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Report No: 32290

IMPLEMENTATION COMPLETION REPORT  
(SCL-42860 TF-29496 TF-20124)

ON A

LOAN AND GEF GRANT

IN THE AMOUNT OF US\$ 7.95 MILLION AND SDR 3.8 MILLION

TO THE REPUBLIC OF LATVIA

FOR A

MUNICIPAL SOLID WASTE MANAGEMENT PROJECT

May 6, 2005

**Environmentally and Socially Sustainable Development Unit (ECSSD)**  
**Europe and Central Asia Region (ECA)**

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## CURRENCY EQUIVALENTS

(Exchange Rate Effective April 22, 2005)

Currency Unit = Latvian Lats  
Lats 1 = US\$ 1.85  
US\$ 1 = Lats 0.54

## FISCAL YEAR

January 1 – December 31

## ABBREVIATIONS AND ACRONYMS

CIDA	Canadian International Development Agency
ERR	Economic Rate of Return
EU	European Union
FRR	Financial Rate of Return
GEF	Global Environmental Facility
ICB	International Competitive Bidding
LFG	Landfill Gas
LVL	Latvian Lats
MTR	Mid Term Review
MW	MegaWatt
MWh	MegaWatt hour
NCB	National Competitive Bidding
NPV	Net Present Value
NRT	Natural Resources Tax
PCD	Project Concept Document
PPU	Project Procurement Unit
QAG	Quality Assurance Group
RCC	Riga City Council
SAR	Staff Appraisal Report
SCL	Single Currency Loan
SDR	Special Drawing Rights
SIDA	Swedish International Development Agency
TF	Trust Fund
VAT	Value Added Tax

Vice President:	Shigeo Katsu
Country Director	Daniela Gressani
Sector Manager	Juergen Voegele
Task Team Leader/Task Manager:	Inesis Kiskis

**LATVIA**  
**Municipal Solid Waste Management Project**

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<i>Project ID:</i> P040553	<i>Project Name:</i> Solid Waste Management
<i>Global Supplemental ID:</i> P045716 ( <i>Fully Blended</i> )	<i>Supp. Name:</i> Solid Waste Management
<i>Team Leader:</i> Inesis Kiskis	<i>TL Unit:</i> ECSSD
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> June 30, 2005

## 1. Project Data

*Name:* Solid Waste Management *L/C/TF Number:* SCL-42860; TF-29496  
*Country/Department:* LATVIA *Region:* Europe and Central Asia Region

*Sector/subsector:* Solid waste management (48%); Renewable energy (47%); Other industry (5%)

*Theme:* Pollution management and environmental health (P); Climate change (P); Other urban development (P)

### KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 09/26/1995	<i>Effective:</i> 07/30/1998	07/30/1998
<i>Appraisal:</i> 07/25/1997	<i>MTR:</i> 11/03/2001	11/03/2001
<i>Approval:</i> 02/26/1998	<i>Closing:</i> 06/30/2003	12/31/2004

*Supplemental Name:* Solid Waste Management *L/C/TF Number:* TF-20124

*Sector/subsector:* Solid waste management (70%); Renewable energy (29%); Other industry (1%)

*Theme:* Pollution management and environmental health (P); Climate change (P); Other urban development (P); Technology diffusion (S)

### KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>GEF Council:</i> 09/26/1995	<i>Effective:</i> 07/30/1998	07/30/1998
<i>Appraisal:</i> 07/25/1997	<i>MTR:</i> 11/03/2001	11/03/2001
<i>Approval:</i> 07/25/1997	<i>Closing:</i> 06/30/2003	12/31/2004

*Borrower/Implementing Agency:* REPUBLIC OF LATVIA/RIGA CITY COUNCIL

*Other Partners:* Swedish International Development Agency (SIDA); Canadian International Development Agency (CIDA)

### STAFF

	<i>Current</i>	<i>At Appraisal</i>
<i>Vice President:</i>	Shigeo Katsu	Johannes Linn
<i>Country Director:</i>	Daniela Gressani	Basil Kavalsky
<i>Sector Manager:</i>	Juergen Voegele	Michele de Nevers
<i>Team Leader at ICR:</i>	Inesis Kiskis	Anders O. Halldin
<i>ICR Primary Author:</i>	Inesis Kiskis; Anders O. Halldin; Frank M. Stubenitsky	

## 2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

	<u>Rating</u>
<i>Outcome:</i>	S
<i>Sustainability:</i>	HL
<i>Institutional Development Impact:</i>	SU
<i>Bank Performance:</i>	S
<i>Borrower Performance:</i>	S

	QAG (if available)	ICR
<i>Quality at Entry:</i>	HS	S
<i>Project at Risk at Any Time:</i>	Yes	

Project was reviewed for Quality at Entry and Quality Assurance Group. While quality at entry was evaluated as highly satisfactory, the quality of supervision in 2000 was deemed to be unsatisfactory. As a result of this review, the project team adopted certain changes in supervision strategy, reverted the negative tendencies in implementing the project, which allowed to achieve the stated project objectives.

## 3. Assessment of Development Objective and Design, and of Quality at Entry

### 3.1 Original Objective:

The objective of the Project was to improve management of solid waste through measures which would improve environmental quality, contain contamination of ground water and create new financial arrangements for recovery of the cost of solid waste services.

The project objective was clear and realistic. It was in line with both national priorities and the Country Assistance Strategy of 1994, and was based on extensive field visits jointly conducted by Latvian and World Bank specialists.

### 3.2 Revised Objective:

The project Objective was not revised

### 3.3 Original Components:

Component	Cost;	Rating
Remediation of existing landfill	\$3,400,000.00	S
Technical and operational improvements	\$7,100,000.00	S
Gas collection and energy production	\$7,300,000.00	S
Managerial improvements	\$1,600,000.00	S

### 3.4 Revised Components:

The project was not restructured and the substance of components was not revised. However, the specific activities were adjusted to reflect the changing circumstances in order to achieve the project objectives. For

example, in order to comply with EU-Regulations, the Government decided that more stringent rules should be applied to prevent leakage of untreated leachate into groundwater. Therefore, lining of the energy cells with polyethylene membrane was included in addition to the already planned clay liner. Moreover, the project was able to finance construction of more energy cells than originally planned (seven, rather than only four).

### *3.5 Quality at Entry:*

QAG reviewed the project quality at entry and judged it to be highly satisfactory.

## **4. Achievement of Objective and Outputs**

### *4.1 Outcome/achievement of objective:*

The Project has achieved all its stated objectives. The Project has resulted in a state-of-the-art municipal solid waste management facility, and has already demonstrated how an obsolete and environmentally problematic site can be converted into an environmentally sound facility providing services at an affordable cost for inhabitants of Riga. The current cost to customers is about US\$ 14.5/ton, compared with about US\$ 30/ton if a traditional waste disposal site meeting Western-European standards would have been built. (See more under Section 4.4)

Other important results of the Project include arresting ongoing ground and surface water contamination, treatment of collected leachate to a level, which in some cases is even higher than the background values for surrounding surface water, and the large reduction in emission of greenhouse gases. Over the lifetime of the Project, calculated at 25 years, the estimated reduction of Carbon Dioxide (CO<sub>2</sub>) equivalent is about 5.5 million tons. At appraisal this figure was estimated to be 5.85 million tons.

### *4.2 Outputs by components:*

The main outputs of the Project by component are as follows:

- i) Remediation of existing disposal site: The dump, which has been in use since 1965, has been completely remediated, covered by soil, and revegetated. Leachate from that part of the landfill, which earlier drained into the groundwater, is now collected and treated in accordance with both Latvian and international regulations.
- ii) Technical and operational improvements to meet "western" sanitary landfill requirements: These improvements include lining the bottom of the energy cells to enable complete collection of leachate; treatment of the leachate; collection of landfill gas containing methane; and burning the methane to reduce the emission of global warming constituents.
- iii) Establishment of a sorting line for separation of recyclable materials and arranging for storage of separated material as well as hazardous waste: This activity has been subcontracted to a company linked to "Green Point" organization, which operates on the site with mobile sorting equipment. This company has contracted all the remaining scavengers, who now have employee status and are paid on a monthly basis, working several days a week on shift system. In parallel, the major waste hauling company promotes waste separation at source - more than 5000 containers for various types of sorted waste (e.g. glass, plastic, organic waste, paper, metals) are placed throughout Riga. Such a practice significantly contributes to delivery of "cleaner" waste and to extended lifetime of the energy cells.
- iv) Establishment of a modern waste management technology based on energy cells for enhanced

degradation of easily biodegradable waste: The energy cells (designed to be 10) are being gradually phased in, and the last one will become operational in 2007. At the completion of the Bank supported activities, 7 energy cells have been implemented, as compared to only 4 cells according to the SAR, which indicates that the implementation actually is ahead of schedule.

v) Collection of landfill gas: Landfill gas with a methane content of about 50% or more is collected from both the old waste pile and the newly established energy cells. The collection of gas from the energy cells is gradually increasing, and the amount is on par with the forecast made at appraisal. There are 166 gas wells on the old waste pile, of which only approximately 120 function as expected. Therefore, the gas collection from the old waste pile is below expectation due to a number of problems with installed gas wells as well as collection pipes. Getlini Eko's own staff, after training under the SIDA financed technical assistance, have started to restore malfunctioning gas wells and will during 2005 establish new wells to replace those which are not repairable. As a result of research in the framework of the technical assistance, 29 wells have been revitalized, while 16-20 wells will be closed and replaced by new ones, equipment procured under the loan.

vi) On-site generation of electricity by use of gas engines with direct delivery to the grid: Since the gas yield in energy cells is steadily increasing, it is expected that the 5MW capacity of the Electricity Conversion Unit (ECU) will be reached during 2006, even without all designed cells being connected to it. Therefore, the management of Getlini Eko will need to make a decision on increasing the capacity of ECU to at least 7 MW in the near future, as the procurement and installation of additional gas engine/s will take about one and a half year. However, Getlini Eko will be in position to finance this investment from its own resources. The capacity might need to be even further increased to utilize the forecasted amount of landfill gas, but it should be left to Getlini Eko management's decision if this additional investment is justified with regard to expected sale of electricity beyond the capacity of 7 MW.

vii) Technical and Managerial assistance through twining arrangements to enable the staff of the landfill to efficiently operate the waste processing system and to achieve maximum revenues from generated landfill gas and the separated by-products: Twining arrangement was financed by SIDA, and the partners of Getlini Eko were Nordvästra Skånes Renhållnings AB (NSR) and Sweco. During the Project the twining partners helped Getlini Eko in these particular areas. The original arrangement was extended until June 2004 to allow for additional work in solving the problems of nonfunctional gas wells in the old landfill.

Furthermore, the Canadian International Development Agency (CIDA) provided technical assistance during the first part of Project implementation, assisting Getlini Eko in reviewing detailed design documents and tender documents. The CIDA consultants also provided advice regarding the physical implementation and supervision for the initial phase of the Project. Since the technology of gas collection was very new, it took time and effort to apply this advice in practice.

#### *4.3 Net Present Value/Economic rate of return:*

The economic analysis of the Project, in particular the net present value (NPV) and the economic rate of return (ERR) is derived from the financial cost-benefit analysis, with several adjustments on both the cost and the revenue sides. On the cost side, VAT payments on the investments have been excluded, as has the subsidy payment to the Stopinu Pagasts community. On the revenue side, three sets of adjustments have been made. First, the sales of electricity have been valued at the import parity price of LVL 13.00/MWh (US\$ 24.07/MWh) which are significantly below the financial price (US\$63.61/MWh). Second, the intangible environmental benefits in the form of captured methane gas have been factored in. Full details of the assumptions and calculations, as well as a comparison with the SAR are presented in Annex 3, Part 1. Third, the cost savings from not closing the Getlini site as a result of the project have also been added to the

benefits stream. Without the project, following the Cabinet of Ministers Decree passed at the beginning of the project preparation, the Getlini site would have been closed and a new site developed. The corresponding costs, amounting to investment costs of US\$ 4.02 million and post-closure operational costs of US\$ 0.99 million from 2004 onwards, were therefore avoided by the project which enabled waste management operations to continue at the Getlini site. These costs savings, however, were not taken into account at appraisal in the economic and financial analysis of the project.

In large part because of these cost savings, the result of the economic analysis is more favorable than that at appraisal: the ERR is 18.45% against the 15% shown in the SAR, while NPV at a discount rate of 10% is US\$ 6.5 million.

A sensitivity analysis similar to that for the FRR assuming a 25% increase in waste disposal fees and in the import parity price for electricity, improves the ERR to 20.44%. Increased waste disposal fee and electricity tariffs are very likely to become effective as of 2006 and the financial and economic performance of the Project would then improve further.

#### *4.4 Financial rate of return:*

#### 4.4 Financial Analysis

The financial analysis of the Project's net present value (NPV) and the financial rate of return can be conducted from two perspectives: either from the company's point of view or from the Riga City Council perspective. The former is comparable to the SAR financial analysis, while the latter is comparable with the ICR economic analysis presented in section 4.3.

The financial analysis from the company's point of view is based on the company's cash flow projections, corrected for the pre-project situation. This means that operating costs and revenues from the disposal operation before the start of project implementation need to be deducted from the respective expenses and revenues streams. The cost stream includes the investments in the Project and the continuing annual investments assumed at the level of US\$ 250,000, as well as the investment in the 2 MW generating capacity. A residual value of 15% of the project's investment has been introduced in year 2025. Full details of the assumptions and the calculation, as well as a comparison with the SAR are in Annex 3, Part 2.

The results of the analysis show that the financial rate of return is 9.85%. The NPV at 10% is almost zero (negative US\$ 198,000). This compares to SAR estimates of 11.93% FRR, and NPV at 10% discount rate was estimated to be US\$ 2.13 million. There are various explanations for the lower FRR relative to SAR estimates: the principal factor is the delay in the start of normal electricity production which substantially reduced the income from electricity sales during 2003. As indicated in the analysis of the SAR, the FRR was particularly sensitive to this variable, as a one year delay in electricity benefits was shown to reduce the FRR by 2.06% from 11.93% to 9.87%. The other reason for the lower FRR is the fact that operational and administrative costs were clearly underestimated; there has been a dramatic "catching-up" phenomenon in wages, salaries and cost of services since 1997. Another but minor negative factor is the disappearance of sorted waste as a source of additional revenues; it was estimated at US\$ 200,000/year in the SAR. A positive factor is the higher price paid for electricity sold to Latvenergo, at an actual price of US\$ 63.61/MWh compared to US\$ 48.15/MWh at appraisal (actual of LVL 34.35/MWh compared to LVL 26.00/MWh at appraisal).

A sensitivity analysis has been carried out, assuming an increase in benefits. In fact, the probability of both higher electricity sales prices and increased waste disposal tariffs seem quite high. Discussions with



staff of Getlini Eko, as well as with the Public Utilities Commission and the Riga City Public Service Regulator have confirmed the likelihood of both higher electricity sales prices to Latvenergo and increased waste disposal tariffs. Regarding the waste disposal tariffs, which are currently invoiced on the basis of cubic meters, new tariffs are likely to be introduced towards end-2005 or early 2006 in conjunction with invoicing based on measured weight, rather than on eye-estimated volume which has been the practice so far. It has therefore been assumed that both prices would increase by 25% to be applied from 2006 onwards. The calculation based on these increases shows that the FRR would increase from 9.85% to an estimated 12.36%, and the NPV at 10% would contribute US\$ 3.6 million to the company's long-term results. Finally, assuming a discount rate of 6% rather than 10%, since 6% is closer to the opportunity cost of capital observed during that period, would result in a positive NPV of US\$ 8.3 million.

To be comparable with the ICR economic analysis, we have also performed the financial analysis from the Riga City Council point of view, instead of the company point of view. Practically, this means that the cost savings resulting from not closing the Getlini site in the "with-project" situation are added to the stream of benefits. From the Riga City Council point of view, the FRR becomes significantly higher at 21.95%, and the NPV using the 10% discount rate comes to US\$ 6.5 million. The Financial internal rate of return (21.95%) is higher than the economic internal rate of return because the financial price of electricity is significantly higher than the economic price. The environmental benefits which accrue late in the project are too discounted to compensate for the lower economic price of electricity.

#### *4.5 Institutional development impact:*

Institutional development impact is substantial. The project triggered the creation of a Procurement Unit (PPU) in Riga City Council and the establishment of a new company Getlini Eko for implementation of the Project and subsequent operation of the landfill. Both entities at the end of the project are mature and fully up to the tasks they have been entitled to perform: the Loan and GEF Grant proceeds have been fully disbursed and Getlini Eko operates without losses and meets the strict environmental standards. The PPU has gained experience and capacity to implement complex large scale projects, which is of high value to Riga City Council, which is involved in implementation of a number of projects, especially those financed by EU structural funds.

The years of project implementation proved that creation of a new company can be a slow and painful process, requiring a lot of effort and patience before the first results start to appear. In that respect, a twinning arrangement with a Swedish partner was very useful - both in technical and managerial terms.

## **5. Major Factors Affecting Implementation and Outcome**

### *5.1 Factors outside the control of government or implementing agency:*

There were no factors outside Government or implementing agency's control which would have negatively affected project implementation.

### *5.2 Factors generally subject to government control:*

There were two issues subject to Government control which negatively affected practical implementation of the Project right after formal effectiveness. First, during preparation and early stages of implementation, the relationship between Riga City and Stopinu Pagasts, where the Getlini site is located, was strained. This prevented effective decision making and implementation of adopted decisions. The second, the management of the newly created Getlini Eko and the Getlini-2 company, the old operator of the landfill, failed to work together productively. To aggravate the situation, in the beginning of project implementation, the management team of the newly created Getlini Eko was not committed to the Project.

Both these factors delayed implementation for almost 2 years. The Government through its Ministry of Environment and Ministry of Economy, stepped in and undertook decisive actions in order to streamline implementation. The Government's interventions helped to resolve the disagreements between the two municipal governments, as well as to find qualified individuals to manage Getlini Eko. As soon as the detailed design was finalized and the right skill mix for the Getlini Eko team found, implementation became smooth. However, the Project closing date had to be extended for 18 months to allow for completion of the works.

The Government also modified the relevant legislation so that the Getlini Eko could sell the "green" energy it is producing to the electricity grid at a tariff equal to average sales prices. This contributes to profitable operation of Getlini Eko.

### *5.3 Factors generally subject to implementing agency control:*

At early stages of implementation, the management team at Getlini Eko was not fully committed to the project: the procurement decisions, which had to be taken in close cooperation with PPU were significantly delayed. At one point the management of the company intended to abandon the agreed technical solutions and to opt for mechanical waste sorting and waste incineration. After the Government intervened and replaced the management, the implementation of the Project and operations at Getlini Eko substantially improved, which allowed for achievement of the stated project objectives.

### *5.4 Costs and financing:*

The overall cost, including contingencies, at appraisal was US\$ 24.35 million, of which US\$ 19.56 million was allocated for investments, and the remaining cost for interest during construction and operational costs for Getlini Eko. Despite the fact that the Project encountered additional costs in order to comply with EU regulations, there were no cost overruns. The Project has also managed to include both more costly investments for groundwater protection (polyethylene liner) and construction of several additional energy cells, which originally were not foreseen for financing by the Project funds.

## **6. Sustainability**

### *6.1 Rationale for sustainability rating:*

The sustainability is rated as highly likely. At the end of the Project, Getlini Eko is a profitable company with a competent management team. To date, Getlini Eko has been able to secure a steady stream of waste to be delivered to landfill. The waste stream will be increasing over the next few years, as the environmental authorities will not be extending operational licenses to small and inadequately equipped landfills around Riga. This however, will require additional effort on the part of authorities in charge of environmental compliance enforcement, so that illegal dumping of waste is prevented.

The Project team is confident that the Office of the Riga City Public Service Regulator will be adjusting the tariffs in a timely manner so that these reflect real cost of waste handling and allow for continued sustainable operations of Getlini Eko. Similarly, the Government is committed to support production of "green" energy, and the existing tariffs are favorable to the company. It is also very likely that if needed, additional land adjacent to the Getlini site can be acquired, so that already made investments in machinery, buildings and infrastructure can be further utilized above the current calculated lifetime of about 25 years.

The financial situation in Getlini Eko is good enough to attract private sector investors, should such a decision be made by its shareholders.

## *6.2 Transition arrangement to regular operations:*

There was no need for any specific transition arrangements, as the site had been in regular operation since Project implementation started in 1998.

## **7. Bank and Borrower Performance**

### **Bank**

#### *7.1 Lending:*

Bank's performance in identifying and helping Latvian counterparts to prepare the Project was satisfactory. The proposed method for management of solid waste was new for Latvia and only minimal expertise was available from similar operations abroad. The Project team confirmed the economic, financial and environmental viability of the Project but did not foresee all possible risks, in particular, institutional and social. In the event difficulties that emerged were resolved as part of the implementation support efforts.

As mentioned above, the Quality Assurance Group rated the Project quality at entry highly satisfactory, which only proves that not all the potential issues can be identified during preparation, especially in the country with dynamically developing legal system and economy.

#### *7.2 Supervision:*

Based on the advice of the Quality Assurance Group which rated supervision as unsatisfactory in 2000, the overall supervision effort is satisfactory. The Project Team took into account QAG recommendations, and was able to support implementation effectively toward successful completion. As a direct recommendation of QAG, the problems of scavengers were addressed, and most of them are now employed by a contractor in charge of sorting the waste in the landfill.

Bank management, representing both Sector and Country departments, on several occasions paid visits to Latvia in an effort to help the project team in streamlining implementation.

#### *7.3 Overall Bank performance:*

Based on the above, the overall Bank performance is rated as satisfactory.

### **Borrower**

#### *7.4 Preparation:*

Government of Latvia was fully committed to the project, as the solid waste management has been one of its top environmental priorities since early nineties. The Municipal Solid Waste Management Project was conceived as the first regional waste management facility in a nation wide solid waste management program "500-", which called for the establishment of an efficient waste management system with only few modern landfills, and aimed at closure of nearly 500 small non-sanitary dump sites. In order to implement the "500-" program, the Government, acting through its Ministries of Environment and Economy was the driving force in preparing the Project

#### *7.5 Government implementation performance:*

During implementation Government remained highly committed to Project objectives and was instrumental

in resolving the emerging problems.

#### *7.6 Implementing Agency:*

Over the years of implementation, the performance of implementing agency, the Riga City Council and that of Getlini Eko significantly varied from time to time. Two sets of management teams at Getlini Eko had to be replaced in order to secure commitment for achievement of original project objectives. The Project team maintains that had more skilled individuals been appointed to manage the Getlini Eko from the beginning, the project implementation process would have been smoother and possibly no extension of the closing date would have been needed.

#### *7.7 Overall Borrower performance:*

The overall Borrower performance at the end of project is rated as satisfactory.

## **8. Lessons Learned**

### Political Problems during Project Preparation and Implementation.

The rivalry between the two municipalities, the Riga City and the Stopinu Pagasts, was an impediment during Project preparation, and unfortunately continued during the first years of implementation. While the political problems seemed to be sorted out just before negotiations, these problems resurfaced again during the first phase of implementation, and resulted in substantial implementation delays and negative press. It became evident, that the negative press coverage to a large extent was orchestrated by the management operating the Getlini site before the Project was approved and implementation started. This also had the result that neighboring residents complained about the Project design as well as the creation of Getlini Eko, which at that time was about to take over the ownership of the site and operational responsibility from the former operator company Getlini-2.

Given this lesson, the team would recommend for future projects in a similar situation, to make greater efforts to achieve political consensus at the grass-root level. It should be mentioned, that this experience was very helpful in the preparation of the second waste management operation in Latvia, the Liepaja Region Solid Waste Management Project. Among other things the following actions were initiated as a requirement for starting preparation: (a) a consensus among all municipalities in the Liepaja Region to establish a common regional waste management facility, (b) immediate launching of information campaign for the public, and repeated meetings in all the municipalities; (c) establishment of a special office in Liepaja City in order to provide information about the project; and (d) on a permanent basis a member of the Ministry of Environment was assigned to participate in the preparation activities. As a result of these actions that project has not encountered any problem at all, and has not received any bad publicity.

### Managerial Problems during first phase of Implementation.

As mentioned earlier, the appointment of management team by Riga City Council, could have been done in a more efficient way. The profiles for different managers were clearly elaborated in the Business Development Plan for Getlini Eko, but unfortunately not followed. Clearly, the Bank could have taken a stronger position when reviewing the staff, but thought it was an issue for Riga City Council. Given the results from the first years of implementation, the appointment of leading staff should be done in time for negotiations.

### Adherence to national design standards

Additional difficulty in the starting phase of the project was caused by differences between Latvian and

Swedish detailed design standards, because the engineering consultant prepared the drawings in accordance with the latter. As a result, Latvian authorities were reluctant to issue the construction permit, as the designs did not match the requirements of respective Latvian standards. Therefore, in order to avoid misunderstandings and delays, it is important that both Bank teams and consultants have a full understanding of valid national design and construction requirements before the actual design process starts.

## **9. Partner Comments**

*(a) Borrower/implementing agency:*



LATVIJAS REPUBLIKAS FINANŠU MINISTRIJA  
MINISTRY OF FINANCE OF THE REPUBLIC OF LATVIA

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SMILŠU IELĀ 1, RIGĀ, LV-1919, LATVIA, TEL: (371) 7 226672, FAX: (371) 7 095503

30.1.4 - 5.6 / 1410  
June 10, 2005

Ms. Dina Grube  
Country Manager  
The World Bank  
Latvia Office  
Smilšu Str. 8,  
Riga, Latvia, LV-1162

**RE: Draft Implementation Completion Report for Municipal Solid Waste Management Project (Loan No. IBRD 4286LV)**

Dear Ms. Grube,

Hereby Ministry of Finance confirms that we have no comments or objections concerning above mentioned draft Implementation Completion Report for Municipal Solid Waste Management Project.

We highly value our existing cooperation and are looking forward to our future co-operation.

Sincerely yours,

Valentina Andrejeva  
State Secretary

Mazprecniece 7094232



LATVIJAS REPUBLIKAS VIDES MINISTRIJA  
MINISTRY OF THE ENVIRONMENT  
OF THE REPUBLIC OF LATVIA

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Rīga, 16.06.2005 Nr. 11.2 - 01/2599

**Mrs. Dina Grūbe**  
International Bank for Reconstruction and Development  
Latvia Office

Smilšu 8,  
Rīga, Latvia, LV1162

*RE: Latvia: Municipal Solid Waste Management Project (Loan LV 4286)*

Dear Mrs. Grūbe,

Thank you for your letter dated May 23 and Implementation Completion Report regarding Latvia Municipal Solid Waste Management Project (furthermore - Project).

The implementation of the Project leads to establishment of territorially largest landfill in Baltic region. It is largest by accepted waste amounts and produced electricity in Baltic States.

Creation of regional waste management system was one of the top-priorities stated in Waste management plan of Latvia. The main Project activities implemented:

- existing disposal site is remediated,
- technical and operational improvements of disposal site, such as, lining the bottom of energy cells, treatment of the leachate, landfill gas capture and energy production are in operation;
- sorting line and arranging for storage of separated municipal waste and hazardous waste established.

Additionally there are several activities, which are planned after Project implementation during 2005-2007:

- arranging place for washing landfill facilities and transport;
- up-dating data processes for water treatment facilities;
- odor control and limitation according to legislation requirements.

This is the only regional solid waste management project, which is not partly cofinanced by European Union funding. Thus, the World Bank financial and managerial support is considered as crucial for smooth implementation.

Established waste management system serves up to 800 000 inhabitants. The operational category "A" permit is granted to Getliņi landfill on 6 April 2005. Six dumpsites, which are still in operation in region will be closed till September 2005, thus the amount of waste transported to Getliņi landfill will increase and almost all region with around 940 000 inhabitants will be served by Getliņi landfill.

Despite the substantial changes in the management of "Getliņi EKO" during Project implementation, all bottlenecks with support of all stakeholders have been successfully resolved (the scavengers' issue, additional requirements for landfill leachate treatment, according to changes in legislation etc.). Also the disposal tariff increase, which was successfully attained in mid 2003, allowed the Project to become more financially sustainable.

The Ministry of Environment supported the Project during the all implementation process and the outcome is to be considered as the best performance. The Ministry of Environment will provide all necessary support in Project operation phase.

Finally let me once again thank the World Bank's officials for provision of the in-depth Project review during whole implementation process.

Looking forward to our further cooperation,

Best regards,



Raimonds Vējonis  
Minister

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SIA "GETLINI EKO"  
PVN LV 40003367816  
CSA Poligons "Getlini"  
p/n Salaspils, Rīgas raj., LV-2121

14.06.2005. No. 123/2005.

„GETLINI EKO” Ltd. Comments for ICR

Project overall evaluation

Historically in this territory there was a landfill since 1970-ies, polluting the environmental grounds, water, air. One of the initial project aims was to stop this pollution and find the ways how to continue waste disposal observing environmental protection standards. Moreover it was planned to secure sustainable landfill development and effective usage of waste biogas.

During the project implementation there were several deviations from the initial plan and schedule, mainly concerning the beginning of electricity production, ground waters treatment, sorting and other operational activities.

Nevertheless the initial project aim was achieved and Getlini Eko is operating as landfill according to the highest environmental protection standards, collecting biogas and producing electricity as planned. It is also a largest landfill by territory, accepted waste amounts and produced electricity in Baltic States.

Project contribution to the community

Project started to change community's perceptions of waste disposal site and waste management, this is being as a resource now, therefore sorting and effective cooperation among municipalities, hauling companies and landfill is becoming an issue.

The World Bank loan and project monitoring allowed achieving the situation when the municipal infrastructure company is able to implement complicated restructuring and development project and secure financial stability.

It has also helped to improve the living conditions in local community of Stopinu parish, securing the pollution diminishing, working places, tax and other financial gains.

Lessons learned

It was important that Bank's project team showed consistency during implementation and sticking to the initial business plan. The problem with local authorities and management was that they sometimes lost the focus in operational arguments. From the beginning Bank's team helped to invent modern managerial style what was not in place before. May be the process would have gone smoother if there were not so many managerial changes.

It is also important for similar projects that there is achieved and documentary formulated political support, not changing over years.

The best results can be achieved when ongoing communication and cooperation among all stakeholders are in place, and Bank's team was working hard to achieve this. Now all the stakeholders: shareholders, politicians, community, company itself, are pleased with project implementation and future prospects.

Imants Stirans

Chairman of the "Getlini EKO" Ltd.

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kods: UNLALV2X; konta Nr.: LV39 UNLA 0050 0055 2119 5



*(b) Cofinanciers:*

29 May, 2005

Tomas Nyström

Ref. number:

## **Sida Final Comments**

Project: Getlini Solid Waste Management Project  
Co-operation partner: Getlini Eko Ltd and Riga City Council  
Project period: 1998-2004  
Sida contribution: 11, 38 MSEK

### 1. Background

Latvia decided in 1998, based on the national environmental plan, to finance a project that would introduce a more efficient and sustainable solid waste management in Riga. The World Bank has provided loan and grant financing for needed investments. A grant financing agreement between Sida, Riga City Council, Getlini Eco Ltd and the Latvian Government was signed in February, 1998.

### 2. Project goal

The project goal has been to develop Getlini disposal site into a modern facility with minimum impact on the surrounding environment. The Sida financed project components have involved investments in leachate treatment, technical support and institutional development.

### 3. Results

According to the grant financing agreement the project should have been completed by end of 2003 but the agreement had to be extended with one year in order to finalise all activities.

#### *a) Treatment of leachate, SBR, performed by YIT VMT*

YIT was contracted in 2001 for the construction of a leachate treatment facility. The project has faced some problems and misunderstandings. The expected COD-levels can for example not be fulfilled since the initial idea that only leachate from the new part of the site would be treated was changed. The incoming flow has further turned out to be less than what the treatment facility was designed for. Also the construction of the inlet has been problematic where the directions from YIT were not followed, which resulted in the inlet being rebuilt two times.



Problems have been corrected and the facility was handed over to Getlini Eco in June 2004. Getlini Eco will receive support from YIT during the guarantee period.

*b) Technical assistance NSR, start 2000*

The TA-part has worked well all through the project. NSR has been a much appreciated discussion partner and has assisted Getlini Eco within a number of areas, e.g. recycling and handling of hazardous waste. The combined training both in Sweden and Latvia is considered to have been valuable. NSR has also, during 2004, supported the training of staff on optimisation of gas extraction, which will have a direct positive impact on Getlini Eco's economy.

*c) Managerial assistance Sweco, start 2002*

This component has experienced a lot of changes and the results are not as good as expected. Changes within management during project implementation are partly the reason for the weak outcome. The original idea of management support changed into support to the development of plans on how to optimise the gas extraction (in close co-operation with NSR).

*d) General*

The project results have been mixed, some parts have worked very well others poorly. The changing of project officers within Sida more or less every year has decreased Sida's management capacity. The support from the World Bank has been positive in following-up also Sida funded components at times when Sida's involvement has been low.

Management within Getlini Eco has been changed three times during the course of the project, something which also has effected the project implementation. The present management team seems to be very competent and there are reasons to believe that Getlini Eco will continue to develop in a positive way.

*(c) Other partners (NGOs/private sector):*

## **10. Additional Information**

## Annex 1. Key Performance Indicators/Log Frame Matrix

### Outcome / Impact Indicators:

Indicator/Matrix	Projected in last PSR <sup>1</sup>	Actual/Latest Estimate
Closure of small dump sites around Riga	19 sites	8 sites

Not all of the 19 small landfills, as written in SAR, have been closed by the Closing date of the Project. However, this is an ongoing process and the both the environmental authorities and the Riga City Council are confident that over the next 12-18 months all the waste from Riga and adjoining areas will be delivered to Getlini landfill, as this is the part of the national waste management strategy. Environmental authorities are now denying the existing landfills the renewals/extensions for their licenses to operate.

### Output Indicators:

Indicator/Matrix	Projected in last PSR <sup>1</sup>	Actual/Latest Estimate
Cash flow as percentage of Revenues	43%	43%
Depreciation as percentage of Cash Flow	68%	57%
Working Ratio - operating costs + depreciation + interest, as % of revenues	39%	59%
Collection rate of LFG	6 million cubic meters./year	5.4 million cubic meters*
Collection and treatment of leachate	100%	100%

<sup>1</sup> End of project

\*Expected to increase over the next few years as gas generation in energy cells will become more intensive

## Annex 2. Project Costs and Financing

### Project Cost by Component (in US\$ million equivalent)

Component	Appraisal Estimate US\$ million	Actual/Latest Estimate US\$ million	Percentage of Appraisal
Remediation of Existing Landfill	3.40	3.28	96
Technical and Operational Improvements	7.13	9.64	135
Gas Collection and Energy Production	7.28	7.19	99
Managerial Improvements	1.54	1.40	91
Interest during construction	1.22	0.29	24
<b>Total Baseline Cost</b>	20.57	21.80	
<b>Total Project Costs</b>	20.57	21.80	
<b>Total Financing Required</b>	20.57	21.80	

### Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method <sup>1</sup>			N.B.F.	Total Cost
	ICB	NCB	Other <sup>2</sup>		
<b>1. Works</b>	0.00 (0.00)	1.22 (1.22)	0.00 (0.00)	3.08 (0.00)	4.30 (1.22)
<b>2. Goods</b>	7.18 (7.18)	2.46 (2.46)	0.04 (0.04)	2.01 (0.00)	11.69 (9.68)
<b>3. Services</b>	0.00 (0.00)	0.00 (0.00)	2.16 (0.95)	0.00 (0.00)	2.16 (0.95)
<b>4. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	1.22 (1.22)	1.21 (0.00)	2.43 (1.22)
<b>5. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>6. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	7.18 (7.18)	3.68 (3.68)	3.42 (2.21)	6.30 (0.00)	20.58 (13.07)

Minor inconsistencies of decimal figures between the tables occurred due to rounding.

### Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method <sup>1</sup>			N.B.F.	Total Cost
	ICB	NCB	Other <sup>2</sup>		
<b>1. Works</b>	0.00 (0.00)	3.11 (2.83)	0.00 (0.00)	5.14 (0.00)	8.25 (2.83)
<b>2. Goods</b>	7.36 (6.72)	1.80 (1.68)	0.56 (0.40)	1.29 (0.03)	11.01 (8.83)
<b>3. Services</b>	0.00 (0.00)	0.00 (0.00)	2.11 (1.06)	0.14 (0.00)	2.25 (1.06)
<b>4. Miscellaneous</b>	0.00	0.00	0.29	0.00	0.29



	(0.00)	(0.00)	(0.29)	(0.00)	(0.29)
<b>5. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>6. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	7.36 (6.72)	4.91 (4.51)	2.96 (1.75)	6.57 (0.03)	21.80 (13.01)

<sup>1/</sup> Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

<sup>2/</sup> Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

## **Annex 3. Economic Costs and Benefits**

### **Part 1 - Economic Rate of Return (ERR)**

Section 1 contains a resume of the analysis and conclusions of the SAR, including the major assumptions; and section 2 deals with the revised economic analysis based on project costs, excluding taxes and duties and incremental benefits due to the project. Up to the year 2004, the figures are actuals, thereafter forecasts until the year 2025. All figures are expressed in US\$ at the uniform exchange rate of LVL 0.54 to US\$ 1.

#### **Section 1 – The SAR (chapter 5, section D and Annex 13)**

##### **The Economic Rate of Return (ERR)**

Total project costs were derived from the project feasibility study prepared by Sweco Consultants and consisted of capital costs, capitalized recurrent costs during implementation, as well as design, training and technical assistance. Investment costs included physical contingencies only. Recurrent costs were also calculated by the Consultants; these were only capitalized up to the year 1999 and shown as a separate cost stream afterwards. Adjustments were made for VAT and social welfare taxes on wages and salaries. Project costs so calculated for the Option 4 retained (gas used for electricity generation) amounted to US\$ 19,627 million.

The Project's benefits were sub-divided into two categories: tangible and intangible benefits. Tangible benefits include revenues from landfill gas collection, incremental revenues from improved sorting and global environmental benefits from reduced emissions of methane. The revenues from gas production were valued at international or border price for electricity and incremental sales of recovered waste materials were estimated at US\$ 100,000. Values for global environmental benefits were derived by using internationally accepted values for carbon dioxide emissions and converted into methane equivalents by using a factor that reflects the respective impacts of the two as greenhouse gases.

Intangible benefits consist of ground- and surface water protection, occupational and health improvements as well as a positive aesthetic and odor impacts through the covering of the landfill.

The ERR analysis for the base-case of Option 4 -- the investment option selected for implementation based on extraction of LFG and generation of electricity -- showed an internal rate of return of 15% when including the global environmental benefits, and 4% when these benefits were excluded. A sensitivity analysis was carried out to test the robustness of the Project against variations in investment costs and benefits; the results showed the project to be relatively insensitive to these changes, with the ERR decreasing with at most one or two percentage points for increases in costs or decreases in revenues. The worst result, an ERR of 11% was calculated for the case where benefits were delayed by one to two years after the completion of the investments; but this event was considered unlikely to occur.

##### **The Net Present Value (NPV)**

The calculation of the NPV discounted the cost-benefit streams at 10% and compared the various options. As with the ERR, Option 4 showed the highest NPV and this calculation also confirmed the relative lack of sensitivity to increases in costs and the sharp decrease of returns in case the start of revenues is delayed by one or two years.

## Conclusion

Both the ERR and the NPV calculations, when taking into account the global environmental benefits of the project, showed good rates of return and confirmed the choice of Option 4 among the four options analyzed in the feasibility study. Delays in the generation of benefits were identified as the most critical events affecting the rates of return.

## **Section 2 - The ICR**

The analysis is summarized in Table 4 and the results are based on the following assumptions:

component	assumption
Period covered	The analysis is carried out over 25 years, from 2000 to 2025, as in the SAR (from 1998 to 2022).
Economic costs	These are the financial costs, Table 3 excluding Value-added tax and the subsidy payment to Stopinu Pagasts.
Economic benefits	These include incremental financial benefits from waste disposal, as calculated for the FRR in Table 3, and electricity sales at the import parity price, currently LVL 13.00/MWh (US\$ 24.01/MWh). Furthermore, the Project has resulted in incremental cost savings in regard to avoided investment and operational costs, due to the fact that closure and post-closure costs could be avoided.
Environmental benefits	These benefits consist of the reduction of methane gas emissions, which are equal to projected LFG extraction volumes. The bulk of LFG will be consumed in the ECU, with any excess being flared. The equivalent quantities in CO <sub>2</sub> have been calculated separately and valued at US\$ 2.73/ton of CO <sub>2</sub> .
Residual value	Taken at 15% of the project investment

The results of the analysis are more favorable than those estimated at appraisal: the ERR is 18.45% against the 15% shown in the SAR, while the NPV at 10% discount rate is US\$ 6.5 million. The reason for the increased ERR is that the cost savings attributable to the project (investment and operational costs for remediation and post-closure of the Getlini site were avoided as a result of the project) have been included in the economic analysis for the ICR, but were not in the ex-ante analysis reported in the SAR. The actual savings are as follows: investment costs US\$ 4.02 million, and operational costs for post closure operation US\$ 0.99 million from 2004 and onwards.

A sensitivity analysis similar to that carried out for the FRR – a 25% increase in waste disposal

fees and in the import parity price for electricity – improves the ERR, to 20.44%. Increased waste disposal fee and electricity tariffs are very likely to become effective as of 2006 and the financial and economic performance of the Project would then improve further.

**Table 4. Economic Rate of Return Calculations**

RIGA SOLID WASTE MANAGEMENT PROJECT	Economic Cost-Benefit calculation in USD					Table 4			
	2000	2001	2002	2003	2004	2005	2006	2007	2008
<b>Economic Costs</b>	actuals					projections			
Financial costs, investment and oper. (see FRR table)	1,919,544	2,421,881	8,964,579	4,435,834	4,246,875	4,447,088	3,080,630	1,692,485	1,809,934
VAT payments on investment incl. under financial costs	0	46,820	710,140	408,250	532,280	246,880	0	0	
Stopinu Pagast subsidy	13,182	15,752	14,952	10,251	22,402	22,000	22,000	22,000	22,000
<b>Total project related economic costs</b>	<b>1,906,362</b>	<b>2,359,309</b>	<b>8,239,487</b>	<b>4,017,333</b>	<b>3,692,193</b>	<b>4,178,208</b>	<b>3,058,630</b>	<b>1,670,485</b>	<b>1,787,934</b>
<b>Economic Benefits</b>	import parity price					13			
Incr. revenues excl. electricity, from FRR table, in LVL	21,139	130,792	145,458	258,827	702,045	682,900	740,400	809,400	878,400
Electr. revenues, at import parity price of 13 LVL/MWh	0	0	45,882	219,120	341,276	376,565	528,846	768,724	843,502
sub-total incr. economic revenues, tangible in LVL	21,139	130,792	191,340	477,947	1,043,321	1,059,465	1,269,246	1,578,124	1,721,902
Exchange rate between USD and LVL	0.54								
sub-total incr. economic revenues, tangible in USD	39,146	242,207	354,333	885,087	1,932,076	1,961,972	2,350,456	2,922,452	3,188,707
Environmental benefits, intangible (from Haldin table)	est 0	0	49,960	214,738	257,452	310,742	436,123	633,941	695,595
Total Incremental Cost Savings	1,688,107	1,715,263	2,653,327	1,458,257	993,987	993,987	993,987	993,987	993,987
Residual value of the project investment (15%)									
<b>Total project related economic benefits</b>	<b>1,727,253</b>	<b>1,957,471</b>	<b>3,057,620</b>	<b>2,558,082</b>	<b>3,183,515</b>	<b>3,266,701</b>	<b>3,780,566</b>	<b>4,550,380</b>	<b>4,878,289</b>
<b>Net economic costs - benefits</b>	<b>-179,108</b>	<b>-401,839</b>	<b>-5,181,867</b>	<b>-1,459,251</b>	<b>-508,678</b>	<b>-911,507</b>	<b>721,936</b>	<b>2,879,895</b>	<b>3,090,355</b>
undiscounted sum of values	46,378,266								
net value, discounted at 6%	14,772,871								
ERR	18.45%								
<b>Sensitivity analysis:</b>									
<b>a - ERR without environmental benefits</b>	<b>-179,108</b>	<b>-401,839</b>	<b>-5,231,827</b>	<b>-1,673,989</b>	<b>-766,130</b>	<b>-1,222,249</b>	<b>285,813</b>	<b>2,245,954</b>	<b>2,394,760</b>
undiscounted sum of values	32,962,275								
net value, discounted at 6%	9,028,943								
ERR	14.05%								
<b>b - incr. waste disp. and electr. tariffs, by 25%</b>	0	0	0	0	0	0	317,312	394,531	430,475
<b>Revised net financial cost - benefits</b>	<b>-179,108</b>	<b>-401,839</b>	<b>-5,181,867</b>	<b>-1,459,251</b>	<b>-508,678</b>	<b>-911,507</b>	<b>1,039,248</b>	<b>3,274,426</b>	<b>3,520,831</b>
undiscounted sum of values	54,695,851								
net present value, at 6%	18,104,724								
ERR	20.44%								

Continuation of Table 4.

	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Economic Costs</b>									
Financial costs, investment and oper. (see FRR table)	1,933,255	1,936,111	1,936,111	1,936,111	1,936,111	1,936,111	1,936,111	1,936,111	1,936,111
VAT payments on investment incl. under financial costs									
Stopinu Pagast subsidy	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
<b>Total project related economic costs</b>	<b>1,911,255</b>	<b>1,914,111</b>	<b>1,914,111</b>	<b>1,914,111</b>	<b>1,914,111</b>	<b>1,914,111</b>	<b>1,914,111</b>	<b>1,914,111</b>	<b>1,914,111</b>
<b>Economic Benefits</b>									
Incr. revenues excl. electricity, from FRR table, in LVL	947,400	947,400	947,400	947,400	947,400	947,400	947,400	947,400	947,400
Electr. revenues, at import parity price of 13 LVL/MWh	743,067	743,067	743,067	743,067	743,067	743,067	743,067	743,067	743,067
sub-total incr. economic revenues, tangible in LVL	1,690,467	1,690,467	1,690,467	1,690,467	1,690,467	1,690,467	1,690,467	1,690,467	1,690,467
Exchange rate between USD and LVL									
sub-total incr. economic revenues, tangible in USD	3,130,494	3,130,494	3,130,494	3,130,494	3,130,494	3,130,494	3,130,494	3,130,494	3,130,494
Environmental benefits, intangible (from Haldin table)	716,472	707,554	688,379	680,335	668,525	655,961	643,093	637,766	630,200
	993,987	993,987	993,987	993,987	993,987	993,987	993,987	993,987	993,987
Residual value of the project investment (15%)									
	4,840,953	4,832,035	4,812,860	4,804,816	4,793,006	4,780,442	4,767,574	4,762,247	4,754,681
<b>Net economic costs - benefits</b>	<b>2,929,699</b>	<b>2,917,924</b>	<b>2,898,749</b>	<b>2,890,705</b>	<b>2,878,895</b>	<b>2,866,331</b>	<b>2,853,463</b>	<b>2,848,136</b>	<b>2,840,570</b>
<b>Sensitivity analysis:</b>									
a - ERR without environmental benefits	2,213,227	2,210,370	2,210,370	2,210,370	2,210,370	2,210,370	2,210,370	2,210,370	2,210,370
b - incr. waste disp. and electr. tariffs, by 25%	422,617	422,617	422,617	422,617	422,617	422,617	422,617	422,617	422,617
<b>Revised net financial cost - benefits</b>	<b>3,352,316</b>	<b>3,340,541</b>	<b>3,321,366</b>	<b>3,313,322</b>	<b>3,301,512</b>	<b>3,288,948</b>	<b>3,276,080</b>	<b>3,270,753</b>	<b>3,263,187</b>

Continuation of Table 4.

	2018	2019	2020	2021	2022	2023	2024	2025
<b>Economic Costs</b>								
Financial costs, investment and oper. (see FRR table)	1,936,111	1,936,111	1,936,111	1,936,111	1,936,111	1,936,111	1,936,111	1,936,111
VAT payments on investment incl. under financial costs								
Stopinu Pagast subsidy	22,000	22,000	22,000	22,001	22,002	22,003	22,004	22,005
<b>Total project related economic costs</b>	<b>1,914,111</b>	<b>1,914,111</b>	<b>1,914,111</b>	<b>1,914,110</b>	<b>1,914,109</b>	<b>1,914,108</b>	<b>1,914,107</b>	<b>1,914,106</b>
<b>Economic Benefits</b>								
Incr. revenues excl. electricity, from FRR table, in LVL	947,400	947,400	947,400	947,400	947,400	947,400	947,400	947,400
Electr. revenues, at import parity price of 13 LVL/MWh	743,067	743,067	736,922	726,657	719,093	714,133	705,660	700,282
sub-total incr. economic revenues, tangible in LVL	1,690,467	1,690,467	1,684,322	1,684,322	1,684,322	1,684,322	1,684,322	1,684,322
Exchange rate between USD and LVL								
sub-total incr. economic revenues, tangible in USD	3,130,494	3,130,494	3,119,115	3,119,115	3,119,115	3,119,115	3,119,115	3,119,115
Environmental benefits, intangible (from Halldin table)	625,036	615,826	607,709	599,240	593,006	588,911	581,925	577,502
	993,987	993,987	993,987	993,987	993,987	993,987	993,987	993,987
Residual value of the project investment (15%)								3,270,870
	<b>4,749,517</b>	<b>4,740,307</b>	<b>4,720,811</b>	<b>4,712,342</b>	<b>4,706,108</b>	<b>4,702,013</b>	<b>4,695,027</b>	<b>4,690,604</b>
<b>Net economic costs - benefits</b>	<b>2,835,406</b>	<b>2,826,196</b>	<b>2,806,700</b>	<b>2,798,232</b>	<b>2,791,999</b>	<b>2,787,905</b>	<b>2,780,920</b>	<b>2,776,498</b>
<b>Sensitivity analysis:</b>								
<b>a - ERR without environmental benefits</b>	<b>2,210,370</b>	<b>2,210,370</b>	<b>2,198,991</b>	<b>2,198,992</b>	<b>2,198,993</b>	<b>2,198,994</b>	<b>2,198,995</b>	<b>2,198,996</b>
<b>b - incr. waste disp. and electr. tariffs, by 25%</b>	422,617	422,617	421,081	421,081	421,081	421,081	421,081	421,081
<b>Revised net financial cost - benefits</b>	<b>3,258,023</b>	<b>3,248,813</b>	<b>3,227,780</b>	<b>3,219,312</b>	<b>3,213,079</b>	<b>3,208,985</b>	<b>3,202,000</b>	<b>3,197,578</b>

## Part 2 – Financial Rate of Return

Section 1 contains a short resume of the analysis and conclusions of the SAR, including the major assumptions; and section 2 deals with the financial analysis based on actual Project expenditures and income up to the year 2004 and on forecasts until the year 2025. The SAR resume is in US\$, whereas the figures of section 2 are expressed in LVL, the currency in which the annual accounts are published; where appropriate conversion into US\$ is made at the agreed standard exchange rate of LVL 0.54= US\$ 1.00.

### Section 1 – The SAR (Chapter 5, section F and Annex 14)

#### The Financial Rate of Return (FRR)

Total project costs were derived from the Project preparation study prepared by Sweco Consultants and consisted of capital costs, capitalized recurrent costs during implementation, as well as design, training and technical assistance. To these were added physical and price contingencies. Recurrent costs were also calculated by the Consultants; these were only capitalized up to the year 1999 and shown as a separate cost stream afterwards. Project costs so calculated amounted to US\$ 19.983 million, rounded to US\$ 20.0 million; this figure excludes interest during construction

and recurrent operational costs.

The Project's estimated incremental revenues consisted of the sale of electricity, generated from the recovered landfill gas, and incremental sales of recovered waste materials, estimated at US\$ 100,000. Electricity sales were calculated on the basis of estimated landfill gas production, converted into electricity using standard conversion factors. This production was valued at the price of US\$ 48.148/MWh, a special concessionary price for renewable energy fixed by Government at the time. Finally, the residual or salvage value of the investment was assumed at 15% of the investment, excluding design, training and technical assistance.

The FRR analysis for the base-case scenario showed a FRR of 11.93%. This rate was considered satisfactorily for an environmental protection project, in particular as no increase in tariffs or disposal fees was necessary to achieve this return.

A sensitivity analysis was carried out to test the robustness of the Project against variations in costs and benefits; the results are summarized in the table below:

COSTS	REVENUES		
	Revenues-15%	Base Case	Revenues +15%
Investment +10%	7.98%	10.50%	13.39%
Recurrent costs + 10%	8.63%	11.39%	14.55%
Base Case	9.21%	<b>11.93%</b>	15.05%
Revenues delayed 1 year	7.63%	9.87%	12.37%

In the base-case scenario the delay in revenues by one year, assuming all investments have been carried out, has the biggest impact on the FRR, reducing it from 11.93% to 9.87%. The 10% increase in costs, respectively investments and recurrent costs, has a much smaller impact and even these results were considered acceptable. Even the worst scenario -- all investments realized, revenues delayed by one year, coupled with a 15% drop in overall electricity sales -- reduced the FRR to 7.63%; however, the probability of this event occurring was considered to be low. The best scenario of unchanged costs and a 15% increase in electricity prices was considered to have a reasonable probability; the FRR in that case would be 15.05%.

#### The Net Present Value (NPV)

The NPV is the present value of future cash flows from the Project, minus the initial investments. It represents the contribution of an investment to the value of the firm and the NPV is considered the primary decision making tool of financial management in the private sector. For this reason its calculation was included in the analysis, using a discount rate of 10%. Applying this discounting procedure to the cost-benefit flows resulted in a positive NPV; and indicated that the investment would yield a positive return over the cut-off rate of 10% and would contribute US\$ 2.13 million to the value of the company.

#### Conclusion of the SAR

The FRR and the NPV analyses of the Project carried out during appraisal indicated that in the

base-case scenario the environmental protection project would yield a satisfactory financial rate of return and a NPV, equivalent to what could be expected from a normal productive investment.

The sensitivity analysis, incorporating increases in costs and reductions in benefits, indicates that the Project would be particularly sensitive to a one-year delay in benefits after the initial investments have been made. An increase of investment costs by 10% would also have a strong negative impact on the returns from the Project, but this event was considered to be of lesser risk, as relatively high physical contingencies had been incorporated in the cost estimates.

## **Section 2 - the ICR**

### Financial Rate of Return

Two sets of financial analysis can be conducted depending on whether one adopts the perspective of the company managing the Getlini site, or that of the owner, the Riga City Council. The difference between the two approaches is whether or not the cost savings attributable to the project (the investment and operation costs avoided as the Getlini site remains open) is taken into consideration or not. From the company's perspective, the cost savings are not taken into account, and in this case, the ex-post/ICR financial analysis is comparable to the analysis conducted ex-ante in the SAR. By not taking into account these cost savings, the ICR financial analysis is not strictly comparable to the economic analysis. To make it comparable, the cost savings attributable to the project need to be taken into consideration, and correspond to the financial analysis from the point of view of the Riga City Council. Both sets of analysis have been performed, and we present in greater detail and in the Table 3 the financial analysis from the company's point view.

The calculation from the company's financial perspective is summarized in Table 3 and uses the standard comparison of project costs and incremental benefits which can be attributed to the Project -excluding, as explained above, the costs savings attributable to the project (i.e., the investment and operation costs avoided as the Getlini site remains open). The analysis has been carried out over a 25 year period from 2000 – 2025 (in the SAR the period was from 1998 to 2022).

The Project's costs are summarized in Table 1 and include the realized investments, including taxes and duties, as well as all technical assistance and interest paid during construction. The figures have been derived from PPU statistics and show total costs of US\$ 21,805,800.

As for operational, maintenance and administrative costs, the base figures have been derived from the audited accounts of Getlini Eko for the years 2000 to 2004 and from projections for the period 2005-2025 made by Bank staff, in conjunction with Getlini Eko. The detailed cash flow projections are shown in Table 2 and are discussed in Part 3 below.

As the present costs include the continued operation of the site as a landfill operation, the pre-project costs of the year 1999 associated with this activity have been excluded from project costs.

Benefits consist of the waste disposal fees, sale of sorted waste and revenues from electricity generated from LFG and sold to Latvenergo; details are provided Part 3, Section 2 below. As the pre-project operational costs of 1999 have been deducted from Getlini Eko's projected operational and administrative costs, so the revenues from waste disposal fees and from sorted waste for 1999



have been excluded from the benefit streams. Fees for waste disposal will no doubt be recalculated on a tonnage basis during 2005 and new tariffs would become operational by early 2006; however, the current fee structure based on cubic meters has been used in this exercise.

Project design and detailed engineering started in 1998, but implementation proper commenced only in 2000. The project costs for 1998 and 1999, a total of only US\$ 603,300 representing cost of detailed project design have been added to the investments of the year 2000.

The main assumptions used in the FRR calculation are summarized below. There is no provision for inflation, so all figures are expressed in 2005 constant terms.

Time span of calculation	25 years from 2000 to 2025.
Costs	Investment costs as per the project accounts; an amount of LVL 135,000 (US\$ 250,000) has been added each year from 2005 onwards to cover additional investments. For 2006 a further LVL 810,000 (US\$ 1.5 million) has been provided for the purchase of an additional 2 MW capacity energy conversion unit. Direct and administrative costs have been increased in real terms by around 5% per year, rounded from 2010 onwards.
Benefits	Quantities of disposed waste for 2005 are likely to remain at 2004 levels, thereafter they are assumed to increase by around 5% to 2009, and then to remain constant at 1.3 million m <sup>3</sup> until 2020. Electricity revenues are based on the most recent LFG extraction projections by Getlini Eko, valued at the current average sales price of electricity, as specified in the Latvenergo convention (LVL 34.35/MWh or US\$ 63.61/MWh). Revenues from sorted waste are actually less than before project implementation and have been ignored in the analysis.
Residual value	Assumed at 15% of the total project costs of US\$ 21.8 million and debited to the year 2025.
Exchange rate	Fixed at LVL 0.54 to the US\$ throughout.

The results of the analysis show that the financial rate of return is 9.85%. The NPV at 10% discount rate is almost zero (negative US\$198,000). This compares to SAR estimates of 11.93% FRR, and NPV at 10% discount rate of US\$ 2.13 million. There are various explanations for the lower FRR (and NPV): the principal factor is the delay in the start of normal electricity production which substantially reduced the income from electricity sales during 2003. As indicated in the analysis of the SAR, the FRR was particularly sensitive to this variable, as a one year delay in electricity benefits was shown to reduce the FRR from 11.93% to 9.87%. The other reason for the lower FRR is the fact that operational and administrative costs were clearly underestimated; there has been a dramatic “catching-up” phenomenon in wages, salaries and cost of services since 1997. Another but minor negative factor is the disappearance of sorted waste as a source of additional revenues, estimated at US\$ 200,000/year in the SAR. A positive factor is the higher price paid for electricity sold to Latvenergo, with an actual price of US\$ 63.61/MWh compared to US\$ 48.15/MWh at appraisal (actual of LVL 34.35/MWh compared to LVL 26.00/MWh at appraisal).

Discussions with staff of Getlini Eko, as well as with the Public Utilities Commission and the Riga City Public Service Regulator have confirmed the likelihood of both higher electricity sales prices to Latvenergo and increased waste disposal tariffs. To the extent that Getlini Eko’s present sales price is the average of Latvenergo’s domestic sales prices, the company is bound to benefit from

any local tariff increase.

Regarding the waste disposal tariffs, which are currently invoiced on the basis of cubic meters, new tariffs are likely to be introduced towards end-2005 or early 2006 in conjunction with invoicing based on measured weight, rather than on eye-estimated volume which has been the practice so far. It has therefore been assumed that both prices would increase by 25% to be applied from 2006 onwards. The calculation based on these increases shows that the FRR would increase from 9.85% to an estimated 12.36%, and the NPV at 10% would contribute US\$ 3.6 million to the company's long-term results. Finally, assuming a discount rate of 6% rather than 10%, since 6% is closer to the observed opportunity cost of capital observed during that period, would result in a positive NPV of US\$ 8.3 million.

To be comparable with the economic analysis, we have performed the financial analysis from the Riga City Council, the owner's, point of view, instead of the company point of view. Practically, this means that the cost savings resulting from not closing the Getlini site in the "with-project" situation are added to the stream of benefits. From the Riga City Council's point of view, the FRR becomes significantly higher at 21.95%, and the NPV using the 10% discount rate comes to US\$ 6.5 million. The Financial internal rate of return (21.95%) is higher than the economic internal rate of return (18.45%) because the financial price of electricity is significantly higher than the economic price. The environmental benefits which accrue late in the project are too discounted to compensate for the lower economic price of electricity.

**Table 1. Project Costs separated on Different Components**

RIGA SOLID WASTE MANAGEMENT PROJECT		ICR		File name: cash flow forecast, for ICR - revised						Table 1	
GLE - Project costs, in '000 USD		1998	1999	2000	2001	2002	2003	2004	2005	totals	
Remediation		34.16	47.83	461.99	601.62	784.54	1,245.10	108.07	0	3,283.31	
Technical improvements		84.75	118.65	118.65	126.84	1,886.22	2,084.30	2,295.26	2,922.95	9,637.62	
Gas and electricity generation		39.25	54.95	54.95	854.49	5,659.15	227.25	304.92	0	7,194.96	
Management systems		33.69	217.02	273.65	246.75	248.48	327.23	330.09	13	1,689.91	
<b>totals</b>		<b>191.85</b>	<b>438.45</b>	<b>909.24</b>	<b>1,829.70</b>	<b>8,578.39</b>	<b>3,883.88</b>	<b>3,038.34</b>	<b>2,935.95</b>	<b>21,805.80</b>	
differences with summary totals		0	0	0	0	0	0	0	0	0	
check of totals, summary table PPU		191.85	438.45	909.24	1,829.70	8,578.39	3,883.88	3,038.34	2,935.95	21,805.80	
cumulative costs			630.3	1,539.54	3,369.24	11,947.63	15,831.51	18,869.85	21,805.80		
<b>total costs, as per PPU data</b>		<b>191.85</b>	<b>438.45</b>	<b>909.24</b>	<b>1,829.70</b>	<b>8,578.39</b>	<b>3,883.88</b>	<b>3,038.34</b>	<b>2,935.95</b>	<b>21,805.80</b>	<b>100.00%</b>
VAT payments		0	0	0	46.82	710.14	408.25	532.28	246.88	1,944.37	8.92%
<b>total economic costs</b>		<b>191.85</b>	<b>438.45</b>	<b>909.24</b>	<b>1782.88</b>	<b>7868.25</b>	<b>3475.63</b>	<b>2506.06</b>	<b>2689.07</b>	<b>19,861.43</b>	<b>91.08%</b>
			630.3								

Source: Table Project Cost, based on PPU information, under Getlini ICR

**Table 3. Financial Rate of Return Calculation.**

RIGASOLIDWASTEMANAGEMENTPROJECT

Financial Cost-Benefit calculation

Table 3

in 000 USD (uniform exchange rate USD 1.00=LVL 0.54)

		2000	2001	2002	2003	2004	2005	2006	2007	2008
		actuals				projections				
<b>Financial Costs</b>		>>>>>>>>		<<<<<<<<		>>>>>>>>			>>>>>>>>	
<b>Project operating expenditures</b>										
Direct production costs, excluding NRT		349,369	382,984	405,255	527,039	775,104	813,859	854,552	897,280	942,144
Administrative expenses		175,650	184,051	189,155	216,071	320,624	336,655	353,488	371,162	389,720
Other costs, during project implementation only		169,683	242,243	103,632	44,445	46,361	20,000	0	0	0
sub-total		694,702	809,278	698,042	787,555	1,142,109	1,170,514	1,208,040	1,268,442	1,331,864
Preproject operating expenditures		489,500	489,500	489,500	489,500	489,500	489,500	489,500	489,500	489,500
<b>Incremental project operating expenditures (in LVL)</b>		<b>205,202</b>	<b>319,778</b>	<b>208,542</b>	<b>298,055</b>	<b>652,609</b>	<b>681,014</b>	<b>718,540</b>	<b>778,942</b>	<b>842,364</b>
<b>Incremental project operating expenditures (in USD)</b>	0.54	<b>380,004</b>	<b>592,181</b>	<b>386,189</b>	<b>551,954</b>	<b>1,208,535</b>	<b>1,261,138</b>	<b>1,330,630</b>	<b>1,442,485</b>	<b>1,589,934</b>
<b>Project investment costs</b>										
Investments under the project		1,539,540	1,829,700	8578,390	3,883,880	3,088,340	2,935,950	0		
Continuing investments after project completion, in USD	0.54	0	0	0	0	0	250,000	1,750,000	250,000	250,000
<b>Total capital expenditures</b>		<b>1,539,540</b>	<b>1,829,700</b>	<b>8,578,390</b>	<b>3,883,880</b>	<b>3,088,340</b>	<b>3,185,950</b>	<b>1,750,000</b>	<b>250,000</b>	<b>250,000</b>
<b>Total project related costs</b>		<b>1,919,544</b>	<b>2,421,881</b>	<b>8,964,579</b>	<b>4,435,834</b>	<b>4,216,875</b>	<b>4,447,088</b>	<b>3,080,630</b>	<b>1,692,485</b>	<b>1,809,934</b>
<b>Financial Benefits</b>										
Waste disposal revenues, net of NRT		602,646	650,561	672,587	840,059	1,286,049	1,265,000	1,322,500	1,391,500	1,460,500
Preproject waste disposal revenues		582,100	582,100	582,100	582,100	582,100	582,100	582,100	582,100	582,100
Incremental waste disposal revenues		20,546	68,461	90,487	257,959	703,949	682,900	740,400	809,400	878,400
Other revenues, incremental		593	62,331	54,971	868	-1,904	0	0	0	0
sub-total incremental revenues, excluding electricity		21,139	130,792	145,458	258,827	702,045	682,900	740,400	809,400	878,400
Electricity revenues		0	0	60,503	317,131	783,383	895,501	1,257,637	1,767,070	1,767,070
sub-total incremental revenues, in LVL		21,139	130,792	205,961	575,958	1,485,428	1,578,401	1,998,037	2,576,470	2,645,470
Exchange rate between USD and LVL	0.54									
sub-total incremental revenues, in USD		39,146	242,207	381,409	1,066,589	2,750,798	2,922,954	3,700,068	4,771,242	4,899,019
Residual value of the project investment (15%)										
<b>Total project related benefits</b>		<b>39,146</b>	<b>242,207</b>	<b>381,409</b>	<b>1,066,589</b>	<b>2,750,798</b>	<b>2,922,954</b>	<b>3,700,068</b>	<b>4,771,242</b>	<b>4,899,019</b>
<b>Net financial costs - benefits</b>		<b>-1,880,397</b>	<b>-2,179,674</b>	<b>-8,583,170</b>	<b>-3,369,245</b>	<b>-1,466,083</b>	<b>-1,524,124</b>	<b>619,439</b>	<b>3,078,756</b>	<b>3,089,086</b>
undiscounted sum of values		43,407,610								
net present value, at 10%		-213,511								
FRR		9.88%								

Continuation of Table 3

in '000 USD (uniform exchange rate: USD 1.00=LVL 0,54)

	2009	2010	2011	2012	2013	2014	2015	2016
<b>Financial Costs</b>								
<b>Project operating expenditures</b>								
	989,251	990,000	990,000	990,000	990,000	990,000	990,000	990,000
	409,206	410,000	410,000	410,000	410,000	410,000	410,000	410,000
Other costs, during project implementation only	0	0	0	0	0	0	0	0
sub-total	1,398,457	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000
Pre-project operating expenditures	489,500	489,500	489,500	489,500	489,500	489,500	489,500	489,500
<b>Incremental project operating expenditures (in LVL)</b>	<b>908,957</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>
<b>Incremental project operating expenditures (inUSD)</b>	<b>1,683,255</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>
<b>Project investment costs</b>								
Investments under the project								
Continuing investments after project completion, in USD	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
<b>Total capital expenditures</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>
<b>Total project related costs</b>	<b>1,933,255</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>
<b>Financial Benefits</b>								
Waste disposal revenues, net of NRT	1,529,500	1,529,500	1,529,500	1,529,500	1,529,500	1,529,500	1,529,500	1,529,500
Pre-project waste disposal revenues	582,100	582,100	582,100	582,100	582,100	582,100	582,100	582,100
Incremental waste disposal revenues	947,400	947,400	947,400	947,400	947,400	947,400	947,400	947,400
Other revenues, incremental	0	0	0	0	0	0	0	0
sub-total incremental revenues, excluding electricity	947,400	947,400	947,400	947,400	947,400	947,400	947,400	947,400
Electricity revenues	1,767,070	1,767,070	1,767,070	1,767,070	1,767,070	1,767,070	1,767,070	1,767,070
sub-total incremental revenues, in LVL	2,714,470	2,714,470	2,714,470	2,714,470	2,714,470	2,714,470	2,714,470	2,714,470
Exchange rate between USD and LVL								
sub-total incremental revenues, in USD	5,026,797	5,026,797	5,026,797	5,026,797	5,026,797	5,026,797	5,026,797	5,026,797
Residual value of the project investment (15%)								
<b>Total project related benefits</b>	<b>5,026,797</b>	<b>5,026,797</b>	<b>5,026,797</b>	<b>5,026,797</b>	<b>5,026,797</b>	<b>5,026,797</b>	<b>5,026,797</b>	<b>5,026,797</b>
<b>Net financial costs - benefits</b>	<b>3,093,543</b>	<b>3,090,686</b>	<b>3,090,686</b>	<b>3,090,686</b>	<b>3,090,686</b>	<b>3,090,686</b>	<b>3,090,686</b>	<b>3,090,686</b>
undiscounted sum of values								
net present value, at 6%								
FRR								
<b>Sensitivity analysis:</b>								
increased waste disposal fees, by 25%	382,375	382,375	382,375	382,375	382,375	382,375	382,375	382,375
electricity tariffs, by 25%	441,768	441,768	441,768	441,768	441,768	441,768	441,768	441,768
<b>Revised net financial cost - benefits</b>	<b>3,917,685</b>	<b>3,914,829</b>	<b>3,914,829</b>	<b>3,914,829</b>	<b>3,914,829</b>	<b>3,914,829</b>	<b>3,914,829</b>	<b>3,914,829</b>

Continuation of Table 3.

in '000 USD (uniform exchange rate: USD 1.00=LVL 0,54)

	2017	2018	2019	2020	2021	2022	2023	2024	2025
<b>Financial Costs</b>									
<b>Project operating expenditures</b>									
	990,000	990,000	990,000	990,000	990,000	990,000	990,000	990,000	990,000
	410,000	410,000	410,000	410,000	410,000	410,000	410,000	410,000	410,000
Other costs, during project implementation only	0	0	0	0	0	0	0	0	0
sub-total	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000
Pre-project operating expenditures	489,500	489,500	489,500	489,500	489,500	489,500	489,500	489,500	489,500
<b>Incremental project operating expenditures (in LVL)</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>	<b>910,500</b>
<b>Incremental project operating expenditures (inUSD)</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>	<b>1,686,111</b>
<b>Project investment costs</b>									
Investments under the project									
Continuing investments after project completion, in USD	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
<b>Total capital expenditures</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>
<b>Total project related costs</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>	<b>1,936,111</b>
<b>Financial Benefits</b>									
Waste disposal revenues, net of NRT	1,529,500	1,529,500	1,529,500	1,529,500	1,529,500	1,529,500	1,529,500	1,529,500	1,529,500
Pre-project waste disposal revenues	582,100	582,100	582,100	582,100	582,100	582,100	582,100	582,100	582,100
Incremental waste disposal revenues	947,400	947,400	947,400	947,400	947,400	947,400	947,400	947,400	947,400
Other revenues, incremental	0	0	0	0	0	0	0	0	0
sub-total incremental revenues, excluding electricity	947,400	947,400	947,400	947,400	947,400	947,400	947,400	947,400	947,400
Electricity revenues	1,767,070	1,767,070	1,767,070	1,752,457	1,728,046	1,710,059	1,698,262	1,678,115	1,665,325
sub-total incremental revenues, in LVL	2,714,470	2,714,470	2,714,470	2,699,857	2,699,857	2,699,857	2,699,857	2,699,857	2,699,857
Exchange rate between USD and LVL									
sub-total incremental revenues, in USD	5,026,797	5,026,797	5,026,797	4,999,736	4,999,736	4,999,736	4,999,736	4,999,736	4,999,736
Residual value of the project investment (15%)									3,270,870
<b>Total project related benefits</b>	<b>5,026,797</b>	<b>5,026,797</b>	<b>5,026,797</b>	<b>4,999,736</b>	<b>4,999,736</b>	<b>4,999,736</b>	<b>4,999,736</b>	<b>4,999,736</b>	<b>8,270,606</b>
<b>Net financial costs - benefits</b>	<b>3,090,686</b>	<b>3,090,686</b>	<b>3,090,686</b>	<b>3,063,625</b>	<b>3,063,625</b>	<b>3,063,625</b>	<b>3,063,625</b>	<b>3,063,625</b>	<b>6,334,495</b>
<b>Sensitivity analysis:</b>									
increased waste disposal fees, by 25%	382,375	382,375	382,375	382,375	382,375	382,375	382,375	382,375	382,375
electricity tariffs, by 25%	441,768	441,768	441,768	438,114	432,012	427,515	424,566	419,529	416,331
<b>Revised net financial cost - benefits</b>	<b>3,914,829</b>	<b>3,914,829</b>	<b>3,914,829</b>	<b>3,884,114</b>	<b>3,878,011</b>	<b>3,873,515</b>	<b>3,870,565</b>	<b>3,865,528</b>	<b>7,133,201</b>

### Part 3 – Financial Cash Flow Projection

Section 1 contains a short resume of the analysis and conclusions of the SAR, including the major

assumptions; and section 2 deals with the financial cash flow projections using audited figures up to 2004 and forecasts until the year 2020. The SAR resume is in US\$, whereas the figures of section 2 are expressed in LVL, the currency in which the annual accounts are published; where appropriate conversion into US\$ is made at the agreed standard exchange rate of LVL 0.54 = US\$ 1.00.

### Section 1 – The SAR (Chapter 4, section E and Annex 7)

The financial analysis of the company is covered in Annex 7 of the SAR and in various tables. Major assumptions include a price of electricity of LVL 26.00/MWh (US\$ 48.18/MWh) and the capitalization of operational costs during construction. On the expenditure side figure the Project Costs, Operational and Maintenance and Administration costs of the modern landfill site. Also included were interest and principal payments of the loans from the World bank and from Riga City Council; company taxes were then at 25% after a 5 year tax holiday, against 15% to-day without tax holiday.

The results of the analysis in constant terms are shown in Appendix 3, Annex 7 of the SAR. They indicate comfortable positive cash flows over the entire period, resulting in a cumulative cash flow of nearly US\$ 19.0 million by 2019 (LVL 10.2 million). The various ratios are all favorable, but the cash flow is to a large extent constituted by depreciation, while the cash flow after loan repayment drops to very low levels at the height of loan repayment.

ratio	2005	2010	2015	2019/20
Cash flow before loan repayment, % revenues	43%	41%	43%	50%
Cash flow after loan repayment, % revenues	23%	15%	8%	50%
Debt service ratio: gross margin over payments	1.54	1.26	1.09	Na
Depreciation as % of cash flow, before loan	68%	80%	83%	75%
Gross margin as % of revenues	61%	55%	51%	49%
Working ratio: operating costs + depreciation + interest, % revenues	39%	456%	49%	51%
Net profit after interest and taxes, % revenues	14%	8%	8%	12%

The SAR projections indicated that the company would be able to create a cash flow sufficient to repay the loans to the World Bank and to RCC, but that overall profitability remained low, primarily as a result of the assumption that waste disposal tariffs would not be increased and that the project would be self-financing from the sale of electricity produced with the extracted LFG.

### Section 2 – The ICR

Table 2 shows the actual cash flows for the years 2000 to 2004, as well as the cash flow forecast for the period 2005 to 2025. The main assumptions are summarized in the table below: all figures are in LVL 2005 prices and no allowance has been made for inflation.

Component	Assumption
Quantities of waste	For 2005 at same level as 2004, some 1.1 million m <sup>3</sup> to increase by around 5% per year until a level of 1.3 million m <sup>3</sup> has been reached by 2009. Increase due to closure remaining landfills and some natural growth of waste production.



Waste disposal tariff	Fixed at the 2004 average of LVL 1.40/m <sup>3</sup> ; invoicing will change to a tonnage basis and rates are likely to be increased during 2005 or 2006. These changes have not been introduced in the analysis.
Electricity production	Depends on LFG extraction: Getlini Eko forecasts have been reviewed by Bank and Getlini Eko staff and a new, higher extraction forecast has been agreed to.
Installed energy conversion capacity	At this stage the installed capacity is 5.25 MW, which gives a maximum production of 41,391 MWh, irrespective of LFG extraction (the balance will be flared). In 2006 a new engine of 2 MW will be installed, operational in 2007, which will increase the production to a maximum of 57,159 MWh.
Electricity sales	Fixed at empirical 90% of production.
Electricity price	At present and according to the Latvenergo concession the price is the average sales tariff of LVL 34.35/MWh (US\$ 63.61/MWh), to be applied over 8 years. In view of the inevitable tariff increases of the next few years, it has been assumed that the present price will be extended after the expiry of the 8 year concession.
Recovered waste	This has been entered at a nominal LVL 1000/year (US\$ 1852), but may well increase as the company opens a sorting area for residents at the landfill site.
Costs, operational and administrative	These have been increased by around 5% until 2009 and rounded to LVL 1.4 million thereafter.
Other costs	Primarily the traditional support to Stopinu Pagasts
Grants	Grants received for the project will be written down over a 15 year period; this accounting procedure increase profits on paper, but not in real or monetary terms.
Depreciation	Increases from LVL 622,000 (US\$ 1.15 million) in 2004 to LVL 700,000 (US\$ 1.30 million) by 2008.
World Bank	Interest and principal calculated on the basis of a 4% interest rate; there are likely to be fluctuations in these amounts, but in any case the loan would be repaid by 2016.
Riga City loan of US\$ 6 million	This loan has been converted into equity during 2004.
Investments	It has been assumed that Getlini Eko will continue to invest LVL 135,000 (US\$ 250,000) per year in energy cells; in addition an amount of LVL 810,000 (US\$ 1.5 million) has been budgeted in 2006 for the purchase of the 2 MW capacity energy conversion unit.

The forecast shows that the company will be profitable throughout, even after elimination of the grant write-down of LVL 218,174/year (US\$ 404,026). Cash flows will be more than sufficient to cover interest and principal payments to the World Bank; the conversion of the RCC loan into equity contributes to this favorable result. The cumulative cash flow would reach almost LVL 30 million (US\$ 55.6 million) by 2025; however, this is a long period and lots of events may influence the figures in a negative way. The most sensitive of these factors are the extraction of LFG from the energy cells, hence electricity production and the price at which electricity can be sold to Latvenergo.

The table below summarizes the main financial ratios and enables a comparison with the SAR estimates (the ICR projection goes to 2025, when the ratios have further improved).

<b>ratio</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
Cash flow before loan repayment, % revenues	43%	50%	52%	52%
Cash flow after loan repayment, % revenues	34%	40%	45%	52%
Debt service ratio: gross margin over payments	4.53	4.76	8.57	na
Depreciation as % of cash flow, before loan	57%	39%	37%	37%
Gross margin as % of revenues	49%	58%	58%	58%
Working ratio: operating costs + depreciation + interest, % revenues	59%	49%	47%	47%
Net profit after interest and taxes, % revenues	20%	31%	32%	32%

While the cash flow ratios before and after loan repayment are roughly similar, the debt service ratio is more favorable than projected at appraisal. Depreciation represents less of a share of cash flows than at appraisal, which is a positive trend, as more cash flow is internally generated. The healthier financial situation of Getlini Eko at present is also reflected in a higher gross margin as % of revenues, lower working ratios and above all, much better profit margins.

The present cash flow analysis indicates a strong improvement of the company's financial situation and outlook compared with appraisal forecasts. The principal reasons are an increase in waste disposal tariffs, which had been kept constant at appraisal; a higher price paid by Latvenergo for electricity generated by landfill gas; and the conversion of the RCC loan of US\$ 6 million (LVL 3.24 million) into equity. Negative factors are the virtual disappearance of sorted waste as a source of income and much higher than anticipated operational costs. Overall, it appears that the project has enabled Getlini Eko to generate healthy cash flows which on the one hand enable the company to comfortably cover loan repayment to the World Bank and on the other hand provide resources for future investments.

**Table 2. Cash Flow Projections.**

## RIGA SOLID WASTE MANAGEMENT PROJECT

## Cash Flows: Actual and Forecast for Years 2000 - 2020

Table 2

File name

WB projections discussed with GLE staff

in constant 2005 LVL

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
	(pre-project)	(actuals)	(actuals)	(actuals)	(actuals)	(actuals)	>>>>> projections >>>>>				
<b>Revenues (LVL)</b>							<i>waste quantities increased by 5% until 2009, rounded</i>				
quantities of waste, in '000 m3		1,018	1,110	1,182	1,094	1,098	1,100	1,150	1,210	1,270	
average net tariff/m3				0.819	1.021	1.402	1.400				
<i>theoretical production of electricity, in MWh, from LFG extraction</i>							<i>electricity production</i>				
<i>maximum production of electricity, in MWh</i>			0	5,098	21,912	26,252	28,967	40,680	59,133	64,885	
<i>maximum production of electricity, in MWh</i>							41,391	41,391			
<i>sales price to Latvenergo/MWh</i>				12.800	14.473	32.370/34.350	34.350	>>>>>	Latvenergo concession, p/	57,159	57,159
Waste disposal revenues, including NRT	852,100	877,646	928,166	968,273	1,116,687	1,539,773	1,540,000	1,610,000	1,694,000	1,778,000	
Electricity Sales to Latvenergo (90% of production)	0	0	0	60,503	317,131	783,383	895,501	1,257,637	1,767,070	1,767,070	
Miscellaneous income (recovered waste, fees)	2,600	3,193	64,931	57,571	3,468	696	1,000	1,000	1,000	1,000	
<b>Revenues Total</b>	<b>854,700</b>	<b>880,839</b>	<b>993,097</b>	<b>1,086,347</b>	<b>1,437,286</b>	<b>2,323,852</b>	<b>2,436,501</b>	<b>2,868,637</b>	<b>3,462,070</b>	<b>3,546,070</b>	
<b>Expenses before the project (LVL)</b>							<i>major cost categories increased by 5% in real terms u</i>				
Direct cost of sales, management and other costs	489,500										
<b>Expenses after Project implementation</b>											
Direct production costs, excluding NRT		349,369	382,984	405,255	527,039	775,104	813,859	854,552	897,280	942,144	
Administrative expenses		175,650	184,051	189,155	216,071	320,624	336,655	353,488	371,162	389,720	
Natural Resource Tax, at 0.25/m3, incl under Waste disposal revenues	270,000	275,000	277,605	295,686	276,628	253,724	275,000	287,500	302,500	317,500	
Other costs		169,683	242,243	103,632	44,445	46,381	42,000	22,000	22,000	22,000	
<i>Stopinu Pagast Inhabitant Support Programme, subsidy</i>		13,182	15,752	14,952	10,251	22,402	22,000	22,000	22,000	22,000	
<i>Other operating income (actuals, or pm item)</i>		0	0	-2,123	-12,999	-26,309	-1,000	-1,000	-1,000	-1,000	
<i>Other operating expenses (actuals, or pm item)</i>		20,607	150,881	31,400	703	4,921	1,000	1,000	1,000	1,000	
<i>Project Procurement Unit</i>		135,894	75,610	59,403	46,490	45,367	20,000	0	0	0	
Grants for PPU management		-88,780	-10,211	-3,700	-43,519	-3,790	0	0	0	0	
Write-down of grants		0	-17,574	-75,320	-166,586	-199,830	-218,174	-218,174	-218,174	-218,174	
<b>Payments Total</b>		<b>880,922</b>	<b>1,059,098</b>	<b>914,708</b>	<b>854,078</b>	<b>1,192,213</b>	<b>1,249,341</b>	<b>1,299,367</b>	<b>1,374,769</b>	<b>1,453,191</b>	
<b>Gross Margin</b>		<b>-83</b>	<b>-66,001</b>	<b>171,639</b>	<b>583,208</b>	<b>1,131,639</b>	<b>1,187,160</b>	<b>1,569,270</b>	<b>2,087,302</b>	<b>2,092,880</b>	
<i>gross margin as % of sales revenues</i>		<i>0.0%</i>	<i>-6.6%</i>	<i>15.8%</i>	<i>40.6%</i>	<i>48.7%</i>	<i>48.7%</i>	<i>54.7%</i>	<i>60.3%</i>	<i>59.0%</i>	
Depreciation of Project Investments		35,040	56,724	184,021	513,833	622,179	625,000	650,000	675,000	700,000	
<b>Net Margin (EBIT)</b>		<b>-35,123</b>	<b>-122,725</b>	<b>-12,382</b>	<b>69,375</b>	<b>509,460</b>	<b>562,160</b>	<b>919,270</b>	<b>1,412,302</b>	<b>1,392,880</b>	
WB Interest (4.0%) - paid against the loan until 2005		0	0	0	0	0	0	137,700	126,576	114,804	
<b>Net income after interest payments</b>		<b>-35,123</b>	<b>-122,725</b>	<b>-12,382</b>	<b>69,375</b>	<b>509,460</b>	<b>562,160</b>	<b>781,570</b>	<b>1,285,726</b>	<b>1,278,076</b>	
Financial income related to forex changes (actuals only)		1,139	0	120,594	179,056	95,906	0	0	0	0	
<b>Net Profits (losses are negative) before taxation</b>		<b>-33,984</b>	<b>-122,725</b>	<b>108,212</b>	<b>248,431</b>	<b>605,366</b>	<b>562,160</b>	<b>781,570</b>	<b>1,285,726</b>	<b>1,278,076</b>	
Company taxes, from November 2003		0	0	0	-47,329	-92,164	-84,324	-117,236	-192,859	-191,711	
<b>Net Profits (losses are negative) after taxation</b>		<b>-33,984</b>	<b>-122,725</b>	<b>108,212</b>	<b>201,102</b>	<b>513,202</b>	<b>477,836</b>	<b>664,335</b>	<b>1,092,867</b>	<b>1,086,364</b>	
Depreciation		35,040	56,724	184,021	513,833	622,179	625,000	650,000	675,000	700,000	
<b>Cash Flow before loan repayment and investments</b>		<b>1,056</b>	<b>-66,001</b>	<b>292,233</b>	<b>714,935</b>	<b>1,135,381</b>	<b>1,102,836</b>	<b>1,314,335</b>	<b>1,767,867</b>	<b>1,786,364</b>	
Loan repayment, World Bank		0	0	110,700	245,620	250,250	261,900	278,100	294,300	313,200	
Investments financed by GLE (roads, energy cells, vegetation)		0	0	114,896	184,140	425,644	135,000	945,000	135,000	135,000	
Refund Natural Resource Tax		35,438	0	67,638	0	0	0	0	0	0	
<b>Cash Flow after loan repayment &amp; investments</b>		<b>36,494</b>	<b>-66,001</b>	<b>134,275</b>	<b>285,175</b>	<b>459,487</b>	<b>705,936</b>	<b>91,235</b>	<b>1,338,567</b>	<b>1,338,164</b>	
<b>Cumulative Cash Flow</b>		<b>36,494</b>	<b>-29,507</b>	<b>104,768</b>	<b>389,943</b>	<b>849,430</b>	<b>1,555,366</b>	<b>1,646,601</b>	<b>2,985,168</b>	<b>4,323,332</b>	
<b>ratios</b>											
cash flow before loan repayment, as % of revenues		0.1%	-6.6%	26.9%	49.7%	48.9%	45.3%	45.8%	51.1%	50.4%	
cash flow after loan repayment, as % of revenues		0.1%	-6.6%	16.7%	32.7%	38.1%	34.5%	36.1%	42.6%	41.5%	
debt service ratio: gross margin over interest and principal		na	na	1.55	2.37	4.52	4.53	3.77	4.96	4.89	
depreciation as % of cashflow, before loan repayment		na	neg	63.0%	71.9%	54.8%	56.7%	49.5%	38.2%	39.2%	
gross margin as % of revenues		0.0%	-6.6%	15.8%	40.6%	48.7%	48.7%	54.7%	60.3%	59.0%	
working ratio: operating costs + depreciation + interest over revenues		43.6%	44.3%	54.2%	72.4%	60.1%	59.1%	57.2%	49.1%	49.5%	
net profit after interest and taxation, as % of revenues		-3.9%	-12.4%	10.0%	14.0%	22.1%	19.6%	23.2%	31.6%	30.6%	

Continuation of Table 2.

## RIGA SOLID WASTE MANAGEMENT PROJECT

WB projections discussed with GLE staff

	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Revenues (LVL)</b>									
quantities of waste, in '000 m3	1,330	>>>>>							
average net tariff/m3									
theoretical production of electricity, in MWh, from LFG extraction	66,830	65,999	64,210	63,460	62,359	61,186	59,986	59,490	58,783
maximum production of electricity, in MWh									
maximum production of electricity, in MWh	57,159	57,159	57,159	57,159	57,159	57,159	57,159	57,159	57,159
sales price to Latvenergo/MWh			34.350	>>>>>					
Waste disposal revenues, including NRT	1,862,000	1,862,000	1,862,000	1,862,000	1,862,000	1,862,000	1,862,000	1,862,000	1,862,000
Electricity Sales to Latvenergo (90% of production)	1,767,070	1,767,070	1,767,070	1,767,070	1,767,070	1,767,070	1,767,070	1,767,070	1,767,070
Miscellaneous income (recovered waste, fees)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
<b>Revenues Total</b>	<b>3,630,070</b>	<b>3,630,070</b>	<b>3,630,070</b>	<b>3,630,070</b>	<b>3,630,070</b>	<b>3,630,070</b>	<b>3,630,070</b>	<b>3,630,070</b>	<b>3,630,070</b>
<b>Expenses before the project (LVL)</b>									
Direct cost of sales, management and other costs									
<b>Expenses after Project implementation</b>									
Direct production costs, excluding NRT	989,251	990,000	990,000	990,000	990,000	990,000	990,000	990,000	990,000
Administrative expenses	409,206	410,000	410,000	410,000	410,000	410,000	410,000	410,000	410,000
Natural Resource Tax, at 0,25/m3, incl under Waste disposal revenues	332,500	332,500	332,500	332,500	332,500	332,500	332,500	332,500	332,500
Other costs	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
Stopinu Pagast Inhabitant Support Programme, subsidy	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
Other operating income (actuals, or pm item)	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000
Other operating expenses (actuals, or pm item)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Project Procurement Unit	0	0	0	0	0	0	0	0	0
Grants for PPU management	0	0	0	0	0	0	0	0	0
Write-down of grants	-218,174	-218,174	-218,174	-218,174	-218,174	-218,174	-218,174	-218,174	-218,174
<b>Payments Total</b>	<b>1,534,784</b>	<b>1,536,326</b>	<b>1,536,326</b>	<b>1,536,326</b>	<b>1,536,326</b>	<b>1,536,326</b>	<b>1,536,326</b>	<b>1,536,326</b>	<b>1,536,326</b>
<b>Gross Margin</b>	<b>2,095,287</b>	<b>2,093,744</b>	<b>2,093,744</b>	<b>2,093,744</b>	<b>2,093,744</b>	<b>2,093,744</b>	<b>2,093,744</b>	<b>2,093,744</b>	<b>2,093,744</b>
gross margin as % of sales revenues	57.7%	57.7%	57.7%	57.7%	57.7%	57.7%	57.7%	57.7%	57.7%
Depreciation of Project Investments	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000
<b>Net Margin (EBIT)</b>	<b>1,395,287</b>	<b>1,393,744</b>	<b>1,393,744</b>	<b>1,393,744</b>	<b>1,393,744</b>	<b>1,393,744</b>	<b>1,393,744</b>	<b>1,393,744</b>	<b>1,393,744</b>
WB Interest (4.0%) - paid against the loan until 2005	102,276	88,992	74,952	60,048	44,172	27,324	9,396	0	0
<b>Net income after interest payments</b>	<b>1,293,011</b>	<b>1,304,752</b>	<b>1,318,792</b>	<b>1,333,696</b>	<b>1,349,572</b>	<b>1,366,420</b>	<b>1,384,348</b>	<b>1,393,744</b>	<b>1,393,744</b>
Financial income related to forex changes (actuals only)	0	0	0	0	0	0	0	0	0
<b>Net Profits (losses are negative) before taxation</b>	<b>1,293,011</b>	<b>1,304,752</b>	<b>1,318,792</b>	<b>1,333,696</b>	<b>1,349,572</b>	<b>1,366,420</b>	<b>1,384,348</b>	<b>1,393,744</b>	<b>1,393,744</b>
Company taxes, from November 2003	-193,952	-195,713	-197,819	-200,054	-202,436	-204,963	-207,652	-209,062	-209,062
<b>Net Profits (losses are negative) after taxation</b>	<b>1,099,059</b>	<b>1,109,039</b>	<b>1,120,973</b>	<b>1,133,642</b>	<b>1,147,136</b>	<b>1,161,457</b>	<b>1,176,696</b>	<b>1,184,682</b>	<b>1,184,682</b>
Depreciation	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000
<b>Cash Flow before loan repayment and investments</b>	<b>1,799,059</b>	<b>1,809,039</b>	<b>1,820,973</b>	<b>1,833,642</b>	<b>1,847,136</b>	<b>1,861,457</b>	<b>1,876,696</b>	<b>1,884,682</b>	<b>1,884,682</b>
Loan repayment, World Bank	332,100	351,000	372,600	396,900	421,200	448,200	234,900	0	0
Investments financed by GLE (roads, energy cells, vegetation)	135,000	135,000	135,000	135,000	135,000	135,000	135,000	135,000	135,000
Refund Natural Resource Tax	0	0	0	0	0	0	0	0	0
<b>Cash Flow after loan repayment &amp; investments</b>	<b>1,331,959</b>	<b>1,323,039</b>	<b>1,313,373</b>	<b>1,301,742</b>	<b>1,290,936</b>	<b>1,278,257</b>	<b>1,506,796</b>	<b>1,749,682</b>	<b>1,749,682</b>
<b>Cumulative Cash Flow</b>	<b>5,655,291</b>	<b>6,978,331</b>	<b>8,291,704</b>	<b>9,593,445</b>	<b>10,884,382</b>	<b>12,162,639</b>	<b>13,669,435</b>	<b>15,419,117</b>	<b>17,168,800</b>
<b>ratios</b>									
cash flow before loan repayment, as % of revenues	49.6%	49.8%	50.2%	50.5%	50.9%	51.3%	51.7%	51.9%	51.9%
cash flow after loan repayment, as % of revenues	40.4%	40.2%	39.9%	39.6%	39.3%	38.9%	45.2%	51.9%	51.9%
debt service ratio: gross margin over interest and principal	4.82	4.76	4.68	4.58	4.50	4.40	8.57	na	na
depreciation as % of cashflow, before loan repayment	38.9%	38.7%	38.4%	38.2%	37.9%	37.6%	37.3%	37.1%	37.1%
gross margin as % of revenues	57.7%	57.7%	57.7%	57.7%	57.7%	57.7%	57.7%	57.7%	57.7%
working ratio: operating costs + depreciation + interest over revenues	49.4%	49.0%	48.6%	48.2%	47.8%	47.3%	46.8%	46.6%	46.6%
net profit after interest and taxation, as % of revenues	30.3%	30.6%	30.9%	31.2%	31.6%	32.0%	32.4%	32.6%	32.6%

Continuation of Table 2.

## RIGA SOLID WASTE MANAGEMENT PROJECT

WB projections discussed with GLE staff

	2018	2019	2020	2021	2022	2023	2024	2025
<b>Revenues (LVL)</b>								
<i>quantities of waste, in '000 m3</i>								
<i>average net tariff/m3</i>								
<i>theoretical production of electricity, in MWh, from LFG extraction</i>	58,301	57,444	56,686	55,897	55,315	54,933	54,282	53,868
<i>maximum production of electricity, in MWh</i>								
<i>maximum production of electricity, in MWh</i>	57,159	57,159						
<i>sales price to Latvenergo/MWh</i>								
Waste disposal revenues, including NRT	1,862,000	1,862,000	1,862,000	1,862,000	1,862,000	1,862,000	1,862,000	1,862,000
Electricity Sales to Latvenergo (90% of production)	1,767,070	1,767,070	1,752,457	1,728,046	1,710,059	1,698,262	1,678,115	1,665,325
Miscellaneous income (recovered waste, fees)	1,000	1,000	1,000	1,001	1,002	1,003	1,004	1,005
<b>Revenues Total</b>	<b>3,630,070</b>	<b>3,630,070</b>	<b>3,615,457</b>	<b>3,591,047</b>	<b>3,573,061</b>	<b>3,561,265</b>	<b>3,541,119</b>	<b>3,528,330</b>
<b>Expenses before the project (LVL)</b>								
Direct cost of sales, management and other costs								
<b>Expenses after Project implementation</b>								
Direct production costs, excluding NRT	990,000	990,000	990,000	990,000	990,000	990,000	990,000	990,000
Administrative expenses	410,000	410,000	410,000	410,000	410,000	410,000	410,000	410,000
Natural Resource Tax, at 0,25/m3, incl under Waste disposal revenues	332,500	332,500	332,500	332,500	332,500	332,500	332,500	332,500
Other costs	22,000	22,000	22,000	22,001	22,002	22,003	22,004	22,005
<i>Stopinu Pagast Inhabitant Support Programme, subsidy</i>	22,000	22,000	22,000	22,001	22,002	22,003	22,004	22,005
<i>Other operating income (actuals, or pm item)</i>	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000
<i>Other operating expenses (actuals, or pm item)</i>	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
<i>Project Procurement Unit</i>	0	0	0	0	0	0	0	0
Grants for PPU management	0	0	0	0	0	0	0	0
Write-down of grants	-218,174	-218,174	-218,174	0	0	0	0	0
<b>Payments Total</b>	<b>1,536,326</b>	<b>1,536,326</b>	<b>1,536,326</b>	<b>1,754,501</b>	<b>1,754,502</b>	<b>1,754,503</b>	<b>1,754,504</b>	<b>1,754,505</b>
<b>Gross Margin</b>	<b>2,093,744</b>	<b>2,093,744</b>	<b>2,079,131</b>	<b>1,836,546</b>	<b>1,818,559</b>	<b>1,806,762</b>	<b>1,786,615</b>	<b>1,773,825</b>
<i>gross margin as % of sales revenues</i>	<i>57.7%</i>	<i>57.7%</i>	<i>57.5%</i>	<i>51.1%</i>	<i>50.9%</i>	<i>50.7%</i>	<i>50.5%</i>	<i>50.3%</i>
Depreciation of Project Investments	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000
<b>Net Margin (EBIT)</b>	<b>1,393,744</b>	<b>1,393,744</b>	<b>1,379,131</b>	<b>1,136,546</b>	<b>1,118,559</b>	<b>1,106,762</b>	<b>1,086,615</b>	<b>1,073,825</b>
WB Interest (4.0%) - paid against the loan until 2005	0	0	0	0	0	0	0	0
<b>Net income after interest payments</b>	<b>1,393,744</b>	<b>1,393,744</b>	<b>1,379,131</b>	<b>1,136,546</b>	<b>1,118,559</b>	<b>1,106,762</b>	<b>1,086,615</b>	<b>1,073,825</b>
Financial income related to forex changes (actuals only)	0	0	0	0	0	0	0	0
<b>Net Profits (losses are negative) before taxation</b>	<b>1,393,744</b>	<b>1,393,744</b>	<b>1,379,131</b>	<b>1,136,546</b>	<b>1,118,559</b>	<b>1,106,762</b>	<b>1,086,615</b>	<b>1,073,825</b>
Company taxes, from November 2003	-209,062	-209,062	-206,870	-170,482	-167,784	-166,014	-162,992	-161,074
<b>Net Profits (losses are negative) after taxation</b>	<b>1,184,682</b>	<b>1,184,682</b>	<b>1,172,261</b>	<b>966,064</b>	<b>950,775</b>	<b>940,748</b>	<b>923,622</b>	<b>912,751</b>
Depreciation	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000
<b>Cash Flow before loan repayment and investments</b>	<b>1,884,682</b>	<b>1,884,682</b>	<b>1,872,261</b>	<b>1,666,064</b>	<b>1,650,775</b>	<b>1,640,748</b>	<b>1,623,622</b>	<b>1,612,751</b>
Loan repayment, World Bank	0	0	0	0	0	0	0	0
Investments financed by GLE (roads, energy cells, vegetation)	135,000	135,000	135,000	135,000	135,000	135,000	135,000	135,000
Refund Natural Resource Tax	0	0	0	0	0	0	0	0
<b>Cash Flow after loan repayment &amp; investments</b>	<b>1,749,682</b>	<b>1,749,682</b>	<b>1,737,261</b>	<b>1,531,064</b>	<b>1,515,775</b>	<b>1,505,748</b>	<b>1,488,622</b>	<b>1,477,751</b>
<b>Cumulative Cash Flow</b>	<b>18,918,482</b>	<b>20,668,165</b>	<b>22,405,426</b>	<b>23,936,490</b>	<b>25,452,266</b>	<b>26,958,014</b>	<b>28,446,636</b>	<b>29,924,387</b>
<b>ratios</b>								
cash flow before loan repayment, as % of revenues	51.9%	51.9%	51.8%	46.4%	46.2%	46.1%	45.9%	45.7%
cash flow after loan repayment, as % of revenues	51.9%	51.9%	51.8%	46.4%	46.2%	46.1%	45.9%	45.7%
debt service ratio: gross margin over interest and principal	na	na	na	na	na	na	na	na
depreciation as % of cashflow, before loan repayment	37.1%	37.1%	37.4%	42.0%	42.4%	42.7%	43.1%	43.4%
gross margin as % of revenues	57.7%	57.7%	57.5%	51.1%	50.9%	50.7%	50.5%	50.3%
working ratio: operating costs + depreciation + interest over revenues	46.6%	46.6%	46.7%	47.1%	47.3%	47.5%	47.7%	47.9%
net profit after interest and taxation, as % of revenues	32.6%	32.6%	32.4%	26.9%	26.6%	26.4%	26.1%	25.9%



## Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating		
	Month/Year	Count	Specialty	Implementation Progress	Development Objective
<b>Identification/Preparation</b>					
	01/26/96	6	TEAM LEADER (1);FIN. ANALYST (1); ENV. SPEC (1); SOCIOLOGIST (1); GEOHYDROLOGIST (1); DIVISION CHIEF (1)		
	05/20/96	4	TEAM LEADER (1);FIN. ANALYST (1); ENV. SPEC (1); ECONOMIST (1)		
	10/21/96	5	TEAM LEADER (1);FIN. ANALYST (1); ENV. SPEC (1); ENERGY SPECIALIST (1); DONOR COORDINATOR (1)		
	09/12/96	4	TEAM LEADER (1);FIN. ANALYST (1); ENV. SPEC (1); ECONOMIST (1)		
<b>Appraisal/Negotiation</b>					
	21/04/97	4	TEAM LEADER (1);FIN. ANALYST (1); ENERGY. SPEC (1); OPERATIONS OFFICER (1)		
	NEG 11/23-27/97	4	TEAM LEADER (1);FIN. ANALYST (1); PROC. SPEC (1); DISBURSEMENT SPEC. (1)		
<b>Supervision</b>					
	03/18/98	4	TEAM LEADER (1);FIN. ANALYST (1); ENERGY SPEC (1); ECONOMIST (1)	S	S
	09/20/1998	2	ENVIRONMENTAL SPECIALI (1); URBAN SPECIALIST (1)	S	S
	12/22/1998	3	ENVIRONM. SPEC (1); MUNICIPAL SERV. SPEC. (1); FINANCIAL ANALYST (1)	S	S
	06/22/1999	4	TEAM LEADER (1); MUNIC. SERVICES SPEC (1); FINANCIAL ANALYST (1); SECTOR LEADER - ENVIR. (1)	S	S
	11/03/1999	2	TEAM LEADER (1); FINANCIAL ANALYST (1)	U	S
	03/28/2000	3	ENVIRONMENTAL SPECIALI (1); MUN. SERVICES SPEC. (1); FINANCIAL ANALYST (1)	S	S
	07/11/2000	4	TASK LEADER (1); MUNICIPAL SERV. SPEC. (1);	S	S

			FINANCIAL ANALYST (1); PROCUREMENT SPECIALIST (1)		
	12/13/2000	4	SR. ENVIRONMENTAL SPEC (1); MUN. SERVICES SPECIALI (1); FINANCIAL ANALYST (1); SOCIAL SCIENTIST (1)	S	S
	01/31/2001	2	SR. ENVIRONMENTAL SPEC (1); MUN. SERVICES SPEC (1)	S	S
	04/27/2001	4	TEAM LEADER (1); MUN. SERVICES SPEC (1); SR. ENVIRONMENTAL SPEC (1); FIANCIAL ANLYST (1)	U	S
	11/03/2001	3	TEAM LEADER (1); MUNIC. SERVICES SPEC. (1); FINANCIAL ANALYST (1)	S	S
	04/15/2002	3	ENV. SPECIALIST (1); OPERATIONS OFFICER (1); FINANCIAL ANALYST (1)	S	S
	11/01/2002	3	TEAM LEADER (1); OPERATIONS ANALYST (1); FINANCIAL ANALYST (1)	S	S
	11/01/2002	3	TEAM LEADER (1); OPERATIONS ANALYST (1); FINANCIAL ANALYST (1)	S	S
	06/21/2003	2	TEAM LEADER (1); FINANCIAL ANALYST (1)	S	S
	11/14/2003	3	TEAM LEADER (1); OPERATIONS ANALYST (1); FINANCIAL ANALYST (1)	S	S
	05/17/2004	3	TEAM LEADER (1); OPERATIONS ANALYST (1); FINANCIAL ANALYST (1)	HS	S
	11/01/2004	4	TEAM LEADER (1); ENV. SPECIALIST(1); FINANCIAL ANALYST (1); OPERATIONS ANALYST (1)	HS	S
<b>ICR</b>	04/18	3	TEAM LEADER (1); ENV. SPECIALIST(1); FINANCIAL ANALYST (1)	HS	S



(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation		
Appraisal/Negotiation		839
Supervision		588
ICR		30
Total		1457

## Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<u>Rating</u>				
<input checked="" type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Physical</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Financial</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Environmental</i>	<input checked="" type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
 <i>Social</i>					
<input checked="" type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Gender</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA

The Project has resulted in that about 150 scavengers have obtained full employment on a regular basis by a private company now working with separation of recyclable material at the Getlini site.

## Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

### 6.1 Bank performance

#### Rating

- |                                      |                          |                                    |                         |                          |
|--------------------------------------|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Lending     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Supervision | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

### 6.2 Borrower performance

#### Rating

- |  |                          |                                    |                         |                          |
|--|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Preparation                           | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Government implementation performance | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Implementation agency performance     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall                               | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

## **Annex 7. List of Supporting Documents**

Feasibility Study

Environmental Impact Assessment

Business Development Plan

Staff Appraisal Report

National Waste Management Strategy

Aide-Memoires, see listed documents in Annex 4

