

District Heating Projects in Latvia and Russia

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Sida Evaluation 05/08

**Department for Infrastructure
and Economic Co-operation**

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1 Executive Summary

1.1 Background: Review of 3 Baltic and 2 Latvian DH Rehabilitation Projects

Sida supported several District Heating (DH) rehabilitation in Latvia and Russia from the mid-90's. This Evaluation assesses five DH rehabilitation projects in 1994–2003 of which four were selected to fit the objectives of the First Baltic Billion Fund (FBBF). Three projects, Jelgava, Archangelsk and Riga, are essentially implemented, while constraints in the environment and ownership caused delay in Gatchina and Daugavpils.

1.2 Evaluation Approach and “Benchmarking” of Success Ratings

The approach followed the T.O.R. and Inception Report proposals, as described in Section 2.2 and elaborated in Appendix 7. The Evaluation took a uniform approach in rating the degree of success. The main exception is institutional development that is assessed and rated in the differing country contexts. Latvia was, for example, a more conducive environment than Russia in terms of the pace of national regulatory reform affecting DH utilities and in terms of improving household incomes.

1.3 The Evaluated Projects in Brief (Section 3.2 and, Appendices 1–5)

Jelgava was the first city to prepare and complete its DH rehabilitation. The network renewal was costly, but met good standards. A condition to financially restructure the DH company before taking on WB debt was taken out of the loan contract. Another burden came as the Company took over a local old DH system under an ailing state industry. The finances collapsed, and 4 years' insolvency administration set back institutional reform and autonomy. The energy savings and environmental gains were overshadowed by poor demonstration of the financial outcome to other DH utilities. The Project is rated partly unsuccessful, and the Sida-interventions successful (see Project Report, Appendix 1).

The *Archangelsk* DH rehabilitation was conceived as an emergency support project. It now scores lowly on most counts. The supplier-driven project became a difficult challenge for Sida and the consultants. The preparations in a short time helped steer some components to effective use. However, piecemeal additions to a complex DH system with local owners that lacked relevant project experience presented big risks. The delivered equipment under FBBF grants was only partially put to good use. The Project is rated unsuccessful, and the Sida-intervention partly unsuccessful, despite the good efforts. (see Project Report, Appendix 2).

The *Daugavpils* DH system is worsening. No material investments are completed, and the demonstration component only partly. An ailing and badly maintained DH system with lagging tariffs saw a downward spiral worsened by falling industry demand. The Company has little real autonomy from the City administration. The system faces a high disintegration risk, as DH may no longer be a least-cost option across the City with falling load density. The Sida interventions are rated partly unsuccessful, as the preparation and demonstration investments seem a sunk cost for a client that failed to put them to good use (see Project Report, Appendix 3).

Gatchina illustrates in contrast to Daugavpils that relative institutional progress can be accomplished even in complex transition environments. Sida and the WB choose the City for its shown reform-orientation. This factor and 3 years of institutional support via Swedish consultants helped reform progress, although the main investments were long delayed by the Rouble crisis and regulatory reform

has delayed tariff adjustments and financial autonomy. The DH Company is well placed to resume priority investments as now prepared with Sida support. The project is rated partly unsuccessful and the adapted Swedish preparatory and demonstration interventions successful. (See Project Report Appendix 4 and the Social and Gender Memorandum in Appendix 6.)

The Riga case stands out as the most successful of the five reviewed projects, and is about to be completed in 2005. The Project and the Sida-interventions are both rated highly successful due to good preparation support to the DH company with Riga City as an insightful owner. The City joined its main DH-systems under one utility company. In contrast to the Jelgava case, “Rigas Siltums” was given a sound organizational, financial and managerial footing before the Project. The Company is now the most advanced among the reviewed DH utilities with good autonomy and sustainability. Its competent management could make good use of the Swedish preparation support. In view of the Evaluators, management was also justified in opting for local currency debt for the Project when this finally became available at good terms from local capital markets instead of taking up the intended WB and Swedish FX loans. (See Project Report, Appendix 5).

1.4 Key Success Factors, Issues and Recommendations (Sections 4 and 5)

1.4.1 High energy-conservation and environmental gains from the two implemented projects

Jelgava and Riga score highly on energy conservation and environmental gains. More metered billing could have added more savings on the margin. In Gatchina, similarly good savings are at hand relative to the cost of the implemented investments. In Daugavpils no main investments took place, and the demonstration component is a partly sunk cost. The measures in Archangelsk focused mostly on supply-security. Overall, the Evaluation concludes that well prepared DH rehabilitation projects have high-energy conservation and environmental gains. Therefore, DH rehabilitation support has a justified place in the continued Swedish collaboration with the eastern transition countries.

(Sections 4.1 and 5.1.)

Recommendation:

- *Develop a DH rehabilitation support strategy for the eastern transition economies.*

Sida should develop a DH rehabilitation strategy for future collaboration with countries in Central and Eastern Europe and further east. It should form part of an overall strategy for municipal environmental infrastructure projects and build on Sida’s past experience.

1.4.2 DH systems can deteriorate beyond salvage if reforms and investments lag seriously

Lagging tariffs, maintenance and investments in Daugavpils led to deteriorated services and a continuous loss of clients. The local DH system shows current signs of disintegration and may eventually collapse, as it may prove too late to turn the tide. (See Section 4.2)

Recommendation:

- *Consider disintegration risks in poorly maintained DH systems with weak owners.*

Early screening of DH projects must consider that the least-cost alternative may no longer lie in DH due to the reduced load densities and if the potential gains with central CHP or other cheap sources of heating energy supplies may no longer be realistic in a system that is disintegrating into scattered sub-systems.

1.4.3 Reform-orientation of the utility owners and institution-building is imperative

Owner-awareness of the non-technical institutional reform-needs stood out as a key condition.

The successful Riga case proves the point in particular when compared to the lacking reform-aware-

ness and success in Daugavpils. The Gatchina project brought some good institutional reform demonstration in the Russian context, despite the lagging investments and tariff adjustments in the adverse general economic climate. In Jelgava, financial restructuring of the DH company was delayed and the resulting insolvency seriously delayed institutional reform. (See Sections 4.3 and 5.2)

Recommendation:

- *Continue critical early tests of the owner-reform orientation in DH projects.*

Screening of DH rehabilitation projects should start with thorough assessment of the owners' insight and motivation to bring about the needed reforms. Before entering costly feasibility studies, Sida should assess the owners' true reform-willingness, as the preparatory studies may otherwise become a sunk cost. The review should look to autonomy and integrity aspects and the risk that strong vested interests may oppose or delay reform. Expertise with a good insight into municipal and utility reform in the country should assist the screening.

1.4.4 Enduring flexible preparations at fast-changing economic transition conditions

Flexible adaptation was a particular strength in Sida's handling of the successful Riga-project and the Gatchina case at fast changing conditions. Sida had in-house experience and handling capacity for insightful enduring preparations. (See Sections 4.4 and 5.3)

Recommendation:

- *Retain minimum sector insight and handling capacity for Sida's co-financier role.*

Sida should retain its capacity for insightful and flexible handling of preparatory support to complex infrastructure projects. Further increased dependence on external consultants may put the necessary minimum sector-insight at risk for competent dialogue with clients, consultants and intended co-financiers. The risk must be considered that more inflexible, procedures-driven approaches can follow if Sida cannot retain critical mass and continuity in its in-house handling of complex infrastructure project preparations.

1.4.5 Least-cost analyses for DH rehabilitation projects and non-technical constraints

The feasibility studies' least-cost alternatives for CHP energy supplies from third parties did not turn out practical in the cases of Jelgava, Riga and Daugavpils. Unclear ownership, technical problems and lacking incentives for cost sharing were common problems. (See Section 4.5)

Recommendation:

- T.O.R. for least cost analyses should point to the technical and institutional factors.*

Least-cost analyses must consider that optimal technical solutions (as linking the DH-systems to expanded CHP output from third party owners with sharing of the gains) may prove impossible to contract in practice. If the prospects seem uncertain due to unclear future status of the CHP owners, or consultations indicate that the CHP investments and gains may not be shared fairly, also other least-cost solutions should be analyzed and recommended in feasibility studies.

1.4.6 Financing of DH projects and fostering of local capital markets development

The Riga DH rehabilitation project is a fine example how the ultimate financing could come from operating surpluses of the DH Company and through raised local-currency debt from local banks on good terms as the Latvian capital markets improved. The intended Swedish and IFI debt financing was not needed in the end, and the client could avoid a significant foreign-exchange exposure risk having all its tariff revenues in local currency. (See Section 4.6)

Recommendation:

Consider prospects to link DH finance-plans to capital markets development.

Financing plans for DH projects at intermediate economic transition stages should keep in mind the prospects with gradually maturing local capital markets. Opportunities may arise to ultimately finance part of the project locally and help avoid a foreign exchange risk exposure. The finance plans should therefore have a degree of flexibility to include more local part financing if the local macro-economic and credit conditions improve as the preparations proceed. The prospects to contribute to local capital markets development by introducing good municipal utility borrowers should be considered.

1.4.7 Piecemeal emergency interventions into complex DH systems can be overly risky

Despite the good Sida efforts, the intervention in Archangelsk scored low success. The project was conceived as emergency support instead of being subjected to the full required preparatory studies. The project went ahead without full prior in-depth review of the local systems and proposed overall investments. The local project planning, implementation management and counterpart funding capabilities were not reviewed critically for the parallel related investments in energy production. As a result, significant parts of the Swedish-funded investments were not put to good use. (See Section 3.2.2)

Recommendation:

Avoid supplier-driven partial interventions in complex DH-systems.

Swedish support to DH rehabilitation should avoid piecemeal interventions into complex DH systems conceived as emergency support. Such projects can be overly risky with insufficient time and resources to review the owner strengths and the proposed investments in a proper systems perspective, or to ensure adequate implementation arrangements. Supplier-driven projects should be screened carefully and rejected if found excessively risky in any of these areas.

Sections 4 and 5 present additional conclusions and recommendations. These include that rational tariff structures must be emphasized, that tariff reform can encounter regulatory, social and political constraints, and that the studies should include more comprehensive financial and socio-economic analyses. The Reviewers finally recommend that Sida hosts a seminar on the findings in this report.

2 Background and Evaluation Approach

2.1 Background

Sida has supported environmentally sustainable development in the Baltic Sea region since the early 90's. Grants to energy sector projects were often as co-financing with international financial institutions (WB, EBRD, NIB). Five DH rehabilitation projects in Latvia and Russia are reviewed in this Evaluation. The projects were prepared from the mid 90's following the experience from prior similar support to Estonia. The Swedish contributions financed preparatory studies, implementation support and demonstration investments. Institutional assessment and reform dialogue, and support to one Russian case in particular, focussed on ownership, governance, management and corporate development in aid of sustainable autonomy of the DH utility companies.

Project	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Intended Inv. MUSD	Inv. Implemented
Jelgava population 71 000													
Prep. Studies	■	■											
Technical Design (MUSD 1,0)			■	■									
Demonstration Project (MUSD 0,2)			■										YES
Add on Prep. Studies						■							
WB Appraisal		■	■										
Main Rehabilitation Project				■	■	■	■					20	YES
Arhangelsk population 355 000													
Technical Design (MUSD 0,05)							■						
Installation of equipment								■	■			4	YES
Daugavpils population 112 000													
Prep. Studies (MUSD 0,2)					■	■							
Demonstration Project (MUSD 0,2)					■								YES
Main Rehabilitation Project												8-22	NO
Gatchina population 83 000													
Prep. Studies (MUSD 0,7)					■	■		■					
Demonstration Project (MUSD 0,2)						■							YES
Grant Funded Investment Project								■	■	■		3,5	YES
Bank Appraisal						■	■						
Main Rehabilitation Project												17	NO
Institutional Support (MUSD 0,9)								■	■	■			
Riga population 815 000													
Prep. Studies (USD 0,8)					■	■	■						
Demonstration Project (MUSD 0,3)								■					YES
Technical Design (MUSD 0,2)													
WB Appraisal							■	■					
Main Rehabilitation Project								■	■	■	■	125-130	YES
Technical and legal support							■	■					
												(MUSD 10,7)	

2.2 Evaluation Approach

The Evaluation followed Sida's adopted post-evaluation approach.¹ Details are given in Appendix 7 along a prior Inception Report for the Evaluation. The Appendix reiterates the rationale and goals for the Sida interventions and the derived evaluation criteria in a with and without project perspective. The Appendix shows the evaluation steps (documents review, interviews, field work, analyses, reporting) and notes some limitations and mitigating factors. This includes that incomplete base data and monitoring reports were compensated, as the Evaluation Team applied its prior experience from DH and other municipal infrastructure reform projects in similar transition countries.²

The findings and recommendations in this Report are mainly addressed to Sida, while it may decide to disseminate relevant parts more widely. Some of the findings may be of interest to parties that consider DH rehabilitation in countries with Swedish development collaboration programs.

¹ See "Looking Back Moving Forwards", Sida 2004

² The Evaluation Team included Mr. Karl-Erik Ramström as coordinator; Mr Anders Grette (economist), Mr Tord Holmström (DH engineer), and Mr Christofer Hök (socio-economic expert). The assignment was contracted under a framework agreement between Sida INEC and RamComp International AB

3 Main Evaluation Findings

3.1 Tariffs

Tariff regulation and social policies affect the reviewed projects and their impact on poverty reduction. In Latvia, the tariffs are supervised by a system of one central and several regional regulators, aiming to ensure that tariffs are cost-effective and that social assistance is directed to the poorest. In Russia, the tariffs have been set within a regulatory regime that did not allow full cost recovery to date. It is only now, in 2005, that tariffs can be raised to cover cost. Tariffs that cover cost will be a mandatory requirement from 2006, but prior similar regulation postponed the target date. Subsidies follow very complicated rules: first a general protection limiting payment for municipal services to 22 per cent of family incomes; and second a system of allowances to selected groups of citizens. The latter part of the social protection system is set to be replaced by direct cash subsidies to these groups. With tariffs increasing, more people come into the first group. Well-prepared and implemented DH rehabilitation projects will bring forward substantial cost savings, allowing for both loan repayments and tariff reductions and thus limiting the cost effects for all customers.

3.2 Key Project Findings

3.2.1 Jelgava District Heating Rehabilitation Project

This project was the first among bigger DH rehabilitation projects in Latvia from the mid 90's. It was seen as a pioneer case with intended WB financing and preparatory and implementation support from Sida and other parties. The USD 20.1 million Project was completed on time in 1999 with some local cost overruns. It includes substantial network rehabilitation, new substations and control equipment, and small boiler conversions. Proposed new heat supply under contract from an existing CHP plant to be upgraded could not be negotiated and a viable alternative remains to be prepared.

– For more details, assessments, conclusions and lessons, see *Project Report, Appendix 1.*

The Evaluators rate the overall Project as partly unsuccessful. The institutional and energy saving aims were clearly relevant. The Sida interventions are rated successful overall, due to good technical preparation, designs and supervision. Good internal insight was also brought by the grant to demonstration investments in substations. Institutionally, the Project rates to the negative: the condition to restructure the client company, JDHC, was overlooked when the WB loan was signed, while Sida could not affect this. JDHC entered the Project with high past debts counter to the preparation assumptions. Improved governance, management, MIS and autonomy were lost when JDHC came under a long insolvency administration that may end only in 2005. The big WB loan added more burdens. So did the unforeseen merger of the inefficient right-bank DH system after its owner, the state's RAF van factory, got defunct. The tariffs could not be raised more, and the Project brought negative demonstration to other DH utilities.

An acceptable rating of technical standards and least-cost solution is likewise justified by good preparatory work and designs. Still, over-emphasized network renewal and resulting high investments per served inhabitant reduced effectiveness. The demonstration project made the client timely aware of the merits with new substations and regulation, but the designs overlooked wider dissemination prospects to other DH utilities.

Financial and economic sustainability rate lowly: the costly Project shows fair financial and better economic returns. Yet, the prolonged JDHC insolvency clearly constrained sustainability. The direct energy conservation objectives were achieved via savings from substations, variable flow and cut network losses plus boiler conversions. Despite the insolvency, numerous new substations were put in place

after the Project also on the right bank with only ca.20 buildings remaining there. The conservation gains would have rated above acceptable, had the CHP generation alternative been brought forward. The environmental protection impact is rated satisfactory for similar reasons: The set targets were met for CO2 cuts in particular with the Project's direct energy conservation. But higher indirect gains will follow with "cleaner" power from upgraded local CHP generation as planned. Poverty Reduction and Gender Equality achievements are not rated: the socio-economic aims were stated only generally at Sida's approval with no specific project objectives or intended designs.

3.2.2 Archangelsk District Heating Rehabilitation Project

The project was implemented in 1998/99, and concerns emergency FBBF funding in the order of SEK 27 million for investments in the DH system of Archangelsk in Northwest Russia to improve the supply security. Sida grants of SEK 1.1 million funded technical preparation and implementation support. – More details, analyses, conclusions and lessons are given in the Archangelsk Project Report (Appendix 2).

The Evaluators assign an "unsuccessful" overall rating to the Project, and a "partly unsuccessful" rating to the Sida intervention. A key factor is that the Project was initially developed, designed and largely driven by a Swedish commercial party active in the region. The Project was then defined as emergency support from FBBF. As such, it presented a difficult challenge to Sida and the contracted consultants, allowing very limited time for preparations. This follows not least, as the intervention concerned piecemeal rehabilitation measures into a complex DH system with uncertain base-line information. Moreover, the system was under two local parties with no prior relevant project implementation experience. These complications saw the Sida intervention with FBBF funding suffer in terms of effectiveness and efficiency. Nevertheless, the preparatory and implementation support helped to improve designs and shift the focus of the Project towards higher efficiency. There was no reform-support to the DH-organisation, and hence no contribution to institutional sustainability.

The delivered equipment has only partially been taken into operation. The overall Project rates poorly with respect to relevance, sustainability and efficiency. Those installations actually completed and brought into operation are rated as acceptable, though, in terms of effectiveness and impact.

3.2.3 Daugavpils District Heating Rehabilitation Project

The project was prepared in the late 90's for the DH system in Latvia's second biggest city, but the main investments never materialized. Sida grants funded preparatory studies and demonstration substations in anticipation of a WB loan for the USD 8–22 million project. The proposed rehabilitation measures included continued sub-station and distribution upgrading for conversion to variable flow and of boilers. The main project alternative included integration of the DH subsystems and added heat supply from an upgraded CHP at a local industrial plant. The lower investment alternative of USD 8 million without these elements was, however, favoured by the Client and the WB.

The demonstration project was completed with support from Swedish FVB who also performed the Feasibility study and its updates by early 2000. One reason why the Project was not implemented was the lacking reform-orientation of the administration of Daugavpils as an ailing industrial centre from the past in Latvia's southeast. Reportedly, the WB relations got increasingly strained. The City also noted how DH rehabilitation in Jelgava had left its debt-ridden DH company insolvent (see 1.2.3) and finally opted not to pursue the Project. But the DH Company, JS, was in a dire state due to neglected maintenance, investments, lost clients and lagging tariffs. A downward spiral continued, and the City failed in governance and management renewal of JS that still lacks autonomy. The Company now seeks EU and NIB funds for small parts of the network and boiler improvements.³ The population

³ These investments follow the feasibility recommendations in essence, but risk becoming a sunk cost if the affected parts of the system have poor survival prospects anyway after the further deterioration over the past few years.

remains ca 117.000, but the reduced load density and poor network status may no longer render DH a least-cost solution. The consultants, FVB, had warned during the preparations of disintegration of the system by default with increasingly inefficient islands in the absence of urgent overall rehabilitation.

The Evaluators assign an overall unsuccessful rating to the Project and partly unsuccessful rating to the Sida intervention. – For justifications and more details, analyses, conclusions and lessons, see the Daugavpils Project Report (Appendix 3).

3.2.4 Gatchina District Heating Rehabilitation Project

The project was selected by Sida in tandem with the WB to be the first in an intended series of DH projects in Russia focusing on energy savings and institutional reform. Sida grant-funded preparations from 1997 came to a halt with the rouble crisis in August 1998. But the preparations resumed in part along with the final Feasibility Study by Swedish ÅF in 2000, and a Sida-funded study in early 2005 will propose more priority investments with anticipated NEFCO funding. The original Feasibility Study proposed an investment programme for ca 17 MUSD, yet to be implemented.

Initial and extended demonstration investments in substations, regulation etc. were continued in the interim through early 2003, funded by USD 2 million equivalent from the Swedish FBBF. A Sida-funded Corporate Development programme with Swedish B&S support ended in 2002 after ca three years' successful collaboration with Gatchina City and GTS, the client company.

Although the full rehabilitation could not be financed after the economic crisis in Russia, the good institutional achievements of GTS have facilitated plans for further external support. Currently, Sida funds an update by ÅF for a reduced programme to invest ca USD 3.5 million in additional substations, network rehabilitation and improved regulation, with applied financing from NEFCO. – For more rating justification, details and conclusions, refer to the Gatchina Project report (Appendix 4)

The Evaluation assigns a partly unsuccessful overall rating of the investment Project, as it was essentially postponed with the exception of the Swedish-funded rounds of demonstration investments. A successful rating to the Swedish intervention is justified by good adaptation to the long general economic setback in Russia that ruled out debt funding of the main investments. Another justification is Sida's enduring continued support to institutional development as described in Appendix 4. GTS still has some way to meet all key objectives in the Corporate Development Plan, including in terms of client orientation. The Company still provides strong reform demonstration to its Russian peers. That it won several awards as Russia's leading DH company and receives regular study visits is in no small way thanks to a supportive and reform-orientated City Administration. As owner, it resolutely renewed management of the Company, introduced an owner council and gave other crucial support in good liaison with the B&S consultants.

The Evaluators assessed social and gender impacts along with Sida's T.O.R. Questionnaire returns from a sample of households in the Aerodrome area could be compared with other returns from a sample of households not yet affected by Swedish-financed distribution and regulation improvements. The results, as presented in Appendix 4 are not fully conclusive, but do point to some merits in the affected district. The switch from general DH subsidies via tariffs to directed welfare to the neediest household progresses very slowly. Cost-based DH tariffs still lag significantly in Gatchina, as in other Russian DH utilities. This is the one area where the Sida-led intervention could not affect reform at the intended pace.

3.2.5 Riga District Heating Rehabilitation Project

This Project is for upgrading of the Riga DS distribution system as well as new combined heat and power (CHP) generation. A World Bank loan of USD 21.7 million and a proposed Swedish FBBF-guaranteed credit of USD 26.6 million equivalent were planned to co-finance total project costs estimated at USD 137.6 million. In addition, Sida extended SEK 11.6 million in grants to preparatory studies and demonstration investments. The intended Swedish and WB loans never

materialized, as the Company finally could finance the Project with internally generated cash and debt from local banks on good terms. By late 2004, the Project was about 2/3 completed by the DH-utility client, "Rīgas Siltums". Progress was essentially along the original plans and budget after a slightly delayed start and the new CHP plant as last main component is well underway.

This Evaluation assigns high ratings to the Riga DH project and the Sida intervention. The success factors include that the Riga City administration was a reform-oriented owner of the DH utility. The Company was given a sound institutional, managerial and financial footing before the Project. The Swedish preparatory support via Sida adapted well to the rapid changes in the Latvian economic transition environment. The Project meets high technical standards and has found good systems solutions based on the Swedish preparatory support. The Sida-funded studies were generally of high calibre. The Project now demonstrates effective DH rehabilitation to other utilities in the region.

Good financial and economic returns of the Project contribute to strong finances and a good autonomy and sustainability of the Company and its services. Substantial direct and indirect energy conservation achievements are wholly in line with the Project projections. Metered billings were introduced to encourage user savings, helped by substation installations following the Sida funded demonstration project. Environmental gains are also significant along with the energy savings, in particular in terms of direct and indirect cuts of CO₂ emissions. The Company has yet to foster internal and client environmental awareness in a more active way, though. Socio-economic and gender aspects were not included in the main aims or designs of the Project, while it facilitates for the City to switch from general tariff subsidies to directed welfare to poor households only.

Further details and ratings justifications are presented in the Riga Project Report (Appendix 5).

4 Identified success factors, issues and lessons

4.1 The Completed Projects Prove the Savings and Environmental Rationale

The Jelgava and Riga projects with most advanced rehabilitation investments will meet the set targets for energy conservation and cut emissions, as shown in their Project Reports (Appendix 1 and 5). Improvements in one Gatchina districts with Swedish-financed substations and better regulation also show good conservation gains. Faster-rising real energy prices than assumed at preparations make for better economic returns than estimated at the appraisal and adds more incentives to the owners and management to continue DH efficiency improvements.

Lessons:

Excellent energy conservation and economic returns potential in DH projects provided that the owners are reform-orientated:

The Evaluators conclude from the reviewed completed investments that DH-rehabilitation projects remain with an excellent potential in the region to assist sustainable energy conservation, environmental improvement and economic transition and growth. A key requisite is sufficient institutional reform orientation of the owners of utility companies to foster their managerial and financial autonomy. The emergency support to the Archangelsk project focused on supply-safety only, with no strong conservation rationale. The root cause of the failure of the Daugavpils project was lacking reform-orientation of the City as owner and the resulting constraints to timely institutional reform.

4.2 District heating systems can fall apart without minimum maintenance:

The Daugavpils project provided strong demonstration that neglected reforms and efficiency improvements will make customers leave DH for other alternatives. Normally, the richest and best customers will disconnect first. Eventually, the DH company will have only scattered poor customers resulting in a down-ward spiral towards insolvency and final closure of the services.

Lessons:

Warning examples can be used to make the utility owners and managers better understand the need for reform and improvement:

The Evaluators conclude from the reviewed that poorly managed and operated DH systems are at big risk as soon as competitive environments are established. The root cause of the failure of the Daugavpils project was lacking reform-orientation of the City as owner and the resulting constraints to timely institutional reform and many customers therefore switched to gas when this became possible.

4.3 Institutional Reform as a Key Success Factor in Utility Rehabilitation Projects

It is telling to compare the autonomy and good sustainability of the Riga DH company vs. the lost institutional impact in the case of Jelgava, where the DH company got insolvent. A further strong indication comes from comparing the Gatchina and Daugavpils DH companies and their owners. Gatchina emerges as better placed to resume the planned project in parts when the adverse Russian economic environment is improving, while the Daugavpils DH system may be beyond meaningful rescue as the owners and the Company neglected reform. The contrasting institutional outcomes show in an unusually clear ways that a reform-orientated municipal owner is a key condition for success. DH-rehabilitation interventions that aim at sustainable, autonomous DH companies with good demonstration potential must therefore start with careful screening and selection of the owners. For example, Gatchina City renewed its DH Company management timely, while the Evaluators found that this has not taken place in Daugavpils.

Lessons:

Selecting owners for DH-rehabilitation with institutional and demonstration impact.

Municipal DH-utility reform and rehabilitation may encounter difficult constraints in economic transition environments to bring about the necessary institutional reform. These can range from regulation to conservatism among DH managers and owners. DH operations are big financially, with resulting risks of strong vested interests and strong opposition to change. Therefore, manifest reform-orientation of the political and administrative leadership in a municipal owner of a DH company is a key condition for success. Selecting just a few potentially strong demonstration cases may be a more efficient way for development financiers like Sida to support nationwide transition in the sector than offering widespread geographic DH rehabilitation projects.

4.4 Capacity Challenges in Sida's Preparation of DH-Rehabilitation Projects

Jelgava, Daugavpils, Riga and Gatchina as DH rehabilitation cases with intended WB co-financing clearly illustrate the range of challenges. Those that emerged at the unstable transition conditions include:

- Lengthy preparations were needed to review complex capital-intensive systems in a good context in cases with incomplete base-line information and uncertain wider contextual change (Jelgava).

- Outdrawn systems re-assessment at fast-changing, unstable transition conditions.
- (Riga with the uncertain Latvenergo privatization and alternative CHP supplies).
- Western norms and rules of thumb partly unsuitable (Jelgava’s expensive network renewal not as urgent as first thought, and might have been staged)
- Uncertain regulation (e.g. of tariff structures, as in Latvia, or taxation as in Russia).

The long time-span for the preparatory studies justified Sida’s several add-on assignments for each of the cases in Jelgava, Daugavpils, Gatchina and Riga. This added cost to the interventions and administrative load to Sida.

The Evaluators found, however, that Sida’s willingness to adapt to change was justified. The flexible and enduring preparatory support by Sida contributed to a very good end-result in the Riga DH rehabilitation project. In Gatchina, Sida justifiably added demonstration investments and continued institutional support after the main investments had to be postponed after the Ruble crisis. The flexible approach was helped by the fact that Sida had experienced staff in municipal infrastructure projects and sufficient handling capacity. This also facilitated effective continuous communication with the client, the consultants and the intended co-financiers. The Sida approach compared favorably, e.g. with the way the WB was not able to adapt as flexibly to changing conditions in Jelgava. Insightful capacity by Sida was clearly an advantage in handling the complex infrastructure project preparations under unstable economic transition conditions. Apart from in-house expertise for the reviewed successful cases, Sida benefited from a degree of critical mass capacity in its organization for similar infrastructure projects. These factors helped in avoiding overly procedures-driven or consultant-dependent handling as seen at times in multilateral aid administrations.

Lessons:

Systemic complexities in DH systems at economic transition and preparation dilemmas:

There is a dilemma in preparing DH-systems rehabilitation support in fast changing transition environments. The pre-investment phase necessarily becomes lengthy to cover all relevant aspect, while the investment environment may change fast. This can affect choices of longer-term vs. pragmatic medium-term measures, and is generally a good reason to implement the heavier investments in a stepwise manner whenever possible.

Good infrastructure rehabilitation preparations need insightful handling capacity.

The co-financier role of Sida needs to retain a minimum of in-house sector insight and handling capacity for good support, e.g. to preparation of complex infrastructure rehabilitation projects. Experience to date from the Sida funded preparations for DH rehabilitation projects in the Baltics and Russia underlines the need for insightful flexible handling at changing local conditions. The relative cuts of Sida’s administration budgets present risks in these respects, as lost flexibility and more procedures-driven approaches tend to follow a further increased reliance on external consultants.

4.5 Least Cost Analyses under Changing Conditions and Institutional Constraints

In three cases the consultants proposed least-cost heat supply solutions that finally did not work. The reason was that the gains with more heat from combined heat and power (CHP) plants assumed that new long-term supply contracts to share the CHP profits could be successfully negotiated with their third party owners (the sugar refinery in Jelgava, the ailing tire cord factory in Daugavpils that

changed owners more than once and Latvenergo in Riga with proposed privatization still pending at the time). All three towns discarded the option: Riga will implement its own smaller CHP units on the system, as Jelgava also plans. Uncertain future ownership of the CHP plants and reluctance on the part of the DH Company managers to embark on costly interlinking of their networks were other factors. As a result, the least-cost solution did not appear as such looking to the institutional constraints and when weighing in the various risks at yet uncertain transition conditions in going for large-scale solutions that would need to involve third parties.

The WB has also observed the issue in many of its DH projects and published a special report with analysis and recommendations in October 2003: “Regulation of Heat and Electricity Produced in Combined-Heat-and -Power Plants.”

Lesson:

Least Cost DH-System Renewal that Rests with Sharing of CHP Gains Can be Risky.

Least-cost options for heat supplies at preparation of DH rehabilitation projects must look realistically to the chances that the full gains can be realized with more supplies from upgraded existing CHP plants, if third parties own these. The experience from transition countries is similar to that in more stable developed economies: long term supply contracts with fair sharing of the CHP gains can be quite difficult to agree. The risks increase at unstable transition conditions. The CHP plant owners may be ailing industries from the past or restructuring or privatizing national power providers. For these reasons, Feasibility Studies should look early on to other options where the gains may be almost as good, while not presenting risks of delayed implementation and lost focus due to failure to negotiate long-term supply agreements with third party owners of existing CHP plants.

4.6 Local Currency-debt as an Alternative to IFI-funding for DH investments

The Riga project preparations were hit by the 1998 Russian economic crisis. But they stretched into 2000 when the Latvian economy was stabilizing and Nordic bigger banks bought the local banks. This enabled them to offer term loans to RS and other good local borrowers at falling margins. A utility like “Rigas Siltums” was a potentially attractive borrower as the banks sought market share. The Company’s chief accountant reportedly impressed on management the advantages with local debt at good terms that would carry no foreign exchange risk.

The Evaluators conclude that the final mode of financing actually contributed to the development of local capital markets, and that the good project preparations contributed to this positive final outcome. There was a range of other factors at play that finally tipped the balance in favour of local debt, as discussed in some detail in Appendix 5.

Lessons:

Long project preparations can see the “additionality” of foreign loans fall.

Providers of development loans should realize that their financing may lose “additionality” and alternative market financing be preferred by the clients and justified, if the project preparations become protracted. This applies in particular to fast-reforming and stabilizing transition economies that may see gradually improved offerings from local financial markets. The chances increase that some clients may ultimately prefer such alternative offerings if the client has all revenues in local currency.

Municipal utilities are capital intensive with potentially good credit capacity.

Well-managed and regulated enterprises in the municipal utility sphere as water and district heating companies are capital-intensive operations with good prospects for generating significant steady cash

flows. As such they are attractive borrowers to commercial banks, if the regulatory risk is seen as modest. For these reasons, preparation and negotiation of development finance to the kind of municipal enterprises in reasonably advanced developing or transition economies should consider the extent to which the foreign funding could be supplemented or even replaced by internal cash flows and local borrowing supporting capital markets development.

4.7 Sida Grants to Preparations and the Interface Risks with IFI Finance

It emerged in the Jelgava case that the WB pursued its sovereign guaranteed loan without conditioning it to restructured finances of JDHC as a client ridden by big unpaid fuel debts from the past. The result was that much of the institutional aims of the Project were lost. The Evaluators think that the case was exceptional, as the WB generally takes a prudent view and insists on corporate borrowers' startup of projects with a sound financial footing prior to loan effectiveness regardless of state guarantees. Sida-funded preparatory studies stressed this requisite in the case of JDHC and had this condition in the financial projections. Moreover, the Project's clear institutional aims apart from the energy conservation and environmental gains should have brought the issue to all stakeholders' attention before it became too late. The technical consultants' remit did not include this financial aspect as part of the Sida-funded design and implementation support.

Lesson:

Sida Co-financing with IFIs and mitigation of interface risks between preparations project implementation.

Sida as co-financier with justified aims not to duplicate the appraisal and loan structuring of the WB and other IFIs has two options: the first is to acknowledge that quality control of the IFIs is generally good, and that Sida cannot reasonably build more monitoring capacity for co-financing cases. The second option would be to add such internal or Sida house-consultant capacity in technical and non-technical fields for deeper and broader interface involvement than intermittent attendance at appraisal missions, steering groups etc.

4.8 Influencing and Conditioning Tariff Adjustments and Structures

The Jelgava Project Report highlights how a poorly prepared launch of two-tier DH tariffs with a fixed and variable component met with strong public resistance. The strong negative reaction caused the utility regulators to ban two-tier tariffs, and even Riga as the most advanced of the DH utilities in Latvia still retains a single-tariff structure. To further efficiency and sustainability, more rational tariff structures are justified to reflect the true cost structure. In hindsight, JDHC would have benefited from early support to prepare the tariff structure change and launch it in a less risky way.

It is difficult to firmly condition external finance to change of regulated tariffs, while the preparatory stage can have built-in elements to focus on improved awareness. A pilot scheme to test a new tariff structure coupled with savings incentives to DH clients in areas with new substations might have been considered. It is notable in the Gatchina case that the "two-tier" tariff revision that was brought with support from the B&S consultants had more modest aims: it simply looked to evening out of the seasonal cash flow of the DH utility, but had no element of metered billings, savings incentives or fixed and variable cost separation. Finally, it is notable that metered billings were not introduced widely, while the new technology would have allowed this. A prominent example is the Aerodrome area in Gatchina where tenants still pay norm-based rates and with no savings incentive.

Lesson:

Preparation of DH Rehabilitation and Tariff Reform.

Preparation of DH rehabilitation projects with combined technical and institutional aims should look to tariff reform early on. The dialogue should aim at fostering of an insight that not only revised tariff levels but their structure and mode of billing is important for cost-covering sustainable operations and energy savings incentives. Pilot schemes to test new tariff structures and metered billing can be considered in combination with user savings incentives linked to demonstration projects.

4.9 Swedish Technical Consultants' Capabilities in Non-Technical Fields

The preparatory studies generally had good-high technical standards, as verified in the WB appraisals. The institutional sections varied a great deal, with Riga representing good standards in the feasibility study and its updates, while the Gatchina study had the least useful institutional contribution. The Evaluators noted that the financial and economic analyses were not always conducted or presented as clearly (Jelgava and Gatchina are examples of partly confusing financial and economic terms). The kind of shortcoming was confirmed by the WB appraisal leaders from the time. The T.O.R. for the studies were comprehensive, while not pointing to poverty reduction and gender equality aspects in the way Sida does currently.

The evaluators conclude that the non-technical parts of the feasibility studies would have benefited from more specified requirements and higher relative weights to the relevant capabilities and proposed approaches in the selection and contract award criteria. This applies not least as it was well known in the late 90' that Swedish technical consultants still generally did not possess good in-house capacity e.g. for economic analyses. In some respects, these constraints remain compared to the international competition standards. Considering that Sida grant funding is mostly restricted to Swedish bidders, Sida should be quite specific in the bidding documents that the offered non-technical capabilities must be up to the best international standards.

Lesson:

Joint Sida and consultancy industry initiatives for capacity building.

The capability of Swedish technical consultants in non-technical fields as financial and economic and institutional assessments has varied in the past. It has not always been up to the required standards of financiers as the World Bank. If Swedish development assistance will continuously be confined to essentially limit procurement of technical consultancy services to Swedish firms, joint Sida and consultancy community initiatives should be pursued to assist capacity building in non-technical fields to better meet the Sida requirements for development projects.

4.10 Socio-Economic Aspects of the DH Utility Rehabilitation Projects

None of the five studied projects was prepared with specific aims, designs or components that focused on poverty reduction or improved gender equality. Nonetheless, the T.O.R. included a review social and gender aspects in Gatchina as the institutional development component could have brought some influence on the user level. For this reason, the socio-economic conclusions in this Evaluation are drawn from the case of Gatchina.

The aforementioned questionnaire returns did indicate positive impact on the part of poorer households in the affected areas of the demonstration investments. It also shows that poor household are deprived the opportunity to control heating costs through shortcomings in the project (metered billings not introduced) and thus to improve their relative economic situation. For further details and questionnaire findings see Appendix 6.

The restructuring of GTS and the tariff structure is likely to have an impact on poverty over time as it releases public resources. However, the immediate consequence of the slow shift in the subsidy structure away from general tariff subsidies can be increased hardship for poor and borderline households, as increased tariffs to cover DH costs do not automatically increase the welfare budgets. To avoid unacceptable social consequences, the transition to full cost recovery needs to be complemented with an effective social security system which clearly lies beyond the scope of DH rehabilitation projects and mostly beyond that of development collaboration programs.

Lesson:

Assess the capacity of social security and mitigate negative short-medium term impacts.

Feasibility studies for utility rehabilitation projects as district heating should continue to assess the capacity of local social security system to serve and compensate the poor and vulnerable. Supporting the development of autonomous and efficient utility companies is expected to help economic growth and poverty reduction in the longer run in addition to the energy conservation and environmental gains, but raised tariffs risk adding burdens to vulnerable groups in the short run. The potential negative short-term impact underlines the importance of mitigating measures but might be a necessary trade-off with the longer-term achievements. Sida should therefore insist on the implementation of project components that enable poor groups to improve control of their costs such as metered heat bills and hire purchase arrangements to enable poor households to install hot water meters. Furthermore, the poor households could be empowered in their role as customers through improved customer relations at the municipal utility companies or other support to households in their consumer role.

5 Key Conclusions and Recommendations

The evaluators recognise that several of the below recommendations are already reflected in Sida's current practice, while they nevertheless merit to be included.

5.1 Sida Support to DH rehabilitation Remains Highly Relevant in the Region

Overall, the rationale of the evaluated DH rehabilitation projects and their Swedish interventions stands out as good against the collaboration goals in the region. The relevance of the Projects was good with Archangelsk as the one exception, as this emergency intervention addressed supply security only.

Jelgava and Riga, the two Projects with implemented main investments, score well on energy conservation and environmental gains as key goals for the Sida interventions, proving the rationale further. The sustainability in Jelgava can, however, depend on a timely ended insolvency of the DH company. Relative to the investments, the Swedish-funded demonstration projects also conserved energy and improved the environment, apart from helping awareness. This is verified in Jelgava, Riga and Gatchina, while not in Daugavpils where the demonstration investments appear as partly sunk cost.

Recommendation:

Continued DH rehabilitation support has a justified place in Sida's range of interventions in the region, where energy sector reform and the environment remain critical areas.

The Evaluators recommend that Sida develops a DH rehabilitation projects sector strategy for the region building on the findings and lessons from this Evaluation and other relevant experience.

5.2 Institutional Focus Emerges as a Core Success Condition

The reviewed cases are a forceful illustration that the institutional aspects should be paramount at early selection of local sponsors and preparation of DH rehabilitation projects. Riga and Gatchina stand out as good examples in their differing context with a lot of useful lessons in Section 4. Jelgava and Daugavpils score lowly on institutional development and sustainability (although for reasons mostly beyond Sida's control) and also yielded important selection and monitoring lessons.

Recommendations:

Selecting Local Owners for Good Rehabilitation and Demonstration Prospects.

Sida should focus strongly on reform-orientation of the political and administrative leadership in among municipal owners of DH companies, as this is a key factor for success. Selecting just a few potentially strong demonstration cases should be a more efficient way for development financiers like Sida to support nationwide transition in the sector than offering support to numerous DH rehabilitation projects with varying owner-insight and capabilities.

Sida should deeply assess the DH utility owner's reform-orientation and integrity.

Municipal utility reform project selection by Sida should start with deep assessment of the municipal owners' reform-orientation, linking the process to study visits, seminars and similar activities over a sufficiently long period. The assessment should be performed by expertise with a very good insight into the local political and institutional prospects and constraints. The assessment should look to the owner capacity and willingness to drive deep reform (of the organisation, change of management, new incentives, autonomy of the utility under new governance arrangements etc). Moreover, integrity checks should be conducted regularly on all the key representatives. The experts for owner-reviews should be truly independent and have no potential conflict of interest in being prospective parties to any following preparations or implementation-support assignments.

5.3 Preparing Projects for Complex DH Systems Takes Time and Resources

The reviewed cases highlight the needed time and resources to prepare complex DH systems at unstable transition conditions. The lack of adequate information and limited local counterpart capabilities were a challenge to Sida and the consultants. The Evaluators concluded that Sida was justified in funding add-on assignments for updates and amendments as the gaps became evident, or conditions changed. A prominent example is when the Latvenergo privatization did not materialize and least-cost solutions with CHP heat supplies from third parties proved impractical. Despite the time, cost and administrative load on Sida, the add-on assignments were justified in view of the Evaluators. The Archangelsk case showed the limitations with short time-spans for preparations.

Recommendation:

Sida should continue thorough preparation of complex DH rehabilitation systems.

There are no realistic short-cut alternatives to time and resource consuming preparations when planning support to complex DH systems rehabilitation.

Swedish emergency support to the region should avoid DH system interventions.

Administrators of emergency support programs should realize that piecemeal interventions into complex DH systems with short preparations bring excessive risks of sub-optimal investments. Supplier-driven projects of the kind should also be avoided.

5.4 Sida is well positioned to make good use of the lessons in this Report

Sida now has a body of useful experience that will help pursue good DH-rehabilitation projects in the region in the coming years. The range of other identified lessons in the Evaluation includes:

- *Prior financial restructuring* of DH entities before new debt for projects is an absolute imperative that needs Sida monitoring.
- *Monitoring and liaison with lead financiers*: Monitoring must ensure liaison and effective “interface” with lead-project financiers like the WB between preparatory and implementation stages to ensure that key conditions identified at preparations will not be lost in loan contracts.
- *Demonstration projects* are a useful tool, and that wider dissemination of the results to other DH utilities should be built into the designs.
- *Tariff reform* should include rational structures and pilot tests of new structures, and metered billings should be considered with a link to the demonstration projects in order to encourage user savings early on.
- *Resource base capacity building*: Sida initiatives are called for to enhance the capacities of the Swedish consultants in none technical disciplines.

Recommendation:

Sida is well justified in its plans to carry out a seminar based on the findings in this Report to foster dialogue and improved insight into the challenges and solutions.

Additional lessons are presented in Section 4 above, and in the Project Reports in Appendices 1–5.

6 Appendixes

Project Report Jelgava	Appendix 1
Project Report Achangelsk	Appendix 2
Project Report Daugavpils	Appendix 3
Project Report Gatchina	Appendix 4
Project Report Riga	Appendix 5
Poverty Reduction & Gender Equality – Methodology and Survey Data, Gatchina	Appendix 6
Evaluation Methodology	Appendix 7
Abbreviations	Appendix 8
Terms of Reference	Appendix 9

Appendix 1

Jelgava District Heating Rehabilitation Project

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1 Evaluators' Summary Assessments and Overall Ratings

Jelgava District Heating Rehabilitation Project		Evaluation Criteria							Sida ¹⁾ Intervention
		Project Overall Assessment					Comments	Overall	
		Relevance	Effectiveness	Efficiency	Sustainability	Impact			
Main Objectives/Expected Results	Institutional autonomy and reforms	H	L	L	L	N	Potential institutional gains lost, as the Co. started the big project with excess debt and became insolvent. This delayed autonomy, governance, mngmt and MIS reforms, and brought poor demo to other DH utilities. The key reform requisites should have been stressed even more at preparations and appraisal.	A	
	Technical Standard and least cost	H	A	A	A	A	Over-emphasized network renewals reduced effectiveness. Otherwise good technical studies and designs helped to meet the objectives. Demo project improved Co. awareness, but overlooked wider dissemination.	A/L	
	Financial and economic self-sustainability	H	L	L	L/A	N	Fair financial and better economic returns from the costly Project. Insolvency hampered sustainability after excessive start-up debt, lagging tariffs and more losses from merger w. the poor right-bank DH system.	A	
	Energy Conservation	H	A	A	A	A	Objectives achieved via savings from substations, variable flow and cut network losses plus boiler conversions. Despite the insolvency, new substations mostly put in place on the right bank after the Project.	A	
	Environmental Protection	H	A	A	A	A	The set targets were met with the Project's energy conservation. But material indirect gains with "cleaner" generation were lost, as no supply agreement was reached w. third party owners of an industry CHP plant.	A	
	Poverty reduction	N/A	N/A	N/A	N/A	N/A	Socio-economic aims were stated only generally, and no specific gender objectives. But the move away from general tariff subsidies helps the City free resources for directed social support to the needy.	N/A	
	Gender equality	N/A	N/A	N/A	N/A	N/A	No gender aspects in the objectives or designs, but improved DH and hot water service may benefit women more in some households.	N/A	
Overall Rating	Partly Successful						Successful		

Standard of Achievement

H = High

N/A = Not applicable

1) – Several preparation updates

A = Acceptable

– Designs & implementation supervision

L = Low

– Demo investments

N = Negative

2 Background, Project Context

2.1 Client and Project History

The Jelgava District Heating (DH) Rehabilitation project has a history that dates back to energy studies for Latvia by EU-PHARE in the early 90's. DH upgrading in Jelgava (Latvia's forth biggest town with some 71,000 inhabitants) is one of the early pilot projects proposed to the World Bank in late 1992. The City was interested to join, as it was prime provider of DH services in central Jelgava. In addition, the DH system on the left riverbank of the City where the Project started off had fairly clear institutional arrangements by Latvian standards at the time.

A Swedish link also existed, as the City was using NUTEK support for pipeline and control equipment rehabilitation in parallel with some EBRD funds for heat meters. These early measures were completed successfully in 1994. This is when ÅF, a Swedish technical consultancy, presented a feasibility study "Rehabilitation of Jelgava District Heating, 1994". This study had received SEK 3.2 million equivalent from the Policy and Human Resource Development (PHRD)¹.

2.2 Interventions by Sida

By 1994, Sweden had given the aforementioned NUTEK support, and also funded an energy expert to advice the World Bank office in Riga for the three Baltic countries. The latter support facilitated dialogue between Sida, Latvian authorities and the World Bank concerning potential Power and DH project collaboration.

The ÅF feasibility study of 1994 was followed by two Sida grants to the Jelgava District Heating Company, JDHC (decisions 1996 0112, and 1997 03 15) totalling SEK 5.8 million. The two grants were for technical specifications, procurement documentation and project implementation supervision. These services were performed by another Swedish consultancy, Fjärrvärmebyrå AB (FVB). The contract with FVB was procured in competition in accordance with Sida procedures.

Yet, another Sida grant for the Project was SEK 1.7 million towards the preparation of an update feasibility study that FVB also won for an institutional and financial audit. (decision 1998 06 26). FVB presented another Sida-funded feasibility study in February 1999 on alternative sources of energy including supply of the whole Jelgava DH system from the Jelgava sugar refinery, with possible funding from FBBF.

The Swedish grants enabled the implementation of the Jelgava pilot project. Its total projected cost was USD 18.2 million equivalent, including the Sida grant funded demonstration project and local cost elements. USD 14 million was financed by a World Bank loan with a Latvian Government guarantee, and USD 1,0 million equivalent by the Sida grants for consultancy services.

For a summary of the various Swedish interventions via Sida, refer to Table 1 at the end of this Project Report.

¹ The PHRD Fund, managed by the World Bank, established in 1990, and its predecessor, the Japan Grant Facility, established in 1987, have provided nearly 2000 grants in support of technical assistance activities to more than 120 countries.

3 Relevance and Rationale

The rationale of the Project was fivefold:

- i) *Technical*: Extend the life, increase operation efficiency and introduce energy saving of Jelgava's DH system
- ii) *Economic*: More efficient DH service provision in a scenario where the transition to a market economy would expectedly see domestic energy prices come closer to world market levels.
- iii) *Institutional*: Promote sound autonomous cost recovery-based operations of a well managed municipal utility looking to its eventual privatisation.
- iv) *Demonstration*: Implement a pilot DH project to gain useful and replicable rehabilitation experience.
- v) *Energy conservation and environmental*: Principally by reduced air emissions with the conservation achievements in more efficient generation and distribution of heat.

The Evaluators conclude that the Project and the Swedish grants were relevant in the light of the Swedish strategies of the early 90's for collaboration with Eastern Europe and Baltic countries, and also in an FFBF perspective. Energy conservation and institutional reform of municipal utilities for improved sustainability of district heating, water and waste services have remained priorities. It was also in line with the adopted policy for Sida to grant-finance preparatory studies and implementation support from Swedish consultants that could facilitate multilateral financing of the projects from parties like the World Bank, EBRD and NIB. The eventual privatisation aim, while not a Sida priority for the sector, was in line with World Bank policy during the 90's that assumed that private participation could help more efficient public utility operations in transition economies like Latvia's.

4 Effectiveness

4.1 Preparations and Design

The preparatory studies in the mid 90's covered technical rehabilitation needs comprehensively and also some institutional aspects. They did not, however, fully reflect all uncertainties with Latvia's yet unstable transition conditions. The resulting risks ranged from further falling heat demand from ailing industries to achievement of a sustainable DH Company that would be able to operate with full cost covering tariffs and to service its debts. The Swedish consultants worked out an investment program and designs and supervised implementation in a way that would help the Company develop towards these objectives. The main issues were correctly analysed in the Swedish consultancy reports, including the important need to put the DH company on a sound initial financial footing. In view of the Evaluators, the associated risks were, however, not as rigorously handled at the WB appraisal. The Evaluators consider, nevertheless, that the Swedish preparatory and demonstration project assistance was efficient and successful as such. Some of the following comment might give an impression to the contrary. Still, with the lacking full insight at the time into the range of transition challenges in Latvia, it was hard for the Swedish technical consultants to see the risks before parties like the WB as intended main financier.

4.2 Least Cost

The least cost analysis of 1994 was based on the operations of JDHC at the time, looking only to the left river bank areas. The analysis concluded that significant network and distribution rehabilitation could contain heat losses with low repayment periods for the investments. The analysis justifiably left big heat generation investments to a later stage. The Feasibility Study might, however, have arrived at different and more articulated conclusions. This is if it had assessed an alternative scenario where the left and right bank systems might be merged at some future point, as the latter part remained under the Government's RAF van factory that was already ailing. The preparatory studies by FVB had shown that an optimal solution would be to bring a bigger share of heat supplies to the system from a CPH plant owned by the local sugar refinery. The Project did not, however, have this as a firm condition, and the alternative had to be abandoned as no long-term heat supply contract could be reached with the owners of the CPH plant.

4.3 Project Components and Phasing

The Project essentially comprised:

- i) Network improvements and life extension, replacing old pipes with new prefabricated ones.
- ii) Substations with conversion to variable flow with new local heat demand controls and metering
Boiler rehabilitation and life extension incl. new water treatment,
- iii) Insulation, control equipment and metering in base load plants, and conversion from coal to gas-fired small boilers in the system.

The planned USD 18.2 million equivalent investments went ahead in 1995 after the WB appraisal and following loan negotiations. The full Project was completed in 1999 at just over USD 20 million equivalent with main funding from a USD 14 million WB loan. The DH system served some 17,000 flats or ca 40,000 inhabitants, while industrial demand had already fallen significantly by late 1994. Material network improvements formed a good part of the Project making for a fairly high total investments per user.

The Project did not comprise any right-bank DH measures, as this network was still under the RAF van factory. The whole system on that side remained in a poor shape, however, with continuous fixed flow and big heat losses in an over-dimensioned network that lacked metering or any new 2-pipe connections to houses. The resulting losses added more burden to JDHC as the right-bank system was transferred to it in 1996. This occurred after as it became clear that the defunct RAF van factory complex could not attract revival investors. This was still thought possible when the 1994 feasibility study was made, while not as the investments on the left side progressed in 1997–99.

4.4 Contracting

A conducive contracting strategy was laid out in the preparatory reports, and the FVB supervision support ensured that it was followed. The interviews and records did not highlight any major issues or disputes during the implementation, and the Evaluators conclude that the contracting was efficient throughout.

5 Efficiency

5.1 The Feasibility and Appraisal Stage

The Feasibility Study was comprehensive, but did in view of the Evaluators focus too much on pipe-line replacements. The Evaluators consider that two main factors explain what now seems an over-investment in the Jelgava DH network rehabilitation. The first is an overly technical focus in the preparatory studies: in the mid-90's: western consultants tended to apply their own norms, and Jelgava was assumed to need replacement of 75% of its network in 5 years. The consultants did not see at the time that different standards could be applied, as the wall thickness of metal pipes and dimensioning of valves etc. were higher in the old system to withstand corrosion and wear. This is now better known for the DH and water systems in ex-Soviet countries.

A second main factor was the intended funding: the WB prefers bigger loans above USD 10 million due to its administration cost for smaller loans, and the WB stayed in close contact with the consultants at the preparations. As a result, the alternative to carry out the network rehabilitation investments in a more step-wise manner for different parts of the system was never seriously considered. The above factors have resulted in higher investments per capita than in other similar projects at the time (USD 500 vs. USD 200–300 per capita for comparable projects). In addition, The WB appraisal over-estimated the savings and projected high investment and Company returns based on insufficient risk analysis in view of the Evaluators. These deficiencies could, however, not be influenced by the Sida-funded intervention that did not extend to the final WB appraisal.

Despite the above observations, management of JDHC should be able to utilise the system improvements efficiently for sustainable future operations on certain conditions. These include that the Company can be finally restructured financially in line with the Municipality's current restructuring plan. There were some promising indications in early 2005 that the plan might actually succeed in ending the insolvency administration.² In addition, the Company must be allowed cost-covering tariffs by the regulator of public utilities in Jelgava and surrounding municipalities and be able to maintain its current fairly good collections.

5.1.1 Support to Preparations, Demonstration Investments, Implementation.

Design phase: The Evaluators found that the technical designs were of good quality. The Company management confirmed that the procurement and installation of the technical equipment had progressed well without material delays or cost overruns. The cost escalation in civil works followed rising local costs. In addition, the FVB design team appears to have maintained good and efficient client contact throughout.

Implementation and supervision phase. Swedish FVB performed implementation support under a separate Sida-financed contract. The Evaluators learnt from the WB and JDHC management that they considered the support as efficient helping the client to implement the Project in a timely and fully satisfactory manner. This was apart from the cost escalations on the civil works outside the control of the consultants

² Yet unconfirmed reports in early February 2005 said that the restructuring plan had advanced and was taking the Company out of formal administration.

5.2 Monitoring

Project implementation supervision and monitoring resulted in completion with the aforementioned cost overrun, but without material delays or any other overruns. When the right bank system was transferred to JDHC, the World Bank correctly feared that this would cause further deterioration of the company's already stretched finances. Still, the WB reportedly considered that it would have been inappropriate to cancel disbursements in the middle of the project implementation phase, as the resulting havoc could have added further damage to the Company.

5.3 Conclusions

In hindsight, the fast changing conditions in Latvia and Jelgava should have justified modified design and monitoring approaches to the Project. These should have aimed at greater flexibility in a more step-wise implementation approach. More regard should have been paid both to phasing of the significant network improvements on the left bank, as well as to the necessary actions for financial consolidation of JDHC prior to its taking on more debt from the WB.

The preparatory studies by FVB did comprise institutional and non-technical improvements. The following investment project did, however, not include any material institutional development component. More crucially, the WB never enforced its intended condition at the appraisal stage that JDHC as borrower should be financially restructured (including settling of significant old fuel debts) prior to effectiveness of the loan and any disbursements. As a result, the precarious finances of JDHC had worsened by 2000 due to the high debt burden when the Company was put into administration. Moreover, the incorporation of the inefficient right-bank DH system had brought additional burdens on JDHC when it was already technically insolvent, adding to the acute crisis. These factors made for a major setback to the institution building and demonstration aims of the Jelgava pilot DH project in Latvia, as further discussed in Section 5.

6 Sustainable Achievement of the Objectives

6.1 Actual Achievements vs. Plans

FVB conducted a comprehensive follow-up in its Sida funded 2000 report on "Continuation of District Heating Project in Jelgava, Latvia", and the Company provided the Evaluators with further updates by the end of 2003. The achievements are generally well in line with projections in the Study and details are further discussed in following chapters.

Unfortunately, sustained good technical achievements are jeopardized to some extent by the poorer performance to date in terms of institutional sustainability. Only partial comfort can be taken from the technical successes when JDHC remains under insolvency administration since 2000.

6.2 Institutional, Governance, Management Autonomy and Ownership Aspects

A big part of the potential institutional development gains were lost with the insolvency administration that lasted over several years. The Company was not restructured financially before implementation of the Project, as the WB did not finally insist on this condition. Moreover, the transfer of the highly inefficient right-bank DH system to the Company should not have been undertaken without a prior

financial restructuring of JDHC. A clear draw-back is that the insolvency has materially delayed good governance arrangements. Ownership influence by the City on strategy and policy in the normal way via its nominated directors to a supervisory board, could not be established. Neither could the desirable interplay between the Board and an autonomous operational management be introduced timely.

Yet another constraining factor with the administration is that good MIS systems was delayed: the Company could also not produce good accounts for effective price regulation. The utilities regulator in Jelgava confirmed that the administrator's accounts and reports were designed to meet the legal insolvency requirements. This made them a poor tool to assess tariffs for full cost coverage. The same shortcoming has applied several years from the 2000 insolvency to meeting management information needs in cost accounting etc. for efficient operation of the Company.

The Project and the continued investments brought one clear institutional benefit despite the insolvency. This was in helping to retain good apparent motivation and morale of the overall and technical management of JDHC. This factor and the continuous insolvency resolution endeavours by the City point to good prospects to resume institutional reform once the administration is ended.

6.3 Financial Performance

The Company posted continuous losses until its insolvency administration in 2000. This was due to the aforementioned combination of excessive debts before the Project, high losses in the later incorporated right-bank system and insufficient tariff increases to cover the full cost. As for the investment Project returns, the WB appraisal did not project a financial internal rate of return, as the preparatory studies had focused on pay-back periods.

The Evaluators found that the FIRR remains low at the current tariff levels. This is due mainly to the high relative network investments, while the net financial returns depend ultimately on the regulated tariffs. It is notable, though, that the JDHC tariffs are at the higher end of those for medium-large DH systems in Latvia, despite the Project's significant fuel savings with the project. On the other hand, these comparatively high tariffs are needed to cover the costs of the poor right bank network where the continued losses have no relation to the Project. The current tariffs represent a bigger share of the average disposable household income than e.g. in Riga, as elaborated in Section 4.7 below.

According to the Administrator's annual report for 2003, the JDHC operations resulted in a small financial surplus after full overheads and capital costs, including interest on the World Bank debt. A positive factor is that the depreciation charges and the partially frozen debt service during the administration have enabled continued investments as discussed under 4.5 above.

6.4 Technical Achievements

As noted above, the Project reached its energy conservation aims with network, distribution and boiler house upgrading that meets high technical standards. Although the Company became insolvent, a positive fact is that JDHC has continued investments in substations, metering and variable flow to cover most of the two networks on each side of the river. Management were able to retain a good part of the cash flow for these investments in part because of the stalled debt-service during the insolvency administration. In 2002–2004, 100 building-substations were installed and 5 central heating stations on the right bank were abolished. Only some 20 buildings now remain on the right bank to complete the installation of new substations throughout.

The Sida interventions and the Project contributed to management's insight that the investments must continue. So did in no small way the good early influence of the demonstration investments in substations. Another good element was the continuous good communication with the FVB team. The Sida-funded interventions did thus help in furthering efficiency and environmental gains with continued technical improvements beyond the Project, despite the fact that the Company became insolvent

6.5 Economic Performance

Economic Performance of the Project clearly exceeds its fair financial returns. The Evaluators' re-assessed EIRR at ca 11 per cent follows principally from adjusted gas fuel costs to comparable border price levels. The financial energy savings are calculated with actual gas prices in Latvia that still remain 20–25% below comparable border prices. These prices for gas have more than doubled in real terms since the project appraisal that assumed more modest rises. This makes for higher than projected economic gains with the confirmed energy savings. Pricing the saved annual gas consumption at some USD 2 million at current cross border prices (vs. USD 1,65 million at current Latvian prices) and adding USD 0.2 million as a modest representation of the environmental gains together with the annual maintenance and water cost savings at USD 0.5 million would result in an EIRR of close to 11 per cent for the USD 20.1 million overall investment. The Evaluators abstained from adding a willingness-to-pay component to the estimates in view of the wide uncertainty to such a measure. By contrast, it appears that the rather optimistic WB appraisal had this factor as a significant part of its estimate of an EIRR well over 20 per cent.³

The prime adjustment compared to the financial estimates is the border price valuation of the saved gas fuel. Indications from Latvia Gas have led the local DH companies to assume that they will face continued rapid increases. After adjusting for the energy content one must assume that a gas price level close to the comparable border prices in Northern Europe should be projected over time for Latvian DH companies. Geopolitical considerations might still result in Gazprom-influenced discounts to the Baltic countries, while their EU membership points to the contrary.

6.6 Tariffs and Affordability

The nominal tariffs have been kept fairly stable since project completion in 1999. This makes for an approximate 40% tariff reduction over 5 years in real terms. According to income statistics up to 2003, heat tariffs then amounted to approx 7–9 per cent of the average disposable household income in Jelgava. This may be compared with the 8 per cent feasibility estimate. The Evaluators conclude that ca 8 per cent of the disposable household income is well in line with the current WB benchmark that the total of municipal utility services for water, heating, waste etc. should not exceed ca 20 per cent of disposable incomes.

6.7 Energy Savings and Efficiency

The Project has reduced direct fuel consumption, maintenance costs, electricity demand and water consumption.

Based on the FVB report of 2000 and the Company updates, and adjusting for changed demand, the annual savings in 2004 amount to USD 2.2 million equivalent in a with and without project scenario.

³ The Evaluators concluded from the review and discussions with senior WB officials that have followed the operations after its early approval that the WB appraisal of the Jelgava report did not meet the institution's otherwise generally high standards in such documents.

Most of this is attributable to energy savings.

In more detail, the annual savings are as follows:

- Reduced heat demand, left bank: 38,7 Tcal
- Reduced heat losses: 33 Tcal
- Reduced pumping costs: 3500 MWh
- Improved boiler efficiency: 31,5 Tcal
- Reduced maintenance cost: 87.000 USD
- Reduced water costs: 320.000 USD

The reduced gas consumption (13.000.000 Nm³) means cut annual costs by USD 1,65 million, and cut pumping costs add savings of ca USD 0,11 million annually. Apart from these considerable operating cost savings, the assets now have a longer lifetime reflected in lower depreciation cost.

Additional indirect saving potentials by linking the system to the existing CHP plant of the sugar refinery were lost, as no long-term supply agreement could be reached for the purpose.

7 Impact

7.1 Environmental Impact and Awareness

With gas as the main current fuel, the efficiency gains and fuel savings result in a reduction of Carbon Dioxide (CO₂) emissions and to a smaller extent, reduction of Nitrogen Oxide emissions. FVB estimated in 2002 that the CO₂ reductions would amount to 3,000 tonnes/year. The information on energy savings obtained in 2004 support this estimate. Awareness of environmental issues has improved over the years in the Company, and the current level seems in line with other well-managed companies in the region, as the DH Company in Riga (cf. Riga Project Report)

7.2 Social Impact, Poverty Reduction and Gender Equality Aspects

The Project was not designed specifically for poverty reduction or to meet gender related aims. The preparatory studies did, however, address how the Project and the proposed cost-covering tariffs would evolve. In particular cost-covering tariffs would assist a change from general subsidies via utility tariffs towards directed municipal subsidies to low-income households. Continued general tariff subsidies would benefit medium and high income earners more than poorer household as the latter use less heating and hot water per capita on average, or they might not have DH services at all. Currently, ca 4 percent of the Jelgava population receive social support (paid out mainly as part payments of housing rent and utility bills) according to the City administration.

The evaluators conclude that the continuous move from generally subsidized DH tariffs towards directed social support to the needy has had a positive social impact. Whether this will be actually achieved in Jelgava is difficult to assess, as there is no automatic transfer of the gains to directed social support. During the JDHC administration, the City budget came under added strain for repayments on behalf of the Company under the World Bank loan to JDHC, albeit under some rescheduled repayments to

the Latvian state treasury. Another factor is that sizeable loans from the City to JDHC will be converted to equity in the Company as part of the restructuring plan.

A final note concerns the service quality. Installation of the two-pipes system has reduced the risks of discoloured washings with the enhanced hot water quality. This tends to benefit low-income households more as these cannot afford to install individual tap water heaters in their flats and also benefits women who generally do most of the washing.

7.3 Wider Demonstration and Replication for Improved Sustainable DH Services

Its pilot character gave the Project unique opportunities to demonstrate improved sustainable services, while it also involved significant risks. The Evaluators conclude that the financial and institutional achievements were overtaken in no small part by the insolvency situation of the Company hampering its demonstration potential.

In practice, other DH utilities benefited from demonstration by the pioneering Jelgava project, but this was not limited to positive experience like from the new substations. In fact, both Riga and Daugavpils City administrators reported that they had taken heed from the strained finances of JDHC. The Riga DH Company was formed as a new utility company to include most of the DH systems in that city from the outset. In addition, the City ensured that Rigas Siltums AS started without excessive old unpaid fuel debts. In contrast to the situation in Jelgava, these past debts were taken over by the City to give the DH company a “clean start”. Riga also embarked on major new DH investments more gradually than JDHC. In the case of Daugavpils, the municipal respondents stated that the City was reluctant to take on big international debt from the WB or others. The City had looked to the Jelgava experience when deciding not to embark on the proposed investment programme in the Sida funded feasibility study, and this led to a downward spiral, as discussed in the Daugavpils Project Report.

A poorly prepared and launched two-tier DH tariff in Jelgava brought more adverse demonstration. The utility regulators reversed the initiative back to single-tariff, and reportedly stopped further two-tier DH tariffs in Latvia, based on the negative public reaction in Jelgava. This delayed more rational cost-based tariff structures. Even Rigas Siltums, the most advanced DH company in Latvia, retains single tariffs with no separation of fixed and variable cost elements.

8 Major Issues, Lessons and Recommendations

8.1 Risks and DH Project Designs under Unstable Transition Conditions

The prime lesson is that institutional and financial reform can be as important as technical rehabilitation of technical utilities at early and intermediate economic transition stages. The JDHC experience also shows that the Project should have taken a more step-wise approach to the investments.

8.2 The Right Bank Incorporation Should have Caused a Prior Project Review

Un-refurbished old installations on the right bank had grossly over-dimensioned distribution pipes. The heat losses on this network were at ca 42 per cent when it was incorporated into JDHC after the Project implementation had started. These losses are currently reduced to a still high 34 per cent.

They therefore continue to drag down the Company's results. The separate right bank system was initially owned and operated under the auspices of the defunct RAF van factory that went bankrupt in 1996. The right-bank network with lower load density and its high losses had inherent high risks of a downward spiral with closing or disconnecting clients. This was clear already at the time of its incorporation into JDHC. The Project was continued regardless of the significantly increased risk to the Company with this added burden. Several big industrial clients as RAF have since ceased to exist. Others opted to disconnect and to go for their own heating solutions as the services deteriorated.

JSDC as a whole lost ca 30 per cent of its deliveries by 2002. From this year no further demand downturn has, however, been recorded. Some public institutions also opted to disconnect, notably the agricultural university in Jelgava. This leading former client installed its own gas fired system, and there was no legal way to compel state budget institutions to remain on the publicly financed DH system. Later on, some new buildings choose to connect to the DH system, and the demand downturn seems to have bottomed out.

JDHC is now justified in considering to close down the main distribution pipe on the Right Bank, and to supply each of the two remaining island systems in the area from new small CHPs. This measure would reduce the network losses and improve the operation efficiency considerably. The Evaluators conclude that a strategy for the right-bank services could have been developed earlier on, if the kind of systems approach had been applied more timely.

Lesson:

Retaining overall systems perspective at appraisal of DH refurbishment projects.

The Jelgava district heating rehabilitation project was selected as a pilot case in Latvia in part because the ownership situation was clear for the left river bank of the City. It later emerged, however, that the right bank DH system would collapse along with the state industrial enterprise that owned it. It was therefore transferred to the municipal company that ran the left river bank system. As a result, this Company was burdened financially with the incorporation of an unreformed old system with big losses, while it was undertaking major debt-funded investments on the left bank. The Company lacked the required financial reserves, and the merger of the two systems under it contributed to an early ensuing insolvency. The experience underlines that the overall systems approach remains key when assessing DH refurbishment projects in transition economies, and that the kind of event should be reflected in risk analyses.

8.3 Underestimated Institutional Development Risks and Mitigation Needs

In hindsight, the Feasibility study had too much of a technical focus, despite its normative sections on non-technical reform requirements, and the add-on studies with institutional and financial focus. As a result, the project design included some over-investment in the network. Moreover, its appraisal by the WB and the ensuing design and monitoring lacked sufficient institutional focus. JDHC was doomed to exceedingly risky finances as it was burdened in full at the outset with the old debt for fuel while taking on new WB debt for the Project. The inclusion of the poor right-bank system added further strain. The result was that the Company ended up in insolvency. The Project should not have been launched and implemented without prior completion of a financial and institutional restructuring of JDHC. Its following insolvency and continued operation under an administrator has materially impaired the institutional sustainability and demonstration merits of the pioneering Jelgava DH rehabilitation project in Latvia.

Lesson:

The key role of institutional reform for successful utility reform projects.

Municipal utility rehabilitation projects in early and intermediate transition economies must give more weight at the initial preparatory stages to the institutional reform aspects than to the technical refurbishment elements. No material investments or debt financing should be prepared for a municipal utility without clear evidence that it can first be put on sound start-up footing organisationally, financially and managerially. The owners must have manifest reform-willingness to ensure the required institutional, governance and managerial renewal towards greater autonomy. Non-technical project components for institution building and training should be defined and have secured funding and implementation arrangements before major technical investments are embarked upon.

8.4 The Pilot Project would have Benefited from Closer Monitoring

Swedish technical assistance concerned preparatory studies and project implementation support for designs, procurement documents and the following supervision of the Project investments. Monitoring of the key loan conditions was, however, a World Bank task as it was main finance provider. It appears in hindsight that its striving to achieve timely implementation of a first pilot DH project under the still complex institutional conditions in Latvia may have caused the World Bank to overlook the financial consolidation conditions for JDHC before the borrower drew on the Sovereign-guaranteed loan. Any lender with a direct risk on the Company would have had strong reasons to condition disbursement to restructured finances of a past debt-ridden borrower. The actual appraisal and monitoring failed to raise this issue with sufficient resolve, and this contributed to the following insolvency of JDHC. The Evaluators conclude that this factor materially reduced the demonstration merits of the Jelgava DH project as the chosen pilot project in Latvia.

Lesson:

A Sovereign guarantee is no justification for lax loan disbursement conditions.

Sida as grant co-financier of projects with Sovereign debt-finance providers such as the World Bank should insist that borrowers such as municipal utility corporations must first establish sound start-up finances before any loan disbursement, irrespective of whether the loans may have a municipal and/or state guarantee

8.5 Dissemination of the Pilot Project Results

It emerged in the various interviews that the demonstration project element had a significant impact on the motivation and insight of the local staff and stakeholders in the Project, ranging from operators to top management. Still, neither the Project files nor the interviews conducted in Jelgava and with stakeholders in the Riga and Daugavpils DH projects indicated that the pilot substation installations and their results had been documented with a view to facilitate wider dissemination of the merits.

Lesson:

Demonstration projects and wider dissemination of the results.

Demonstration projects should regularly incorporate plans for the wider dissemination of the merits brought about with new investments and reforms, looking beyond the enhanced direct insight of the beneficiary organisations.

Table 1. Sida decisions

Sida Decision Date	Sida Decision No	Assignment/Project Scope	Budget MSEK	Disbursed MSEK	Sida, Team Leader	Beneficiary	Swedish Partners	IFI funding
19960112	Öst 4/96	Phase 1 – Preparation of technical specifications and tender documents, support to delivery and installation of DH-distribution pipes, sub-stations, water treatment units and oil furnace	2 550 000	5 7930 667	KG	Jelgava District Heating Company	FVB Fjärrvärmebyrån	
19970305	Öst 64/97	Phase 2 – Preparation of technical specifications and tender documents, support to delivery and installation of DH- distribution pipes, sub-stations, safety equipment distribution pumps, energy monitoring equipment	3 250 800	Incl. In decision Öst 4/96 above	KG	Jelgava District Heating Company	FVB Fjärrvärmebyrån	
19980626	Öst 326/98	Phase 3 – Feasibility Study Financial and institutional audit	1 700 000	1 751 821	KO	Jelgava District Heating Company	FVB Fjärrvärmebyrån	
19990329	Öst 165/99	Phase 3 – Amendment for dissemination of result from Feasibility Study	52 000	Incl. In decision Öst 326/98 above	MA	Jelgava District Heating Company	FVB Fjärrvärmebyrån	

Table 2. Persons contacted during the evaluation

Name	Position	Contact information		
		Phone	Email	Address
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JDHC “Jelgavas siltumtiklu uzņēmums” Shareholding Company declared insolvent	Secretary	+371 30 23 446 Fax: +371 30 83020	info@jdhc.lv	Katolu 6/8, Jelgava
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⁴ to be addressed to Mr. Andris Ravinsh, Chairman of the City Council and Mr. Levchonoks

Appendix 2

Archangelsk District Heating Rehabilitation Project

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1 Evaluators' Summary Assessments and Overall Ratings

Archangelsk District Heating Rehabilitation Project		Evaluation Criteria						Comments	Sida ¹⁾ Intervention
		Project Overall Assessment					Overall		
		Relevance	Effectiveness	Efficiency	Sustainability	Impact			
Main Objectives/Expected Results	Institutional autonomy and reforms	N/A	N/A	N/A	N/A	N/A	No institutional objectives set. Project was addressed as an emergency operation. The two client organizations remain weak and poorly coordinated.	N/A	
	Technical Standard and least cost	L	L	L	L	L	A supplier-driven FBBF emergency grant for a complex DH system was a huge challenge for Sida and the consultants to get good technical standards in a short time given the poor base data and a weak client. The result is partly inadequate equipment despite good efforts by the technical consultants.	A	
	Financial and economic self-sustainability	N/A	N/A	N/A	N/A	N/A	No financial/economic objectives set.	N/A	
	Energy Conservation	A/L	N/A	L	L	L	The emergency support did not focus on energy conservation but on improved supply security.	L	
	Environmental Protection	L	A	L	L	L	See Emergency Conservation above.	N/A	
	Poverty reduction	N/A	N/A	N/A	N/A	N/A	No socio/economic objectives set, apart from alleviating the critical supply security situation to the citizens.	N/A	
	Gender equality	N/A	N/A	N/A	N/A	N/A	See Poverty Reduction above.	N/A	
Overall Rating	Unsuccessful							Partly unsuccessful	

Standard of Achievement

H = High

N/A = Not applicable

1) – Technical prep's, spec's

A = Acceptable

– Implementation supervision

L = Low

N = Negative

2 Background, Project Context

2.1 Client and Project History

In March 1999, the Swedish Government decided to support the City of Archangelsk with investments to rehabilitate the district heating system in the City. A grant was set to a maximum 24 MSEK. The decision was based on a request by the Governor of Archangelsk Oblast for financial support by the First Baltic Billion Fund (FBBF) to urgent measures in the energy sector. A number of measures were identified by the City and Swedish consultants contracted by Sida for the preparations. The aim of the project was to solve some of the most urgent supply security problems in the district heating (DH) system of Archangelsk. The scope of the project did not extent to institutional reforms or the longer-term financial sustainability of the Archenergo DH system.

2.2 Interventions by Sida

The interventions by Sida focused on the emergency programme and on immediate improvements to essential parts of the DH services in the City of Archangelsk. The grants funded by Sida (MSEK 1,089) was related to the preparation, procurement, supervision and inspections of investments to be made under the FBBF funding. The physical investments made under the funding of the FBBF (MSEK 27.0) have been evaluated by Sida on a prior occasion against the specific objectives of the FBBF, while this did not involve any field work..

3 Relevance and Rationale

The rationale of the investment funding was emergency support, and that of the Sida intervention to help prepare and manage the investments in an effective and efficient way.

The evaluators concluded that the Sida funded support was relevant but too limited in time to address optimal interventions in a complex DH system. The emergency character of the project and the fact that it had a strong initial influence by one of the main Swedish suppliers left limited room for the Sida intervention to be fully effective..

4 Effectiveness

4.1 Preparations and Design

The Russian authorities proposed an emergency investment program after consultations with ABB. Sida was then given the task to assist in procuring consultancy services for preparation an implementation support. A team of independent consultants was contracted for these purposes. The Team initially reported that some of the investments could be overlapping with an ongoing World Bank program. The consultants also suggested a shift in focus from power plant rehabilitation only to a combination of power generation and heat distribution rehabilitation, which in their view would better meet the actual needs.

As a short time was assigned for designs, Russian technical documents were used as a basis for the equipment specifications.

4.2 Least Cost

As the project was designed without feasibility studies there is no base to judge to what extent the investments actually were in line with least cost system solutions. In the Evaluator's opinion, it may reasonably be assumed that the boiler replacements and the pipeline improvement would have been part of the principal recommendations from a full feasibility study. The Power Plant investments would, however, probably not fit into a well-designed least cost investment program. This follows in part from the weak managerial, institutional and financial capacities of the company that ran the plant.

4.3 Project Components and Phasing

The Sida funded components comprised mainly support to preparation, management and monitoring of the investment program by the technical consultants. The FBBF funded Project essentially comprised supply and installation of the following components:

- New main pipeline to a region called Solombola
- Modern sealing system for air pre-heater
- RAH-Cleaning systems at the combined heat and power (CHP) plant.
- Release valves in the CHP plant.
- Two new HOBs, 4MW and 10MW

4.4 Contracting

The consulting services for the preparation, management and monitoring were procured as direct procurement considering the specific circumstances, and the project being an emergency operation.

After the preparations, normal Sida procurement procedures were adopted and a tender evaluation committee reviewed and selected bidders for the investment components.

5 Efficiency

5.1 The Feasibility and Appraisal Stage

The lack of thorough preparatory studies has resulted in a project that now emerges as far from well designed for an effective intervention. There were material implementation delays and faulty delivery of equipment currently not utilized to the full extent.

5.2 Design and Implementation

After a long period with serious implementation problems (which could have been avoided with normal preparations for a project of this complexity), the two new boilers are in full operation. They have significantly higher efficiency than the old boilers (90–92% vs. 60%), and the pipe-line seems to work satisfactorily.

The investments in the Power Plant, however, have not been put to use to date. The transformer and other electric equipment was installed to serve Power Unit 7. This was under reconstruction when the Swedish equipment was installed. Shortly thereafter the Power Company ran out of investment funds and the overall reconstruction halted to this date. The air pre-heater stopped due to corrosion of the regulation equipment. The Swedish implementation support consultants found that this was the Suppliers responsibility. New equipment was therefore delivered but, for unknown reason, it still remains in the transport boxes.

At the time of the site visit by the Evaluator, equipment worth about half of the grant was still unused with no evident sign of progress in this respect. It may therefore be concluded that it may take long before at least parts are put to the intended use.

5.3 Monitoring

Swedish consultants were recruited to supervise procurement, contracting and monitor installations. The consulting contracts for supervision were extended by Sida at several occasions along with the considerable implementation delays.

5.4 Conclusions

The project is clear example of the risks with supply-driven projects where too little time is left for the required preparations. With better preparation, several of the evident mistakes in this project would have been avoided.

The Sida intervention, however, helped to shift the focus from a pure power rehabilitation programme towards more systems adapted investments. In the main, only those components proposed by the Sida consultants actually work and contribute to better services and the targeted supply improvements.

6 Sustainable Achievement of the Objectives

6.1 Actual Achievements vs. Plans

As discussed above, none of the objectives for the installation of equipment at the Power Plant seem to have been achieved.

By contrast, the boilers and pipe-line installations seem to fully achieve the goal of providing more reliable and better DH services.

6.2 Institutional, incl Governance, Management Autonomy, Ownership

The organisation of DH services has recently been changed by the Municipality's decision to hand over its central DH system to RKS (Russian Kommunal Systems). The outer part of the services are provided by EnergoAudit. The two new boilers are operated by this company. Institutionally, all visited authorities and companies in the region appeared weak with lacking project implementation experience in the new market context.

6.3 Technical Achievements

Management of the DH company stated is satisfaction with the new boiler installations and the pipe-line. Efficient backup and some training were provided during procurement and implementation.

6.4 Financial Performance

Financially, the local administration and its municipal service companies were generally weak when the project was designed and implemented. This situation seems yet to prevail, in the absence of any institutional support programmes.

6.5 Economic Performance

As for other energy efficiency projects, the economic rate of return is higher than would have been the financial returns, as Russian fuel prices are lagging behind the rising world market energy prices.

6.6 Tariffs and Affordability

No tariff information was presented by the City during the short visit of the Evaluator.

6.7 Energy Savings and Efficiency

Except for the two boilers, the investment seem to have minimal energy efficiency gains. The two boilers (HOB) installed, however, reduce annual fuel consumption by ca 2,000 tonnes of “mazut” (heavy fuel oil). Conversion to gas is not an option as there are no pipelines.

7 Impact

7.1 Environmental Impact and Awareness

Based on the above, the Evaluator estimate environmental benefits to be:

- Reduced emission of CO₂: ca 7000 tonnes/year
- Reduced SO₂: ca 100 tonnes/year

Other Environmental goals or achievements or goals could not be discussed during the brief visit by the Evaluator. Neither was such information found in the available monitoring reports.

7.2 Social Impact, Poverty Reduction and Gender Equality Aspects

The project’s social impact stems from sustainable heating services from the new boilers and the reconstructed pipe-line. Poverty reduction and gender equality aspects were never reflected in the objectives or designs.

7.3 Wider Demonstration and Replication for Improved Sustainable DH Services

It is doubtful if this project has any Demonstration or Replication potential.

8 Major Issues, Lessons and Recommendations

8.1 Risks and DH Project Designs under Unstable Transition Conditions

This project shows the importance of good preparations and that institutional prospects and risks must also be assessed prior to the investments to achieve sustainable results. Another lesson is that the kind of projects must always have secured local counterpart funding (this was lacking for the power plant completion).

The preparatory and implementation support by Sida via consultants was efficient and timely on the whole, given the very short available time for preparations. Many deficiencies in the first designs were corrected, and the procurement and implementation support was handled in a professional manner. The problems seen during the visit by the Evaluator are caused by poor Russian designs and data, poor financial performance and lack of good incentives to maintain efficient operations.

Table 1. Sida decisions

Sida Decision Date	Sida Decision No	Assignment/Project Scope	Budget MSEK	Disbursed MSEK	Sida, Team Leader	Bene-ficiary	Swedish Partners	IFI funding
19990412	Öst 181/99	Consultancy services – Feasibility assessments	127 640	123 744	CÖ	City of Archangelsk	QuEnTec/ LR, EW Energiråd-givarna	N/A
19990521	Öst 245/99	Consultancy services – Preparation of Tender documents and Procurement Support	250 000	270 086	CÖ	City of Archangelsk	QuEnTec/ LR,EW Energiråd-givarna	N/A
19990817	Öst 395/99	Amendment Consultancy services – Preparation of Tender documents and Procurement	23 000	Included in Öst 245/99	CÖ	City of Archangelsk	QuEnTec/ Lennart Rörgren	N/A
19990528	Öst 262/99	Consultancy services – Preparation of Tender documents and Procurement	60 000	60 000	CÖ	City of Archangelsk	Gävle Energi	N/A
19990621	Öst 310/99	Tender evaluation, costs for visit by representatives of Archangelsk City in Stockholm	30 000	23 059	UB	City of Archangelsk	Internal decision	N/A
19991005	Öst 404/99	Investment Support delivery and installation of equipment	23 650 000	26 552 135	CÖ	City of Archangelsk	ABB+ Central-värme-produktion AB	N/A

Sida Decision Date	Sida Decision No	Assignment/Project Scope	Budget MSEK	Disbursed MSEK	Sida, Team Leader	Bene-ficiary	Swedish Partners	IFI funding
20010705	Öst 395/01	Amendment – Delivery and installation of HOB	2 389 800	Included in Öst 404/99	KL	City of Archangelsk	CP Energi former Central-värme-produktion	N/A
20021113	Öst 700/02	Amendment – Completion of delivery and installation of HOB	970 000	Included in Öst 404/99	KL	City of Archangelsk	ETAB	N/A
19990830	Öst 408/99	Amendment – Consulting services monitoring and control	350 000	333 257	CÖ	City of Archangelsk	Lennart Rörgren, Torbjörn Ståhl, Sten Gabert	N/A
20001219	Öst 612/00	Amendment – Consulting services monitoring and control	142 860	406 667	CÖ	City of Archangelsk	Lennart Rörgren	N/A
20010705	Öst 393/01	Amendment – Consulting services monitoring and control	217 340	Included in Öst 612/00	KL	City of Archangelsk	Lennart Rörgren	N/A
20021220	Öst 815/02	Amendment – Consulting services monitoring and control	46 467		KL	City of Archangelsk	Lennart Rörgren	N/A
20001211	Öst 589/00	Amendment – Installation and delivery of spare parts	310 000	279 000	CÖ	City of Archangelsk	CP Energi former Central-värme-produktion	N/A

Table 2. Persons contacted during the evaluation

Name	Position	Contact information		
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Mr Ivan Popov	Deputy Director Energoaudit	+ 7 911 55 80008		

Appendix 3 Daugavpils District Heating Rehabilitation Project

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1 Evaluators' Overall Assessments and Rating

Daugavpils District Heating Rehabilitation Project		Evaluation Criteria						Sida ¹⁾ Intervention
		Project Overall Assessment					Comments	
		Relevance	Effectiveness	Efficiency	Sustainability	Impact		
Main Objectives/Expected Results	Institutional autonomy and reforms	H	L	L	L	N	Virtually no institutional gains: the Client Co mngmt and organisation remain unreformed, and regular interference from the City makes for low autonomy. Reform-orientation of the City administration was not deeply tested prior to costly project preparations that now risk becoming a sunk cost (c.f. below).	L
	Technical Standard and least cost	H	L	L	L	N	The standards at DS were low at the outset and have deteriorated further – the Demonstration Project was to limited avail as several components remain uninstalled. DH may no longer be a least cost option in the worn down system.	L
	Financial and economic self-sustainability	H	L	L	L	L	Falling demand, lost clients, low service quality and lagging tariffs resulted in poor financial performance. The economic returns of the few investments made may prove low-negative, if the DH system were to emerge as beyond salvage in a complete revision of its future feasibility.	L
	Energy Conservation	H	L	L	L	L	Energy efficiency gains from the intervention are negligible. The very late switch from oil to cleaner gas fuel would have come w/out the Sida interventions, as oil prices soared. Marginal added savings with the few completed demonstration measures. System retains constant flow, inefficient 4-pipe connections.	L
	Environmental Protection	H	A	L	A	A	A few boiler improvements with the demo measures, and more importantly reduced emissions from the Company's belated switch to gas counter to the recommended early change.	A
	Poverty reduction	N/A	N/A	N/A	N/A	N/A	No specific objectives set or design elements in the Project. The move has been very slow away from a general subsidy via controlled tariffs below cost. This delays a switch to directed social support to the most needy households as proposed in the Feasibility Study.	N/A
	Gender equality	N/A	N/A	N/A	N/A	N/A	No objectives set for this aspect, consequently no specific intervention elements towards this objective, and no material achievements.	N/A
Overall Rating	Unsuccessful							Partly unsuccessful

Standard of Achievement

H = High

N/A = Not applicable

1) – Project Preparation

A = Acceptable

– Demonstration Project

L = Low

N = Negative

2 Background, Project Context

2.1 Client and Project History

Daugavpils is the second biggest city in Latvia with ca 117,000 inhabitants. It is located in the south-east close to neighbouring Belarus and Lithuania, and has a predominantly Russian-speaking population. The City's district heating (DH) utility Daugavpils Siltumtikli (DS) was included among a handful of DH rehabilitation projects in Latvia considered for support in the early 90's by Sida (acting on behalf of the First Baltic Billion Fund, FBBF) and the World Bank (WB). Earlier PHARE-funded studies had identified that municipal DH systems in Latvia had urgent upgrading needs to conserve increasingly expensive energy and reduce air emissions. Sida would grant-finance consultancy services and the World Bank (WB) lend towards capital investments in these DH projects.

The following consultations led to a request in March 1977 from the Latvian Ministry of Finance. Sida and the WB were asked to finance priority DH improvements in Riga and Daugavpils. Sida agreed to fund preparatory studies for both projects after a joint Sida-WB mission to Latvia in May 1977.

2.2 Interventions by Sida

By the mid 90's Sweden had provided some DH rehabilitation support to Latvia via the Swedish Technical Assistance Agency (BITS) and the Ministry of Industry, Employment and Communication through the Swedish Business Development Agency (NUTEK). BITS also funded an energy expert seconded to the World Bank office in Riga for the three Baltic countries. This facilitated dialogue that led to the Daugavpils DH intervention.

Fjärrvärmebyrån AB (FVB), was selected after competitive bidding among Swedish DH consultancies to undertake a feasibility study for Daugavpils Siltumtikli (DS), the municipal corporate DH entity at the time.

The FVB feasibility study of 1997 was funded by a Sida grant of SEK 2.0 million, and another Sida grant of SEK 0.5 million financed designs and supervision for a substation demonstration project that formed part of the Swedish support (both decisions of 1997 10 10). Yet another grant from Sida of SEK 1.6 million financed delivery of four demonstration substations and some boiler equipment (decision 1997 11 05). The feasibility study was later extended to include more detailed study of the proposed upgrading of the Dautex plant, and this was funded by a fourth Sida grant of SEK 0.4 million (decision 1999 04 14).

2.3 The Current Situation

No material capital investments have followed the Sida grant-funded preparations to date, apart from the demonstration substations. The City hesitated to debt-finance rehabilitation investments with a WB loan. It reportedly looked to the experience of Jelgava town. (Its DH company ran into financial crisis shortly after completed upgrading in 1999 funded by a WB loan for the investments). A contributing factor may have been a heated discussion between the Daugavpils Mayor and the WB Task Manager for the Daugavpils Waste Water Rehabilitation Project. The experience reportedly made the Mayor of Daugavpils hesitant to cooperation with the WB.

The Daugavpils DH system now faces a spiralling crisis. The situation has been exacerbated by falling industrial demand, under-investment and continuous heat losses, while the fuel cost rose sharply.

To this was added inefficient services and marketing with resulting lost customers and worsening finances of DS. These were poor already at the time of the Feasibility Study due to big collection arrears, and as tariffs continued to fall far below cost. The regular interventions by the City administration and its politicians in the company's operations contributed continuously to lost efficiency.

3 Relevance and Rationale

The Proposed Project had clear economic, technical, environmental and institutional Rationale, apart from its implicit demonstration aims as a planned pilot DH project:

- i) *Economic*: More efficient DH service provision in a scenario where the transition to a market economy would inevitably see energy prices come closer to world market levels.
- ii) *Technical*: Extended life, and increased efficiency reliability and service with rehabilitated DH infrastructure, installations and operations.
- iii) *Environmental*: Principally by reduced air emissions with the conservation achievements in more efficient generation and distribution of heat.
- iv) *Energy conservation*: Reduce fuel consumption by improving boilers and end-user installation, thereby reaching the overall efficiency and environmental objectives.
- v) *Institutional*: Promote sound cost recovery policies and operations, support commercialisation and development of a professionally run more autonomous heating company that could also help its eventual privatisation.
- vi) *Demonstration*: The implied rationale with this pilot DH project in a major Latvian town was also to gain useful and replicable rehabilitation experience.

The Evaluators conclude that the Proposed Daugavpils DH project and the Swedish grants were relevant, as in the case of the other Swedish interventions in the late 90's for the Jelgava and Riga DH projects in Latvia. This can be concluded in the light of the Swedish strategies since the 90's for collaboration with Eastern Europe and Baltic countries.

4 Effectiveness

4.1 Preparations and Design

The preparatory studies by FVB presented thorough analyses of the technical rehabilitation alternatives. They included comprehensive assessment of key technical, economic and financial aspects, including least cost. The economic and financial risk and sensitivity analyses were particularly clear and comprehensive. The institutional and organisational aspects were, however, dealt with in a more normative manner: the feasibility study included a series of justified general recommendations for change and improvements. These were based on best practice vs. the generally observed reform needs within DS and in its interplay with the City as owner.

It is true that the City had demonstrated reform-orientation in its collaboration with Sida and several co-financiers for the Daugavpils waste water rehabilitation project in the mid 90's. The evaluators conclude, nevertheless, that some of the institutional reform risks for the DH services could have been highlighted more in the Feasibility Study. This is given the much bigger financial implications in DH compared to water services, and the resulting higher political risks to implementation of the reforms. It was clear in the second half of the 90's that the Daugavpils city administration was generally less reform-orientated than e.g. Riga's and therefore less likely to allow municipal utilities full professional and operational autonomy. Major reform in the financially important DH services could therefore expectedly encounter more conservatism than in other municipal spheres, and at worst obstruction from a range of local vested interests.

4.2 Least Cost

In 1997, Daugavpils had already seen a setback as a Latvian industrial centre. The recommended least cost alternative was based on what the Feasibility Study said were fairly conservative demand projections. In this context the Study favoured increased heat supply from the upgraded CHP unit of Dautex, a recently privatised foreign owned producer of tyre cord and one a leading industrial plant in the City. Still, later developments have shown that the projections underestimated the actual fall in heat demand, including from ailing industries like Dautex. The Study, however, assumed that the proposed investment project would be implemented along with the proposed institutional reforms. This would also help the Company to become more customer-oriented and competitive. Without having implemented the Project and due to its weak management practices and service-orientation the Company has, however, lost many customers that opted to disconnect and install their own heating. As a result, conversion to individual gas boilers and discontinued DH services in Daugavpils should be seriously considered as one of the alternatives in a renewed analysis of the least cost option.

4.3 Proposed Project Components and Phasing

The Proposed Project essentially comprised different investment alternatives depending on whether agreements with external heat suppliers could be established. As for most DH rehabilitation projects, this case also demonstrates an early focus of the preparations on the technical aspects for enhanced energy efficiency. This was manifested in an investment program comprising substations, pipe-line rehabilitation and boiler equipment and in that the institutional recommendations were much more general.

The demonstration project comprised the installation of following major equipment:

- Four substations;
- Oxygen analysers;
- Feed water pump; and
- Oil circulation pumps.

5 Efficiency

5.1 The Feasibility and Appraisal Stage

In the Evaluators view the project proposed by FVB was well prepared and would bring both technical and institutional improvements in the operations of the company. The chances would in view of the Evaluators have been much better that the proposed technical rehabilitation had been actually implemented if the institutional changes could have been brought about.

5.2 Design and Implementation of Demonstration Units with Sida funding

Only part the demonstration project including the boiler equipment have been implemented to date: the Company lacked funding to implement the substations in full as was reported by FVB in November 2001. The Company informed the Evaluators that some of the delivered equipment had been stolen and other parts intentionally damaged. The responsibility for the design, procurement and implementation supervision of the demonstration project was assigned to FVB with the DH Company as the client and buyer of the equipment. The Evaluators got the impression that FVB made serious efforts to assist the Company in forwarding these investments. It seems, however, that the Company lost some of its interest in the demonstration program after the discussions between the City and the WB collapsed on debt funding for the proposed main Project's components.

5.3 Monitoring

As mentioned above, the responsibility for the monitoring of the implementation of the Demonstration project was assigned to FVB. The monitoring was reported on Nov. 7, 2001 (see Final Report, Demonstration Project, Daugavpils). There was an apparent lack of interest on the part of the City to seek to pursue the Project via other channels after discussions with the WB had collapsed. This indicates that more active monitoring on Sida's part hardly would have changed the City's attitude.

5.4 Conclusions

The institutional reform requirements and political risks were underestimated in otherwise comprehensive preparatory studies with clear technical assessments and recommendations for the Daugavpils DH project. The demonstration investment in substations and the in-depth feasibility study in 1999 of the Dauteks CPH rehabilitation proposition had similar technical focus. The various preparatory studies and the demonstration project did not, however, lead to the intended investments.

Regrettably, the demonstration project did also not bring about the expected effects to enhance awareness of the benefits due to lack of active project management and monitoring by the client, and as the endeavors of FVB could not influence change in this respect.

The Daugavpils DH case demonstrates in an unusually clear way that municipal utility reform projects in early or intermediate economic transition environments must give strong emphasis at the outset to the institutional aspects. Technical studies of high caliber will not be sufficient and risk becoming a partly wasted effort, if the institutional aspects are not addressed with equal vigor and critical risk analysis.

6 Findings on Sustainable Achievement of the Objectives

6.1 Actual Achievements vs. Plans, and vs. Developments without the Sida funded Intervention

The investment project did not materialise for reasons explained in the preceding sections. As a result, there has been no sustainable achievement of the objectives.

The evaluators conclude that DS would have reached its current unfortunate critical state regardless of the Sida intervention. A key factor in this respect is that the Feasibility Study underestimated the general economic and institutional risks, as discussed in Section 3.

6.2 Institutional, incl. Governance, Management Autonomy, Ownership

The recommended institutional programme was not fully adapted to the local conditions and also appears not to have been thoroughly discussed with the City administration. The Programme was never implemented and the Company remains institutional weak with the regular interference by the City administration and politicians in the operations. To conclude, the preparations had little or no influence on institutional reform in the case of DS.

6.3 Technical Achievements

The impact of the equipment installed under the Demonstration Project could be assessed and reported by FVB. The improvement at the boiler stations have resulted in some expected savings of electricity and fuel and reduced emission to the environment. Still, due to poor metering and reporting as well as the lack of local funds to complete some installations and, finally, theft and damage has reduced the demonstration value of the substations significantly.

6.4 Financial and Economic Performance

The financial and economic returns from the investment Project that has not materialized would have come principally from the energy savings with substations, better regulation and systems integration and more efficient heat from the Dautex CHP in particular. The actual development has decreasing efficiency in a worn-out old network with falling load density, lagging maintenance and installations and falling service level. The financial and economic viability is now uncertain at best of plans to carry out limited DH rehabilitation investments with NIB and EU funding. The reason is that the proposed network and generation improvements along some of the lines in the Feasibility Study will first need to be re-assessed in a new systems and least-cost perspective, as discussed in Section 4.2.

The Company auditors said in their qualified report on the 2003 accounts that DS was moving towards insolvency, and that tariffs would need to be increased sharply to catch up with escalating fuel and other operating cost. The utility regulator for Daugavpils and other municipalities in area confirmed that tariffs had been too low in the past, while also pointing to the need for more rationalization and measures to enhance technical efficiency.

6.5 Tariffs and Affordability

The nominal tariffs were kept too low until recently to cover cost, and the significant cross-subsidy between industrial and institutional users on the one hand and households on the other still remain.

On the one hand, the average tariffs in Daugavpils are among the lowest for DH systems of similar size in Latvia. They now need to be raised sharply, however, to cover the increasing costs. But affordability limits this route. The income statistics are inexact, but the data still indicate that the combined heating and hot water bill currently amounts to 9–10 per cent of the average disposable income of households in Daugavpils. This is significantly above the share e.g. in Riga and Jelgava (at ca 6 and 8–9 per cent respectively).

The City now faces a strategic dilemma for its DH system: without more investments, the tariffs need sharp rises to avoid big deficiencies that the City would have to cover. More investments on the other hand might turn out as sunk cost, if the deteriorating system were found to have fallen below any least-cost justification for DH rehabilitation vs. individual gas boilers.

6.6 Energy Savings and Efficiency

By the decision to turn down the investment program, do nothing to improve the company's finances and not introduce any changes in management and owner practices, no material efficiency gains were achieved. There were some savings with the actually installed substations and other demonstration measures, while these are quite marginal. The system remains with constant flow and inefficient four pipe "open system" connections to the buildings with very few exceptions. As a result the energy efficiency gains of the interventions were negligible.

7 Impact

7.1 Environmental Impact and Awareness

The local and regional environmental control agencies did not report any major breaches by the Company. The Evaluators could, however, not identify any material improvements of the environmental situation as a result of the preparations and the implemented demonstration project, or the proposed investment programme. DS management appears also not to have been materially influenced by the environment.-related recommendations made by the consultants in the Feasibility Study.

7.2 Social Impact, Poverty Reduction and Gender Equality Aspects

The Sida approval memoranda and the Feasibility Study did not specifically address poverty reduction or meeting of gender-related aims. The evaluators conclude that the Daugavpils slow move from generally subsidized DH tariffs towards directed social support to the needy has had some positive social impact. As in the case of other Baltic cities, the extent is difficult to assess. One reason is that the direct social support systems remain imperfect with difficult needs assessments.

7.3 Wider Demonstration and Replication for Improved Sustainable DH Services

Its pilot character might have given the Project a good opportunity to demonstrate improved sustainable services. In practice, the Daugavpils case has become more of a negative demonstration in its showing how under-investment and delayed reform has led to a downward spiral in the efficiency and quality of the local DH services.

8 Major Issues, Lessons and Recommendations

8.1 Underestimated Institutional Development Risks and Mitigation Needs

One reason why institutional reform did not come about may be that there were no incentive or conditions linked to an investment program and its financing. The Evaluators conclude, however, that the basic constraint was lacking insight and reform-orientation of the City's political leadership. There are clear signs to this date that the Company governance remains one of frequent intervention from the City.

The institutional risks to the proposed Project became evident in a way even before it was launched, when communications between the City and the WB got sore.

Lesson:

Preparation of Investment support to municipal utility rehabilitation projects in early or intermediate transition environments should always start with a thorough appraisal of the reform-interest and openness to reform in the municipal administration and political leadership. To drive a reform process requires insightful and motivated owners prepared to take controversial decisions and challenge a range of vested interest in *status-quo*.

8.2 DH Project Preparation under Unstable Transition Conditions

The Feasibility Study had very good technical standards. The institutional parts had good general coverage, while underestimating the reform risks. The financial and economic sections were rather less rigorous in all aspects, as often in the otherwise high-calibre reports from Swedish technical consultants. In hindsight it appears, however, that a broader perspective on the demand and institutional dynamics would have been needed in particular. A fairly narrow technical focus in the preparatory studies did for example not fully address the risks with continuously contracting industrial activity.

Lessons:

Ensuring a Full Capability Range when Technical Consultants are Selected

Sida should encourage the leading Swedish technical consultants that are often engaged for feasibility studies to build more capacity in the sphere of financial and economic analysis and presentations. At procurement of feasibility studies of technical refurbishment projects in early and intermediate transition economies, Sida should review the weights assigned to technical, financial and economic capabilities of the offered teams, and consider high relative weights to the latter.

8.3 Least Cost in the Light of Survival Prospects for the Dauteks Factory

There is a risk that rehabilitation of the Daugavpils DH system may no longer be a least cost heating and hot water supply alternative as the worn down system soon may reach a critically low connection density. In Daugavpils with many parts of the City having scattered residential blocks of max 3–4 storeys, many clients have been lost with disconnections or because of industry closures, an ocular rough assessment is that the average for the Heat load density in Cal/h per Km now could have fallen as far as to a maximum range of 2.5–3 Ccal/h/km.

Recent WB working papers on District Energy Trends have concluded that heat load densities below 3.5–4 Ccal/h/km network may be critically low at gas prices comparable to Northern European

border prices. It is true that DS will benefit for a time from the lower priced supplies from the national gas provider in which Gazprom is a prominent shareholder. Still, the least cost assessment must take a long enough perspective to look more to the international price level,

8.4 Grants to the Project Preparations May Turn Out a Sunk Cost

The local authorities did not accept the proposed WB funding despite the fact that the preparatory work led to a well designed project. The key constraint proved to be lacking insight and reform-orientation on the part of the municipal leadership.

Lesson:

Comprehensive preparatory of good quality is not a guarantee for a successful completion of a project, only a necessary foundation for the continued funding and development of the project. Front-end interventions may prove necessary on the institutional side to bring about the required awareness among the owners and top management.

Recommendation:

A thorough review and risk assessment should be made of the reform-orientation of the municipal leadership when addressing investments in municipal utility rehabilitation projects. Conducive dialogue with reform-motivated owner and client representatives must be maintained at all stages of the preparatory work. Under unstable early economic transition conditions, efforts should be made to target capacity building support to identified local counterpart staff.

8.5 Demonstration Projects are Effective Instruments if Properly Applied

The installation and startup of the delivered equipment demonstration purposes became delayed and incomplete. Furthermore, the DS organization did not monitor the base line scenario to create a basis for assessment of the impact of the demonstration equipment. As a result the intended support to the development of the project by a demonstration of modern techniques did not become fully effective.

Lesson:

Even though full-scale demonstration of techniques and equipment at the clients facilities can be a powerful way to enhance the awareness and understanding of the benefits, proper preparation, supervision and disseminations of results is a required part to obtain the desirable overall results.

Recommendation:

Demonstration projects should be planned with good care in each case by the funds provider. Considerable resources jointly with the client should ideally be allocated for preparations, information and training of counterpart staff. Special provisions should be made for the recording and reporting of results and achievements. Internal and wider dissemination of results to the client organization and peer entities in the sector should be addressed as a special activity in order to achieve the best overall impact of the demonstration project.

Table 1. Sida decisions

Sida Decision Date	Sida Decision No	Assignment/Project Scope	Budget MSEK	Disbursed MSEK	Sida, Team Leader	Bene-ficiary	Swedish Partners	Future funding
19971010	Öst 276/97	Preparation of Feasibility Study	2 000 000	2 028 000	PH	Daugavpils Siltumtiklis	FVB Fjärrvärmebyrån	WB
19971010	Öst 276/97	Consulting support to Demonstration Programme	520 000	523 986	PH	Daugavpils Siltumtiklis	FVB Fjärrvärmebyrån	WB
	Öst 328/97	Consulting support to Demonstration Programme	1 600 000	1 518 820	PH	Daugavpils Siltumtiklis	FVB Fjärrvärmebyrån	WB
	Öst 150/99	Amendment to the Feasibility Study for assessment of the connection of the Dauteks Plant	417 540	417 540	CÖ	Daugavpils Siltumtiklis	FVB Fjärrvärmebyrån	WB

Table 2. Persons contacted during the evaluation

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Appendix 4 Gatchina District Heating Rehabilitation Project

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1 Evaluators Assessments and Rating

Gatchina District Heating Rehabilitation Project		Evaluation Criteria						Sida ¹⁾ Intervention
		Project Overall Assessment					Comments	
		Relevance	Effectiveness	Efficiency	Sustainability	Impact		
Main Objectives/Expected Results	Institutional autonomy and reforms	H	A	A	A	H	Selecting a reform-orientated city was a successful strategy. This factor explains the institutional development success, despite postponed investments at Russia's economic setback. The Corporate Dvpt Plan is not met in full. Still, GTS provides strong reform-demonstration.	A-H
	Technical Standard and least cost	A	L	A	A	H	The preparations were generally good and the demonstration investments completed. Apart from up-scaled demonstration, Sida successfully adapted to put-off debt for the main investments with continued institutional support, and lately by resumed preparations for priority investments. Achieving least cost will take time for lack of funding, but the demonstration and priority investments are logic steps.	H-A
	Financial and economic self-sustainability	H	L	A	L	A	The Company still has a good way to reach sustained self-financing. Local politicians approved adjusted tariffs in pace with rising fuel costs but failed in narrowing the ca ¼ gap to full cost. Institutional support helped in improving financial and subsidies transparency.	A
	Energy Conservation	H	L	A	L	A	The demonstration projects brought energy savings in limited sections of the system. The opportunity to promote user savings with the new house meters was not used timely, though. Continued preparations of priority investments will help to achieve more.	A
	Environmental Protection	H	L	A	H	H	Good reductions of emissions relative to the investments to date in sections of the system where demo investments and improved regulation helped as did a few boiler improvements.	A
	Poverty reduction	A	N/A	L	A	A	No poverty related objectives in project. Impact on poverty of tariff reform and inclusive targeting of poor groups rated. Poor and vulnerable households may face short-medium term extra burdens with raised tariffs, as directed welfare may not increase in tandem and lacks efficiency. The project has reduced poverty by increasing as-sets of poor groups but it has not achieved any substantial empowerment.	A
	Gender equality	N/A	N/A	N/A	N/A	L	No gender-related objectives or project designs. Also no gender elements noted in current human resources development of the company, or any clear gender impact among consumers.	L
Overall Rating	Partly unsuccessful							Successful

Standard of Achievement

H = High

N/A = Not applicable

1) – Project Preparation

A = Acceptable

– Demonstration Project

L = Low

– Investment Project (FBBF)

N = Negative

– Corporate Development support

2 Background, Project Context

2.1 Client and Project History

Gatchina, a town ca 35 km south-west of St. Petersburg, got Swedish support in 1997–2003 to improve its district heating (DH) system. As other Russian towns, it urgently needed to cut mounting losses in housing and DH services. In the new market context, the DH utility had highly inefficient output and distribution of heat and hot water. Big heat losses and low efficiency in combination with rising fuel and other costs brought a major strain on the municipal budget. The tariff receipts lagged, as disposable income of households remained low and industry was contracting in the crises of the late 90's. Gatchina "Teplovye Seti" is the local DH utility (GTS, or "the Company"). It serves ca 80% of Gatchina's population of just over 80,000 plus most of the local institutions, industries and businesses.

Sida and the World Bank (WB) had consulted from 1996 with Russian Authorities on wider support for DH reforms, and Gatchina was selected from among ca 100 candidate towns in the Federation. A key justification was the evident reform-orientation of the senior town hall representatives. In addition, Gatchina had a fairly stable political administration. Looking to the resulting good demonstration potential, the City was selected among 10 candidates in north-west Russia. In this way the City became the first Russian town to receive Swedish DH-reform support.

Ångpanneföreningen Syd (ÅF Syd), conducted a Sida-funded feasibility study and the WB was prepared to lend to the following investments. The Draft Feasibility Report in August 1998 proposed early priority investments at an estimated cost of 17 USD million and more upgrading over 10-years. It also proposed institutional reform support over a few years period.

The World Bank programme was cancelled, as debt finance turned impractical after the Rouble crisis shortly after, in late August 1998. Instead, some of the 17 USD million equivalent upgrading investments carried out to date received Swedish grants, mainly for demonstration installations like house substations and regulation improvements.

2.2 Interventions by Sida

Table 1 at the end of this document lists the Swedish grants to preparations, investments and supervision. This support via Sida totaled SEK 20 + million (ca USD 3 mill+ equivalent). Of this sum, SEK 15.8 + million was with financing from the First Baltic Billion Fund (FFBF). Five ÅF assignments for SEK 5+ million include the first feasibility study and its amendments in 2000. Another ÅF assignment was to prepare and design the demonstration and follow-on investments, and yet another was for project implementation management (PMU) support.

Sida decided in 2000 to support its investment program with an institutional strengthening program. The institutional development contract with B&S of 2000-08-18 and its 2003 amendment totaled SEK 6.3 million, and monitoring for Sida by AIEKA SEK 0.8 million. Finally, Sida decided in 2004 to fund a revised priority investments feasibility study for which ÅF also won the contract. This priority investment programme at an estimated cost of 3,5 USD million, is now discussed with financial institutions as, for instance, NEFCO.

2.3 The Current Situation

The institutional support helped the City lay a foundation of structural change in parallel with successfully completed demonstration and add-on investments at GTS with Swedish grants. The Company was separated from the municipality. It also put to good use 3 years' institutional advice on governance, management and various information system reforms and replaced key managers. Thanks to these factors, GTS became a prominent reform example and got several awards as leading DH company in Russia. The Company, however, lost some industrial and institutional customers by 2002. From then on, new clients turned the trend. It followed as Gatchina built more houses for returning officers and the historic town got popular by retirees from St. Petersburg.

The economic decline ceased and Gatchina benefited from being close to the second biggest Russian city, St. Petersburg. The reform accomplishments and the economic recovery justified the second feasibility study in 2004. It proposed resumed priority investments from 2005 looking to the new conditions. The Nordic Environmental Finance Company (NEFCO) considered a loan of ca USD 3,5 million equivalent. The feeble finances of GTS had been strengthened along the earlier institutional recommendations to improve collections. The Company's revenues did, however, still depend slightly over 50 per cent in 2004 on direct or indirect subsidies, compared to ca 63 per cent in 1997. Improved self-financing lagged the plans to achieve full cost coverage by 2004, as raised tariffs through that year had just about kept pace with rising fuel and other operating costs.

3 Relevance and Rationale

The rationale was economic, technical and environmental with an important institutional addition: wider demonstration aims prompted the selection of Gatchina as a pilot municipal DH reform project. More specifically, the Sida interventions looked to the following:

- i) *Economic rationale:* Refurbished DH was key to ease the increasing strain of the service on municipal budgets under new market conditions. The means were more efficient and affordable DH services that could achieve self-financing of the DH utility. Saving on fuel was key as its local cost would expectedly move closer to world markets.
- ii) *Technical:* Extended life, and increased efficiency and reliability of rehabilitated and upgraded DH infrastructure and operation of the service.
- iii) *Environmental:* Reduced air emissions would come with fuel conservation in more efficient generation and distribution plus metered tariffs to induce clients' savings.
- iv) *Institutional:* The Project would promote a professionally run autonomous DH company with sustainability based on cost recovery. It would support commercialisation and an enhanced customer and service focus.
- v) *Social:* Reduced general and cross-subsidies between client categories via more rational tariffs and tariff structures would free municipal resources in general. In the long term this would allow the municipality to engage in social activities in support of vulnerable groups.
- vi) *Demonstration:* The explicit rationale for selecting Gatchina was that the City leaders appeared reform-oriented. This was a key condition to achieve successful demonstration of municipal DH reform that could be replicated.

The Evaluators conclude that the rationale and aims for the Swedish support were clearly relevant. The goals and strategies for Sweden's collaboration with transition economies in its vicinity emphasized municipal infrastructure reform, energy conservation and environmental improvement. It was also in line with the Sida policy to grant-finance preparatory studies and implementation support from competitive Swedish consultants. This could facilitate multilateral financing of the resulting projects from international financial institutions (IFIs) like the WB, while also fostering Swedish economic collaboration with the Baltic transition economies.

The aim to foster economic collaboration was a key rationale for project components financed by the FBBF, including the major demonstration investments and their project management support.¹ Finally, the indirect potential social gains and environment improvements with the Project would expectedly make it relevant in the long run against the poverty reduction goals of Sida.

4 Effectiveness

4.1 Preparation, Design and Implementation Support

The preparatory studies by ÅF had clear analyses of the rehabilitation options, including technical, economic and financial aspects. The institutional parts of the first feasibility study superficially covered all aspects listed in the ToR. This part, however, lacked the same clarity and concreteness as the aforementioned elements. As a result it gave less useful design guidance for the actual support, if comparing with the physical investments. The Draft Feasibility Study of early August 1998 could not foresee the Rouble crisis just a few days later that set back funding for the full project many years. Still, its logic sequence included the demonstration investments. A handful of early Sida-funded sub-stations made the client see the benefits and paved the way for more similar later investments carried out with FBBF funding. The PIU support for implementation of the demonstration investments might seem costly if relating the SEK 1 million budget to the SEK 8 million investments. The PIU component did, however, bring crucial new insight into procurement and project management, and could draw on the experience from the first Sida-funded substation demonstration investments. The high PIU cost was also depending on external factors: the Russian parties were not familiar with import rules, the suppliers were not familiar with Russian requirements, and the custom authorities were not familiar with grant financed import rules. Many other project in Russia have benefited from the experience gained in the Project.

In this light, the Evaluators consider that Sida put to good use its prior experience in transition economies. The demonstration investments brought timely client insight into the good potentials with substations for closed systems and improved metering. Enduring institutional reform advice was a prominent part of the intervention, and was crucial for its relative success in Gatchina despite the adverse economic environment until recently.

4.2 Least Cost

Demand projections in the Feasibility Study did not foresee the Rouble crisis and its effect on industrial demand in particular. The forecasts in the Study assumed that the World Bank financing would move forward with parallel Corporate Development Programs also helping the Company's customer orienta-

¹ See Project Evaluation Report to Sida of June 2004 on this and other FBBF funded DH projects that looks in particular to the commercial collaboration elements.

tion and improved services. As only parts of the main investments were implemented following the Sida interventions, it is difficult today to relate current performance to the Study forecasts. However, all the main investments to date and the currently prepared additional priority investments will be logic steps towards least cost solutions with complete conversion to variable flow and other key elements.

4.3 Investment project components

The Swedish funded investments essentially comprised:

- New substations for the Aerodrome District;
- One 500 mm pipe-line;
- Pressure Regulators;
- Measuring Equipment; and
- Maintenance Equipment.

4.4 Contracting

The contracts were signed with Swedish suppliers after selection through normal Swedish bidding procedures. The Evaluators did not observe or hear of any major disputes or other complexities, and the process was helped with the aforementioned PIU support.

5 Efficiency

5.1 Efficiency in Implementation

Implementation of the investments met the normal complexities at the time in the Russian environment. All parties involved lacked essential experience in export/import activities into Russia. First, some of the winning bidders were not registered in Russia, which is a requirement for exporters to the country. Second, although grant financed equipment, according to bilateral agreements, should be imported without custom duties charged, the Russian party had big difficulties in proving this to the local custom authorities. The Swedish support to the PIU seem to have been efficient although implementation was severely delayed. The delays were mainly caused by factors outside the control of the PIU.

5.2 Monitoring

When registrations and custom clearances were in place, good monitoring helped to implement and to start operation of the Sida Project in an efficient manner. The Client expressed its satisfaction with services and training provided. The Sida-monitoring remained good throughout, helped by the ongoing institutional support program and the good communications between the client and the technical consultants. Progress reports on file are informative.

6 Sustainable Achievement of the Objectives

6.1 Actual Achievements vs. Objectives and Plans, and seen Against Likely Counterfactual Developments without the Swedish Intervention

The wider demonstration aims were met despite the postponed main investments. In this sense, the Gatchina project is well placed to meet the objective to stimulate wider reform in Russia. In this way the preparatory interventions and the Project will assist sustainable, efficient and environmentally friendly energy systems that could deliver heating to consumers at reasonable prices. This was stated in the approval documents seeking to make Gatchina a strong demonstration case.

There are clear signs that the Gatchina reforms to date have attracted much domestic attention, and that they have replicable elements for wider national DH reforms over time. The advantages with closed systems and improved metering with the new substations were demonstrated beyond Gatchina. So was the model with an owner's council for the separated "unitary" municipal DH entity with strengthened professional management as tested successfully in Gatchina. This set another good example looking to a new Federal law that requires all "unitary" municipal DH entities to convert in 2005 to joint stock companies. They will then come under the same corporate law as commercial companies necessitating the separation on which Gatchina already embarked. Other municipal DH organisations have paid a series of study visits to Gatchina, including from St. Petersburg and further away.

Publicity came with the various awards to GTS as leading national DH company. A demonstration video was recently shot in Gatchina by the new subsidiary of RAO and GASPROM, "Russian Kommunal Systems" (RKS). RKS offers nationwide investment-, management or other services to municipalities in the energy sector and the video will help disseminate the Gatchina achievements. The City's vice-mayor who overlooks DH-provision, commented that the reforms that attracted so much attention would only have come several years later, had there been no Swedish support. The Evaluators conclude that the reform-orientation of the City administration was a prime and necessary success factor, while indeed the Swedish support made the earlier achievements possible.

6.2 Institutional, incl Governance, Management Autonomy, Ownership

The objectives of the institutional development contribution included:

- Strengthened management, making GTS a competitive, creditworthy, sustainable and environmentally friendly DH company
- A Corporate Development Plan to be implemented in key parts.
- Turning GTS into a separate corporate entity, restructured financially
- Bring Governance reform with split political owner and GTS management functions
- Effect clear new contractual relations between the City, GTS and DH clients
- Tariff and tariff structure reform and efficiency improvements for a sustained positive cash flow of GTS
- Modernized financial and management information systems
- Enhanced client and service orientation
- Human resources development and performance related bonus system.

The Evaluators conclude that many key institution development objectives were met in essence. In this, the Evaluators largely agree with the monitoring report for Sida by AIEKA of March 2003. GTS was established as a separate entity, the new owner's council has functioned, management was renewed and strengthened, new contracts between the parties were introduced and the management information systems were improved. It is clear from the interviews and various progress reports that the Swedish support over three years was instrumental in helping to bring about the reforms.

Despite the material achievements on many counts, including replacement of the CEO and CFO with more reform oriented new recruits, progress was slower in some areas. Tariff reform has lagged due to political and economic constraints: the sum of a direct municipal subsidy to GTS (now construed as an "offer" contribution towards the Company's production) plus directed subsidies (mostly Federal to help eligible needy households pay the full tariffs) still was ca 52 per cent of the GTS revenues in 2004. Moreover, GTS has not yet had any material financial restructuring, and still works with too high tariff debtors and fuel creditors, despite recent collection improvements. The tariff structure also remains inefficient. A so called two-tier tariff merely spreads the payments to GTS more evenly over the calendar year, while it does not separate fixed and variable elements to better reflect cost. Another shortcoming is that no metered billings have yet been introduced, despite the technical resources in with the demonstration investments in the Aerodrome area.

Concerns that the achieved reforms faced risks to their sustainability in the yet unstable Russian environment justified the 2003 extension of the contract with B&S. This helped useful updates in some key areas. The Evaluators agree that changing of structures, management techniques and attitudes may need long time-horizons in the kind of transition environment. Despite all reform brought by the advise, training and study visits to Sweden, and the good step-wise approach, the evaluators could still identify areas where the Corporate Development Plan remains to be met in full. These include i) that the GTS organization still shows clear signs of lacking internal cross-communication between e.g. the technical department and finance/accounts or the clients' unit, and ii) that the latter department still works mainly as a billing and collection unit with little or no attention to promotion, customer relations or service quality. Gatchina still has to introduce service quality targets and monitoring to come nearer to best practice in similar western utilities.

Human resources management and development were not prioritized by the project due to the limited potential economic gain to be made through transparent staff administration and rationalizations. However, a performance related bonus system was approved by the Municipality and introduced in 2003. Furthermore, a staff policy was developed, but seem to have had little impact since it did not filter down through the organization. No gender considerations were included in the institutional development component or designs of the overall project.

6.3 Technical Achievements

Except for the slow implementation, the equipment supplied and installed has been of good standard and met all objectives and expectations.

6.4 Financial Performance of GTS

The March 2004 monitoring report to Sida stated that GTS no longer has losses thanks to the municipal "offer" subsidy model. This is true, if looking only to the internal financials and formal annual reports of GTS as a "unitary" municipal entity. The direct and indirect municipal subsidy is, however, ca 1/3 of the revenues. The corresponding deficit is covered after adding ca 5 per cent tariff payment subsidies to low-income households to the direct municipal "offer" subsidy. Moreover, opportunity cost

reasoning needs more realistic depreciation charges in the capital intensive business. Looking to other DH operations, these charges would need to be at least double the current ca 4 per cent of revenues. The responsible vice-mayor for DH services and the management of GTS agreed that the book value of the assets is an insufficient basis for depreciation that remains far too low. (Former asset revaluations with official indexes had no relation to the depreciated replacement values). An opportunity to rectify the valuations and hence the under-depreciation may come as the Company is transferred to a joint stock company in 2005, if the rules will allow justified asset revaluation. In this context, it is notable that a financial restructuring of GTS that still carries little debt, would not necessarily need big new equity injections. Instead, the Company needs to address its poor working capital situation with still excessive debtors and high creditors (mainly for fuel).

If including both direct and indirect subsidies, GTS has moved from ca 37 per cent self-financing in 1997 to 48 per cent. These figures would be 4–5 per cent lower with more realistic depreciation charges. The Evaluators conclude that the Company has a significant way to go before reaching the aim of sustained self-financing operations. Preliminary proposals by the City administration to raise tariffs significantly in 2005 reportedly met with strong opposition from Councillors. Moreover, a Federal decree that DH operations should charge full cost tariffs already from 2004 has again moved the deadline forward. As mentioned above, an important constraint has been rising gas prices. These made political decisions difficult to raise tariffs fast enough to cover both the fuel cost increase and the existing gap to other costs. Nevertheless, the Reviewers conclude based on the affordability indications in Section 4.8 that there is reasonable headroom for faster increased tariffs toward cost coverage than realized to date.

6.5 Financial and Economic Performance of the Project

6.5.1 Financial Returns

The Feasibility Study showed very short repayment periods and high financial returns from the proposed investments, due to combined tariff adjustments and fuel savings. The small investment program financed by Sida, has confirmed many of the assumptions in the study and already contributed to a substantial reduction of fuel consumption and related emissions.

The Evaluators conclude that the Sida contribution has been very efficient in terms of fuel savings and reduced emissions. The gas cost has, however, increased slower than assumed in the feasibility study and remains still at about ¼ of the World Market Price. With the current price (ca USD 40/1000 Nm³) the annual cut in cost brought forward by the Sida Project is approximately USD 120.000.

6.5.2 Economic Returns

No recalculations are made, as the main project was not implemented. Taking the prime cost item – fuel – nearer to world market prices than the current domestic Russian price would render higher returns from the savings in economic terms than financially.

6.6 Tariffs and Affordability

In the absence of good statistics, the evaluators got confirmation from representatives of the municipal administration, housing company and DH company that the following estimate may be a reasonable current illustration for Gatchina:

- a) Average monthly household disposable income Rbls. 4,000–5,000

b) Average monthly heating cost for a 55 M2 flat,
plus hot water consumption Rbls 250–300

b) as per cent of a) 5–7 per cent

The rough estimate indicates that the current cost may be 5–7 per cent of the average disposable household income. This lies clearly at the lower end of norms in use e.g. by the WB for the sum of utility costs, and also below the feasibility study estimates.

This finding indicates that the City has more headroom than it and its advisers might have thought in pursuing raised tariffs more actively towards full cost coverage.

Finally, some cross-subsidy remains between industrial tariffs and those of households while they are being phased out.

6.7 Energy Savings and Efficiency

As already stated, the Sida investments were efficient and helped to reduce fuel consumption, use of electricity and water and, as a result, also reduced emissions. The company is eager to continue with more investments, based on the experience of the Sida program as soon as the financials allow for that. Up to date, the Sida Project has helped to cut annual gas consumption with approximately 3 million Nm³.

7 Impacts

7.1 Environmental Impact and Awareness

The Project has already resulted in substantial reductions of emissions. Annually these can be estimated at 7,500 tonnes of CO₂ and 11 tonnes of NO_x.

The only environmental issue concerned violated water discharge norms at times and the company paid small fines for this.

7.2 Poverty Reduction

The Feasibility Study and the Corporate Development Program stipulates no specific poverty or gender related project objectives and thus baseline data is not available in this field. The assumption is that the project has had a poverty reducing impact through tariff reform and through an inclusive targeting of poor groups and the evaluators have tried to establish to what extent the project has offered opportunities and empowered poor groups and reduced their vulnerability to risk. Information about the households was acquired through a survey in the residential area of Aerodrome, that was equipped with substations through the demonstration project, and in a reference area. The results of the survey are presented in Appendix 6.

7.2.1 Poverty reduction through tariff reform

On a structural level the project's impact on poverty depends, in the long term, on the achievements in making GTS a competitive financially well managed company based on full cost recovery. Generally speaking, economic development is a prerequisite for redistribution of wealth in society. In this particular case, full cost recovery for all client categories and a shift from general to direct subsidies will free

municipal resources and leave room for additional municipal interventions and activities. In comparison, the cost of the municipal services in Gatchina falls well below international benchmarks, and Gatchina has both higher salaries and lower municipal charges than the surrounding region.

In terms of the public's capacity for more directed welfare, poor households will be losing from the current drain on the public budget for subsidies to the DH companies. In a longer perspective directed support only for low income earners combined with other social undertakings from the municipality would be a more effective social measure. While GTS has only managed to increase the self-financing from 37% to 48% between 1997 and 2004, the trend is towards reduced general subsidies. However, in the short-medium term the move towards cost recovery is likely to increase the number of households eligible for direct low income subsidies. Furthermore, it will make poor and borderline households more vulnerable to the market fluctuations of fuel prices which will need to be counterweighted by an efficient social security system. Another important issue is that the general subsidies for DH services and the direct low income subsidies are drawn from different budgets and there is no automatic transfer of funds between the two.

The reluctance of the local politicians to raise the tariffs can be traced to the dilemma between long-term sustainable DH services and short term political survival as an increase in heating costs will meet massive opposition. The wealthy, more articulate parts of the population will naturally oppose increases in costs while the poor strata become more dependent on an unreliable social welfare system that is out of the control of the municipal politicians.

7.2.2 Poverty reduction through inclusive targeting of service users

The project has had a general impact on poverty through the inclusive targeting of poor groups of consumers offering access to appropriate heating and hot water. The increase in satisfaction with the hot water services in Aerodrome, after the project, is significantly higher among poor groups than for the non poor groups.² Through qualitative answers a majority of the poor households stated that the water was now cleaner or better.

The cost for heating is not charged according to metered consumption but on a norm estimated from metering taking place within the heating system. Although the apartment blocks equipped with substations are charged according to a lower tariff there is no possibility or incitement for the users to control the costs through heat economy. There is the possibility for households to pay for the hot water according to metered consumption which is estimated to reduce the cost by approximately 30%. However, since the meters are financed by the consumer (at the cost of 20–25% of an average monthly salary) the frequency of meters among poor household is about half that of non poor households. Thus, despite an improved access to municipal services, the poor households do not have the financial capacity to benefit from the opportunity of reducing costs through moderate consumption.

² The satisfaction with the hot water is a better indicator of the perceived improvements than is heating since the changes are more obvious. The hot water now has a regular temperature and is of higher quality while the improvements in heating seem mainly to have benefited those households living in buildings with inadequate supply regardless of poverty status.

8 Major Issues, Lessons and Recommendations

8.1 The City Administration's Reform Orientation as a Key Success Factor

Comparing the good results in Gatchina with generally slower progress in other Russian DH utilities as in St. Petersburg, one prime issue stands out: the political and administrative municipal leadership must be clearly reform-oriented to reach good results. Painful decisions are needed on issues like raised tariffs. Other systems changes that can challenge powerful vested interests, as district heating is by far the most significant utility operation financially. Gatchina's leadership did not hesitate to replace unwilling reformers in the top management of GTS, and brought various reform in its own housing administration. The picture contrasts favorably to the situation in Novgorod where municipal utilities have also received institutional reform support, but where neither the town administration nor top management of the DH company have responded as favorably as in Gatchina.

Lesson:

Municipal DH utility reform can encounter difficult national, regional and local constraints for the necessary institutional changes. These can range from adverse regulation to conservatism among managers and other parties with strong vested interests that oppose change. Therefore, manifest reform orientation of the political and administrative leadership is a key condition for success. Selecting just a few potentially strong demonstration cases like Gatchina's in DH reforms may be a more efficient way to support nationwide transition in the sector than offering widespread geographic collaboration programs.

8.2 Remaining Sustainability Risks to the Institutional Reforms at Gatchina

The evaluators concluded that GTS still has some way to go to meet all main aims in the Corporate Development Plan. The legacy of the past could be seen in lagging reform of the client's department towards more service orientation. Despite the introduction of a management committee and consolidated progress reports to the Owners' Committee, the interviews showed that communication between the technical and non-technical departments remains to improve. Two remaining risks to truly sustainable operations are that tariffs necessitate continued high municipal and federal subsidies, and that accounting regulation results in material under-depreciation of the Company assets. Other risks include some recent tendencies in the regional administration to aspire to regulate and coordinate municipal utilities in a way that would clearly counteract decentralized independent municipal utilities founded on sound commercial operation basis.

Lesson:

Municipal utility projects in early and intermediate transition economies must give equal prominence to technical rehabilitation and institutional reform needs. No material investments or debt financing should be embarked upon for a municipal utility corporation without clear evidence that it has been put on sound start-up footing financially. The same condition applies to clearly defined business responsibilities and plans for governance and independent professional management of the utility company. Non-technical project components for institution building and training should be defined and have secured funding for the identified needs before major technical investments are started.

8.3 GTS Has a Long Way Towards True Sustainability

The Company has reported only slight losses or profits of late, but in fact operates with actual losses. This became clear when looking to the significant remaining direct municipal subsidy and the unsustainably low current depreciation charges. As discussed in Section 4.6, the main factors are: i) too low tariffs adjusted in arrears rather than against the coming years' budgets, ii) under-depreciation based on historic index-adjusted asset values with little or no relation to their adjusted replacement values for past depreciation, and iii) that potential efficiency and energy conservation gains have not yet been realised in full.

Lesson:

When addressing the financial sustainability of municipal utility operations it may not be enough to analyse audited accounts or management reports. Crucial tests must be made that include if the tariffs anticipate the coming year's anticipated key cost increases (such as of fuel and energy if priced significantly below world markets). Moreover, capital intensive utilities like district heating companies must have sufficient depreciation charges to sustain reinvestments of depleted installations over time, and undervalued past assets may result in too low depreciation. Finally, the test should look to the extent to which the potential for fuel and energy conservation and efficiency gains are well reflected in tariff structures, operational modes and investment plans.

8.4 Lagging Reform of the DH Tariffs

Section 4 analysed how the tariffs have consistently lagged cost over the past few years with only marginal catch-up. One explanation can be found in the recent years' rising fuel costs that made faster still faster tariff hikes politically difficult. The evaluators also found that the so called dual tariff structure in current use by GTS is in fact only an adjustment to enable a more stable seasonal cash-flow. A true dual structure would have a fixed capacity tariff plus a variable tariff based on metered actual consumption and not according to M2 or other norms. Discussions with the City administration and the Company revealed that it would be the former party's initiative to press for more metered payments by house dwellers. This is technically possible principally in the "Aerodrome" district of Gatchina where the sub-station installations with proper metering now cover ca 85 per cent of the connected apartment buildings. Most industrial clients pay metered consumption, while private family houses pay by norms as individual meters are costly and less accurate for small users.

The Evaluators conclude that the institutional support program might have emphasized the savings potentials more with metered billings. That early savings occur is well known from other locations where metered bills brought consumer saving incentives. As long as a sizeable part of the GTS production costs are met by the per GCAL "offer" subsidy direct from the municipal budget, the City should have strong reasons to introduce metered billings as fast as new technical installations allow. An important benefit from the substation investments in the Aerodrome area remains to be realized. This might have come earlier on had the advisors pressed more for this reform.

Lesson:

Demonstration investments in substations improved regulation and metering should ascertain that savings incentive on the part of users is brought by timely introduced metered billings.

8.5 DH Project Preparation under Unstable Transition Conditions

The Feasibility Study could not foresee the Rouble crisis, while the sequencing of investments made and those likely to be proposed by the Study in 2004 on resumed priority investments will follow a logic sequence towards overall system improvements.

Lesson:

Acute external economic crises may set back project implementation for a long time, while it can be virtuous not to abandon the client, but to carry on partial grant-funded demonstration and other investments that form logic parts of final system improvements.

8.6 Tariff reform could have negative short-term impact on poverty reduction

As explained above the shift from general to targeted subsidies will have a poverty reducing impact only in the long term. The transition to full cost recovery is even likely to have a negative effect on poverty in the short term by putting financial strain on the economy of poor or borderline households without readily available welfare compensation. The direct low-income subsidies for heating do to a great extent come from the regional (“Oblast”) budget. The years that this budget cannot finance these subsidies, the municipality will in principle step in and cover the deficit. In January 2005 the old subsidy system where the subsidy was presented to the beneficiary as a cost reduction was changed to a system of direct financial transfers to the individual beneficiary. The immediate political crisis provoked by late or lacking payments show in a very revealing way how the welfare beneficiaries are now suffering the direct consequences of the authorities’ shortcomings to deliver.

Lesson:

During the feasibility phase the consultants need to continue assessing the capacity and functionality of the social security system to serve poor and otherwise vulnerable groups. Although a local increase in need for social subsidies is unlikely to have any greater impact on the federal budget, a larger-scale reform or other political or economic factors could dramatically increase the burden on the social system or its ability to deliver. The recognition of the discrepancy between the long-term macro level impact and the short term local impact on poverty of full cost recovery presents a dilemma between institutional sustainability and efficiency with poverty reducing potential in the long term on the one hand, and designs to protect the socially vulnerable on the other hand. Although it is rational to aim for sustainable long term solutions the project need to acknowledge the consequences and include short term support to compensate poor groups.

8.7 Extending opportunities to poor groups

As shown under 5.10.2 *Poverty reduction through inclusive targeting of service users*, the project has had a positive impact on poverty in a general sense as poor groups benefited more than non poor groups from the actual improvements in living conditions, especially with regard to the hot water supply.

However, poor households have benefited less from the opportunity of cost control through metered consumption since a) the poor household lack the financial capacity to install individual hot water meters and b) GTS has not implemented heating charges according to metered consumption. As a result the poor groups could end up paying more for hot water than non poor groups as the norm is generally higher than the actual consumption.

Lesson:

The projects need to put increased focus on extending the benefits of cost control to poor groups. As an example, the project could make available small credits, leasing or hire/purchase arrangements for the installation of hot water metering equipment in the apartments. The use of heat meters for billing could have had a poverty reducing spin-off effect since it will not only serve as a efficient incentive for economic consumption, it will also promote mobilisation in the apartment blocks to improve the conditions in the common spaces where a great deal of energy is lost. With limited means the project could extend the kind of opportunities to poor groups and promote empowerment.

Table 1. Sida decisions

Sida Decision Date	Sida Decision No	Assignment/Project Scope	Budget MSEK	Disbursed MSEK	Sida, Team Leader	Bene-ficiary	Swedish Partners	IFI
19971218	Öst 401/97	Feasibility Study	2 500 000	2 499 255	UB	Gatchina Teplovyte Seti	ÅF Inter-national AB	WB
19980623	Öst 275/98	Demonstration project and consultancy assignment	1 490 000	1 489 299	UB	Gatchina Teplovyte Seti	ÅF Inter-national AB	WB
19990406	Öst 175/99	Amendment to Feasibility Study o	76 000	75 829	UB	Gatchina Teplovyte Seti	ÅF Inter-national AB	WB
20000412	Öst 176/00	Project monitoring	800 000	787 188	UB	Gatchina Teplovyte Seti	AIEKA Björn Andersson	WB
20001215	Öst 603/00	Project monitoring	Included in above		UB	Gatchina Teplovyte Seti	AIEKA Björn Andersson	WB
20000502	Öst 207/00	Support to Project Implementation Unit	1 000 000	1 000 000	UB	Gatchina Teplovyte Seti	ÅF Inter-national AB	WB
20000717	Öst 304/00	Investment Support for DH system rehabilitation	8 000 000	7 955 647	UB	Gatchina Teplovyte Seti	PowerPipe and Armatur-johnsson	WB
20000818	Öst 364/00	Support to Corporate Development	6 000 000	5 990 000	UB	Gatchina Teplovyte Seti	Bohlin& Strömberg	WB
20003011	Öst 162/03	Amendment to Corporate Development Support	300 000	77 203	JJ	Gatchina Teplovyte Seti	Bohlin& Strömberg	WB
20030325	Öst 163/03	Project Monitoring amendment to ongoing	95 882	26 734	JJ	Project monitoring	AIEKA Björn Andersson	WB
		Administration of First Baltic Billion Fund		Included			Internal decision	WB

Table 2. Persons contacted during the evaluation

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Appendix 5 Riga District Heating Rehabilitation Project

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1 Evaluators Overall Assessments and Rating

Riga District Heating Rehabilitation Project		Evaluation Criteria						Sida ¹⁾ Intervention
		Project Overall Assessment					Comments	
		Relevance	Effectiveness	Efficiency	Sustainability	Impact		
Main Objectives/Expected Results	Institutional autonomy and reforms	H	H	H	H	H	Institutionally, the City reformed the DH system's organisation, management and finances prior to the Project in dialogue with the WB and Sida. Enduring Sida support followed for preparations, demo investments and designs, adapting to the changing conditions with updates as the preparations got protracted with uncertain privatisation of the national power company. This response supported autonomy.	A
	Technical Standard and least cost	H	H	A	H	H	The preparations and designs kept a good focus on systems and least-cost. RS now builds its own CHP plant along one of the main recommended alternatives. The Project demonstrates good DH rehabilitation to other DH utilities in the region. It offers a good example of adapted systems and financing to changed economic transition conditions.	H
	Financial and economic self-sustainability	H	H	A	H	H	The Project returns are good from the saved energy. Despite the lowest comparable tariffs in Latvia, RS generates internal cash for a continued investments and is an attractive borrower to the local banks. The Company provides dependable DH services at affordable rates.	H
	Energy Conservation	H	H	A	H	H	Substantial savings in line with the Project estimates for gas as the main fuel and by the gains in combined heat and power (CHP) generation. Metered billings introduced to encourage savings.	A
	Environmental Protection	H	H	A	H	H	The set targets will be met cutting CO2 in particular. RS has yet to introduce full environmental monitoring and to foster internal and client awareness more vigorously.	A
	Poverty reduction	H	N/A	N/A	A	A	Socio-economic aims stated only generally. The Project eliminates needs for general tariff subsidies facilitating directed Municipal welfare to poor households only.	N/A
	Gender equality	N/A	N/A	N/A	N/A	N/A	Gender influence not in objectives/designs. Improved service for heat and hot water may benefit women more in some households.	N/A
Overall Rating	Highly Successful						Highly Successful	

Standard of Achievement

H = High

N/A = Not applicable

1) – Projectory Studies

A = Acceptable

– Demonstration Investments

L = Low

– Design & Supervision Support

N = Negative

2 Background, Project Context

2.1 Client and Project History

Based on the experience from the prior co-operation with the World Bank (WB) to help rehabilitate district heating (DH) systems in Estonia, Sida began in 1996 to pursue support to refurbishment of the DH system in Riga, the Capital of Latvia and with a population of 808 000. Co-financing from the WB and from Sweden's First Baltic Billion Fund (FBBF) was envisaged.

The initiative was timely in that Riga had finalised institutional restructuring of its DH services. A new company to operate the DH networks and heat generation units had been created, Rigas Siltums ("the Company", or "RS"). The Company had a "clean" balance with reduced old debt and revalued assets, forming a good basis to secure funds for rehabilitation investments. A new young management team had also been hired. The World Bank began preparation of a loan and Sida received a Latvian Government request in August 1997 to fund a feasibility study.

2.2 Interventions by Sida

The Feasibility Study began in the fall of 1997 with Swedish grant funding administered by Sida. The Swedish DH consultancy "Fjärrvärmebyrå AB" (FVB) was selected with Sida's normal bidding procedures to perform the Study.

It was assumed initially that Latvenergo, the national Latvian energy company, would be privatised in 1998. As this did not take place as expected, the Feasibility Study was considerably delayed. As a result, three Sida-funded updates were made to the Feasibility study in 1998–1999, funded by Sida and with VBB as executor. A Sida grant-funded project to demonstrate the gains with new substations in buildings was implemented in parallel (Sida decision 327/97). The sum of Swedish grants in 1997–2000 to the Project was SEK 11,524 million, as shown in Table 1 below.

3 Relevance and Rationale

The FVB consultants reiterated the main objectives of the feasibility study as follows:

- To extend the life, increase the efficiency, enhance conservation, and improve the reliability and service levels in the DH system of Riga through rehabilitation and introduction of modern technologies and materials; and
- To promote sound cost recovery policies and practices, support the commercialisation and development the heating company for its eventual privatisation, and support project implementation.

As regards the Demonstration Project, its purpose was to show the energy saving potential well as operating and client advantages with introduction of modern sub-stations in the served buildings to replace the old four pipe system substations.

The Evaluators conclude that the Project rationale was fully in line with the Swedish strategies for the FBBF as well as those for Sida's collaboration with Eastern transition countries. In this respect the

Project had the same economic, institutional and environmental rationale as Jelgava, the first Sida-supported DH project in Latvia (see Jelgava Project Report).

The Feasibility Study comprised one technical and one financial/economic and institutional part. The technical part looked to the current status and need for improvements of the DH systems. It proposed priority investments and longer-term requirements over 10–15 years. The financial/economic and institutional part examined the present structure, management practices and financial performance and economic aspects as well as future development of the DH Company.

A first phase or the priority investment programme was identified with proposed financing with loans from the WB and with a Swedish FBBF guarantee towards investments in the range of USD 139 million. In addition, the proposals included consultancy services for identification, procurement and implementation of a demonstration project funded by Sida grants.

4 Effectiveness

4.1 Preparations and Design

The amendments to the Feasibility Study in 1998 and 1999 aimed at updating technical and economic information to reflect the delay of the implementation start. The tasks of the consultants included to analyse institutional aspects, the expected impact of different privatisation alternatives, as well as various financing possibilities. In a systems and least-cost perspective the analyses would look to the future viability of operating with heat supply from both Latvenergo's CHP plants as well as integration of the main DH systems on each side of Dauga river.

4.2 Least Cost

The Feasibility Study of 2000 concluded that continued DH services would be the least-cost solution. Significant network and distribution improvements could contain heat losses with low repayment periods. In this way, the DH operation would be better adjusted to future competition with other means of heating. An integration of the two main networks on each side of Dauga River would be feasible if a long term supply agreement could be established with Latvenergo for increased supplies from its CHP units. Failing such an agreement the Study proposed a new CHP plant for the left bank system owned by RS.

4.3 Project Components and Phasing

The Project essentially comprised:

- i) Installation of automated consumer substations for all buildings.
- ii) Replacement of corroded DH pipe sections.,
- iii) Construction of a pipeline interconnection of the right and left bank systems.
- iv) Various investments in boilers on the left bank, such as water treatment and control.
- v) Elimination of a number of small coal and mazut-fired boiler houses.

Item iii) rested with a long-term supply agreement with Latvenergo that would involve a reasonable split between it and RS of the cogeneration benefits from this rehabilitation component. Such an agreement was never reached, however. RS therefore selected alternative 2 in the Feasibility study, i.e. build their own CHP on the left bank.

4.4 Contracting

Although the World Bank and Sida financing was never utilized, the Company choose to implement the project according to Alternative 2, with full application of the WB guidelines for competitive procurement. As further commented in Sections 3.5 and 4.6, costs for the main components implemented to date turned out generally lower than the Feasibility Study estimates with good performance of the contractors. The major remaining component is the new CHP plant on the left bank. For this part RS has recently signed a contract with Swiss Sulzers AG for a 47 MWe and 40 MWheat gas and steam turbine CHP for the sum of USD 45 M, or well within the original estimates for this component.

5 Efficiency

5.1 The Feasibility Study and Appraisal Stages

The Project became generally well-designed. The Evaluators consider that the Feasibility Study and its updates were comprehensive in the systems analysis, in the staging of the main investment components as well as in the financial and institutional parts. The economic analysis, however, was of similar standard as in most Swedish technical consultants' reports of the time, i.e. merely a partial adjustment for taxes etc. to the financial analyses. The Evaluators interviewed the WB appraisal leader from the time who expressed a similar assessment, while pointing to the good technical standards and communications between the consultants, RS and the WB. Moreover, Sida took a flexible attitude to changing conditions during the outdrawn preparations as the privatization of Latvenergo remained uncertain. The several Sida-funded add-on assignments to the first Feasibility Study could in this way present feasible system design alternatives to further integration with the Latvenergo CHP plants. Moreover, the DH Company was able to adapt its financing and implementation plans when commercial bank financing alternatives finally emerged. That this would occur and replace the planned Swedish and WB funding was counter to reasonable expectations by a fairly late stage of the preparations, as elaborated in Section 5.3.

5.2 Sida-funded Design and Implementation Support

Design and implementation support to the Sida-funded demo substations: RS management confirmed to the Evaluators that the sub-station design and implementation support by FVB was of high caliber. It was notable, however, that the unit cost became high and the specifications not very sophisticated. This remains the impression of RS management for the first half a dozen sub-stations that were delivered under the grant-funded demonstration project. The Evaluators' view is, however, that the subsequent deliveries to the Project not financed by the grant had lower unit costs and higher specifications, firstly because of the much higher numbers of units procured, and secondly as instructions for the first demo units were explicitly to limit the specifications to basic and well proven technology. Especially the volume factor appears important, when comparing the initial and later substation deliv-

eries. Management confirmed that the first round of substations under the grant clearly fulfilled their demonstration aims. The enhanced awareness of the merits was reflected in the numerous following substation installations by RS as part of the project.

Design support to the main Project: As in the case of the Feasibility Study and its updates, the Evaluators consider that the design work under the Sida grant was of good quality. This assessment was confirmed by the interviewed task manager who oversaw the WB appraisal. In addition, the FVB design team appears to have maintained good and efficient client contact throughout. RS management has in fact been following the recommendations in all key respects, from technical specifications to procurement strategy. In this respect, the preparatory support from Sida, reinforced by the WB appraisal consultations, became a key factor in the Project's implementation success to date. The Company itself performs project management, while it follows all the proposed key steps and designs. A strong management team in RS pursues this line regardless of the fact that debt funding now comes from local banks and not externally from Sida and the WB supplemented by the Nordic Investment Bank, NIB, as planned.

A review with the Company management could confirm that the procurement and installation of the technical equipment has progressed well without any material delays or cost overruns. The Company is currently implementing the few remaining network and production plant rehabilitation investments largely along alternative 2 of the Feasibility Study. The Evaluators conclude that there are good prospects that the Project will be implemented largely as planned cost and time-wise, if adjusting for an approximate 12 months' delayed start. Looking to the contract for the CHP plant as the only significant component that remains to complete, the Evaluators conclude that the prospects are good for completing the Project well within the overall cost estimates of the Feasibility Study.

The Evaluators conclude that the overall effectiveness of the Swedish preparation and implementation support was good. A key success factor was insightful owners of a good DH company as client able to communicate effectively with competent technical consultants. The City of RS had ensured that dedicated and capable management was brought to the DH Company that also had been financially restructured. Another success factor was Sida's flexible approach to changing conditions during the outdrawn preparations. The CEO of RS shared this view and also underlined the good performance of the Swedish consultants at all stages: the existence of a strong and updated Feasibility Study had clearly facilitated both the financing and implementation of the Project in an optimal way for the Company.

5.3 Monitoring

No external monitoring arrangements were put in place as the project has been completely managed by the Company itself. If international financing had been selected by RS, a PIU with assistance from Swedish experts would have been a normal element of the Swedish intervention. The Evaluators conclude, however, if the kind of assistance to a client with as good internal management capacity as RS would have helped the project reach better and quicker results. The main difference would probably have concerned the reporting requirements. International financing, including from the WB, generally requires more elaborate reporting than in cases where well consolidated borrowers with a good cash-flow borrow from commercial banks.

5.4 Conclusion

A combination of a competent client utility company on a good financial footing with good management and governance arrangements under a strong municipal owner, an enduring Swedish grant-provider for the outdrawn preparations, as well as experienced Swedish technical consultants contributed

to a successful resolution of the various early obstacles to implement the Project. The inclusion of demonstration projects helped timely client insight into the advantages with modern substations in the distribution system. All these factors contributed to rehabilitation of the Riga DH system with clear technical, economic and environmental gains. That the first envisaged Swedish and WB debt funding to the Project never materialised was largely due to the good reform pace in the Latvian economy, as elaborated in Section 4.6.

6 Sustainable Achievement of the Objectives

6.1 Actual Achievements vs. Plans

The key development objectives of the Project were to optimise operational performance, increase efficiency, improve reliability, enhance energy conservation and improve environmental conditions. This would be achieved through network rehabilitation, substation modernization and introduction of new technologies, while promoting sound pricing policies and commercial practises to allow for the competitive development of the Company.

The Project emerges as successful in meeting all its key objectives. Some have been discussed above, and other fulfilment is elaborated in the following sections.

6.2 Institutional, incl Governance, Management Autonomy, Ownership

The Latvian Government followed the international debate on governance, control and regulatory problems in the energy sector in the wake of scandals like the Enron case. Interviews with the Ministry of Environment, the City administration and RS management indicated that the Government gradually became less eager to pursue DH privatisation. Nevertheless, the Company currently operates with basically commercial arrangements, including autonomous management and result-based incentives. The Riga municipality retains its statutory regulatory role for control of tariffs and DH services. Still, the Company's reporting to a Board named by the City as owner has replaced the legacy of more direct municipal intervention into the operations. This arrangement for enhanced autonomy and efficiency was further helped, as all Latvian municipal utility companies now fall under the same corporate law as private enterprises.

The Evaluators could confirm good progress in other areas as

- Significant advances in transparent audited statutory accounts, annual reporting as well as supplementary accounts according to IAS standards.
- Clearly advanced financial planning, cost accounting and use of financial information as a management tool.
- Evident striving to improve on customer orientation with measures as the introduction of a public hotline for questions and complaints.
- The IT-strategy helps the management to better supervise and control operations.

The Company still has some way to go in terms of benchmarking and monitoring of its service quality in line with best-practice among municipal utility companies in the EU. Apart from the public hotline,

the Company has not yet introduced full accountability in the said respects. As a natural monopoly or “near-monopoly” RS should look to best practice in the sector in terms of setting and publicly reporting on achieved service standards against good industry benchmarks.

6.3 Technical Achievements and Service Quality Improvements

Interviews and Company reports ranging from production to customer feed-back confirm other improvements than fuel savings in the following key areas:

Gains with change from constant to variable flow and substation installations:

- The heat distribution is now more even, customers close to heat generation plants no longer experience over-heating, while peripheral buildings on the network now get steady heat supply.
- The substations and the shift from open to closed systems have facilitated continuous hot water supply, including during the summer months, at lower total cost to the clients.
- The hot water quality has generally been improved.
- User savings incentives: Households can now affect their heating and hot water cost, as most billings are based on meter readings in the buildings as opposed to the prior standard per m² cost.

Improved IT systems have increased efficiency in production, distribution and administration, including for billings.

Finally, RS maintains among the lowest tariffs among DH companies in Latvia, although its tariffs are based on cost and enable sustainable operations with significant self-financed investments. (By comparison, the Daugavpils DH Company had equally low tariffs in 2004, while these are clearly unsustainable and well below cost, see Daugavpils Project Report.)

Despite the above merits, the Evaluators found that RS still has some way to go towards best practice standards in some fields for DH utilities. This concerns in particular benchmarking and monitoring of its service quality, as further discussed in Section 4.5 below

6.4 Financial Performance

Without revisiting all the original assumptions, the Evaluators still conclude that the Project will yield a good financial rate of return. Despite modest tariff increases in the later years (and even a slight reduction in 2004/05), the project may still yield a higher return than the WB appraisal’s 11 per cent FIRR estimate (it was significantly higher in the Feasibility Study’s more optimistic assumptions): The reason for the Evaluator’s view that the FIRR may exceed the WB estimate is *firstly* that the total project investments are more likely to fall below than exceed the projected total of USD 137.6 million equivalent. *Secondly*, the Evaluators could confirm that the fuel savings are at least as good as projected. The value of the savings is much higher than projected, as prices for gas as main fuel were projected in the Feasibility Study to increase by 25 percent by 2004 in real terms, while the actual gas price index rose about 2.3 times from 1999 to 2004. *Thirdly*, the Company has continued rationalization and staff reductions to compensate the increasing local operating costs. The FIRR is, however, of less significance for a regulated public utility company than a private unregulated enterprise, while the cash-flows and sustained financial autonomy remain crucial.

The project and Company achievements in the latter respects are evident in the RS accounts: Since its start with “clean” books, the Company has developed well and has now a sound financial footing,

despite having the lowest tariffs among bigger DH providers in Latvia. At its recent financing discussions for the new CHP investments the Company found that the commercial banks are willing to lend long-term funds to it at very low margins without owner guarantees or pledges. As well consolidated borrower with stable revenues, modest profits and a substantial cash flow, the Company is now a very attractive client for the banks in the Baltic Countries. Without the Project, RS would in no way have reached this favourable position, as its rising costs for fuel in particular and declining service levels could not have supported the current tariffs and service levels.

6.5 Economic Performance

The Evaluators conclude that the economic performance of the Project exceeds its financial returns. This is principally because of the high economic value of the net energy savings at border prices. The economic value of the environmental gains is a contributory factor. These considerations are in line with the WB appraisal's estimate of a 16 per cent EIRR. By contrast, the Feasibility Study estimated a lower economic than financial rate of return of the Project, while this was based on incomplete adjustments of the financial flows.¹ The financial energy savings were calculated on actual gas prices in Latvia that still remain 20–25% below comparable European border prices. Recent price increase indications from Latvia Gas support, however, that comparable border prices should be largely applied in an economic returns calculation for a Latvian DH company that has converted in the main to gas-fired heat supplies. As a result, RS should plan for continuous tariff increases along with the adjusted local gas prices, although these may still remain below world market prices for a time for geopolitical reasons

6.6 Tariffs and Affordability

At Ls 17.9 per MWh, the tariffs of RS remain the lowest among bigger DH companies in Latvia. The reported average heating and hot water costs now account for ca 6 per cent of the average disposable household income in Riga according to official statistics. This falls below the 8 per cent average in the Feasibility Study and WB appraisal. Improved general incomes as well as the modest tariff increases following the improved efficiency of RS thanks to the Project are the main reasons for this favourable development.

A socio-economic rationale for the Project was that moving to cost-covering tariffs would release the City budget from any subsidy requirements for the DH services. This would enable a continued move towards direct subsidies to poor households as opposed to general tariff subsidies (This had been clearly understood by the City as it revamped the Company financially and made arrangements prior to the Project for its operation by independent competent management.) The Feasibility Study noted that ca 3 per cent of the households received welfare support from the City, while as many as 11 per cent would be eligible looking to the standards.

To conclude, the Project has helped sustainable operations of the Company despite modest tariff adjustments. In this way, it has helped to free the City budget from any burden for the DH services, thereby contributing to improved prospects for directed welfare support to the poorer households. The 6 per cent average cost to households for DH services is below the share before the Project and falls below the national average. It also falls well within the WB norm for the sum of municipal utility and service payments not to exceed 20 per cent of average disposable incomes.

¹ The lower EIRR than FIRR in the Feasibility study could be explained mainly by applying world market opportunity cost to gas fuel as opposed to the lower local prices. However, this logic should be equally applied to the cost of fuel and the tariffs in an economic assessment. Without adjusting the two sides in tandem for the aforementioned opportunity cost factor one would underestimate the economic value of the heat and hot water output.

6.7 Energy Savings and Efficiency

One of the key objectives was to improve energy efficiency and enhance energy conservation. These objectives have become more valid as fuel prices have risen faster than projected in the Feasibility Study. New automated substations and metered consumption and billings in almost all buildings to date in the Riga DH system has enabled the highest energy savings. The combined effect of improved regulation and control made possible with the introduction of variable flow, and to a lesser extent consumer's ability to influence savings, have reduced the heat consumption by approximately 800 GWh/year, or by ca 100,000 tonnes/year in oil equivalents.

Secondly, by improving the distribution, network losses were reduced by 45,000 oil equivalents annually (from 1,000 GWh to 640 GWh p.a). A third savings element was through improved gas boilers and replacement of some inefficient small coal boilers. This yielded annual fuel consumption savings of ca 10,000 oil equivalents (or 125 GWh by boiler efficiency improvements from 139 kg/MWh in 1997/98 to 132 kg/MWh, 2002/03 currently).

The three above savings components add to direct annual savings by the Project of 155 tonnes in oil equivalents (1,285GWh), exceeding the comparable Feasibility study projection of savings at just under 1,000 GWh.

When the new CHP as the final part of the Project is implemented in 2006, it will bring additional efficiency gains seen in a regional Baltic context. This follows as the new electricity production will replace other less efficient and environmentally friendly production (e.g. shale oil based from Narva). In the Feasibility Study, the oil equivalent fuel savings on this wider count were estimated at ca 250,000 tonnes/year, which the Evaluators confirm as a reasonable estimate.

In all, the Project will thus help annual overall fuel savings in the order of 400,000 oil equivalents. This may be concluded in a with and without project perspective, as the DH Company's heat deliveries are likely to remain fairly stable in the coming years.

7 Impacts

7.1 Environmental Impact and Awareness

With natural gas as the dominant fuel throughout, the main environmental benefit from the direct fuel savings by the project (155,000 tons p.a. in oil equivalents) are reduced CO₂ emissions from reduced gas consumption. In a with-and-without project perspective, the Evaluators estimate the reduction at ca 450,000 tonnes CO₂ annually. The CHP effect will add another 750,000 tonnes of cut CO₂ emissions as more efficient and "cleaner" power from the CHP plant can replace existing generation in the region. These direct and indirect CO₂ savings are in line with the Feasibility Estimate of ca 420,000 plus 780,000 tonnes. The main additional direct benefit comes from closed inefficient coal-fired boilers in the DH system. This has cut the direct SO₂ emissions from 134 tonnes/year to only 6 tonnes/year and dust from 126 tonnes/year down to 8 tonnes/year.

Consumption				
Appraisal:	Before	After	Savings	Savings according to Evaluation 2004
Kton/year				
CO2	2,700	1,500	420+780	450+750
SO2	11,6	5,4	6,2	Magnitude direct + indirect savings confirmed
NOx	6.1	5,0	1,1	" –
Dust	0,8	0,1	0.7	" –

As for SO₂, NO_x and dust, the projected reductions are mostly indirect. The Evaluators found quite low direct emissions of these substances in the current RS Reports. Their indirect reductions stem in the main, however, from more efficient and cleaner power generation from the new CHP. This power would replace the least efficient and most polluting power plants in the region. The appraisal projections looked to this effect in the light of the Baltic Ring Study of the surrounding power systems. Against this background the Evaluators could conclude that the indirect emission reductions of SO₂, NO_x and dust will be largely as projected when the new CHP comes on stream. This is looking to the amount of CHP power from the new RS plant and the remaining precarious state of the Power systems in the region from an environmental viewpoint.

A second consideration is environmental monitoring capacity and standards RS. The Evaluators found that the Company does not as yet have a designated environmental department. Moreover, the environmental monitoring of the Company now includes CO emissions, but will only add CO₂ as from 2005. As major enterprise in the energy sector, RS needs to enhance its environmental monitoring, even if gas as its main fuel is relatively clean and the coal fired smaller boiler plants are being phased out. Finally, the Company might introduce more environmentally oriented information into its promotional and marketing activities than evident to date.

7.2 Social Impact, Poverty Reduction and Gender Equality Aspects

The Project was not designed per se for poverty reduction or with gender oriented objectives. The Feasibility Study did look to the need for a change from generally subsidized utility tariffs towards directed subsidies to low income earners. Substituting directed support for general subsidies via utility tariffs would be socially desirable, as general tariff subsidies benefit medium and high income earners more (they consume more heat and hot water) than poorer households.. Currently, ca 4 percent of the Riga population qualify for social support (paid out mainly as part payments of housing rent and utility bills) according to the City administration. The longer-term aim is, however, to move towards welfare contributions in cash to the households.

In conclusion, the continuous move from generally subsidized DH tariffs towards directed social support to the poorer household has a positive social impact, while there are still imperfections in the direct social support systems. On a more marginal note, installation of the two-pipes system has reduced the risks of discoloured washings with the enhanced hot water quality. This improvement has benefited households in the lower income brackets that could not afford to install hot water heaters in their own flats, and also women who generally do most of the washing.

7.3 Wider Demonstration and Replication for Improved Sustainable DH Services

Other DH utilities, as for instance those in Jelgava and Ventspils in Latvia benefited from demonstration by the Riga Project, and it now seems to impact also the Russian and Ukrainian scene as DH representatives from Murmansk and Kiev have visited the Company several times to study its rehabilitation measures and share experience about procurement methods and supplier performance.

8 Major Issues, Lessons and Recommendations

8.1 Financial Pre-Project Restructuring of the Company and Management Renewal as Key Success Factors

The Riga experience shows that the Project benefited in a crucial way from the institutional and financial reforms prior to the technical rehabilitation project. These early reforms were brought by the City upon dialogue between the vice Mayor, also a leading national energy expert, and the WB representative. The City moved on to join an array of DH entities into one company by 1997, and also ensured that it got good management and a sound financial footing. This made for a good start of the rehabilitation preparations and successful ensuing investments.

Lessons:

Pioneering utility rehabilitation should select the most reform-oriented municipal owners.

The successful Riga DH rehabilitation project shows that a utility company that has been put on sound financial and managerial footing initially has the best prospects to demonstrate the benefits with concurrent technical and institutional rehabilitation.

Screening of utility projects in intermediate or early economic transition environments.

Any considered Sida intervention in a municipal utility such as district heating or water services should begin with a deep assessment of the municipal owners' reform-orientation. Such owner-assessment should be performed by independent expertise with a good insight into the local political and institutional prospects for projects with a good reform-demonstration potential. The assessment should weigh the prospects that the municipal owner sees the need and is capable to pursue deep reform (of organisation, management, incentives, autonomy, tariffs etc.). Moreover, the experts for owner-reviews should be truly independent. They should have no conflict of interest in terms of being potential parties in any following preparatory studies or implementation support to an investment.

8.2 Swedish and WB financing replaced at a late stage by commercial bank loans

The Evaluators studied how the project preparations and financing discussions evolved. The following events and factors help to explain why the Company finally abstained from WB and Swedish financing for the Project, opting instead to combine its internally generated cash with commercial bank loans:

- i) The proposed external Swedish and WB financing and a supplementary NIB credit remained a key assumption up to a quite late stage. Still, significant changes in the Latvian economy finally caught up with the protracted preparations.

- ii) In addition, Management of RS was able to read and finally adapt to the aforementioned changes in Latvia's transition economy.
- iii) The Latvian economy gradually stabilized after 2000. This followed the prior years' set-back after the Rouble crisis of 1998. During these years no other term loans were offered to Latvian borrowers other than from international development financiers.
- iv) In the early 2000's, the banks in Latvia and the Baltics were increasingly bought by Nordic banks as strategic investors. The new ownership and improving economy strengthened the local banks' position, and they gradually offered bigger roll-over and term loans, striving to gain market share. Some of the stronger borrowers in the municipal sphere came into their focus.
- v) The national gas company continued until late to lobby for direct gas heating as an alternative to DH supplies and was supported by Gazprom och Ruhrgas as its influential part-owners. The Evaluators heard anecdotal evidence from well placed observers at the time that the gas company claimed that a Government guarantee for foreign loans to RS should distort sound competition; it seems in fact that the gas company realized only quite recently that it would sell relatively more gas to DH companies compared to direct deliveries to clients changing to individual gas boilers. Lacking capacity of the local gas distribution pipes was another constraining factor that finally changed the strategy of the gas company to a clearly positive DH approach.
- vi) As the project preparations progressed, the Latvian Government stuck to a policy of financial prudence, moderating its foreign borrowings and guarantees for external loans, being backed in this approach by the IMF.
- viii) A first sign of the changing situation was that the Company reported during the WB negotiations in May 2000 that an envisaged supplementary loan from NIB would not be required. This part of the funding could be replaced by local bank loans in local currency, reducing the currency risk.
- ix) A letter from the Ministry of Finance announces in January 2001 that the Government is hesitant to offer a guarantee for the proposed foreign loans to RS due to a range of noted risks. The Evaluators conclude, however, that this message may have been influenced by signals from the Company. According to the CEO of RS, his Chief Accountant had at this point finally persuaded management to opt for local funding.
- x) More specifically the Chief Accountant had concluded that the Company's annual depreciations added a cash flow of ca USD 11 mill equivalent that would suffice for the Project investments, if combined with local bank borrowings at quite favourable terms. If adding the guarantee fee, the offered cost would not exceed that of the foreign borrowings, and the Company with all its earnings in local currency would have the additional material advantage of not being exposed to the foreign exchange risk.

Looking to the current situation where the Company is offered additional local bank financing at quite favourable terms for the CHP unit as the last stage of the Project, the Evaluators conclude that the Chief Accountant had good reasons for her recommendations at the time. Nevertheless, the timely implementation of the Project could still have been in jeopardy with the abstained WB and Swedish foreign funding, if the yet unstable Latvian economy might have taken a negative turn instead of its recent growth.

Lessons:

Protracted project preparations in transition economies may see falling “additionality”.

Providers of development loans should realize that their financing may lose “additionality” and alternative market financing be preferred by the clients and justified, if the project preparations become protracted. This applies in particular to fast-reforming and stabilizing transition economies that may see gradually improved offerings from local financial markets. The chances increase that some clients may ultimately prefer such alternative offerings if the client has all revenues in local currency.

Municipal utility corporates are capital intensive with potentially good credit capacity.

Well managed and regulated enterprises in the municipal utility sphere as water and district heating companies are capital intensive operations with good prospects for generating significant steady cash flows. As such they are attractive borrowers to commercial banks, if the regulatory risk is seen as moderate. For these reasons, preparation and negotiation of development finance to the kind of municipal enterprises in reasonably advanced developing or transition economies should consider the extent to which the foreign funding could be supplemented or even replaced by internal cash flows and borrowing from local financial markets

8.3 The Least Cost Alternatives in the Preparatory Studies

The recommended least cost Alternative 3 by FVB with interconnection of the left bank to the rehabilitated Latvenergo CHP, (TEC II) could not be implemented. The reason was that no long term supply agreement could be reached with Latvenergo. Instead alternative 2 will be implemented, with no interconnection of the left bank to TECII. RS is instead investing in a new CHP plant of its own on the left side of the river. This Alternative 2 became the best financial option for RS, as Latvenergo was unwilling to share the significant CHP gains in a beneficial way to RS. From a macro-economic viewpoint, the Evaluators conclude that Alternative 2 might be seen as marginally inferior to Alternative 3. The latter would, however, add some risks to the system. A single cross-river connection of the network to the left of the river to that on the right side would have made the former part more sensitive to disruptions. Adding a risk-premium for this factor would render a more equal overall outcome of Alternatives 2 and 3. From a financial viewpoint, Alternative 3 would have turned out inferior to RS failing an agreement with Latvenergo, and a final CHP solution may well have been delayed.

Lesson

Least Cost and Institutional or Political Constraints: Economic and technical least cost can differ from financial least cost to an investing client utility company due to various institutional and/or political or administrative constraints. For example, it may prove difficult for a DH company to negotiate with an outside owner of a CHP plant mutually beneficial sharing of the returns from rehabilitation and expansion of such a plant to supply more energy to the DH system. As a result, marginally sub-optimal alternatives can still be justified. A DH company may for example opt to build its own CHP and other heat production capacity, if satisfactory supply agreements cannot be reached timely with external owners of plants that might otherwise have had slightly better efficiency prospects from an overall systems viewpoint.

8.4 Staged Project Preparation and Design under Unstable Transition Conditions

The Evaluators noted that Sida’s flexibility and willingness to fund updates of the first Feasibility Study was a success factor for the Project. The Sida grants towards the various preparations were in the order

of SEK 10 million or just over USD 1 million at then prevailing exchange rates. This remains a modest sum compared to the Project's current assessed total in the range of SEK 125 million equivalent (vs. the Feasibility estimate of SEK 139 million).

Lesson:

Staged project preparations under unstable economic transition:

It may be justified to stage preparation support to some projects under unstable transition conditions. This may equally apply when wider institutional arrangements that significantly affect the project, including privatisation options, may not be resolved timely for political reasons.

Table 1. Sida decisions

Sida Decision Date	Sida Decision No	Assignment/Project Scope	Budget MSEK	Disbursed MSEK	Sida, Team Leader	Bene-ficiary	Swedish Partners	Future Fund-ing
19971010	Öst 275/97	Feasibility Study (FS)	5 000 000	4 950 106	PH	AS Riga Siltums	FVB Fjärr-värmebyrån	Local
19971010	Öst 275/97	Consultancy assignment re: Demonstration Project	550 000	549 878	PH	AS Riga Siltums	FVB Fjärr-värmebyrån	Local
19971105	Öst 327/97	Demonstration Project	2 400 000	2 502 859	PH	AS Riga Siltums	FVB Fjärr-värmebyrån	Local
19980710	Öst 376/98	FS amendment for in depth financial and technical study	1 615 000	1 439 852	TB	AS Riga Siltums	FVB Fjärr-värmebyrån	Local
19990121	Öst 34/99	FS amendment for dissemination of study results	442 000	441 988	UB	AS Riga Siltums	FVB Fjärr-värmebyrån	Local
19990414	Öst 126/99	FS reallocation of budget and amendment	118 215	113 074	CÖ	AS Riga Siltums	FVB Fjärr-värmebyrån	Local
19971010	Öst 268/99	FS – DH III	587 875	565 075	CÖ	AS Riga Siltums	FVB Fjärr-värmebyrån	Local
19971010	Öst 21/00	FS – DH IV Bidding documents	810 767	810 767	CÖ	AS Riga Siltums	FVB Fjärr-värmebyrån	Local
	Öst 106/00	Information Procurement		50 015	CÖ	AS Riga Siltums	Ordförrådet	Local
	Öst 325/00	Administration costs		386 125	CÖ/PH	AS Riga Siltums		Local
	Öst 325/00	Technical Consultancy		203 410	CÖ/PH	Internal desicion		Local
	Öst 325/00	Juridical consultancy		246 368	CÖ/PH	Internt beslut		Local
	Öst ??	Adm Baltic Sea Fund Energy Latvia		535 036		Internt beslut		Local

Table 2. Persons contacted during the evaluation

Name	Position	Contact information		
		Phone	Email	Address
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Various Staff Rigas Siltums	Economic, Environmental and Customer Departments			

Appendix 6 Poverty Reduction and Gender Equality – Methodology and Survey Data

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1 Executive Summary

The main conclusions of the evaluation with regard to poverty reduction and gender equality are presented in *Appendix 4 Gatchina District Heating Rehabilitation Project*. Below follows the conclusions from a survey among a limited number of households in the residential areas of Aerodrome (project area) and Marienburg (reference area) in Gatchina:

- There is no heat metering for billing purposes taking place in Gatchina. The frequency of individual meters for hot water consumption among poor household is half that of non poor households. Thus, poor households are deprived the opportunity of cost control due to their low financial capacity.
- The household satisfaction with the heating services increased with the project to a level similar to the reference area. Households with insufficient heating due to geographical location seem to have benefited regardless of poverty status.
- Only one household out of 80 stated that lacking heating services had caused health problems to members of the household and thus, the health risk does not seem acute.
- The satisfaction with the hot water supply increased with the project in particular among poor groups.
- The survey showed that women do over 90% of the domestic household work. However, it could not be proved that time savings had been made on domestic work through improved municipal services.

2 Background and Methodology

2.1 Background

The support for Gatchina “Teplovye Seti” (GTS) was the only Sida intervention of those covered by the *Evaluation of District Heating Projects in Latvia and Russia* that included a Corporate Development Program (CDP). Due to Sida’s support for the institutional aspects of district heating it was decided that this project should also be evaluated with regard to poverty and gender equality. Even though the project includes no objectives related to poverty reduction and gender equality the evaluation could bring up important lessons on how to promote poverty alleviation and gender equality and mitigate negative consequences in the support to municipal heating services.

Background documentation to the decision to fund the Feasibility Study and the CDP components stipulated that the project had no particular gender impacts while it was stated that the CDP would contribute to a socially sustainable economic development by reducing the municipal budget expenditures through general subsidies and thus liberating funds for social activities. As a result, the project lacks both indicators and baseline data in these fields.

2.2 Structure

The conclusions are found in the Gatchina report, Appendix 4. This appendix covers the methodological assumptions made and presents the findings of a survey among households in Gatchina.

2.3 Approach and methodology

Poverty should be understood as the lack of income and assets, power and influence and lack of security to potential shocks from the surrounding. The assets are among others financial, savings and access to credits, human, such as good health and the capacity to work and physical in terms of access to infrastructure. The lack of power deprives the poor the capacity to influence the public institutions that affect their lives. Social and gender equality is a step in the empowerment of these groups. Eventually, poor groups are vulnerable to economic, social and health risks since they lack the assets to cushion these unavoidable insecurities.¹

The approach to poverty in the context of municipal heating and hot water services is based on the recognition that poor and non-poor as well as men and women have different needs, use and dependence on municipal service supply in general. Poverty deprives the households the ability to adapt coping strategies when the services fail both through purchasing solutions such as individual boilers and electric heaters and by claiming better services. Since municipal services has an impact on domestic work, for which women are mainly responsible, the shortcomings of these services are likely to have a great affect on women. Insufficient heating and hot water services has also effects on the general home environment and may pose health risks to the inhabitants.²

The evaluation of the achievements in poverty reduction and gender equality focuses on the households using the municipal heating and hot water services. It covers:

- The impact on poor groups of the tariff reform initiated through the project.
- Household satisfaction with the services, problems perceived and time spent on domestic work. It has aimed at creating baseline data for comparison between poor and non-poor groups.

2.4 The survey

In order to get input from users of the municipal heating and hot water services the evaluation included a brief survey among the households living in municipal housing in the area of Aerodrome, (area for demonstration and the subsequent limited investment project) and Marienburg (that is still equipped with the old 4 pipe system where warm tap water is drawn directly from the heating network). The information from Marienburg and the satisfaction with services in Aerodrome prior to the project is assumed as a baseline to evaluate the improvements in Aerodrome.

The questionnaires focused on household and flat information, satisfaction and problems with the services and attitude to the current tariffs. Due to the short time available the survey was done by staff of the Municipal Housing Company (UzhKH) at their cash centre for payment of bills and the number of interviewees was limited.

¹ Handbook on Poverty and Social Analysis, Section I, Asian Development Bank

² Gender equality study: Gender equality in energy and environment projects in a transition economy, the case of Russia, Sida ref 2002-003647, by Environmental Resources Mangement Ltd, 2004

2.4.1 Categories

Due to insufficient information about household income the population has been categorised according to the household structure. Household income has only been considered in the case the household receives low-income subsidies³. Consequently the categories used for the analysis of the material identifies groups that are likely to be poor or at risk of falling into poverty due to conditions in Russian society making them vulnerable. The Groups 1–3 have mainly been treated together when analysing the material and they are referred to as “poor”

1. Single mothers: unmarried, divorced or widowed
2. Pensioner: living alone or in couple
3. Households receiving low income subsidies
4. Other households

Women are generally more vulnerable to fall into poverty than men due to the fact that they have more difficulties finding work and generally lower salaries. Single mothers have been identified as a high-risk group due to low public transfers, such as allowances, and to cuts in public health expenditures.⁴

Pensioner is another exposed group due to eroding pensions and vulnerability to health hazards in the case of failing municipal services. Female pensioners are generally more exposed since that they are less likely than male pensioners to be entitled to state privileges.⁵ However, pensioners have here been considered as a single category due to the narrow statistical material.

Households that receive low-income subsidies but do not qualify in the above mentioned groups are treated as a separate category. Looking at the family structure they showed to be households with children.

The last category, labelled other households, consists of households with children, with pensioners but at least one member working, of several generations living together etc...

2.4.2 Issues

- The area of Marienburg was supposed to provide baseline data for analysing some of the information from Aerodrome. Considering that the inhabitants of Marienburg are more satisfied with the heating services, without project, and the tariffs while paying more since the tariff is lower in Aerodrome there might be other factors active.
- The questionnaires asked about the satisfaction prior to and after the project. The basic rating system of 1–5 (1 being very bad and 5 being very good) may have had the effect of boosting tendencies. Furthermore it is difficult to assess the accuracy of the information on how people felt about the services several years ago.
- The narrow sample of approximately 40 interviewees from each residential area is too narrow to draw firm statistical conclusions. Furthermore the characteristics of the households interviewed made it impossible to have wide enough statistical bases for analysing the gender dimension of poverty. The categories stipulated above consider gender as one of several criteria to qualify as poor or in risk of falling into poverty.

³ The household qualifies for low-income support if the costs for the municipal services (maintenance of the apartment, electricity, gas, cold/hot water, solid waste and heating) exceed 22% of the household income.

⁴ Gender equality study: Gender equality in energy and environment projects in a transition economy, the case of Russia, Annex B.

⁵ Ibid

- Since staff from UzhKH did the interviews the questions were kept basic and the number of questions was limited. This seems as a good strategy since the quality of the answers in terms of qualitative information was higher in the early interviews.

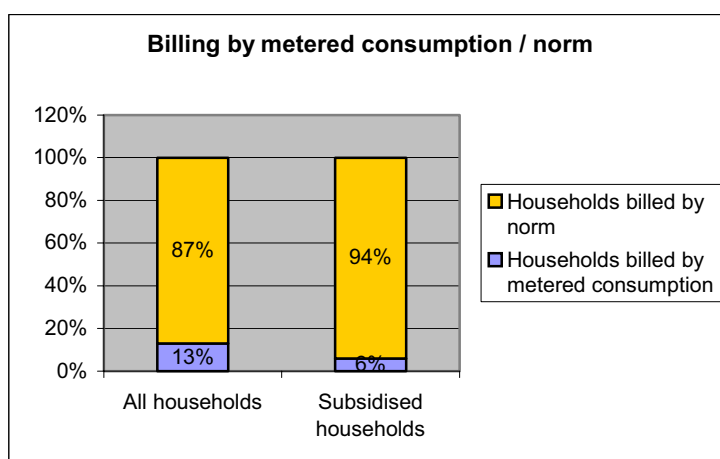
As a result of the above mentioned problems the results of the survey should be considered as indicative for the attitudes of the population.

3 Main findings of the survey

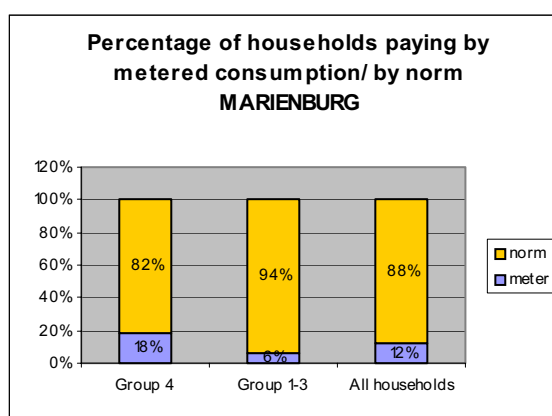
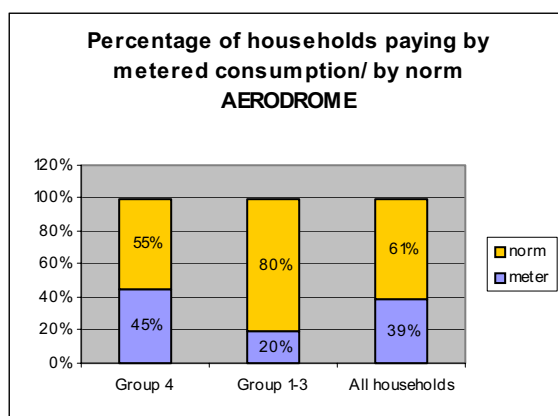
3.1 Billing according to metered consumption vs. norm

Officials from UzhKH estimate that the installation of meters and the billing according to actual consumption reduces the cost for water and hot water by approximately 30%. The installation of a hot water meter costs RUR 1000 that should be compared with the average monthly salary of RUR 4250/ person/month (Leningrad Oblast). It was also said that people are keener on installing meters for the hot water than for the cold since the hot water is more expensive.

GTS is not doing any metering of heat consumption for billing purposes.



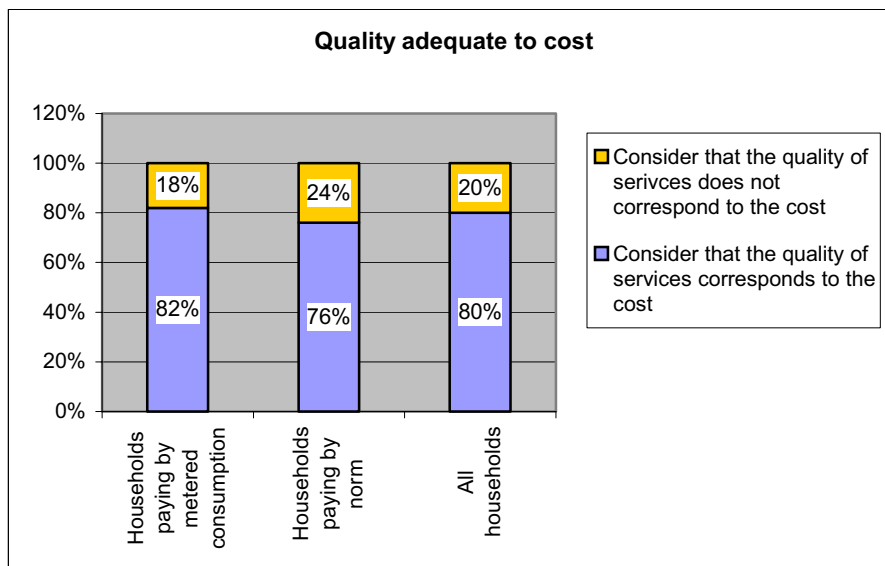
The table shows the percentage of households and of households receiving low income subsidised paying by metered consumption of hot water. While 13 % of all households pay by metered consumption the figure is only 6% for the subsidised households.⁶



⁶ The figures were provided by UzhKH

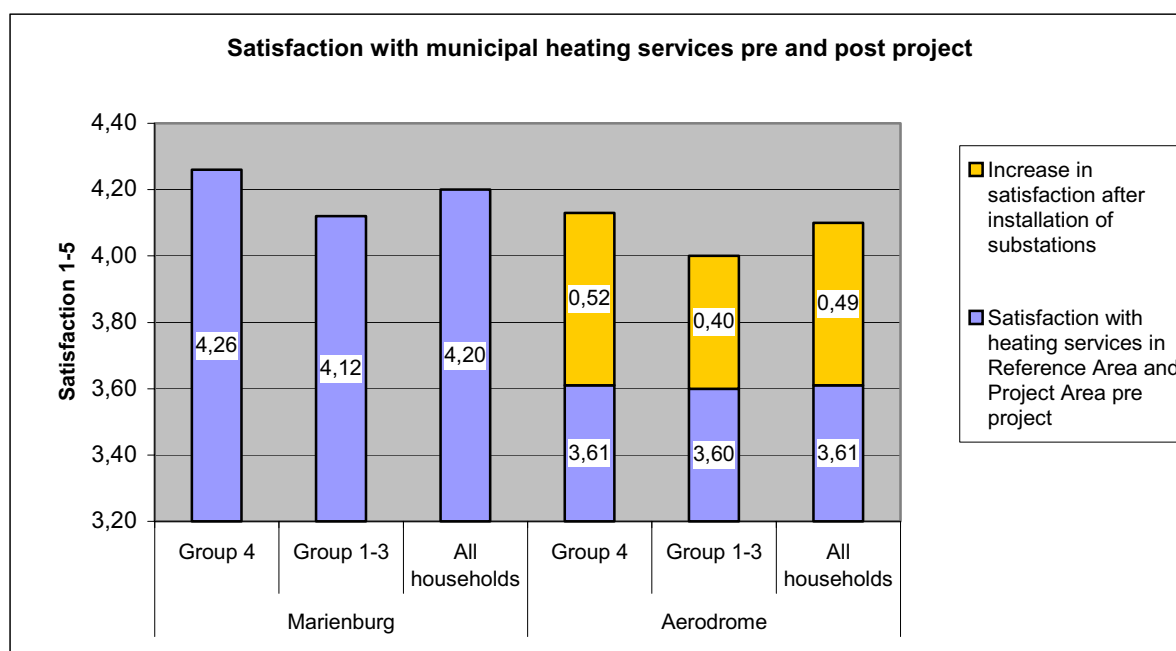
According to the vulnerable groups stipulated in this survey the relation between poor or vulnerable groups 1–3 paying by metered consumption and the overall use of meters is similar to the figures given by UzhKH. The frequency of hot water meters in the poor groups is about half that of all households. The conclusion is that poor households do not have the same financial capacity to benefit from the opportunity of cost reduction or cost control through installation of meters

3.2 Quality of services adequate to the cost

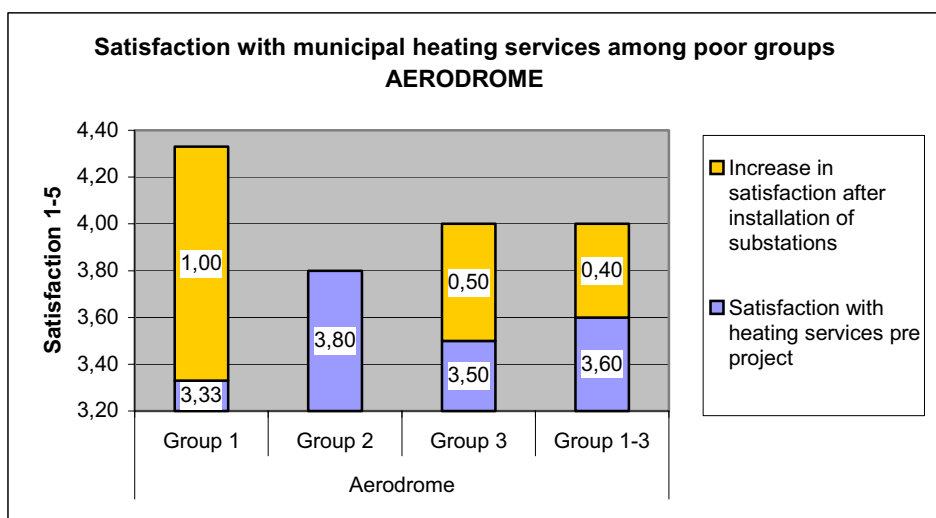


Asked whether the quality of the municipal heating and hot water services was adequate to the cost of the services a majority of the households agreed. The group paying by metered consumption, thus in average paying 30% less than the norm, to a greater extent considers the quality of the services adequate to the cost.

3.3 Satisfaction with heating services



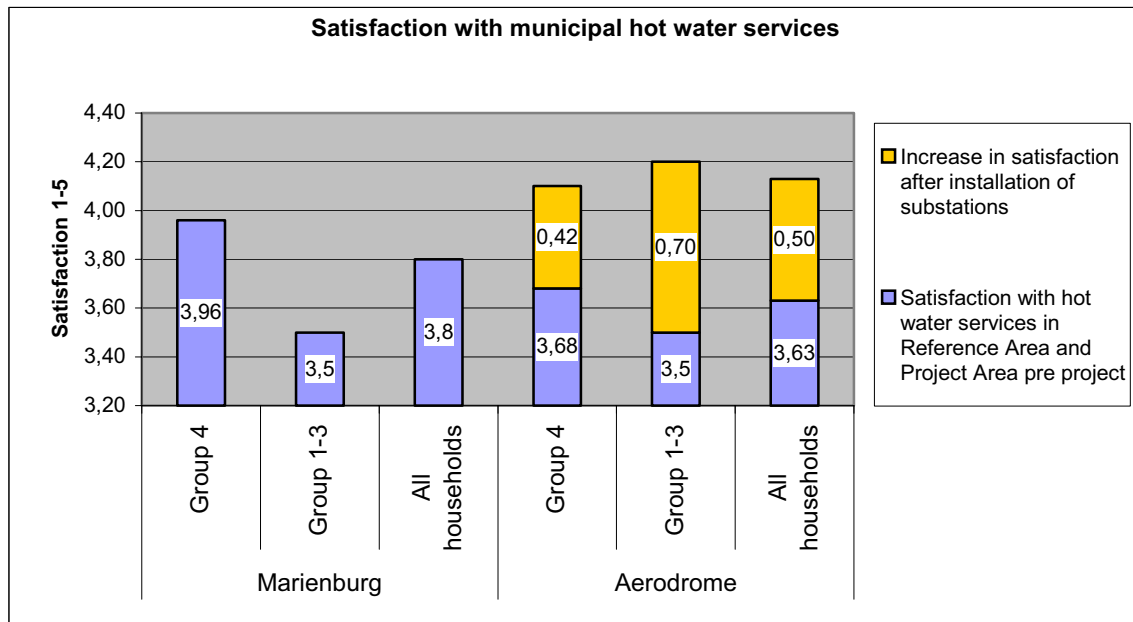
The users of the municipal heating services gave an overall good rating to the services with an average of 4,10 in the Aerodrome area (post project) and 4,20 in the Marienburg area. The project has increased the overall satisfaction in Aerodrome by 0,50. However, 30% of the respondents said that there had been no changes or improvements at all. The answers indicates that there have been changes for those who had an insufficient heating while the users with adequate heating have experienced little changes regardless of poverty status. In some few cases the changes have been perceived as negative. UzhKH gave a possible answer to the negative attitudes when explaining that some users had raised complaints over not being able to sleep with their windows open at night since GTS was no longer overheating their apartments. Furthermore, there seem to be a trend in both areas of lower satisfaction with the heating services among poor households compared to non-poor. A possible explanation could be that the poor households have a lower physical standard of apartments that cannot be entirely compensated through heating.



When comparing the subgroups of poor households it is remarkable that the group of single mothers shows the greatest increase in satisfaction while the group of pensioners shows no increase at all. According to the rationale of poor groups being more dependent on the municipal services including heating it seems logic that single mothers should appreciate the improvements. Why there is such low increase in satisfaction among pensioners is more difficult to understand. The age factor and the attitudes of different age groups in terms of memories from the past and hopes for the future offer one possible explanation to why pensioners show such low satisfaction while single mothers are more positive.

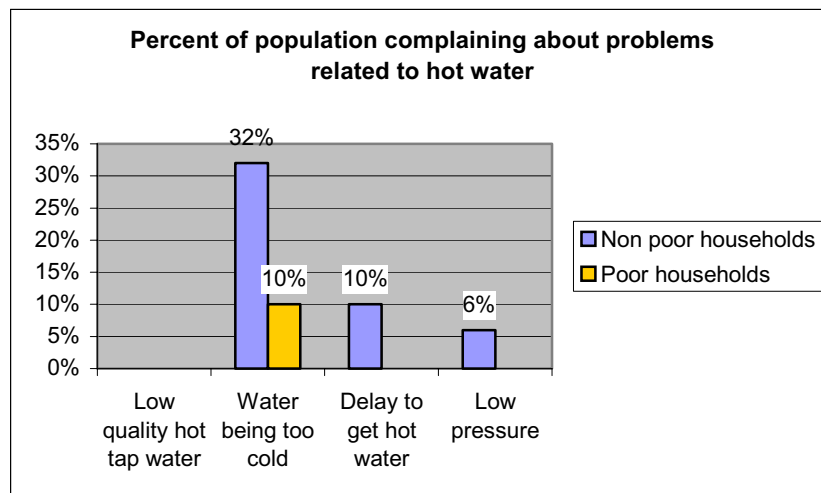
On the question of whether inadequate heating services had caused health problems to the members of the household only one (non poor) household said that this was the case while one household did not know. Furthermore 5% of the households in Aerodrome households said that the heating was inadequate (too cold). The health risks caused of poor heating thus seem limited in the case of Gatchina.

3.4 Satisfaction with hot water services

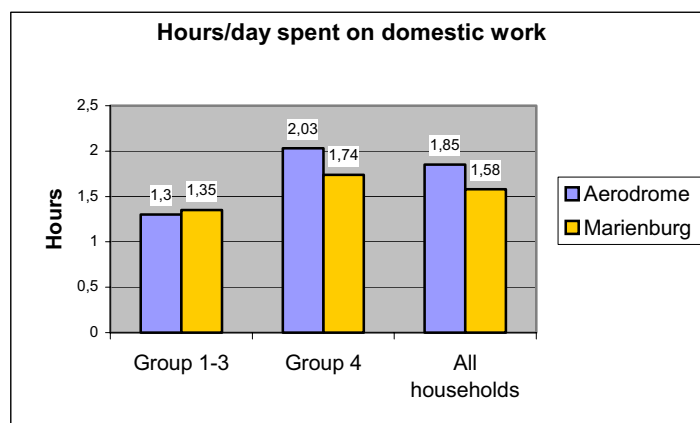


According to the survey data the satisfaction of the users regarding municipal hot water supply was similar between in area of Aerodrome and Marienburg prior to the project. The average increase in satisfaction after the project for all households in Aerodrome is 0,50.

The satisfaction of the groups of poor households has increased substantially more than for the non-poor households. Furthermore, of the poor households 60% stated, through qualitative answers, that the water was now better or cleaner. The corresponding figure for the non-poor households was 19%. Being more dependent of the municipal hot water supply the poor households have benefited to a higher degree than the non-poor households from the improved services. The dependence of the services is also reflected in the complaints about the services where non-poor households raised the issue of the tap water being too cold (32%), delays to get warm water from the tap (10%) and low pressure (6%) while poor households only complained about the water being too cold (10%).



3.5 Time spent on domestic work



In both the areas of Aerodrome and Marienburg women were responsible for the domestic work in 90% of the households. In an additional 10% of the households in Aerodrome the domestic work was shared between women and men or women and children. As shown in the table above women of the poor groups spent considerably less time on domestic work in both areas compared to the non-poor households. The difference is likely to be symptomatic for the poor households and the figures cannot confirm that the improvements in municipal services has reduced the time needed for domestic work.

Appendix 7 Evaluation Methodology

1 Methodology

1.1 Purpose and Scope of the evaluation

The purpose of this evaluation is to review and analyze the outcome of the five DH rehabilitation projects, firstly in terms of relevance to the Swedish and Sida collaboration aims in the region and secondly in terms of objectives fulfillment. The evaluation criteria concern the relevance, effectiveness, efficiency, impact and sustainability of the interventions that aimed to support successfully implemented DH rehabilitation with good demonstration merits and some other wider impact. The evaluation findings are intended to assist Sida in drawing relevant lessons for the future, and to provide interested stakeholders with an insight into the outcome of five DH-rehabilitation projects prepared from the mid- to late 90's.

Findings and recommendations from this evaluation are primarily for Sida, while Sida may decide to disseminate relevant findings to municipalities and other parties in Russian or other countries of co-operation that are considering DH rehabilitation programmes.

1.2 Aims and logic of the evaluated interventions

The common aim of the interventions was to help improve the DH systems and services, conserving energy improving the environment. The initial status was generally over-dimensioned and badly maintained DH networks with high losses and low-quality service. Clients suffered from overheated or cold apartments due to poor control and regulation. The utilities had dire finances due to low and poorly structured tariffs and poor collections. Inadequate maintenance meant further deterioration threatening sustainability. Institutionally, overstaffing was common as well as poor organizations, management and incentives. The governance arrangements still meant low autonomy from the municipal administrations. These kinds of shortcomings were addressed by the interventions. The strategy was for Sida to grant-finance preparation, design and implementation support via Swedish Consultants to develop affordable and "bankable" rehabilitation projects for finance from international financial institutions as the WB. The proposed projects looked to physical improvement and institution reform to support financial and economic sustainability. Sida worked in tandem with the WB as intended lender to four of the five projects with Archangelsk as the exception as a stand-alone emergency project without co-financing.

1.3 Evaluation methodology and criteria

The Evaluation Team points out some restricting factors, including a) Limited baseline data in all respects; b) Some objectives expressed only in more general terms including any social, economic and gender considerations; c) Limited monitoring data; d) Limitations in the Sida archives and working files in terms of evaluation requirements; e) Frequent desk officer changes over time. The Evaluators used the best of their ability and their prior sector insight in the region to overcome the constraints, seeking to assess the documents, and interviewee responses in an informed perspective.

The evaluation was conducted along the following main steps:

1. Initial data collection in the archives of Sida and by interviewing of Sida staff
2. Preparation and presentation of Inception report for comments by Sida Programme Manager
3. Second stage data collection by interviewing of representatives of central and local authorities in the country of operation and project owners. In connection to this representatives of co-financiers were contacted and interviewed.
4. Analyses of and assessment of relevance and completeness of gathered information and data.
5. Third stage of data collection. Collected data was checked and completed by email and facsimile exchange with concerned project stakeholders.
6. Analyses and assessments of findings and development of preliminary conclusions
7. Preparation of Project Reports assessing standards of achievements using the set of criteria on their opening pages.
8. Preparation of a brief Main Report based on project specific findings and assessments in the Project Reports.
9. Presentation of Draft Final Report for comments by the concerned Sida staff
10. Preparation of Final Report considering and integrating comments received by staff of Sida.
11. Presentation of Final Report

1.4 Questions

As a basis the assessments and evaluation of the interventions a number of main questions were formulated in order to focus to the main issues and aspects related to the concerned projects. These main questions are:

Regarding Relevance

Could the interventions have been differently designed to better meet the needs and priorities of the local partners and the concerned groups of the population?

Regarding Effectiveness

Have the evaluated interventions achieved the objectives of reduced emissions and energy consumption, improved services, financial and economic self reliance, institutional reforms and autonomy and gender equality?

Regarding Efficiency

Could the interventions have been designed for a more efficient implementation and are the achieved results adequate related to output and results?

Regarding Impacts

What are the overall impacts of the intervention, intended and unintended, considering specifically service levels and affordability of services for the vulnerable groups of the consumers?

How has the interventions affected to the status of the concerned DH-organisations in short and long term?

Regarding Sustainability

Has the benefits produced by the interventions be maintained until now and what are the perspective in the longer term?

1.5 Sida Organization for the interventions

The evaluated Sida interventions were organized in a similar manner, where Sida East joined up with an IFI as described above. The team leader of the IFI would coordinate the project development activities. Sida desk officers took part in the key negotiations with central and local client country authorities. Sida mostly took on to fund and arrange main preparations like Feasibility Studies. Responsibility for procurement of goods and services, consultants and contractors rested with the local client and project owner. The procurement was supported and monitored by Sida-funded consultants to ensure transparency, fairness, efficiency and compliance with governing rules and legislations. Supervision and monitoring of consultant studies was taken on by the local partner and by the IFI team leader.

1.6 Partners and Stakeholders

The local partners were the DH utility companies/organizations and their municipal owners. Other stakeholders in Russia, included the Regional Administrations (Oblast), and the Federal Ministries of Finance and of Environmental Protection. In Latvia the Ministries of Finance and Environmental Protection actively supported development of the projects. Apart from Sida-grants, those of FBBF were used for several of the projects.

The main international partner was the World Bank, and a number of local contractors were engaged in the implementation. Swedish parties include consultants for preparation and implementation support, and suppliers and contractors to deliver and install various equipment. Their selection was with competitive tendering in accordance with applicable procurement rules of the funding agency. The involvement of Swedish commercial partners in the projects was evaluated in a separate report of May 2004 by RamComp International AB.

The consumer perspective is not were clearly addressed and the poverty and gender equality aspects are in most cases left out all together. Based on above and in hindsight one can see that greater attention should have been paid to the fact that the Swedish consultants predestined (by tied funding) for a number of assignments at the time had none or little awareness of the need for comprehensive assessments related to economic and financial issues related to preparations of larger infrastructure projects

Appendix 8 List of Abbreviations

AG	Aktien Gesellschaft
AIEKA	Financial Advisor Björn Andersson
A/S	Joint Stock Company
ÅF	Ångpanneföreningen International AB
BITS	Swedish Technical Assistance Agency
BOT	Build Operate Transfer
B&S	Bohlin och Strömberg
CDP	Corporate Development Plan
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CHP	Combined Heat and Power Plant
CO ₂	Carbon Dioxide
CV	Curriculum Vitae
Dauteks	Textile Industry in Daugavpils
DH	District Heating
DS	Daugavpils Siltumtikli (Daugavpils District Heating Entity)
EBRD	European Bank for Reconstruction and Development
ECU	European Currency Unit
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
EU	The European Union
EU/Phare	Technical Assistance Programme of the European Union
EUR	The currency of twelve European Union countries
FBBF	First Baltic Billion Fund
FIM	Finnish Markka
FIRR	Financial Internal Rate of Return
FX	Foreign Exchange
FVB	Fjärrvärmebyrån AB
GmbH	Gesellschaft mit beschrenkter Haftung

GTS	Gatchina District Heating Company
HELCOM	Helsinki Commission for Baltic Sea Environmental Management
HO	Head Office
HOB	Heat Only Boiler Plant
IBRD	International Bank for Reconstruction and Development
IFC	International Finance Corporation
IFI	International Funding Institution
ISPA	EU Environmental financing facility for pre accession countries
JDHC	Jelgava District Heating Company
LVL	Latvian Lat
MIS	Management Information System
NDEP	Nordic Dimension Environmental Partnership
NEFCO	Nordic Environment Finance Corporation
NIB	Nordic Investment Bank
NUTEK	The Swedish Business Development Agency
PHRD	Policy and Human Resource Development (Japanese Fund)
PIU	Project Implementation Unit
PMU	Project Management Unit
RAH	Rotary Air Heating
RAF	Factory for manufacturing of vehicles
RKS	Russian Kommunal System
RS	Riga Siltums (Riga District Heating Company)
SEK	Swedish Krona
SIA	Limited Liability Company
Sida	Swedish International Development Cooperation Agency
TA	Technical Assistance
TOR	Terms of Reference
UzhKH	Municipal Housing Management Company
USD	United States Dollar
WB	The World Bank

Appendix 9 Terms of Reference

Terms of Reference for the Evaluation of District Heating Projects in Latvia and Russia, part II

1 Background

Sida has contributed to an environmentally sustainable development in the Baltic Sea region since the early 1990s. Efforts concern e.g. improved energy efficiency and natural resource management, reduced pollution through better wastewater treatment and solid waste handling. Sida's work is based on international and regional agreements, mainly the HELCOM Baltic Sea Joint Comprehensive Action Programme and the Baltic 21 – an Agenda 21 for sustainable development in the Baltic Sea region, NDEP – the Nordic Dimension Environmental Partnership, and EU requirements regarding environment for the candidate countries.

Sida grants are often used for co-financing with International Financing Institutions, IFI, (inter alia World Bank, European Bank for Reconstruction and Development, Nordic Investment Bank etc.), to support projects with high economic and environmental benefits which due to affordability constraints would not otherwise have been possible.

Since 1996 Sida has co-financed eight district heating projects in the Baltic States and Russia – Jelgava, Riga and Daugavpils in Latvia, Archangelsk and Gatchina in Russia, and Vilnius, Kaunas and Mazeikiai in Lithuania. The projects in Latvia and Russia are subject for evaluation. The Sida contribution has been in terms of consultancy services – feasibility studies, technical support and institutional development. The studies have involved technical, financial and institutional assessments. The technical support was connected to investment projects and concerned technical design, drafting procurement documents, monitoring and supervision. The institutional development focussed on corporate development in the district heating company.

The objective of the Sida support has been to define investment programmes aiming at efficient district heating operations, to be financed by IFIs (in these cases the World Bank). Other district heating projects are under preparation in Russia (Kaliningrad and Murmansk).

The Sida contribution totally disbursed is MSEK 37.

The stakeholders of the projects have been the district heating companies, the municipalities and inhabitants, the international financing institutions, Swedish firms and the Swedish government and Sida. Implementing organisations have been local district heating companies and Swedish firms.

The projects to be evaluated are Jelgava, Riga, Daugavpils in Latvia and Archangelsk, Gatchina in Russia. Most of the projects are finished why the timing of this evaluation is ex-post. A short overview of each project is presented in annex 1.

2 Purpose and Scope of the Evaluation

The purpose of the evaluation is to review and analyse the results of the projects in terms of goal achievement through the components financed by Sida. The evaluation will identify and analyse the effects of the Swedish contribution. A comparison between the projects with regard to input, results and experiences are also of great interest.

Some of the projects were evaluated in November 2003–March 2004 with regard to effects of the projects co-financed by the First Baltic Billion Fund, FBBF. This evaluation is a second step in evalu-

ating district heating rehabilitation projects with Sida involvement. It is of great interest to evaluate the results of earlier financed projects in order to learn for future financing of feasibility studies and investment projects. The findings and recommendations from this evaluation are also expected to be used in seminars for Russian communities preparing for district heating rehabilitation programmes. The interested party is primarily Sida.

3 The Assignment (issues to be covered in the evaluation)

The Consultant shall take into account all project components and other processes generated by the projects.

The issues referred to below shall be covered by the Consultant.

- A. The Consultant shall give an overview of the projects (the phases of preparations, implementation, completion) and the role of Swedish assistance. The basis for decisions, co-operation with recipient countries and co-financiers during project preparations and implementation shall be discussed.
- B. The results and effects of the Swedish contribution in each project shall be reviewed and compared with the goals and indicators defined during project preparations. The consultant shall also discuss what could possibly have happened without any support.
- C. The review shall give an account for the development of sustainable heating and heating management methods in the district heating companies, where applicable.
 - In investment projects the consultant shall review the following: the project design, procurement and contracting structure, allocation of resources and some technical ratios such as reduced fuel consumption, reduced emissions of CO₂ and other green-house gases.
 - If the project contains any institutional support the consultant shall review: the development in the district heating companies regarding sales, tariffs, staffing and Human Resource development, financial strength, level of customer orientation, management and some relevant technical ratios such as reduced communal subventions.
- D. Based on the results of the assessment of each project the Consultant shall identify deviations and problems as well as success stories, discuss and propose possible improvements, and develop lessons learned from the projects, serving as a basis for recommendation for future projects. When applicable the evaluation shall analyse the reasons for different outcome for projects with similar approach (e.g. Riga-Daugavpils).

Relevance

The relevance of the project goals and indicators – as defined and documented during project preparation; i.e. in decisions by the Swedish Government, Grant Agreements, Contracts for the project components – shall be assessed from a development perspective¹ – taking into account the overall economic, social and environmental situation.

Achievement of objectives

Achievement of the *project goals* as defined and documented in the contracts and agreements for the project components shall be assessed, taking into account possible changes in circumstances.

¹ Relevant documents: Baltic 21; Decision and grant agreement documents of Sida-East and the Division for Environment and Energy; Government bill on the development with Central and Eastern Europe; World Bank Project Appraisal Report and corresponding EBRD documents (as lead agencies).

- To what extent do development changes in the projects target area accord with the planned outputs, purposes and goals of the evaluated projects?
- To what extent do development changes in the projects target area accord with the objectives of the Swedish development co-operation.
- To what extent are the identified development changes the results of the project rather than the results of external factors?
- What are the underlying reasons for the achievement of objectives, or the lack thereof? What are the key factors of success and failure in this respect?

Environmental aspects

The evaluation shall include a discussion on environmental improvements related to improved operation and management, and increased awareness of energy saving measures should be discussed as well as improved quality of energy due to possible investments in heat production facilities.

- To what extent has the Swedish support contributed to more efficient use of energy and an improved and cleaner environment due to e.g. reduction in emissions?¹

Sustainability of results

The question of sustainability shall be discussed with regard to:

- The capacity and performance of the district heating companies:
 - Technical aspects: District heating plants related to today's demands and foreseen developments (heat consumption, environmental legislation and requirements).
 - Institutional aspects: Are the district heating companies characterised by good governance, including efficient management and organisation?
 - Financial aspects: Do partners have the financial capacity to maintain project results also after the withdrawal of the Swedish support?
- Local ownership: Are the projects consistent with partners' priorities and effective demand? Are requirements of local ownership satisfied? Did partner country stakeholders participate in the planning and implementation of the project?
- Affordability including possible negative effects on the social budget of the Municipality should be dealt with.

Cost-effectiveness

An assessment of the cost-effectiveness of the Swedish contribution shall be made, set forth from e.g. the following questions:

- Could the evaluated projects have been implemented at a lower cost without reducing the quality and quantity of project results? (Efficiency)
- Could a completely different project have solved the same development problem but at a lower cost? (Cost-effectiveness)
- Have the environmental improvements, in terms of energy efficiency and reduction of emissions, achieved by investments in heating facilities been cost-effective, compared to e.g. similar investments in Sweden, or other alternative solutions?

4 Methodology, Evaluation Team and Time Schedule

Desk study and preparations in Sweden

- Identification and study of relevant documentation in Sweden (decisions, reports, other evaluations).
- Interviews with key persons in Sweden involved in the project preparations, implementation and follow-up.

Site visits and interviews

- Field visits in Latvia 4–5 days (Riga, Daugavpils, Jelgava) and Russia 4–5 days (Archangelsk, Gatchina) including travelling.
- Interviews with key persons in the recipient countries involved in the project preparations, implementation and follow-up, e.g. the district-heating companies, their boards and municipal representatives, and representatives for the national authorities and if applicable, the lead agent and main co-financier (Sida/the Swedish Government, the World Bank, EBRD) as well as Swedish consultants and Swedish firms involved in the projects.
- Completion of the written report and presentation of the findings to relevant parties.

Composition and competence of evaluation team

The Consultant shall form a team including consultants that have relevant knowledge in evaluation methodology and that are acquainted with technical and environmental issues. The consultants shall have comprehensive international working experience, preferably in the transition countries in the Baltic region or Eastern Europe. Experience of international development co-operation is a requirement. The consultants forming the team shall preferably have frame work contracts with Sida.

Time Schedule

The assignment is expected to take the Consultant about 1 024 hours in total (see enclosed budget), including preparations at home office, interviews in Sweden, Latvia, Lithuania and Russia, report writing and presentations.

The assignment shall start 26 October 2004.

Visits to the recipient countries are expected to take place in November 2004.

The assignment will end with the submission of the final version of the evaluation report, in March 2005.

Undertakings

Sida will inform the involved parties of the review and forthcoming visits by the evaluation team. The Consultant will be responsible for practical arrangements in conjunction with the missions to the countries concerned. If interviews cannot be carried out in Swedish or English, interpreters shall be hired and costs reimbursed by Sida (included in enclosed budget).

The Consultant will be responsible for visits and arrangements in Sweden.

Sida will ensure that all written material listed in Annex will be made available.

The Consultant team will during all phases of the review be in contact with Sida.

5 Reporting

Reports

An *inception report* with outline of final report (headings), lists of persons to be interviewed and questions to be asked shall be submitted to Sida within *two weeks* from the start of the assignment. Sida shall comment on the report.

The results from the desk study, site visits and interviews will be presented to Sida in a *draft evaluation report* in English, within *16 weeks* from the start of the assignment. The evaluation report shall be divided in nine parts: one main report and eight project reports. Main findings and conclusions from each project evaluated shall be presented in separate reports to be annexes in the main report. Each project report shall not exceed 10 pages. The main report shall contain summarised conclusions of each project report as well as recommendations for future projects (see section 3D, page 3). The reports shall be submitted to Sida and the involved parties for comments.

The *final version of the evaluation report* shall be written in English and submitted to Sida, two weeks after Sida has commented upon the draft report, in 10 copies and on diskette. Subject to decision by Sida, the report will be published and distributed as a publication within the Sida Evaluations series.

The evaluation report shall be written in English and should not exceed 20 pages, excluding annexes. Format and outline of the report shall follow the guidelines in *Sida Evaluation Report – a Standardised Format* (see Annex 3). The draft report shall be submitted to Sida electronically and in 5 hardcopies (air-/surface mailed or delivered) no later than 3 February 2005. Within two weeks after receiving Sida's comments on the draft report, a final version shall be submitted to Sida, again electronically and in 10 hardcopies. The evaluation report must be presented in a way that enables publication without further editing. Subject to decision by Sida, the report will be published in the series *Sida Evaluations*.

The evaluation assignment includes the completion of *Sida Evaluations Data Work Sheet* (Annex 4), including an *Evaluation Abstract* (final section, G) as defined and required by DAC. The completed Data Worksheet shall be submitted to Sida along with the final version of the report. Failing a completed Data Worksheet, the report cannot be processed.

Seminar

The assignment includes an optional part regarding preparation and presentation of the results of the evaluation at seminars arranged by Sida. The seminars will be decided upon after the final draft report.

Enclosures

Annex 1: Project Overview – components financed by Sida

Annex 2: Budget

Annex 3: Sida Evaluation Report – a Standardised Format

Annex 4: Sida Evaluation Data Worksheet

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