverage

Country	Title (short)	Implementation plan	Investment cost budget	Capacity constructed	Financing plan	Operating costs	Tariff covers O&M costs
Portugal	SIMARSUL – Sanitation sub-systems of Barreiro/Moita and Seixal	Timely start, construction period 3 months longer (5%)	On budget	As planned	EU grant reduced, national grants increased	Operating costs 4% lower	Yes (cost coverage assumed and achieved)
Czech Republic	Renovation and constr. of sewerage system in Brno	Start delay of 9 months, operation start delay 4 months only	10% below budget (construction contingencies)	As planned	Mainly EU grants reduced with lower investment costs	As planned	Yes (cost coverage assumed and achieved)
Lithuania	Sludge Treatment Facility at Vilnius WWTP	As planned	On budget	As planned	As planned	As planned	Yes (cost coverage assumed and achieved)
Malta	Malta South Sewage Treatment Infrastructure	As planned	On budget	As planned	As planned	Some 50% higher than planned	No. Substantial public subsidy assumed.
Poland	Sewage and storm water collection systems and municipal WWTP in Tarnow Mountains - phase 1	Constr. start delay 8 months, construction period double length, delay in operation start 2 years	1/3 below budget (construction contingencies)	As planned	Reduced EU grant and less national soft loans	Operating costs 11% lower	Yes, even to larger extent than what ex-ante analysis provided for cost coverage

For all projects that have incurred delays with respect to operations start, a common feature is an underestimation of the length of the construction period (incl. design). For a few projects, the time needed for mobilization, possibly including a later approval of the EU co-funding application has resulted in additional delays.

The investment cost budgets have been accurate or overestimating costs. A common feature for the Polish water/wastewater projects is that outturn costs are as much as 1/3 lower than the budget. According to the expert opinion, this is only to a limited extent due to construction capacities being lower than planned or effects of variance in the exchange rate (EUR/PLN) On the contrary, the main

reasons underlying the overestimation of investment costs in the water sector in Poland are considered to be as follows (to be further explored and validated during case studies in Task 4).

- The market is very competitive and large discounts are usually applied by tenderers. In addition, projects are usually split into smaller contracts, so that relatively small companies are able to participate in the public procurement, which makes competition even stronger.

- The sewage network construction (which represents, on average, the majority of the investment cost) is a relatively simple civil engineering, which does not require sophisticated skills, mainly excavators and some working experience. Thus, no technical problems are usually at stake.

- The financial crisis put some additional pressure on lowering the costs, while majority of budgets were prepared just before financial crisis.

The unchanged capacity for a few projects has seen a lower service demand when in operation. At least in the short-term covered in this assignment, the capacity constructed is too high. In Malta on the other hand, where demand for wastewater treatment has so far turned out some 25% higher than forecast, the treatment capacity constructed may well be too small. Already in the application, a plant life of some 10-11 years only was foreseen, whereas a 30 years life is considered technically and financially sound.

Overall, operating cost budgets as well have been too pessimistic. The only exception is Malta with a 50% increase as compared to the budget and one of the two projects in the Czech Republic. For the Maltese project, about half of the increased costs reflects higher throughput in the wastewater treatment plant of the project.

The lower operating costs reduces need for tariff increases and improves the likely financial sustainability of the projects. For the Maltese project, it is known that public operating subsidies will help cover operations and maintenance costs with tariffs below their cost recovery levels. Provided that such subsidies are secured in a sustainable manner, financial sustainability should not be an issue in spite of the much higher operating costs. However, this implies that full cost recovery from tariffs is far from achieved. These questions should be further explored during the case study in Task 4.

Generally, the financing trend has followed the trend in the investment budget, i.e. the EU grant element has been reduced when the investment budget was reduced. However, in two cases (Portugal – SIMARSUL project and Czech Republic - Jihlava and Svatka rivers project), the grant element was reduced even though the investment budget was as planned or increased. This is unexpected given the financial crisis and considering that, for Portugal, the co-financing rate was increased during the period. The case study on the Portuguese project should look into this issue in more detail.

2.3 Conclusions

This chapter concludes on the reliability of the assumptions, demand and financial analysis as well as the financial sustainability of the investments based on the data on planned and actual figures and the comparisons presented in chapter 2.

2.3.1 Reliability of the assumptions and the demand and financial analysis

For all projects with deviations from the initial plan, the time needed for construction, and in a few cases mobilization, has been underestimated confirming the systematic optimism bias identified in the Task 2 report.

Generally, projects have either correctly estimated or overestimated the investment cost budget. The three Polish water/wastewater projects appear systematically to have overestimated demand for wastewater treatment and overestimated – very considerably – investment costs, as explained above.

This is a surprising finding, since during the previous programming period (2000-2006), a main issue was that investment cost budgets were generally underestimated. It is possible that the same explanatory factors as highlighted above for Poland, can also help to explain why projects have been more correctly estimated during the programming period under evaluation. It is also possible that Member States have learned from the mistakes made in the previous period and have bettered their budgeting. This should be explored further during the case studies in Task 4. .

2.3.2 Financial sustainability of investments

The objective of the financial analysis review is to identify and assess the assumptions behind the financial projections for the projects that demonstrates its forecast financial sustainability. The project is financially sustainable if cumulated total cash flows are non-negative in each year of the project's lifetime. This cannot be verified as completely as projects have only recently become operational (and in one case has not yet become operational).

The assumptions made behind the financial analysis do not deviate substantially from the assumptions made in the applications. In general, the realised investment costs are below or in line with the budgeted costs in the Application. Few cost overruns have been experienced by the beneficiaries. Investment cost overruns could have indicated a financial sustainability issue. In Poland, the investment costs are close to 1/3 below the budgeted investment costs, whereas it was 10% below the budgeted cost in one project in the Czech Republic. The remaining projects landed more or less on the estimated budget. In terms of the capacity constructed all projects have implemented the expected capacity or have made some km pipe savings in the network.

The financing assumptions made are close to the realised financing agreements. The EU grant element is reduced for those projects where investment costs are reduced. However, the proportion of grant financing (EU and national) remains the same in the projects. If the financing of a project had changed to a higher proportion of loan and own financing this could have signified a potential financial sustainability issue.

Construction delays were mainly experienced in Poland and in the Czech Republic. This could indicate some financial sustainability issues. However, there are no indications when studying other indicators and assumptions that any of these projects will experience financial problems.

The water projects in Lithuania, Poland, Estonia, Czech Republic and Portugal do not have any financial sustainability problems. No tariff collection problems are reported indicating that the water companies receives the revenue they are entitled to. All the above water projects have annual profits, whereas the solid waste project in Poland has planned losses but does not have any cash flow problems as the annual losses are small compared to depreciation. Tariffs do not cover all costs in Maltese water project. However, the government is subsidising the operations and thereby ensuring

financial sustainability of the operator. However, the sustainability of such subsidies could be an issue and full cost recovery is not achieved, which should be further explored during the case study.

As can be seen in Table 2-1, some of the projects analysed were assisted by JASPERS and others were not. There is no clear evidence to support that the projects, which did receive support, had better correspondence between assumed/planned and realised values. However, the population analysed is very small – and factors such as planning capacities of the relevant national/regional/local authorities and degree of complexity in projects must also be considered.

2.3.3 Issues for consideration in Task 4

Summing up, Task 3 has helped to highlight a number areas, which should be further examined in the case studies under Task 4. Most notably, the following questions are relevant to address:

- > Why are projects below their budgets? Could this be because Member States have learned from the period 2007-2013? Or has the financial crisis had the effect that there is less overscoping of projects? Or is this due to price-driven public procurement practices (possibly in Poland)?
- > Are projects to be considered financially sustainable if costs are covered through public finances? Can the poorer segments of the population afford the planned tariffs?
- > Did assistance from JASPERS help or not?
- > Public procurement issues – to what extent have these issues had an impact on the case study projects (and on implementation of operational programmes in general)?

While the case studies can help to shed light on these issues for the ten selected projects, it must be kept in mind that the projects under study include only a small fraction of the major projects – and furthermore, an important selection criterion was to include operational projects. This also means that it is likely that there is a bias towards the better performing projects in the projects selected for case studies. We will seek to off-set this by asking questions of a more general nature (referring to the entire portfolio of environmental projects) in the interviews with Managing Authorities and Implementing Bodies carried out in connection with the case studies.

3 Pilot case study report: Municipal waste management in Gdansk

3.1 Introduction

This is a case study report under the study "Ex post Evaluation of Cohesion Policy Programmes 2007-2013 Co-financed by the ERDF/CF. Work package 6: Environment." The case study concerns the project Municipal Waste Management in Gdansk (Poland) and is one out of ten case studies of projects undertaken for the purpose of the evaluation. With reference to the tender specifications, the objectives of the case study are to:

- provide an overview of the selection mechanism and the factors that led to the selection of the projects,
- assess the consistency of the projects with relevant management plans and local development strategies,
- identify institutional factors that are critical to the produce reliable financial analyses (including demand analyses),
- give an overview of the implementation difficulties (including time and cost overruns and their reasons),
- explore the impacts of financial aspects (including the financial analysis if it affected project delivery) on the implementation of the projects, and
- analyse the solutions that are put in place to ensure the financial sustainability of investments, including but not focusing on identifying good practices

This case study report is structured as follows:

- Section 3.2 provides an executive summary of the results of the case study
- Section 3.3 presents the project
- Section 3.4 provides the analysis of project relevance
- Section 3.5 provides the analysis of project performance
- Section 3.6 assesses the technical and financial sustainability of the project
- Section 3.7 presents lessons learned and possible policy implications

3.2 Executive summary

Project title	Modernisation of municipal solid waste management in Gdańsk
Location (country and region/city)	Poland, city of Gdansk plus seven other surrounding municipalities
Beneficiary	Zakład Utylizacyjny, Ltd.
Implementing body	Zakład Utylizacyjny, Ltd. with National Fund for Environmental Protection (NFOŚ - the Management Authority of the priority Operational Programme 'Infrastructure and Environment'
Total investment costs (planned / actual)	PLN 330.42 million versus PLN 325.61 million (in EUR: 84.7 million and 83.5, respectively)
Total co-financing / ERDF contribution (planned / actual)	A grant from the Cohesion Fund covered EUR 48.2 million (nearly 58% of the total) of the investment amount.
Assistance from JASPERS (yes/no)	No
Start date (planned / actual)	21 Nov 2007 / 21 Nov 2007 (construction) 26 Mar 2007 / 21 Nov 2010 (supervision)
End date (planned / actual)	17 Aug 2010 / 22 May 2012 (construction) 26 Mar 2012 / 21 Oct 2014 (supervision)

The major project "Modernisation of municipal solid waste management in Gdańsk" is located in Gdańsk, Poland. Gdansk is one of the largest cities in Poland, located at mouth of the Vistula River at the Bay of Gdańsk. The city has a population of about 456 thousand.

The project included a sorting station/materials recovering facility to handle various types of waste streams including bulky waste, WEEE, construction and demolition waste, a composting facility, an electrical and thermal power plant using landfill gas, as well as a cell for handling asbestos waste, and modernisation of landfill cells.

The project is fully consistent with national, regional, and local waste management strategies and plans, national environmental policy, and it contributes to the meeting the objectives of priority axis 2 of the Operational Programme 'Infrastructure and Environment' - Waste Management and Protection of the Earth.

The planned capacities were 60,000 Mg/year for the composting station and 140,000 Mg/year for the sorting facility. There is reserve capacity in the system through the addition of two to three shifts as required. The realised capacities were essentially unchanged from the design.

The overall investment amount, as realised, was PLN 325.61 million (EUR 83.5 million). A grant from the Cohesion Fund covered EUR 48.2 million (nearly 58% of the total) of the investment amount.

No technical, staffing or organisation issues were noted by the beneficiary. Problems arose when the main contractor experienced financial problems, which led the responsible consortium member to decline to make the warranty repairs. As a result, the beneficiary had to use its warranty insurance and was awarded about PLN 36 million. The beneficiary had to conduct a tender for the repairs.

In terms of deadlines, construction began in 2007 and the contract for design and construction works was delayed from an expected end date of August 2010 to May 2011. The major reason of delay was a necessity to obtain a new decision on environmental impact. There were also a few months delay in the delivery of equipment (October 2011, instead of end of May 2011), which was caused by delay in construction works (there was no reason to deliver equipment when construction works were not advanced). Since the July 2015, however, the sorting facility after correction works were performed, has been working at 100% capacity, while the composting station is working with 100% capacity since 20 of November 2013.

The project is technically and financially sustainable. The realised operating budget – both revenues and costs – was close to the planned budget in the application. Project operation is financed by gate fees and no subsidies have been required. Combined waste collection and treatment tariffs are affordable (0.7% of average household disposable income compared to the threshold of 1.2% accepted in Poland).

3.3 Project description

The major project "Modernisation of municipal solid waste management in Gdańsk" is located in Gdańsk, Poland. Gdansk is one of the largest cities in Poland, located at mouth of the Vistula River at the Bay of Gdańsk. The city has a population of about 456 thousand. It is the capital city of the Pomorski Province and is an important port city with a developed industrial sector (in particular shipbuilding). It is also an important tourist destination, due to its numerous monuments, as well as the beaches and bathing spots on the Bay of Gdańsk.

3.3.1 Project objectives

Before the project, Gdańsk did not have a comprehensive and EU-compliant waste management system. As implemented the waste management system in Gdańsk is mainly based on structures of the limited liability company "Zakład Utylizacyjny," the sole shareholder of which is the City of Gdańsk.

The main objectives of the project were to:

- Process and treat municipal solid waste generated in mix waste streams – 140,000 Mg/year
- Reduce the volume of biodegradable waste going to the landfill compared to the amounts from 1995 – 65% by 2020
- Reduce the volume of waste going to landfill compared to amount of collected solid municipal solid waste – 50%.
- Extend the period for landfilling of waste (landfill lifetime) – 35 years
- Handle safely waste containing asbestos – 150,000 m3 of total capacity in 35 years.

- Make quality and quantity improvements in the treatment of leachate - 120 m³/d.

The project included a sorting station/materials recovering facility to handle various types of waste streams including bulky waste, WEEE, construction and demolition waste, a composting facility, an electrical and thermal power plant using landfill gas, as well as a cell for handling asbestos waste, and modernisation of landfill cells.

3.3.2 Planned capacities

The planned capacities were 60,000 Mg/year for the composting station and 140,000 Mg/year for the sorting facility. There is reserve capacity in the system and the design assumed that work would be in two to three shifts as required. The realised capacities were essentially unchanged from the design.

3.3.3 Stakeholders

The key stakeholders are the city of Gdansk, the seven other municipalities participating in the project, the beneficiary (Zakład Utylizacyjny, Ltd.), the National Fund for Environmental Protection (NFOŚ - the Management Authority of the priority Operational Programme 'Infrastructure and Environment', and the Office of the Speaker of the Regional Parliament (as the owner of the provincial waste management plan).

The project contributes to achieving the objectives of the priority axis 2 of the Operational Programme 'Infrastructure and Environment' – Waste Management and Protection of the Earth, in particular activity 2.1 related to solid waste management.

3.3.4 Investment costs

The overall investment amount, as realised, was PLN 325.61 million (EUR 83.5 million). A grant from the Cohesion Fund covered EUR 48.2 million (nearly 58% of the total) of the investment amount. The next highest source of financing was a soft loan from the National Environmental Fund (EUR 25.6 million, or about 31% of the total), followed by own funds (EUR 7.8 million, 9.3%) and national grant (EUR 1.8 million, or about 2.1%) the decision was taken to use that source of financing. Short-term bonds were also used as bridge financing, but they have been fully repaid.

3.3.5 Project development

The idea for the project was first developed in 2003-2004. The City of Gdańsk contracted the preparation of the first feasibility study for solid waste management and entered the project into its municipal strategy. At the same time, the beneficiary (Zakład Utylizacyjny) tendered the design.

In 2005, an application was prepared to the Cohesion Fund and the application was first assigned a number. On 25 September 2005, a construction permit was issued. At the end of 2006, a Project Implementation Unit was established and the National Fund for Environmental Protection conducted a positive pre-implementation assessment. The application, however, was assigned to the reserve list and finally the project did not receive financing in the 2004-2006 period. At the beginning of 2007, the feasibility study was updated and the application was prepared one year before the guidelines (for project preparation for investments under the Operational Programme Infrastructure and Environment 2007-2011) were ready. The application was approved.

In order to commence project implementation, the beneficiary issued municipal-guaranteed bonds in six series ranging from PLN 10 million to PLN 50 million for a total of PLN 150 million. Bonds were issued during the construction period starting from November 2009 and the last one was issued in October 2011. All bonds were repaid by the end of 2011. At the time the National Fund for Environmental Protection did not offer bridge loan financing.

In general, there were deviations in the completion of works and major deviations in the commencement of full operations. The tender process began in November 2007, construction works started a year later in August 2008 and the planned end date for construction works was 17 August 2010, whereas the actual end date was 22 May 2011. The supervising engineer was planned to complete its contract on 26 March 2012, but after being re-contracted in 2010, supervision activities were completed on 21 October 2014. The works were taken over in May 2011 with a list of defects, mainly related to the technology of the sorting and composting facilities. The main contractor's insolvency then became evident, as did a sub-contractor's refusal to remedy the defects. The warranty was activated and a tender for addressing the defects was necessary. The sorting station was operational since 2011 however, by the time corrections were completed in 2015, required additional, time consuming works from the beneficiary's employees. The corrections of the composting station were completed and composting station is working on 100% capacity since the end of 2013. , Corrections however has meant that the beneficiary has to prepare a new application for the final payment.

3.4 Relevance of the project

3.4.1 Coherence with policy objectives

The project falls under the assumptions of Second Priority Axis of the Operational Programme 'Infrastructure and Environment' 2007-2013 – waste management and protection of the earth – activity 2.1 on comprehensive activities in solid waste management, including hazardous waste. The Operational Programme, in accordance with the National Strategic Reference Frameworks, is one of the tools for achieving the objectives set out in utilising Cohesion Fund sources in accordance with the Council Regulation No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999.

As a result of the project, the transformation of the Zakład Utylizacyjny in Gdańsk Szadółki into a modern facility is in accordance with the Waste Management Plan of the Pomorski Province to 2010 and the Waste Management Plan of the City of Gdańsk. The treatment of municipal waste from the municipalities of Kolbudy, Żukowo, Kartuzy, Pruszcz Gdański, Przodkowo and Somonino is consistent with the waste management plans of each of those municipalities.

A modern recycling system, sorting station, composting facility and efficient insulation of the landfill will enable the obligations of EU directives and Polish law on municipal solid waste to be fulfilled. It is also in accordance with local plans to have the possibility to store waste containing asbestos.

The project responds to the implementation of the following EU directives:

- 75/442/EEC on waste,

- 1999/31/EC on the landfill of waste,
- 91/689/EC on hazardous waste,
- 94/62/EC on packaging and packaging waste.

The Waste Framework Directive is not mentioned in the project documentation as application was prepared in 2007.

All above mentioned directives played important role in the decisions on project preparation. According to the beneficiary, from the today's perspective, the decision on selected solution would be similar, with exception that some more advanced technologies are currently available. The insulation of the landfill, implementation of the sorting and composting station, were urgently required and has no alternative. Use of biogas is a modern solution to reduce emissions from the landfill and reduce costs of heating and electricity.

It has to be emphasized that waste collection system was not a part of the application and is out of the beneficiary's responsibilities.

Appendix E provides a table summarising the activities, tasks, and cohesion with programming documents.

In addition, the City of Gdansk has a Development Strategy, originally formulated in 2004, and updated up to 2015. The strategy demonstrates the great importance the city attaches to waste management issues. Because the project was of strategic priority for the city, it provided the guarantees for the bonds issued by the beneficiary "Zakład Utylizacyjny".

The "Waste Management Plan for the Pomorski Province 2018 (resolution number 415/XX/12), , indicates the Zakład Utylizacyjny, Ltd. in Gdańsk Szadółki as the regional operator for waste treatment for eight municipalities.

Also of importance was the need to update the integrated permit for the landfill, which lost its validity in 2009, and this required the sealing of the landfill.

3.4.2 Consistency with needs in the territory

As detailed in Task 3 for the Gdansk waste management project, initially the application for co-financing considered only four municipalities for inclusion in the service area. As the project developed and was implemented, however, a total of eight municipalities joined the service area. The main differences in the demand analysis were due to the inclusion of waste streams from a total of eight municipalities and conservative estimates of population growth in each of them. The demand analysis was based on data on waste delivered to the landfill from 2004-2008. Also the waste composition was based on historical measurements of the waste morphology at the entrance to the landfill. The projection of population growth was based on the projections from the Central Statistical Office.

The number of residents registering for the waste tax was also underestimated. This led to a difference in estimates of solid waste generation of about 96 thousand tonnes per year in the application and a realised volume of 144 thousand tonnes per year. Household waste generation per

capita also proved much higher than expected, with about 202 kg/person/year in the application and a realised rate of 244 kg/person/year.

No changes were made in the overall project scope. Minimal differences arose in the dimensions of facilities, but these did not have an impact on the overall project. According to the beneficiary, the constructed capacity is sufficient to process incoming waste streams despite the fact that there are actually more customers and waste than planned.

3.5 Project performance

3.5.1 Fulfilment of objectives

The project objectives have been reached in full and the planned capacities constructed.

3.5.2 Implementation effectiveness

In general, there were deviations in the completion of works and major deviations in the commencement of full operations. The planned end date for construction works was 17 August 2010, whereas the actual end date was 22 May 2011. The supervising engineer was planned to complete its contract on 26 March 2012, but after being re-contracted in 2010, supervision activities were completed on 21 October 2014. These dates are shown in the following table.

Table 3.1. Project implementation schedule, planned versus actual

#		Application	Realized	Slippage
		Date	Date	Months
Ia	Contract 1 (Contract engineer)			
1	Start date	21.11.2007	21.11.2007	
2	End date	26.03.2012	16.12.2010	
3	Operation start date	X	X	
Ib	Contract 1 (Contract engineer)			
1	start date	21.11.2007	25.11.2010	
2	End date	26.03.2012	21.10.2014	31
3	Operation start date	X	X	
II	Contract 2 (PR and ecological education)			
1	Start date	20.11.2007	20.11.2007	
2	End date	17.01.2011	02.11.2011	10
3	Operation start date	X	X	
III	Contract 3 (Design and construction works)			
1	Start date	21.11.2007	21.11.2007	
2	End date	17.08.2010	22.05.2011	10
3	Operation start date ⁴	06.08.2008	06.08.2008	
IV	Contract 4 (delivery of equipment)			
1	Start date	23.06.2009	20.03.2010	
2	End date	30.05.2011	27.10.2011	5
3	Operation start date	23.09.2009	06.08.2010	

Source: ZU Gdansk – questionnaire for Task 3 report

The overall investment budget was only a bit lower than expected (planned PLN 330.42 million versus actual PLN 325.61 million; in EUR the figures are 84.7 million and 83.5, respectively).

The main reasons for time overruns are explained below.

Questions concerning state aid

At the beginning of 2009, questions were raised with respect to state aid for such investments. Therefore, in 2009 the co-financing agreement from the Cohesion Fund (with the National Fund for Environmental Protection) was conditional upon a satisfactory response to the issue of state aid. After a change in the law, the state aid problem disappeared and an implementation agreement was signed in December 2009. After this, the first co-financing instalment was transferred together with the loan from the National Fund for Environmental Protection). Prior to this, all project activities had been financed using bonds.

⁴ Date at which some components of the construction works begin operations. Full operations were achieved in 2015.

Public procurement law

Initially the tenders had been conducted according to the old law, which had not fully transposed EU directives and discussions on the discrepancies lasted about two years. The beneficiary committed an error by failing to publish information on the changing of deadlines, but the public procurement law in force at the time was faulty and did not foresee such publication. This led to a fine on the beneficiary of 10%, but because in the end this was not the fault of the beneficiary, the fine was rebooked against a grant from the state budget⁵. This led to a change in the financing structure, involving a lower grant from the Cohesion Fund and a new grant from the state budget.

Changes in the construction permit

Construction was planned for 24 months and, theoretically, the deadlines could have been met. It was necessary to make changes to the construction permit (changes to the design that were not significant to the overall project), but these changes, according to the beneficiary, made it necessary to obtain a decision on environmental impact. While the project proponents (beneficiary and the city of Gdańsk) were prepared to conduct the EIA, the Regional Environmental Directorate (RED) stated that an EIA was not required. This led to an impasse during which RED and the city of Gdańsk debated the issue; in the end, however, the RED issued a decision on the EIA. In the meantime, construction had been halted and the contractor obtained a ten-month extension for performance.

Defects in completed works

The works commissioned were received in June 2010 with a list of defects, mainly related to the technology of the sorting and composting facilities. The main contractor's insolvency then became evident, as did a sub-contractor's refusal to remedy the defects. The warranty was activated and a tender for addressing the defects was necessary.

In summary, the main problems were related to the delays in securing financing from the Cohesion Fund, variability and contradictions in the law, and well as the works contractor.

3.6 Technical and Financial Sustainability

3.6.1 Technical operation

No technical, staffing or organisation issues were noted by the beneficiary. Problems did arise with the sorting facility and composting station, but not with any of the other components of the system (weighbridge, landfill lining, cells, biogas collection, as well as production of electricity and thermal energy). The problems with the sorting facility and composting station were that a member of the consortium acting as contractor made mistakes that were supposed to be remedied based on a guarantee for the works. The main contractor, however, experienced financial problems and had not been paying the other members of the consortium, which led the responsible consortium member to decline to make the warranty repairs. As a result, the beneficiary had to use its warranty insurance and was awarded about PLN 36 million. The beneficiary had to conduct a tender for the repairs.

⁵ The same situation occurred in another Polish case study project

In terms of deadlines, the supervising engineer was supposed to have started in November 2007 and complete its engagement by March 2012. Instead, a second engineer had to be engaged in November 2010 and its contract was completed in October 2014. The contract for design and construction works was delayed from an expected end date of August 2010 to May 2011. The delivery of equipment was delayed (October 2011, instead of end of May 2011) due to delay in construction works.

Since the end of 2013, however, the composting station has been working at 100% capacity, while the sorting facility is expected to reach full capacity by June 2015.

A key question is whether this situation could have been avoided through a better public procurement process. The biggest problem here is the Polish public procurement law, which – at the time the original tender was conducted – essentially allowed price as the single evaluation criterion or provided weak legal recourse to eliminate threats to contract execution, such as in the case at hand. Since then, the law has been slightly changed to allow other evaluation criteria, although price is still the predominant one. It was not possible, however, to foresee all of the problems, such as that the difficult financial situation of the main contractor. This resulted from winning several other unrelated contracts, which due to delays in payments caused cash flow and capacity problems during implementation of the works. At present, it is not possible to determine whether the changes in public procurement law – allowing other, non-price evaluation criteria – will be sufficient to reduce the probability of such cases occurring due to the fact that the amendments are still relatively new. The experience and financial stability of the bidder should in particular be considered as evaluation criteria.

Despite these difficulties, the beneficiary is satisfied with the technical solutions, although with hindsight, would have proposed that some elements be even more modern. Although on paper the contractor was highly experienced and from an old EU Member State, it still made a series of mistakes. The financial situation of the main contractor further complicated and delayed the remedy of defects.

In summary, the beneficiary was asked, with the benefit of hindsight, about how it would have handled specific technical solutions, it responded as follows:

- Cells – no changes
- Bio-gas electricity generation – the solution is modern and is scalable, so no changes would have been made
- Sorting station – at the time, the best available technology – no changes
- Composting station – at the time, the best available technology – no changes
- Size and capacities – no change.

The beneficiary is planning to construct an incineration plant, but this will not affect the operation of the existing facilities since the fraction to be incinerated will be separated out at the sorting plant.

3.6.2 Operating budget

The operating costs have been realised almost as planned. For example, in 2014, the actual operating costs were PLN 42.81 million, while in the financial projection it was assumed that the costs for 2014

would be PLN 44.95 million. Depreciation was accurately estimated (estimated: PLN 21.25 million compared to the actual 2014 figure of PLN 22.55 million).

The main deviation in terms of cost elements was that outsourced services turned out to be more expensive than planned. On the other hand, fees, and in particular environmental fees, turned out to be lower than planned.

Revenues from gate fees have proven higher than planned while revenues from the sale of recyclables are several times higher than planned. The sale of electricity, although a low amount, is more than double that planned.

In general, the operating budget was correctly estimated, although the actual operating revenues were slightly higher than estimated and operating costs lower than estimated. This is due to the following factors:

- Delays in implementation – as a result, the operating costs occurred later than expected in the plan
- Tariffs – although delays in implementation might also have delayed the introduction of new tariffs, the city has been implementing tariffs even slightly in advance of the original plan
- Service area – in the feasibility study, the service area was consciously reduced due to uncertainties in the speed at which the expansion into other areas could be carried out. In reality, the service area is now larger (including eight municipalities), meaning that the client base is larger.

3.6.3 Financial sustainability

Combined waste collection and treatment tariffs are affordable (0.7% of average household disposable income compared to the threshold of 1.2% accepted in Poland). The City of Gdansk regularly informs the public on waste management tariffs and they have a special webpage for waste.

The project beneficiary only receives a gate fee for waste deposited at the regional landfill. The gate fee is paid by the company who delivers the waste or by the respective city which collects the waste tax. The beneficiary does not collect waste and therefore does not obtain a fee for collection.

No subsidies have been required. In general, the operating company does not have any cash flow problems. Operating costs are a bit lower than planned and revenues a bit higher than planned in the feasibility study. The tariffs (gate fees) are set in accordance with the plan set out in the feasibility study. In fact, the city council even uses the (now old in study terms) feasibility study as the basis for its tariff setting. While the prices of recyclables are volatile even within a year, they are currently higher than expected.

Problems were experienced, however, with project financing due to a common practice in Poland with such projects. Project implementation began – based on ready detailed design, construction permit, and completed public procurement procedure – before financing was obtained from the Cohesion Fund. Delays in the awarding of co-financing mean that short-term financing gaps arise if the already commenced works should continue without hindrance.

In the case of the current project, these short-term financing gaps necessitated that the operator had to issue bonds that were guaranteed by the City of Gdansk. This was the largest financing problem and no problems occurred with the financing of daily operations.

According to the beneficiary, the most important element of risk was ensuring waste streams. At the time, the city had issued licenses for collection of waste, but it was not enforceable that the waste had to be delivered to a specified landfill. This was changed through the development of a Provincial Waste Management Plan that specified the regional landfill to which waste had to be delivered. Economic concerns (higher wages for waste vehicle drivers and fuel costs) also contributed, as licensed collectors preferred closer landfills. Since 2013, a new law on waste exists and there are no more issues with the guaranteeing of waste streams, as this lies within the competencies of cities to control.

3.7 Good practises and possible policy implications

The beneficiary related a common opinion in the country – that Poland was not prepared to implement the operational programme when it was introduced in 2007. The city of Gdansk prepared a feasibility study and application one year before the appropriate guidelines were published (and thus the study and application subsequently had to be updated). According to the beneficiary, the guidelines for financing sources are usually issued late and the rules frequently change.

A good practice then would be to complete the programming phase before collecting applications. This applies in particular to applications that are parked and should be implemented as quickly as possible to complete the previous programming (but already while the new period is underway) before collecting applications for the next programming period. This also means that project selection procedures need to be accelerated. This is mostly related to the national programming but also has implication on the need of quick approval of the operational programmes on the EU level.

Project also faced problems related to the uncertainties on state aid. The possible policy implication is that project related to the municipal services have a clear exclusion from the state aid provisions.

Information tends to flow very slowly between the Ministries of Environment and Regional Development, and the National Fund for Environmental Protection and needs to be accelerated. Due to its complex structure, information flow within the National Fund for Environmental Protection itself is also time-consuming. In addition, some applicants have complained that the Fund issues follow-up comments after some time that are contradictory to previous comments. All information submitted to the National Fund must be submitted by post; scanned documents sent electronically or uploaded are not accepted.

According to the beneficiary, the following factors guarantee success:

- Project Implementation Unit – a solid PIU has clear and applicable procedures, an experienced staff, and appropriate training. The beneficiary recommended that the PIU be established even earlier than in their case, for example before the tenders are conducted for works, supervision, or supply
- Co-financing – an alternative financing scheme needs to be devised and ready given the uncertainties with respect to grant financing.

- Best-available technologies – BAT should be applied in all cases.

4 Pilot case study report: Sludge Treatment Facility in Vilnius

4.1 Introduction

This is a case study report under the study "Ex post Evaluation of Cohesion Policy Programmes 2007-2013 Co-financed by the ERDF/CF. Work package 6: Environment." The case study concerns the project Sludge Treatment Facility in Vilnius (Lithuania) and is one out of ten case studies of projects undertaken for the purpose of the evaluation. With reference to the tender specifications, the objectives of the case study are to:

- provide an overview of the selection mechanism and the factors that led to the selection of the projects,
- assess the consistency of the projects with relevant management plans and local development strategies,
- identify institutional factors that are critical to the produce reliable financial analyses (including demand analyses),
- give an overview of the implementation difficulties (including time and cost overruns and their reasons),
- explore the impacts of financial aspects (including the financial analysis if it affected project delivery) on the implementation of the projects, and
- analyse the solutions that are put in place to ensure the financial sustainability of investments, including but not focusing on identifying good practices

This case study report is structured as follows:

- Section 4.2 provides an executive summary of the results of the case study
- Section 4.3 presents the project
- Section 4.4 provides the analysis of project relevance
- Section 4.5 provides the analysis of project performance
- Section 4.6 assesses the technical and financial sustainability of the project
- Section 4.7 presents lessons learned and possible policy implications

4.2 Executive summary

Sludge treatment facility at Vilnius Wastewater Treatment Plant

Location (country and region/city)	Lithuania, Vilnius
Total investment costs (planned)	54.7 MEUR (<i>61.7 MEUR</i>)
Total CF/ERDF contribution (planned)	45.1 MEUR (<i>45.6 MEUR</i>)
Start (planned)	Sept 2008 (<i>Sept 2008</i>)
End (planned)	July 2013 (<i>June 2013</i>)
Beneficiary	JSC Vilnius Vandenys
Implementing body	Ministry of Environment
Assistance from JASPERs	yes

Short project description

The main objective of the project was to construct a new sludge treatment facility at the Vilnius wastewater treatment plant. The facility is a regional facility and was the first priority of the National Sludge Treatment Study and Investment Programme. The facility processes sludge from the Vilnius wastewater treatment plant (90.8%), as well as sludge from nine smaller nearby wastewater treatment plants (9.2%).

Without the project, the sludge would primarily be landfilled. With the project landfilling stopped and the sludge is (through composting) used as fertilizer.

Project beneficiary

The project beneficiary is JSC Vilnius Vandenys, the largest water supply company in Lithuania, which operates water supply and wastewater networks in the municipalities (districts) of Vilnius City, Šalčininkai, Švenčionys and Vilnius District. The Company provides water supply and wastewater collection and treatment services.

Main findings

The objective of the project was to comply with the EU Sludge Directive 86/278/EEB and treat all sludge from the Vilnius region. An additional but also evident objective was to reduce the smelly environment from piles of untreated sludge, which affected half the population living in Vilnius.

The project is in line with the national strategic framework for the environment sector and the water and wastewater sector in particular. The first priority of the environmental authorities in Lithuania was wastewater treatment and improvement of environmental conditions in the Baltic Sea. The second priority, after securing wastewater treatment, was to deal with the sludge.

The capacity of the sludge treatment facility was constructed as planned and this is sufficient for dealing with the sludge from wastewater treatment plants in the Vilnius area.

The project objectives have been fulfilled. The project was implemented according to the outlined plan in the Application, but implementation could have been speedier if temporary financing problems had not occurred during implementation.

The project is operated sustainably from a technical point of view. No problems are foreseen. The actual operating budget is also in line with what was specified in the Application, but it was not foreseen that getting rid of the dried sludge had to be done at an extra cost. All costs are covered by

tariffs. The water company does not have any financial problems as all costs are covered by the tariffs and, basically, the company experiences a 100% collection rate. The project beneficiary is assessed to be financially sustainable and operates the facility in a technically sound manner.

4.3 Project description

This section provides a factual description of the project.

4.3.1 Key facts about the project

The project name is "SLUDGE TREATMENT FACILITY AT VILNIUS WASTE WATER TREATMENT PLANT" - CCI No 2009LT161PR001. It is located in the capital Vilnius of Lithuania next to the existing wastewater treatment plant.

The main objective of the project was to construct a new sludge treatment facility at the Vilnius wastewater treatment plant. The facility is a regional facility and was the first priority of the National Sludge Treatment Study and Investment Programme. The facility processes sludge from the Vilnius wastewater treatment plant (90.8%), as well as sludge from nine smaller nearby wastewater treatment plants (9.2%).

The total investment costs were in the Application anticipated to be 61.7 MEUR of which the eligible investment costs constituted 45.6 MEUR, while the difference of 16.1 MEUR were ineligible costs which included VAT and contingencies.

The total realised investment costs were after the tenders reduced to 54.7 MEUR. This is because of realised savings of seven MEUR of which approx. four MEUR were saved on the contractor, one MEUR on services and the remaining were due to reduced VAT costs.

The sources of finance of the investment costs of 61.7 MEUR were according to the Application anticipated to be from an EU grant (27.4 MEUR), National grants (13.0 MEUR), NIB loan (10.3 MEUR) and own financing from the beneficiary (11.1 MEUR).

However, the total financing of the project was 54.7 MEUR, seven MEUR below the anticipated financing in the Application. The financing was obtained as follows: EU grant (23.9 MEUR), National grants (10.8 MEUR), NIB loan (9.8 MEUR) and own financing from the beneficiary (10.2 MEUR). The EU financing constituted 44% of the total financing – both in the Application and in the actual or realised funding.

4.3.2 History / key milestones

The project had a long planning horizon. In November 2004 to May 2006 national feasibility studies were undertaken on how to deal with the sludge from the wastewater treatment plants. Design studies were also undertaken at that time. The environmental impact assessment was undertaken from November 2005 to March 2008. The actual feasibility study was undertaken from October 2009 to February 2010 and the CBA analysis was undertaken from October 2008 to January 2010. Preparation of tender documents was done mid-2007.

The application for major project funding was submitted to the European Commission in June 2010. There was a lengthy approval procedure as during the process of handling the application, the project was audited by three different institutions – the Court of Auditors (in 2011), OLAF⁶ and the National Financial Crime Investigation (in 2010-2011) as problems were emerging regarding the way in which the public procurement was carried out for the project as well as issues related to environmental concerns. During this process, an amended application was submitted in February 2012 clarifying state-aid issues, addressing environmental concerns and revising the CBA. Also, the Lithuanian authorities had to confirm their assessment on state-aid using analytical grids in April 2013. The final judgement was that there were no irregularities and no reasons for financial corrections and the application was initially approved in August 2013 with the final decision in December 2013.

In the application, the construction starting date was assumed to be end of September 2008 and the completion date was anticipated to be end of July 2013. The realised construction period was exactly identical to the planned period, although the construction of the facility was completed 1 month before planned.

As explained above, the approval of EU Cohesion Fund financing did not emerge until August 2013, i.e. after the project had been completed. The project was thus initialised and implemented even without a decision on financing from Cohesion Funds. Actually, the construction was initialised even before the application was submitted. This was done on the basis of a decision by the Government of Lithuania and the beneficiary. During construction, the project experienced a construction stop for a period of six months as there were no funds for payment of the contractor⁷. The Government of Lithuania then decided to take the risk and provided bridge financing for a period until the application for Cohesion Funding was approved.

Even with the construction stop, the contractor was still able to stick to the original implementation plan and the operation of the facility, which was anticipated to start in August 2013, started one month ahead of schedule - in July 2013.

4.3.3 Main objectives and outputs

The objective of the project was to comply with the EU Sludge Directive 86/278/EEB and treat all sludge from the region. An additional objective was to reduce the smelling environment from piles of untreated sludge at the wastewater treatment plant, which affected half the population living in the capital.

The output of the project was a sludge treatment facility catering for Vilnius City's and surrounding municipalities' generation of sludge and converting the sludge to proper fertilizers through composting and mixing with green waste. The application envisaged that within 4-5 years a waste incineration facility would be constructed in Vilnius and the treated sludge would be incinerated at the plant. Until then, the sludge would be used as fertilizer and stored, if necessary. The observation from the case study is that no incineration plant has been constructed and that this is not foreseen for the immediate future either. The implications of this are discussed below.

⁶ The date/year of this investigation has not been made available to the evaluation team

⁷ Construction was stopped for six months, but the actual delay was probably closer to nine months as the period of construction stop was in the summer season, which has the most appropriate weather conditions for the construction works.

The anticipated capacity of the facility was to handle 62 MT sludge per day whereas the realised sludge processing capacity was 62.1 MT/day, which is identical to the planned capacity.

The plant was planned and operates with four main stages in sludge treatment:

- Preliminary dewatering through centrifuges
- Thermohydrolysis (to dry the sludge and reduce need for digester capacity)
- Digestion (to produce biogas and, consequently, electricity)
- Final drying

4.3.4 Key stakeholders

The project beneficiary is JSC Vilniaus Vandenyys, the largest water supply company in Lithuania, which operates water supply and wastewater networks in Vilnius City, Šalčininkai, Švenčionys and Vilnius District. The Company provides water supply and wastewater collection and treatment services. JSC Vilniaus Vandenyys is the project owner and applicant.

The relevant authorities apart from the water company are the municipalities benefitting from the sludge treatment facility, the Ministry of Environment and the Public Procurement Office.

The Ministry of Environment is responsible for the operational programme and for strategic planning for the environmental sector.

The Public Procurement Office co-ordinates the activities of public procurement, supervises compliance of procurement activities in accordance to the Law on Public Procurement and the implementing legislation. The Public Procurement Office approves all public contracts as well as any variations to the contracts.

The Environmental Projects Management Agency under the Ministry of Environment handles all processes in relation to the EU and supervises projects implemented on behalf of the Ministry.

4.4 Relevance of the project

4.4.1 Coherence with policy objectives

The Sewage Sludge [Directive 86/278/EEC](#) seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and man. To this end, it prohibits the use of untreated sludge on agricultural land⁸. Treated sludge is defined as having undergone "biological, chemical or heat treatment, long-term storage or any other appropriate process so as significantly to reduce its fermentability and the health hazards resulting from its use".

The project objectives are thus consistent with the EU Sludge Directive targets and this was part of the selection criteria for the project.

⁸ unless it is injected or incorporated into the soil

The project is in line with the national strategic framework for the environment sector and the water and wastewater sector in particular. Before and after EU Membership, the first priority was wastewater treatment and improvement of environmental conditions in the Baltic Sea. In the 1990s after Lithuania gained independence, five major cities were selected and wastewater treatment plants constructed along with networks/pipes to connect the population. Later, starting from 2004, the project activities covered the whole territory of Lithuania.

The second priority after securing wastewater treatment was to deal with the sludge. Initiatives in this field were taken in 2006 with a sludge management study covering the whole of Lithuania. The result was a National Sludge Management Plan called "Investment Plan for Sludge Treatment" for the period 2007-2013. This project was one important component in this plan, which also comprised construction of sludge treatment facilities in other cities. In total, 12 sludge treatment facilities were envisaged – of which the one in Vilnius was the biggest. This was made part of the environmental operational programme (2007-2013) with EU funding envisaged for all facilities. As the project in Vilnius exceeded the threshold for major projects, this project was implemented under the relevant requirements, whereas the other 11 projects were smaller and implemented as part of the operational programme. Out of the 11 other projects, nine were constructed during the 2007-2013 period, whereas two were postponed for 2014-2020 mainly due to difficulties relating to procurement⁹.

The background for the sludge treatment plan and the Vilnius project was the objective to fulfil the requirements in the Urban Wastewater Treatment Directive and the Sludge Treatment Directive, but also to a very large extent because the environmental authorities recognised that there was a problem. Large parts of the population of the city of Vilnius were affected by bad smells from the piles of untreated sludge. This had also become a political issue due to many complaints received.

4.4.2 Consistency with needs in the territory

The capacity of the sludge treatment facility of 62 MT/day sludge was constructed according to the planned sludge treatment capacity. No major changes in project scope were made during project implementation. The average load per day varies between 45-60 MT/day. The project beneficiary informed that in 2014 the average load was 47 MT/day. This is slightly lower than foreseen, and there is still scope to accommodate increased loads due to larger volumes of wastewater being treated, following a slight population increase expected in the Vilnius area. Judging from the first years of operation, the capacity is proportionate to the needs. The treatment facility can also handle the sludge from the surrounding municipalities' wastewater treatment plants, as planned in the National Sludge Management Plan.

4.5 Project performance

4.5.1 Fulfilment of objectives

The project objectives, as described above in section 4.3, have been reached. This regards the capacity of the facility, as well as treating the sludge from wastewater treatment plants in the Vilnius area.

⁹ Interview with Ministry of the Environment

As mentioned above, the application built on the assumption that a waste incineration plant would be built in Vilnius and that this plant could be used for incineration of treated and dried sludge from the sludge treatment facility. The understanding from interviews undertaken is that no such plant has been constructed and that original plans are delayed and there is considerable uncertainty about this project. This leads to concerns about the sustainable management of the treated sludge. From the interviews, it has been informed that it has proven possible to use the treated sludge to produce compost. The Vilnius Water Company currently pays another company to handle the treated sludge and ensure its use as compost and otherwise. According to interviews, it has until now proven possible to find use for the treated sludge and there was no mention of expected problems in this regard, however, given the fairly large amounts produced, the sustainability of the current set-up could be a concern in the future.

According to interviews, the quality of dried, treated sludge is regularly checked and there was no mention of any problems with regard to heavy metal content. Academic articles have raised some concerns in this respect¹⁰, however, these date from before the construction of the sludge treatment plant and thus cannot serve as information source concerning the situation when the plant is in operation. Any content of heavy metals would originate from industrial wastewater and action to restrict this would thus also involve action towards the specific industries, which are allowed to use the common wastewater facilities.

4.5.2 Implementation effectiveness

Table 4-1 shows the anticipated dates for the start and completion of the construction works as well as the operational starting date as reported in the Application. This is compared to the actual dates in the far-right column.

Table 4-1 *Planned and realised implementation plan*

Ref.		Application	Realised
AF p. 42		Date	Date
	Construction start date	29/09/2008	29/09/2008
	Construction end date	29/07/2013	1/07/2013
	Operation start date	1/8/2013	19/07/2013

As shown in Table 4-1, the project was implemented with remarkable precision. The actual construction phase was as anticipated and the operation of the facility started slightly ahead of schedule. The project was thus implemented on schedule and on budget.

During interviews with the beneficiary, it was emphasized that a good and financially strong contractor who delivers high quality outputs is essential for proper project implementation. That was emphasised as the main reason for the timely implementation of the project.

The main challenge in respect to project implementation, according to the stakeholder interviews, was that obtaining the financing from the EU was a lengthy process with many rounds of questions and submissions before the project was approved by the EU. The Lithuanian authorities decided to start

¹⁰ (DETERMINATION OF CADMIUM IN A MUNICIPAL SEWAGE SLUDGE BASED COMPOST BY SPECTROPHOTOMETRIC METHOD Viktorija Podgaiskytė, Journal of Environmental Engineering and Landscape Management, 12/2009.

the project at their own risk and, when financing was needed, bridging finance was provided by the Ministry of Finance. If EU financing had been available from the start, the project could have been implemented six to nine months ahead of schedule. If bridging finance had not been provided by the Lithuanian government, the beneficiary considers that the project would have been delayed by several years.

4.6 Technical and financial sustainability

4.6.1 Technical operation

After inspection of the facility and through discussions with the technical director of the facility, it is concluded, that the facility is operating as intended and satisfactorily. There have been no operational interruptions in the operations of the facility since July 2013 where the facility started operating. Staff was trained by the contractor during project implementation and no problems are experienced in operating the facility and they are capable of operating the facility.

There are no organisational issues related to the operations of the facility, which can impede the operational sustainability of the facility.

The facility has had several visits from interested foreign persons who wanted to see and experience how such a facility can work. Hence, it actually also stands as a demonstration project.

From a technical point of view, it is thus concluded that the facility is operating as intended and producing the expected dried sludge ready for composting. Hence, the facility itself is assessed to be technically sustainable. As mentioned above, the main concern with regard to technical sustainability is related the management of treated, dried sludge from the facility as large amounts of dried sludge are produced and it may be questioned whether these can be used as compost and for other purposes as no waste incineration plant exists and the plans to build one seems to have been put on hold.

4.6.2 Operating budget

The operating costs of the sludge treatment facility were budgeted to be around 2.7 MEUR per year . Minor fluctuations occurred in the annual operating costs for two main reasons. The first is variations in the amounts of wastewater received at the Vilnius wastewater treatment plant – primarily due to variations in the rain amount (weather related) - as the population around Vilnius has remained stable. The second cause of minor deviations in the annual operating costs is related to variations in receipts of sludge from the surrounding municipalities' wastewater treatment plants.

The actual operational costs are, however, higher than foreseen, because of the unforeseen costs related to getting rid of the treated, dried sludge. These were not anticipated in the Application as the Application foresaw that this would be handled through incineration. Apart from this, the operating costs of the facility are consistent with the budget in the Application with minor fluctuations. The analysis of the quality of the financial analysis showed that the budget for maintenance of the facility (EUR 111,080/year) may be underestimated as experience shows that costs around 1.5% of total investment costs should be calculated for this (i.e. approximately 0.6 MEUR/year). It is not possible based on current information to judge whether this is the case as the facility is so new no major repairs have been required yet. However, as indicated below, the Water Company is aware that future

major repairs will have to be paid through tariffs, which indicates an awareness that not all maintenance costs are included in the budgeted operating costs.

No other deviations in the operational costs can be expected in the years to come. No cost elements were misjudged, apart from the cost of getting rid of the sludge, and only small deviations in the operation and maintenance costs will occur due to variations in the volumes of wastewater received at the wastewater treatment plants.

4.6.3 Financial sustainability

As explained above, the Beneficiary experienced a cash flow problem during the implementation or construction period of the project, however, this was solved first in an intermediate solution where bridge financing was provided by the Lithuanian Government, and finally, with approval of the project by the European Commission and the release of Cohesion funds to co-finance the project.

Interviews, supported by documentation provided by JSC Vilnius Vandeny, show that the company has not experienced cash flow problems during the operational period. All costs are covered through tariffs charged to the consumers for wastewater service provision.

The Water Company did experience some minor problems (complaints) in relation to the acceptability of tariffs, but that was considered as normal or expected (nothing exceptional) as the tariff had to increase following implementation of the project. The Water Company did not experience any difficulties in invoicing the customers and/or in collecting the payments with a collection rate very close to 100%, which implies that tariffs are affordable for all income groups of the population. During interviews, it was explained that the institutional set-up for deciding tariff levels as set out in the Application still prevailed. I.e. there is a national authority (the National Control Commission for Prices and Energy), which holds the power to set the tariffs to ensure cost recovery and this mechanism contributed to ensure that tariffs were maintained at the necessary level – even when municipalities wanted lower tariffs. The assumptions made in relation to the population's ability to pay for the services are thus deemed to be realistic.

The Beneficiary informed that from 2010 to the present the JSC Vilnius Vandeny had annual net profits demonstrating the financial sustainability of the company. For the rehabilitation of the project assets, which deteriorate over time, the JSC Vilnius Vandeny expects to finance this through savings of depreciations and through additional loans, which will be covered by tariffs.

4.7 Good practises and possible policy implications

Good practises and prerequisite for smooth project implementation experienced by the Beneficiary can be summarised as:

- The project was well planned. This was due to that the National Sludge Management Plan outlined the strategy to construct the 12 sludge processing facilities in Lithuania as well as the technology to be used. Hence, there was no need for further discussion of the strategy before implementation – nor during implementation. The feasibility study behind the Sludge Management Plan was well prepared, including precise estimates of costs, and there was no need for major changes during the project.

- The staffing in the Project Management Department at the JSC Vilniaus Vandenyys possessed the right qualifications and they could draw upon expertise from the various department within the JSC Vilniaus Vandenyys as well as from the Ministry of Environment and Vilnius Municipality.
- It was emphasized that a good contractor which is financially strong and delivering high quality outputs is essential for proper project implementation.

Problems experienced by the Beneficiary:

- The Beneficiary found that the decision making process at the EU level in approving the Application was slow due to the extra investigations and further documentation requirements (ref. section 4.3.2). As seen in section 4.3.2 there were also national investigations, which also contributed to slow down the decision making. The Beneficiary understands that extra scrutiny is needed for the major projects, but it was still regarded as an overly cumbersome and time consuming process. The Ministry of Environment considers that it was beneficial that ceiling for major projects in the environmental sector was raised from 25 MEUR to 50 MEUR.

5 Lessons learned from pilot case studies

This chapter presents the lessons learned from the pilot case studies in respect to interview guide and instructions to the experts responsible for the case studies. This is done with a view to improving the quality of the remaining eight case studies.

5.1 Interview guide

For the purpose of conducting the interviews a generic interview guide was developed along with instructions for the experts. These instructions – among other things – included that experts should develop a list of more specific interview questions catered to the individual project.

The experience from the pilots is that the generic interview guide works in the sense that it covers the main subjects to be discussed with the stakeholders during interviews. However, it is extremely important that specific interview questions are prepared for each project drawing on the observations made during the desk studies in task 2 and 3 (task 3 observations only relevant for operational projects). The experts responsible for the case studies should therefore prepare specific interview questions and submit these for approval by the key experts before conducting the interviews. This has been further accentuated in the updated version of the instructions.

As agreed during the Steering Committee meeting on 15 April, questions of a more general nature on the progress in implementing the major projects and the operational programmes were included in the list of questions to be asked to Managing Authorities. The experience from the pilot case shows that it is possible to have an overall discussion on these issues in the framework of the interviews. However, the questions and subjects of discussion remains at an overall level. More detailed and specific questions would require more preparation and insight into the relevant major projects and operational programmes, which is beyond the scope of the case project exercise. The questions included in the interview guide are based on what is considered feasible based on the experience from the two pilot studies. It is suggested that the qualitative data collected from responses to these interview questions is not reported in the case study report, but in a separate note, which can feed into the analysis of the contribution of Cohesion Policy to the objectives of environmental policy in the EU.

5.2 Verification of the case study reports

The two reports as presented in chapters 3 and 4 have not (yet) been reviewed by the key stakeholders who were interviewed to check for factual mistakes and misunderstandings. However, it is considered relevant to incorporate this into the procedure for conducting the case studies, and the instructions have therefore been amended to include this.

5.3 Identifying the correct interview persons and arranging interviews

The experience from the two case studies reveal two different models for identifying interviewees and arranging interviews. In Lithuania, the project beneficiary was very helpful and assisted in putting together an interview programme – and with all stakeholders located in Vilnius, this was also practical from a logistical point of view. This greatly facilitated the case study and also served to ensure that

the most relevant persons were interviewed. In Poland, the expert had to take a more active role in contacting the various stakeholders and this also meant more logistical challenges. However, the fact that the expert was located in Poland made it easier. Furthermore, in Lithuania it was fortunate that key interview persons had been in their positions for a relatively long period of time and thus, the institutional memory of the project was very good. This was not the case to the same extent in Poland. The lesson learned is that the core team will make an effort to introduce the case study through the contact person identified in connection with task 3 and will try to arrange with that person that he or she can take charge of identifying the right interview persons and arranging the interview programme, if possible. Once the model is agreed, the case study will be 'handed over' to the relevant expert.

Appendix A Persons met and Itinerary - Vilnius

Day and time	Organisation	Persons met
Tuesday 12.5.2015		
12:00-14:00	JSC Vilniaus Vandenys	Valentinas Miltienis – Director General of Vilniaus Vandenys; Vanda Kalpokienė – Chief Financial Officer of Vilniaus Vandenys; Jolanta Žukauskaitė – Project Financial Manager of Vilniaus Vandenys; Linus Didrikas - Deputy director development and Sales of Vilniaus Vandenys
14:00-17:00	Site visit to the sludge processing plant at Vilnius wastewater treatment plant	Linus Didrikas - Deputy director development and Sales of Vilniaus Vandenys
Wednesday 13.5.2015		
9:00-10:00	Ministry of Environment	Inesis Kiskis, Director, European Union Assistance management Department Vilma Slavinskienė – Head of European Union Funds Management Division of the Ministry of Environment of the Republic of Lithuania Raimonda Juknaite, Chief Desk Officer European Union Funds Management Division of the Ministry of Environment of the Republic of Lithuania
10:00-11:00	Environmental Projects Management Agency under the Ministry of Environment	Monika Gudžiūnaitė – Senior Project Manager, Department of Pollution reduction projects Environmental Projects Management Agency under the Ministry of Environment of the Republic of Lithuania. Konstantinas Strazdauskas – Project Manager, Department of Pollution reduction projects Environmental Projects Management Agency under the Ministry of Environment of the Republic of Lithuania.
11:00-13:00	JSC Vilniaus Vandenys	Linus Didrikas - Deputy director development and Sales of Vilniaus Vandenys

Appendix B Pictures from the project site - Vilnius







Appendix C Persons met – Gdansk

The following persons were interviewed in the preparation of this case study:

From the City of Gdańsk:

Izabela Kus, Director of the Department of Development Programmes, City of Gdańsk

From the utility company:

Maciej Jakubek, Member of the Management Board for Technical Activities

Piotr Gołaszewski, Main Specialist for Investments and Development

Katarzyna Polińska, Specialist for Reporting and Analysis, Project Implementation Unit

Appendix D Pictures of the facility - Gdansk



Figure 1. Photos of the biogas power facility

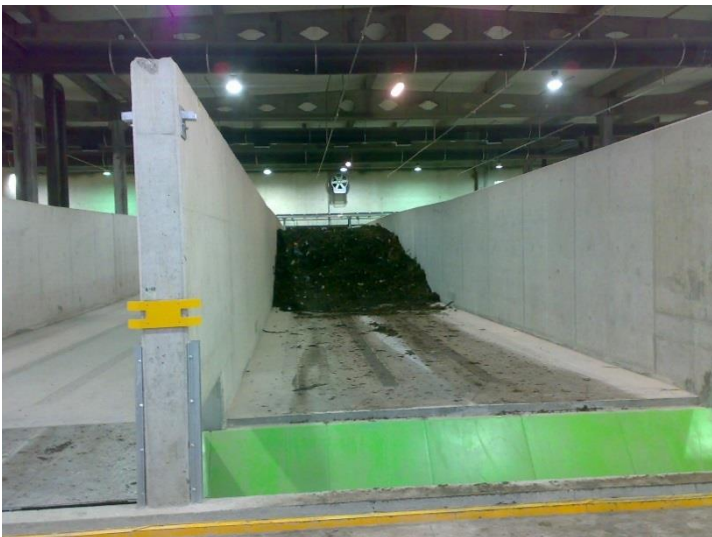


Figure 2. Photos of the composting facility



Figure 3. Photos of the sorting plant





Figure 4. Photos of the treatment facilities



Figure 5. View of the composting windrows

Appendix E Activities, tasks, and consistency with programming documents - Gdansk

	Area of activity	Task	Consistency with programming documents
1	Reduce volume of waste landfilled	Construction of a sorting station, together with required infrastructure	Consistent with Operational Programme 'Infrastructure and Environment', the chapter of the National Waste Management Programme on sorting municipal solid waste, and Directive 1999/31/EC
		Construction of a segment for handling bulky waste and WEEE	Consistent with Operational Programme 'Infrastructure and Environment' and the chapter of the National Waste Management Programme on handling of bulky waste and WEEE
		Construction of a platform to accept waste from physical persons	Consistent with National Environmental Policy 2003-2006, with perspective for 2007-2010
		Construction of a segment for accepting and storage of hazardous waste	Consistent with Operational Programme 'Infrastructure and Environment', the Strategy for Absorption of Cohesion Fund sources, and Directive 91/689/EEC
2	Reduce landfilling of biodegradable waste	Construction of a composting facility	Consistent with Operational Programme 'Infrastructure and Environment', the chapter of the National Waste Management Programme on treatment of organic waste, and the Second National Environmental Policy
3	Protect surface and groundwater sources	Construction of separate sanitary sewer, leachate, and stormwater system, with retention and pumping stations	Consistent with Operational Programme 'Infrastructure and Environment', assumptions of the National Development Strategy for 2001-2006, and the chapter of the Second National Environmental Policy on the protection of surface and ground water
		Liquidation of dumpsites and recultivation of land	Consistent with Operational Programme 'Infrastructure and Environment' and the assumptions of the chapter of the Second National Environmental Policy on the protection of surface and ground water
4	Ensure effective leachate management	Construction of biological and chemical treatment of leachate	Consistent with Operational Programme 'Infrastructure and Environment'
5	Adapt landfill to waste management laws in force	Modernisation of municipal solid waste cells	Consistent with the National Waste Management Programme and the Operational Programme 'Infrastructure and Environment'
		Construction of a cell for storage of asbestos waste	Consistent with the Provincial and National Waste Management Programmes and the Operational Programme 'Infrastructure and Environment'
		Construction and modernisation of technical infrastructure	Consistent with the National Waste Management Programmes
6	Prevent air pollution	Construction of CHP plant using landfill gas	Consistent with the chapter of the National Environmental Policy on air protection

[INSIDE BACK PAGE]

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