

Document of
The World Bank

FOR OFFICIAL USE ONLY

Report No: 22868

IMPLEMENTATION COMPLETION REPORT
(SCL-40640; TF-34224)

ON A

LOAN

IN THE AMOUNT OF US\$10 MILLION

TO THE GOVERNMENT OF

LITHUANIA

FOR AN

ENERGY EFFICIENCY/HOUSING PILOT PROJECT

3/4/2002

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

CURRENCY EQUIVALENTS

(Exchange Rate Effective November 28, 2001)

Currency Unit = Litas (LT)

LT 1 = US\$ 0.25

US\$ 1 = LT 3.99

FISCAL YEAR

January 1 December 31

ABBREVIATIONS AND ACRONYMS

AHA	-	Association of Homeowners' Associations
HOAs	-	Homeowners Associations
HUDF	-	Housing and Urban Development Foundation
IFI	-	International Financial Institution
MCUD	-	Ministry of Construction and Urban Development
MOF	-	Ministry of Finance
PIU	-	Project Implementation Unit
SFH	-	Single Family Homes

Vice President:	Johannes F. Linn
Country Director:	Michael F. Carter
Sector Manager:	Sumter Lee Travers
Task Team Leader:	Gailius J. Draugelis

**LITHUANIA
ENERGY EFFICIENCY/HOUSING PILOT PROJECT**

CONTENTS

	Page No.
1. Project Data	1
2. Principal Performance Ratings	1
3. Assessment of Development Objective and Design, and of Quality at Entry	1
4. Achievement of Objective and Outputs	3
5. Major Factors Affecting Implementation and Outcome	9
6. Sustainability	10
7. Bank and Borrower Performance	12
8. Lessons Learned	15
9. Partner Comments	17
10. Additional Information	20
Annex 1. Key Performance Indicators/Log Frame Matrix	21
Annex 2. Project Costs and Financing	23
Annex 3. Economic Costs and Benefits	25
Annex 4. Bank Inputs	27
Annex 5. Ratings for Achievement of Objectives/Outputs of Components	29
Annex 6. Ratings of Bank and Borrower Performance	30
Annex 7. List of Supporting Documents	31
Annex 8. Borrower's Contribution	32
Annex 9. Cofinancier's Contribution	45

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

<i>Project ID:</i> P035163	<i>Project Name:</i> ENERGY EFFIC/HOUSING
<i>Team Leader:</i> Gailius J. Draugelis	<i>TL Unit:</i> ECSIE
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> March 4, 2002

1. Project Data

Name: ENERGY EFFIC/HOUSING *L/C/TF Number:* SCL-40640; TF-34224
Country/Department: LITHUANIA *Region:* Europe and Central Asia Region
Sector/subsector: FS - Financial Sector Development; UY - Other Urban Development

KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 06/03/1995	<i>Effective:</i> 11/05/1996	11/05/1996
<i>Appraisal:</i> 01/01/1996	<i>MTR:</i> 05/25/1998	05/25/1998
<i>Approval:</i> 07/11/1996	<i>Closing:</i> 12/31/2000	06/30/2001

Borrower/Implementing Agency: Republic of Lithuania/Ministry of Finance
Other Partners: Danish Ministry of Housing and Urban Development; Netherlands Ministry of Foreign Affairs

STAFF	Current	At Appraisal
<i>Vice President:</i>	Johannes F. Linn	Johannes F. Linn
<i>Country Manager:</i>	Michael F. Carter	Basil G. Kavalsky
<i>Sector Manager:</i>	Sumter Lee Travers	Thomas Blinkhorn
<i>Team Leader at ICR:</i>	Gailius J. Draugelis	Mats Andersson
<i>ICR Primary Author:</i>	Gailius J. Draugelis; Peter D. Ellis	

2. Principal Performance Ratings

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

Outcome: S
Sustainability: L
Institutional Development Impact: SU
Bank Performance: S
Borrower Performance: S

QAG (if available) ICR
Quality at Entry: S S
Project at Risk at Any Time: No

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

3.1 Original Objective:

The objectives of the Energy Efficiency/Housing Pilot Project (EEHPP) were to: (i) support private

initiative in improving residential energy efficiency; (ii) support public initiative in improving energy efficiency in schools; and (iii) support the implementation of the Borrower's policies with respect to the privatization of housing and enable increased private initiative in housing maintenance in general. The project was designed to: (a) promote and facilitate energy efficiency rehabilitation of residential buildings, by providing loans for technically and economically attractive packages of measures which are affordable to a broad range of citizens; (b) promote private initiative in housing and energy efficiency by supporting the organization of homeowners into functioning associations able to take charge of their buildings and housing maintenance functions; (c) support municipalities in the energy efficiency rehabilitation of schools for demonstration purposes; (d) develop the use of private energy consultants for housing retrofits; and (e) introduce the commercial banking sector to the concept of long-term lending for housing and housing improvements.

The project was demanding for the borrower, but its objectives were clearly defined and relevant to the country's policy on the promotion of residential thermal energy efficiency and fostering private initiatives in property management. While Lithuania privatized nearly 90 percent of residential housing units by 1995, its new homeowners faced obligations of ownership that previously were taken care of by the Government for over 50 years. These obligations, for example of paying household expenditures for energy, including space heating, water and other utilities as well as the capital costs of maintenance and renovation, comprised a significant and increasing portion of household income. At appraisal energy bills absorbed about 11 percent of monthly income. According to a survey conducted for the Bank's Vilnius District Heating Project in Vilnius, the average bill for rents and municipal services comprised 50 percent of monthly income for 36 percent of respondents and about one-third for another 39 percent, and district heat alone comprised approximately 11 percent of monthly income in 1999. In particular the impact on household expenditures of the upward adjustment of energy prices to market levels was made more severe by the problem of the energy inefficient housing stock in Lithuania. The new approaches introduced by the project asked to a certain extent for a leap of faith of people, whose belief in a better future had been eroded by an extended period of economic hardship. At the beginning of the project, the country was barely returning to a growth path from a severe contraction that saw GDP contract by about 6 percent in 1991, 21 percent in 1992, 16 percent in 1993 and almost 10 percent in 1994. Several major banks collapsed in a general banking crisis in 1995, and by May 1996 16 of the 27 banks licensed in Lithuania were under suspension or facing bankruptcy. The comprehensive design of the project, however, helped the borrower overcome early institutional weaknesses, incorporating lessons learned throughout implementation.

3.2 Revised Objective:

The original objectives of EEHPP were not revised.

3.3 Original Components:

The project consisted of: (a) Part A - credit for residential energy efficiency rehabilitation, with incentives for homeowners to encourage participation; (b) Part B - energy efficiency renovation of schools in municipalities; and (c) institutional development and strengthening through technical assistance designed to: (i) facilitate project implementation, including setting up advisory centers for homeowners and HOAs, and (ii) support further policy reform in demand side energy use and the energy and housing sectors in general.

The components were satisfactorily designed to achieve the project's objectives and the borrower's administrative and financial management capacity were taken into consideration. Likewise, the Bank had limited experience with housing and energy efficiency in ECA at the time and it was unclear what institutional and financial mechanisms as well as energy investments would be most successful in

Lithuania. The decision to make this project a pilot operation, therefore, was highly appropriate.

3.4 Revised Components:

The project design was not formally revised during implementation, but the project significantly reduced the amount of loan funds available to homeowners associations by 26% and increased the amount available for schools by 76%. The reason for this reallocation was the concern over the initial low demand for loans from HOAs and the proven demand and success of the schools renovation component. The project did reallocate \$100,000 of unspent funds from consulting services to HOA loans after the introduction of the up to 30 % grant element markedly increased demand towards the end of the project.

3.5 Quality at Entry:

There was a QAG (Quality Assurance Group) assessment of supervision that provided an overall satisfactory rating and found focus on development objectives highly satisfactory in FY2000.

The ICR rates the quality at entry of the project as fully satisfactory. Lessons from test activities undertaken by the borrower prior to appraisal helped to shape the final design of the project components. Some important actions to be taken were left as conditions of effectiveness, namely the signing of an implementation agreement between the responsible ministry and the implementation agency, the confirmation of operating procedures, and staffing of certain positions within the implementation agency. However, the effectiveness conditions were met in a timely fashion and did not significantly affect the implementation of the project.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

The overall project as a demonstration and pilot effort was fully satisfactory. Although interest from homeowners' associations was initially slow in developing, the project's institutional development and physical implementation were satisfactory. Despite frequent changes in the Government, and implementation delays regarding, first, the Participating Financial Institution and, second, the introduction of the grant element, Government initiatives reinforced project development objectives, particularly towards the end of the project. Finally, the project's learning process was highly satisfactory. The project implementation unit absorbed the lessons learned and readily adjusted operations accordingly. However, the key monitoring and evaluation activities undertaken at the mid-term review could have been delayed so that they could include results from a larger sample of beneficiaries.

Part A (loans to homeowners and homeowners associations) was highly successful in testing and having an impact upon the legal standing of homeowners associations, thereby strengthening their role in community-driven management of housing. Amendments made to the Law on Homeowners Associations in 2000 streamlined residential community decision making and strengthened the HOA mechanism as a viable alternative to public sector housing administration. The project also helped the Government to creatively use a part of its existing heat subsidies to pay for a portion of energy efficiency investments owed by low income households. This temporary, targeted use of existing subsidies removed barriers for low income families to accept the financial obligations which they were unwilling to take given their fragile income prospects. Finally, the Government drafted an outline for improving Government housing assistance programs which it has asked the Bank to support in a follow-on operation.

The promotion of private initiative in housing renovation was satisfactory, though its impact was limited by the combination of a slow uptake of HOA loans and the time constraint in which the project operated. On the one hand, the Government's support for energy retrofitting of multi-family housing has successfully

encouraged households to invest in housing renewal which generated financial benefits. On the other hand, the slow uptake of Part A limited its ability to capitalize on growing HOA interest in the final year of the implementation period. A larger, follow-on project may help to develop a critical mass needed to have a larger national impact -- of the 726 HOAs that registered interest with the project, nearly 30 percent (207 HOAs) were serviced during the project's implementation period. Also, 4,300 HOAs out of a total of 45,000 multi-apartment buildings were converted mainly from former cooperatives; few buildings established HOAs where no formal cooperative structure previously existed. Likewise, the project had mixed results in the promotion of private maintenance for which legislative changes show promise, but have yet to translate into broad-based reform.

The outcome of Part A had a limited impact on the expansion of commercial lending to the sector due mainly to the underdeveloped market for such borrowing. The design of the project did not meet the strategic interests of commercial banks, which were recovering from a major banking crisis in 1995 and appear to have seen no advantage for being an agent for Government lending. The psychological barriers to putting up one's home at risk, particularly for common space investments, and distrust of banks in general remained strong throughout the project. This was particularly evident by the lack of interest in loans by single family homeowners and single apartment owners (only one flat owner took a loan) who were required to mortgage their home as collateral even though the social assessment at appraisal indicated that single family homeowners paid on average 60 percent more for heating than their counterparts in apartment buildings. Also, until recently, the prudential requirements of potential lenders and their own limited access to sufficiently long term funding prevented banks from providing long term local currency loans at attractive rates. Finally, the Government's assistance to the project (through a fixed interest rate, an energy subsidy for low income persons, VAT exemption, and a budgetary grant element equivalent to up to 30 percent of the subloan amount) appears to have been necessary for demonstration effects. However, the lack of budgetary funds to sustain this assistance program and the provision of Government budgetary support in the first place increased the perceived market risk for lenders.

The demonstration effect of loans for schools renovation was highly satisfactory as the Government in late 2000 embarked on a larger program of energy efficiency renovation in schools based largely on the results of the project.

4.2 Outputs by components:

The design was appropriate for all three components. There were no macroeconomic policy objectives included in the project. The project satisfactorily brought forward success stories and identified gaps in the mechanisms and institutions that were supported by the Government to promote private initiative in the maintenance and administration of the newly privatized housing stock. The project introduced a process that helped to reorient Government programs from a centrally planned to a more demand driven, community based approach -- it brought investment in housing more in line with consumer preferences. It advanced the politically difficult agenda of increased private initiative in housing maintenance through policy dialogue supported by project outcomes. Finally, the project demonstrated improvements in energy efficiency. An evaluation of each project component is provided below.

(a) Part A - Loans for Residential Energy Efficiency Rehabilitation (projected US\$15.1 million; revised after reallocation to US\$8.3 million; actual US\$8.5 million).

- Part A was able to service 207 HOAs and 25 SFHs with a total investment of US\$8.5 million, meeting its revised investment targets. The average size of investment increased to \$40,955 in 2000-2001 from \$20,426 in 1997-1998, correlating strongly with the introduction of the grant element and improved

marketing with real-life examples in the project. The increase in average project size, however, further reduced the number of beneficiaries that could be reached during implementation.

- Advisory services to homeowners took longer than expected to develop an effective outreach program, but eventually met or exceeded expectations at appraisal in terms of their effectiveness in delivering loans: (a) the ratio of HOAs advised to loans signed (34 percent) exceeded expectations at project inception (29 percent); and (b) the ratio of buildings assessed (full energy audit) to loans signed on average was 69 percent, compared to a projected 65 percent.
- The loan was fully committed for this component, though disbursements lagged until the end of the project. The drag on disbursements was due to a number of operational factors: (a) slow initial demand for loans from HOAs; (b) lack of interest from commercial banks; (c) an unexpected take-over of the single participating financial institution (Hermis Bank by Vilniaus Bankas, the largest private bank) caused a delay in processing the component for the new bank to familiarize itself with the project; (d) a decision by the Ministry of Finance not to open a Special Account. This forced the Ministry to find budgetary resources to advance to the project only to be reimbursed after eligible expenditures were made; (e) residual amounts of loan proceeds were kept by HOAs without penalty (no commitment charges on the subloans) thereby holding up potential funding for new investments.

(b) Part B - Energy Efficiency Rehabilitation of Schools (projected US\$2.3 million; revised after reallocation to US\$5.9 million; actual US\$5.9 million).

- Part B met revised investment estimates and reached a total of 26,745 pupils, 78 percent higher than the original estimate of 15,000 students. The per-student beneficiary costs rose to US\$ 221 from US\$ 153, or 44 percent higher than projected at appraisal.
- Procurement under Part B was difficult due to the lack of experience of municipalities and the PIU with Bank procurement procedures. In addition, the procurement plan expanded significantly where 6 out of 12 municipalities were able to undertake a larger scope of investments due to savings realized from lower-than-expected prices obtained through competitive procurement.

(c) Institutional Strengthening and Technical Assistance (projected US\$2.9 million; actual US\$4.10 million).

- Organizational support for homeowners and homeowners associations through the establishment of advisory centers in five major urban areas was highly satisfactory. Technical assistance provided by Denmark and the Netherlands to support the Advisory Centers and training of energy consultants was well timed and targeted. Danish supported Advisory Centers in Vilnius and Kaunas, the two largest cities, were set up by May 1997 and three more centers were opened by the end of 1997 in other major urban areas. Dutch assistance trained over 150 engineers within the first three years of implementation, of which about 20 were contracted to perform services under the project (for free energy audits and follow up technical supervision). The division of labor appears to have been well coordinated and devised. While a great majority of technical support, particularly at the beginning of the project, was provided by energy engineers, the Advisory Centers showed initiative and motivation to address social barriers related to organizing HOAs and helping promote the benefits of the project.
- The HUDF moved very quickly since effectiveness in November 1996 to develop a comprehensive implementation structure and launch an aggressive public information campaign. It distributed over 700 brochures to HOAs, developed a series of ten television features and generated registered interest

of 28 HOAs within the first three months of project implementation. During the course of implementation, the HUDF learned and adjusted its process to address the slow progress of Part A of the project. In the second half of the first year of implementation, the HUDF moved to simplify operational procedures, reduce interest rates, modify communication strategies and work closely with Advisory Centers to better target its message to beneficiaries. HUDF support to municipalities in procurement matters was fully satisfactory. It introduced municipalities to the discipline of well planned and transparent procurement based on the use of the Bank's standard bidding documents.

- Technical engineering advice provided to homeowners and their associations, as well as training provided to the local consulting industry on energy audits and investments, was excellent. The combination of formal training and on-the-job assistance developed a pool of consultants who have since organized into the Lithuanian Association of Energy Consultants. Though not perfect, technical work was rated satisfactory by the end of the project.
- Technical and social monitoring were well designed but were executed before a larger sample of HOAs and schools implemented their investments. Funds ran out for additional systematic monitoring by the end of the project and the Government refused to use loan funds (or budget funds in place of loan financing) for consulting assignments that could have improved the scope of the lessons learned from the project.
- Assistance to commercial banks to help evaluate energy efficiency investments did not have the expected impact, partially due to a lack of interest by banks as a whole in the sector. The participating financial institutions (Hermis Bankas, and later Vilniaus Bankas) spent very little resources, it appears, in technical evaluations or supervision depending mostly on the HUDF for support in this area.
- The policy study subcomponent was satisfactory. Three policy studies out of three projected were submitted to the Government. Some of the recommendations from the studies or through dialogue with the task team were implemented during the project. Among these were: (i) amendments to the HOA law that mandated membership, streamlined decision making and defined common property rights; (ii) recategorization of HOAs to as non-governmental organizations, rather than corporations, thereby removing a tax disincentive; (iii) allowing the use of targeted heat subsidies to low income persons for the repayment of investments in energy efficiency using an institutionalized means test; and (iv) adoption of a Housing Concept Outline that proposed new measures in social housing, housing finance, construction and energy efficiency.
- The record on facilitating private property maintenance is somewhat mixed. The political difficulties with breaking up the monopoly of municipal maintenance companies were difficult to predict at appraisal and appear to be more formidable than expected at that time. However, the institutional linkages and technical assistance could have been stronger in this area, given its importance to the objectives of the project. For example, the consultants provided on a long term basis to the HUDF had mainly an engineering background. The TA could have had a community/condominium housing expert strengthen the PIU's capacity to incorporate lessons learned from the studies into a broader agenda. This is particularly relevant since the Ministry of Construction and Urban Development, the main Government sponsor of the project, was dissolved in mid-stream of project implementation and housing policy responsibilities were further disaggregated among the remaining ministries. Despite these constraints, the component did facilitate some initial positive steps. The adoption of legislation introducing the concept of separating maintenance from building administration (building administrators, if appointed by the municipality, are required to procure competitively maintenance services) were concepts that were drawn largely from lessons learned in this project and policy

recommendations from the study.

4.3 Net Present Value/Economic rate of return:

The project produced an economic internal rate of return (EIRR) of 8.6%. The Staff Appraisal Report (SAR) projected an EIRR of 25.9%, which evaluated energy savings from the perspective of the economy as a whole as they occur in the reduction of the economy's consumption of imported fuels. The SAR assumed that homeowners would choose rehabilitation measures with short gestations and high rates of return, corresponding to reduced energy consumption for the economy as a whole. However, many households used part of their energy efficiency gains to increase their comfort (temperature) in their homes, realizing lower-than-expected reductions in energy consumption. Surveys showed that many households choosing to invest had some objectives unrelated to energy efficiency. In particular, they had a backlog of foregone maintenance on roofs, doors, and windows, repairs on which were driven more by concern for the structural integrity of the housing rather than energy savings. Investments in housing renewal were allowed under the project's operational procedures and were appropriate given the objectives of the project. The value of this benefit was not calculated in the SAR, despite the stated importance of this benefit to project objectives. During the first half of the project, the demand for loans was sluggish and in 1999 the government introduced a subsidy of up to 30% of capital expenditures in order to stimulate investments not only in energy efficiency but also in housing renewal. As a result of the sizeable subsidy that the government provided and the lower-than-expected energy savings, the project's EIRR was lower than that expected in the SAR. The methodology of the economic analysis is described in greater detail in Annex 3.

4.4 Financial rate of return:

The project produced a financial internal rate of return (FIRR) to participating households of 12.1%. The FIRR was calculated by taking into account the exemption of VAT for 90% of the household investment costs and by netting out the grant received by households. In the Staff Appraisal Report (SAR), the main benefit of the project was measured solely in terms of reductions in the amount of energy consumed, which was expected to result from the investments done by households and schools. However, calculating the financial savings to the users measured only by the value of energy consumption reduced would be misleading, as homeowners and municipalities (for schools renovation) made decisions to pursue investments with longer payback periods (e.g. a roof) that contribute partly to energy efficiency, but also lengthen the productive life of the asset, a benefit that is difficult to quantify due to lack of data in the country. (See Lessons Learned.) For the purposes of the ICR, the amount of energy saved also accounted for the fact that end-users were able to attain higher levels of temperature (comfort) due to the investments they made, but at a relative cost that was effectively lower than if they never did the investment. This comfort-adjusted energy consumption presents a more accurate picture of the savings that accrued to end-users. The SAR assumes that end-users started out at room temperatures that were optimal, when in fact the social assessment survey done prior to the project's start revealed that many individuals considered their apartments to be cold, even though many were using additional sources of heating. It is important to note that the SAR does attribute the difficulties of capturing these additional benefits to the outcome of an FIRR that was higher than the projected EIRR.

4.5 Institutional development impact:

A separate component on institutional strengthening and technical assistance was included in the project and is evaluated in section 4.2 of this ICR. The following is a supplementary evaluation of key institutional participants in the project.

Project Coordination Unit (PCU). Institutional strengthening of the project coordination unit was excellent

in terms of the social and operational aspects of the project. The HUDF was the nerve center of the project, incorporating lessons learned into project implementation, coordinating and supporting activities of advisory centers, supporting municipalities in the development of schools renovation investments and disseminating information to a wider local and later international audience. The HUDF would have benefited from stronger support in financial issues, thereby increasing its capacity to support banks, on technical issues, helping it to ramp up earlier in the project its technical and procurement capacity to a level it reached by the end of the project, and on policy issues as mentioned in section 4.2 of this ICR.

Advisory Centers (ACs). The early establishment of the Advisory Centers allowed their staff to gain valuable experience and learn lessons that helped to improve the project during implementation rather than at the end of the project. The ACs were a well disciplined and coordinated branch network which was key to the successful implementation of the project on a national scale. However, the institutional linkages between associations of Homeowners Associations or other locally based constituencies and the Advisory Centers did not develop as well as expected at appraisal. Also, the effectiveness of the ACs to organize homeowners into forming associations was also limited, only 15 percent of multiapartment buildings have formed HOAs, the majority of which were former cooperatives. Stronger linkages may have mitigated the concern expressed by the project team and the Danish authorities over the sustainability of the investments made in the Advisory Centers. As Danish financing was reduced on a declining scale, the advisory centers started to reduce staff and capacity. The HUDF eventually incorporated the advisory centers into its structure and later spun them off as a legally separate NGO called "Housing Advisory Agency" that is expected to provide fee based services, such as training of HOA chairpersons, on property management and other housing issues.

Energy Consultants. A clear victory for the project is the development of a pool of trained energy consultants. 193 individual consultants were trained of which about 20 were given an opportunity to work on the project. While the number of participating consultants is low, the ratio of consultants relative to the number of loans (254) and buildings renovated (289) is acceptable. These consultants formed the Lithuanian Association of Energy Consultants during the final year of project implementation, a strong indicator of an established constituency that in great part exists as a result of this project. These consultants are now positioned to compete for new business in the sector and support new programs in energy efficiency, helping to sustain the momentum created by the project in the market.

Commercial Banks. The lack of interest from commercial banks was a clear disappointment. The design of the project did not meet the commercial and strategic interests of Lithuania's nascent commercial banking sector. On the one hand, the commercial banks were starting to get back on their feet after a major banking crisis in 1995 and were growing their commercial lending business as a primary strategic objective, leaving retail and household lending as a secondary objective. On the other hand, the transaction costs involved in evaluating credit risk and supervising the investments were too high given the returns. Without putting up capital of their own, commercial banks were not very interested in acting as paying agents for the fees offered by the project.

Homeowners Associations (HOAs). While only about 3 percent of existing HOAs participated in the project, member households who chose to take a loan as HOAs indicated a stronger appreciation for the role of an HOA as private property administrators after the investment. Where they did exist, HOAs proved to be a viable alternative to public property maintenance and administration. A broader discussion on HOAs is provided in the Sustainability chapter of this ICR.

Single Family Homeowners (SFAs). Very little data was collected for this segment of the market.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

There were no major factors outside the direct control of the government or implementing agency.

5.2 Factors generally subject to government control:

While Government commitment remained strong throughout the project, the Government delayed certain operational decisions that would have facilitated implementation. First and foremost, the Government decided to begin the pilot effort without a matching grant, but when it decided to provide a matching grant of up to 30% the Government delayed implementing this decision for over a year. The wait-and-see strategy for the grant was prudent, and consistent with the learning approach of the pilot project. Over eighty percent of total commitments to HOAs were made after the introduction of the grant in February 1999. Given this positive response to the grant, an earlier introduction of the grant would have accelerated implementation. Second, the Government lacked follow through on improving consolidation of accounting reports for the project, a recommendation first noted in the 1998 audit. This was due in large part to a division of labor between the project implementation unit and the Ministry of Finance where the former was responsible for technical quality control and reporting to the Bank and the latter managed disbursements. The Government agreed to pass on disbursement management to the implementing agency, but did not follow through. The transfer likely would have helped avoid recurring errors in reconciliation. Third, the Government did not finalize an agreement with a second participatory financial institution that would have broadened homeowner access to funds. Fourth, the Ministry of Finance delayed implementing a cabinet decision in September 2000 to make funds available from the project's reflows for new loans to HOAs. It appears that re-flows were already disbursed for new subloans to HOAs under the project. (The MOF opted for withdrawals on a reimburseable basis, rather than opening a special account to finance initial investments.) This decision restricted the total envelope of funds available to HOAs at the end of the project when demand started to increase.

The dialogue on housing policy was made more difficult by institutional changes in the Government. The Ministry of Construction and Urban Development, the main catalyst of the project, was dissolved. In May 1998 the project implementation unit was transferred to the Ministry of Finance, while the housing policy unit was transferred to the Ministry of Environment.

Delays in the passage of amendments to the legal environment governing HOAs until June 2000 also hindered implementation. The amendments streamlined decision making, separated administration from maintenance of publicly administered buildings, mandated membership in an HOA once it was established (this in turn was struck down by the Constitutional Court six months later), and established HOAs as non profit organizations thereby reducing their tax burden from a corporate marginal rate of 29 percent to 5 percent.

5.3 Factors generally subject to implementing agency control:

The initially weak technical, administrative and financial management capacity of the HUDF was compensated by the outstanding commitment of the staff, including its Managing Director. The capacity of the unit rapidly increased with assistance from a Danish implementation consultant and the other technical assistance from Denmark and the Netherlands. The unit also benefited from intensive supervision provided by the Bank task team particularly at the beginning of the project. By 1998, the HUDF had established itself as the project nerve center, having good relations with the advisory centers, incorporating lessons learned into project implementation and adequately disseminating information. The HUDF worked hard at

learning to be client responsive, a deficiency identified early in implementation, and now is regarded by participating HOAs and municipalities as a reliable information resource and center for technical excellence. It is regarded among Government institutions as an expert resource on housing and energy efficiency issues. However, some the issues with its technical supervision and financial management persisted. The HUDF relied too heavily on the Bank for review of technical proposals and on procurement issues which caused some delays. This resolved itself in the latter half of the project as the HUDF gained experience and confidence. Likewise, the maintenance of reconciled accounting records was less than satisfactory, appearing consistently in the management letters of the auditors since 1998.

5.4 Costs and financing:

There were no cost overruns of Part A or B of the project; however, technical assistance from Denmark was increased to sustain the Advisory Centers due to a slow demand for Part A loans from homeowners associations. Even with a year's delay in its adoption by the Government, the up-front grant helped to rapidly increase commitments and significantly reduce the possibility of longer delays in disbursement. Also, Part B benefited from the six month extension. Five municipalities held loan balances totaling US\$772,000 because they had signed loan agreements that exceeded the contract prices procured within six months of the original Closing Date of the project. The savings from these parts indicates less of a dramatic shift in input costs and more of an overestimated budget, reflecting a need for more experience in the energy consulting industry. Likewise, the HUDF could have provided stronger technical input during the review stages helping to upgrade consultant's information on prices obtained for previous work under the project. The project took six months longer to close than originally planned, closing in June 30, 2001.

Part A of the project was rated unsatisfactory during the mid term review in June 1998 and subsequently was upgraded to satisfactory by June 30, 1999, mainly due to the year's delay in the Government providing the energy efficiency grant.

6. Sustainability

6.1 Rationale for sustainability rating:

Project Objective (i) Support private initiative in improving residential energy efficiency

The project made investments that have produced demonstrable benefits in (i) more efficient space heating and (ii) the renewal of important household and public assets, extending their productive life. The investments introduced building level improvements that increased consumers' control of heat consumption, empowering homeowners and municipalities to make decisions about consuming space heating based on individual choice and ability to pay.

Yet, at current income levels, the financing mechanism piloted to support private initiative in residential energy efficiency is unlikely to be sustainable without a grant element. Given the initial starting point, the Government's decision to introduce a grant element, together with its other incentives noted earlier, helped to overcome substantial barriers to entry. The lack of a stronger role for private maintenance companies was identified by the HUDF Managing Director as the single largest barrier to forming HOAs. The lack of progress by municipal governments to allow for an even playing field between municipally-owned and private maintenance companies had a significant impact on project progress. Alytus city municipality, a city of 77,000 persons, created conditions for private maintenance early in project implementation. It ranks second in HOA investments per city inhabitant (Litas 21) above Vilnius, the capital city, (Litas 18) and Panevezys (Litas 10). A significant social barrier, as mentioned before, was the lack of trust of banks. It should be mentioned, also, that banks at that time were less accustomed to customer-orientation and lacked

capacity in their branch network (this in fact caused serious constraints on the project initially as persons had to travel to Vilnius to apply for a loan through the bank).

If the project focused solely on energy savings as the objective, the analysis suggests that the investments should have been limited to those which yield a higher probability for energy savings. The low economic internal rate of return of the project, when measured purely in energy savings terms, suggests that the barriers discussed in this ICR continued to outweigh energy savings benefits of the investments. The financial internal rate of return suggests that the grant element was required to make returns on their investment attractive to homeowners as measured in terms of the energy savings benefits.

The use of energy efficiency investments for the purposes of furthering institutional development reforms in housing as piloted by the project showed the difficulties in calibrating the appropriate level of subsidy needed, albeit temporary, given the lack of quantifiable benefits in housing renewal and institutional development generated by this project. These benefits are not included in the rate of return calculations; therefore, they are underestimated in the analysis. Nonetheless, the financial instrument, as used for energy savings purposes only, is unlikely to be sustainable without changes to the investment selection criteria and an increase in people's incomes. (See Paragraphs 4.3 – 4.4 and Annex 3 for more details on economic and financial analysis.)

Project Objectives (ii) Support public initiative in improving energy efficiency in schools; and (iii) support the implementation of the Borrower's policies with respect to the privatization of housing and enable increased private initiative in housing maintenance in general.

While the pilot project as such has had a limited impact on the national economy in terms of a reduction in energy consumption, it has strengthened the Government's commitment to housing and energy efficiency issues. The process introduced by the project has created momentum for a dialogue on broader housing policy issues: (i) The Government has asked the Bank for a follow up operation that would help it strengthen the institutional linkages and fill in policy gaps that were identified by the project and incorporate lessons learned from the project into a broader housing reform agenda; and (ii) The Government has adopted a Housing Policy Concept Outline (September 2000), which includes an official position to use IFI resources for further energy efficiency investments. In addition, the Vilnius municipality, the capital of the country, is currently moving forward on privatizing its municipal maintenance companies, something that had been delayed during the course of the project.

The Government remains committed to public initiatives to improve energy efficiency in schools, in particular the Government has made use of another Bank loan, the *Municipal Development Project* (Ln. 4481-LT), to expand energy efficiency investments in schools while it prepares a more substantial investment through the Bank's proposed *Education* loan.

The pilot introduced the HOA as an effective community-based mechanism for residential housing management that is likely to be a sustainable alternative to the 50-year legacy of having the Government take care of housing. A participant survey conducted by HUDF of 46 HOA Chairpersons and 290 members in 2001 provided strong anecdotal evidence of the impact on the strength of HOAs in housing communities. About 26 percent of those surveyed agreed to the statement that taking a loan improved their relationship with other members and an overwhelming number of respondents (90 percent) would recommend taking a loan to implement energy efficiency projects to other HOAs. This willingness to take a loan for community improvements through HOAs is a remarkable achievement given the initially poor reputation of commercial banks, particularly after a series of banking failures during the banking crisis of 1995, and the lack of a history of private initiative in the care for housing, particularly in common areas.

The Government made a policy choice to make the project overcome the significant barriers to community-driven housing investments by introducing a grant element of up to 30 percent in 1999. While it did contemplate a grant element during project preparation, the Government decided to try without the grant in the beginning of the pilot effort. Prior to the introduction of the grant element, investments were smaller (See Paragraph 4.2) suggesting higher sensitivity to financial rates of return and short gestations. Milestone surveys conducted during the mid-term review suggested, however, that the motivation to invest did not rest solely on energy savings but also on achieving desired comfort levels and making emergency repairs. The surveys also suggested that the experience of going through with the investment strengthened homeowner satisfaction with their HOA. The grant element helped to reduce the social costs of collective decision making so that a greater number of households could gain access to energy efficiency measures and the experience of community based efforts to improve their common assets. The grant element helped HOAs to decide on larger and more varied investments than they otherwise would have made. This broader experience reinforced the role of the HOA as an alternative to Government-led property maintenance and management.

For the purposes of the ICR, overall project sustainability is rated likely because the project ultimately focused on institutional development impact for which it realized a sustainable outcome – improving the way communities of private homeowners interact with one another to make collective decisions for the maintenance of common property.

6.2 Transition arrangement to regular operations:

The Government has asked the Bank for a follow on housing project and has moved to place elements of a transition from the pilot project to a regular operation in place. As it prepares for project preparation work, it has decided to use the reflows from the project for a revolving fund (though this decision was made about a year ago) to maintain the energy efficiency loan program to HOAs and help with the transition from this project to the next. The Government has formed a Coordination Committee comprising key ministries, the Housing and Urban Development Foundation and private sector participants, including a representative of a homeowner's association, to steer project preparation and develop a comprehensive housing policy. The Bank has received approval from the Government of Japan for a \$502,000 Policy and Human Resources Development grant for project preparation. The Government has obtained financing from the Government of Denmark for a Danish civil servant to develop a implementation plan following on the Energy Efficiency Strategy study it funded under the pilot project. The Bank supported the organization of an international housing finance conference by the Lithuanian Government, with a focus on credit enhancement mechanisms (including planned discussions on attracting private investment for housing renewal) in Vilnius in October 2001. The conference was attended by the highest levels of Government.

7. Bank and Borrower Performance

Bank

7.1 Lending:

The Bank's performance during preparation was satisfactory. Identification, preparation and appraisal were carried out in accordance with the Government's energy and housing priorities for the sector. The Bank's experience particularly on the social aspects of demand side residential energy efficiency and generally the housing sector in the region was limited at appraisal. The Bank team made full use of pilot activities and studies prepared with Swedish and EU Phare funds, and worked closely with key donors in the Netherlands, Denmark and Norway, to develop an effective project design and technical assistance package containing several innovative participatory techniques. Notably, the team kept its eyes on a good

start for ensuring timely mobilization and effective coordination of the many consultants. This helped to deploy the distribution of information, engineering advice and other technical assistance that were needed to provide energy audits (and thereby a potential pipeline) for about 20 HOAs who had expressed interest before loan effectiveness. The Bank also avoided duplication by using the eligibility criteria and review process of the Bank's Enterprise and Financial Sector Assistance Loan to qualify participating banks under the project.

The Bank left a few key preparation issues -- signing an implementation agreement, signing of participatory financing institution agreement, adoption of operating procedures -- as conditions for loan effectiveness. However, effectiveness was declared in timely fashion, four months after Board approval.

7.2 Supervision:

The Bank's supervision effort was satisfactory. The Bank team made a substantial effort to manage a demanding supervision agenda within the resource limitations imposed by country allocations for supervision. The task team used several consultants from Consultant Trust Funds to help supervise the project, particularly in engineering, communications and housing policy. Strong support from the Program Team Leader and Sector Manager ensured a smooth transition to a new Task Team Leader in the last two years of implementation. A Quality Assurance Group supervision audit rated the supervision effort satisfactory and staff continuity highly satisfactory in the transition year.

The task team exhibited implementation flexibility, which is essential for pilot projects. The Bank was flexible in modifying the Legal Agreement three times to adjust to the requirements of this demand-driven project. Notably, the first amendment reduced resources for residential loans due to weak demand, while the third reallocated uncommitted funds back to residential loans to accommodate strengthened demand from homeowners. The task team adjusted procurement procedures to streamline implementation and made innovative use of the Bank Internal Audit Department to investigate a case of alleged misprocurement (it turned out to not have been misprocurement). Certain implementation issues could have been more strongly pursued. Follow through on observations in the auditors management letters (reconciliation of project accounts) was less than satisfactory and could have been more strongly communicated. In addition, the team could have taken a stronger position with the Ministry of Finance when preparations to sign an agreement for a second participating commercial bank stalled. Onlending rates were kept reasonable at 11 percent for three years (a subsidy of 12-19 percent, well below the 29 percent threshold established during supervision) but the required interest rate reviews were only sporadically done by the MOF in the later half of the project. Table 1 provides data on lending rates during project implementation.

Table 1. EEHPP Lending Rates for Part A

	1996-1997	1998	1999	2000	2001
HOA Loan interest rate ("consumer rate")	15%	11%	11%	11%	11%
average yield on 6-12 mo Govt Bonds/Deposit Rates ^{1/}	11%	8%	8%	9%	8%
market reference rate	16%	13%	13%	14%	13%
Government subsidy on interest rate	1%	2%	2%	3%	2%
subsidy as share of market reference rate	3%	14%	13%	19%	13%
1-5 year commercial loans (BoL data) - for reference ^{1/}	14%	13%	13%	12%	11%

^{1/} Source: Bank of Lithuania

The Bank closely coordinated its supervision activities with bilateral donors and used the pilot project to keep open a dialogue on broader housing issues with the Government. Its focus on development objectives was highly satisfactory, emphasizing learning and information exchange inside and outside of Lithuania.

As mentioned, the team arranged for the Managing Director of HUDF to give a presentation on community driven development to the delegates of the 2000 Spring Meetings of the World Bank. The continuous sector dialogue helped to secure the interest of the Government in a follow on housing project.

7.3 Overall Bank performance:

The overall Bank performance was satisfactory. Despite the shortfall in supervision resources, the Bank team provided significant support to the Borrower and moved the project forward to a satisfactory completion.

Borrower

7.4 Preparation:

The borrower's preparation effort was satisfactory. The Ministry of Construction and Urban Development took full ownership and prepared the project efficiently. The Ministry was a strong champion for the project. The project coordination unit, the HUDF, was set up in 1994 as the Fund for the Renovation of Residential Housing with a small staff. The HUDF (then called the Housing Credit Foundation) worked effectively to develop its implementation capacity during preparation. Government funds for project preparation helped to finance demonstration projects which facilitated preparation activities and contributed to a project design well tailored to local conditions.

7.5 Government implementation performance:

Government implementation performance at the ministry-level was marginally satisfactory, but PIU performance was strong. Government commitment to the project remained strong despite frequent Cabinet and institutional changes, the most significant of which was the dissolution of the Ministry of Construction and Urban Development in 1998. The supervision of technical assistance and the execution of Dutch Trust Fund (TF034224) totaling NLG 1,249,500 (disbursed NLG 1,005,789) was also satisfactory. However, better follow through on several operational issues could have improved implementation performance the most significant of which was the year long delay in providing the up front energy efficiency grant. Finalizing the agreement for a second commercial bank and releasing the revolving fund would have broadened homeowner access and potentially improved project performance. The opening of a special account would have reduced the burden on the state budget by making the Bank's loan funds directly available to homeowners and helped to streamline project accounting.

Policy advances were made though perhaps not to the extent hoped for at appraisal. The heat subsidy was changed in 1997 to better target low income persons and then in 1998 to allow low income persons to use the subsidy to cover their debt obligations under the project. This latter change removed an obstacle to participation of those homeowners with low and unstable incomes who were reluctant to take on long term financial obligations. Privatization of municipal maintenance did not go as far as expected but some progress was made. The law on homeowner's associations was amended in June 2000 improving the enabling environment for the administration of private property.

7.6 Implementing Agency:

The strong commitment of HUDF staff and its Managing Director contributed to successful project completion despite initially slow progress and problems with implementation. The HUDF demonstrated high professional competence particularly in social, technical and procurement aspects of the project. It helped to incorporate early lessons into project implementation, introducing changes that streamlined operational procedures in the first supervision mission. The loss of the Ministry of Construction and Urban

Development (MCUD), the chief institutional sponsor of the project, and frequent changes in the Government placed additional demands on the HUDF to ensure project continuity and facilitate pending implementation issues with new Government officials. The HUDF became the nerve center of the project, supporting Advisory Centers and providing substantive inputs to the policy studies mandated under the Loan Agreement. By the end of the project the HUDF was widely disseminating lessons learned through academic journals, trade shows, presentations as well as providing data and advice to international and local energy efficiency and housing administration activities.

HUDF involvement in a second Bank project distracted it from doing more technical and social monitoring at the end of the project. A substantial portion of project staff were assigned implementation responsibilities for a large energy efficiency retrofitting in schools component under the Municipal Development Loan. Nonetheless, despite some technical and non-technical problems, physical implementation of the project was satisfactorily managed by HUDF.

Financial management of the project was adequate. The follow through on project audit recommendations was less than satisfactory. The division of labor between the HUDF and MOF caused financial statement reconciliation difficult and responsibility for following up on auditor and Bank supervision comments ambiguous.

The overall performance of the implementation agency is rated as fully satisfactory. It should be noted that Bank implementation experience was largely limited to a Rehabilitation Loan at the time of project inception, and as such the achievements of the PIU are commendable.

7.7 Overall Borrower performance:

The overall borrower performance was satisfactory. Though not in the time frame hoped for, the Government provided financial and implementation support to ensure effective project implementation. The HUDF implemented the project efficiently and supported Bank as well as donor supervision missions satisfactorily.

8. Lessons Learned

General Lessons:

Pilot projects such as this are based on a limited amount of knowledge and experience. As pilots, they are an opportunity to confirm the efficacy of mechanisms, institutions and project assumptions. The strength of the monitoring and evaluation process is central to the project's success or failure. As such, the project was well designed, but key milestone surveys were conducted at a time when few loans were taken and the process not fully tested. In as much as implementation flexibility is required, stringent adherence to timetables may limit the intended impact of the pilot from the point of view of quantifiable data. Whatever the shortcomings of the data, the qualitative information generated by the project helped to test and refine project assumptions.

Well defined operational procedures are essential for pilot projects to generate experiences such that performance measures are meaningful at completion. The project benefited from an early demonstration project sponsored by the Ministry of Construction and Urban Development which focused on process issues and technical outcomes. However, the procedures should not be a straight jacket. Implementation flexibility is needed to ensure that early lessons are incorporated and then re-tested in later years of implementation. A number of operational lessons were gained from the strengths and weaknesses identified

during implementation as a result of the project's operational quality at entry.

However well prepared they are, though, projects whose main purpose is to change people's behavior through new experiences will by definition be slow to begin, and moreover, slow to disburse. A critical mass of experience is needed before demand-driven projects like this project are able to achieve their desired impact. This implies higher than usual transaction costs for the project and a demanding supervision assignment for the Bank. For fifty years, two generations grew up in Lithuania depending on the State to perform administration and maintenance of their homes. After privatization homeowners were faced with unaccustomed-to responsibilities not only for their own home, but also for common property in multiapartment buildings. The degree to which meaningful private initiative for property maintenance in multiapartment buildings could be achieved without considerable transaction costs particularly in Eastern Europe and the Former Soviet Union should be carefully considered in similar operations.

Lessons on Community-Based Energy Efficiency Projects:

Project Beneficiaries (Homeowners/Homeowners' Associations)

- HOAs are able and willing to renovate common property if provided with institutional support, technical support and financial incentives. This can be considered as a tested, successful approach to Community-driven development-style projects in urban areas.
- HOAs take debt seriously and are repaying loans, often faster than needed (may be specific to Lithuania).
- Case stories and examples have an important demonstration effect when communicated directly to homeowners.

Legal Barriers

- Proper legal and regulatory framework is mandatory to facilitate formation of HOAs and energy efficiency investments. These barriers should be addressed in similar operations.
- Lack of wider educational program regarding HOAs leads to a poor understanding of laws and regulations.

Institutional Barriers

- Significant institutional support and financial incentives are needed to reduce the transaction costs associated with addressing barriers to the formation of HOAs and to private initiative in maintenance of residential buildings. Alytus city is the only successful case of private maintenance penetration in the market during project implementation. In Alytus, a private maintenance company literally went door-to-door, convincing homeowners of the benefits of HOAs, helping to establish them, and then offering private maintenance and administration services.
- HOAs are hesitant to invest in project preparation (energy audit and preparation of investment proposal); however, they are willing to cover some expenses for design, procurement and supervision consultant services. Experiences count -- the higher the number of successful cases, the larger the interest and willingness to contribute financially towards home improvements.
- Privatization of municipal maintenance companies would help to facilitate formation of HOAs by removing artificial pricing of maintenance services, opening the door to competition in the sector and offering homeowners choices in maintenance services. This issue should be addressed in similar operations.

Energy Efficiency and Energy Savings

- The main motivations for homeowners when they decide to take the loan were (in order of importance): (i) to improve their own apartment, e.g. improved indoor climate, better windows; (ii) to carry out urgent repairs of the building (leaking roofs, etc.) thus prolonging the life of their asset; (iii) to obtain energy savings.
- After project implementation, homeowners become more interested in energy savings and some start planning new projects.
- Once payment for heat is based on building level metering and size of apartments, the actual energy savings – reduced consumption – varies significantly from building to building and can be negligible due to increased consumption – from a motivation to have higher indoor temperatures.
- Metering in individual apartments with thermostatic valves and heat cost allocators on the radiators have demonstrated high energy savings and satisfaction.

Financial Barriers

- Homeowners are willing to invest in energy efficiency and renovation if supported with financial incentives, i.e. tax benefits and grant elements. Public outreach alone will not convince homeowners.
- Lack of collateral is an important obstacle to private sector lending to HOAs. Transaction costs associated with administering the subloan as it was structured in this project made this product unattractive for commercial banks as they emerged from banking crisis over the second half of the 1990s. Other financial products could be more effective in mobilizing private bank lending in energy efficiency retrofitting once banks are in a position to move into retail banking.

9. Partner Comments

(a) Borrower/implementing agency:



**LIETUVOS RESPUBLIKOS FINANSŲ MINISTERIJA
MINISTRY OF FINANCE OF THE REPUBLIC OF LITHUANIA**

Mr. Gailius Draugelis
Operations Officer
Infrastructure and Energy Department
Europe and Central Asia Region
World Bank Group

2002-01 *30* Nr. 1302-04-0201103

Dear Mr. Draugelis,

Thank you for your letter of October 25, 2001 transmitting the Implementation Completion Report for the Energy Efficiency and Housing Pilot Project. We have reviewed the report and fully agree with its content and conclusions.

Please find attached our report on the implementation of this Project - a contribution of the Borrower, which was prepared by Housing and Urban Development Foundation, the implementing agency of the Energy Efficiency and Housing Pilot Project.

Kind regards.

Vice Minister

Asta Ungulaitiene

Borrower's contribution is provided in Annex 8.

(b) Cofinanciers:

Comments received from the Ministry for Economic and Business Affairs (formerly Ministry of Housing and Urban Development), Denmark:

Our evaluation of the project is that it has been successful for the following reasons:

- the loan money has been used on time;
- the process of establishing HOAs has been enhanced, and legislation and taxation issues related to HOAs have been improved;

- chairpersons for HOAs have been trained in maintenance planning;
- public awareness of the possibilities and advantages of energy renovations has increased;
- the renovations have had a positive impact on energy efficiency as was the intention, although different renovation solutions and different buildings, as well as the wish to have warmer apartments, now given that opportunity, have to some extent influenced the extent of savings;
- more than 200 blocks have been renovated;
- private energy consultants have been trained;
- a revolving fund with loan repayments has been established to allow new loans to circulate; and
- HUDF has, as a side effect of the project, developed into a professional unit for implementing and stimulating housing policy.

The following steps however still need to be taken by the Lithuanian government in order to assure the sustainability and the spreading effect of results obtained:

- financial assistance in coming years for the major parts of the running costs of the advisory centers - this is a government task, as the centers implement housing and energy efficiency policy. Money invested in the centers comes out with an accelerator effect on society in terms of renovations and thereby jobs created as well as a positive effect on the renovated neighborhoods and thereby the value of apartments and their social attractiveness. Denmark has provided financial assistance for the initial 6 years so far and will do so for another year or two on a declining scale, but the centers have a purpose of advising and training home owners in maintenance, organizational and energy efficiency in many years yet to come, when looking at the potential for forming HOAs and the potential for further energy efficient renovations;
- put a one-time sum of money into the revolving fund to off-set the negative impact of the fund having been created later than originally intended; and
- make a law either on obligatory privatization of the municipal maintenance companies or on quality requirements for work done by the municipal companies - the positive impact on the national budget would, however, be most direct through privatization.

If future projects of this type are considered we would recommend that:

- the World Bank set in motion a special program to develop and make more efficient the private banking sector in parallel, possibly in coordination with the World Bank and Ministries of Economy of interested donor countries;
- the World Bank in accordance with donors assures that information activities are as targeted as possible from the outset and that they continue throughout the entire period - instead of broad initial campaigns followed by targeted and then more or less no information; and
- attention is given not just to creating new institutions like HUDF and the advisory centers but also to ensure their formal linkage, instead of the opposite, to the public administration, as public trust in public administration needs to be improved and could be by such capacity building.

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

Comments received from the Dutch Ministry of Economic Affairs recommended inclusion of an excerpt "Lessons Learned" of Consultant's Final Report under the Project. This section is included in Annex 9. The full report is on file.

Senter [the agency of the Ministry of Economic Affairs responsible for supervising the co-financing of this project] has already approved this final [consultant] report and believes that this project has shown that a tripartite cooperation between the World Bank, the donor countries and the beneficiary country can really have added value. In particular the active contribution of the Lithuanian government and in particular HUDF has been in my view very important. Also the close cooperation between the Netherlands and Denmark has been positive. Because of this development I have good trust that the sustainability of this new development initiated via this common tripartite approach is secured. For this optimistic view a stable governmental environment will be of course be of great importance.

10. Additional Information

None.

Annex 1. Key Performance Indicators/Log Frame Matrix

Outcome / Impact Indicators:

Indicator/Matrix	Projected In last PSR	Actual/Latest Estimate
No. of buildings rehabilitated: apartment buildings single family homes (SFH)		264 apartment buildings renovated. 25 SFHs renovated.
No. of loans approved by PFI: to Homeowners' Ass.(HOA) to SFH owners	200 HOAs and 25 SFHs	234 loans to 211 HOAs provided. 26 loans to SFH owners provided.
No of consultants completed training	120	193 consultants trained. The Lithuanian Energy Consultants Association was formed recently. The members of the Association comprise the trainees who gained experience under the EEHPP.
Other indicators re. HOAs: No of HOAs advised/supported No of inv. proposals prepared	Advised 675 HOAs	726 HOAs advised. 304 investment proposals prepared.
Total amount of investment undertaken by homeowners' associations (in US\$ equivalent) and SFHs (of which 30 % counterpart funds) (PART A)	\$7.57 mn (excluding 10% downpayment by borrowers)	\$8.48 mn total invested.
Energy saved (measured in % terms, in relation to energy consumption before implementation of measures, taking weather conditions and indoor temperature into account).	30-40% for medium sized packages. 50 % where all measures taken.	Of 62 HOAs monitored, heating consumption average savings are 20% percent. In 18 schools monitored heat consumption average savings were 62%.
Number of pupils impacted in rehabilitated schools	5,000	43 schools and 10 kindergardens in 12 of 60 municipalities rehabilitated, benefitting 26,745 pupils.
Total amount of investment undertaken by municipalities (in US\$ equivalent) (of which 20 % counterpart funds) (PART B)	\$5.8 mn	\$5.88 mn total invested.
Other Indicators: 5 advisory centers fully established and staffed.	5 advisory centers operating	5 advisory centers operating.
20 local engineers contracted for project related work.		HUDEF keeps a roster of engineers that have gained experience in energy audits and project related design work. In total 19 engineering consulting firms were used in project work.
% of credit risk which banks are willing to assume regarding lending to Homeowners' Associations.	Banks are unwilling to take credit risk at this time; though consumer lending has just started.	Banks are unwilling to take credit risk regarding lending to HOAs.
Relevant policy decisions taken / activities initiated (e.g. targeting of housing subsidies; cost recovery in residential energy tariffs; reform of residential energy subsidy program) *Improved HOA Law drafted in 1998 and presented to Parliament during Spring 1999.		Status of HOA Law improvements made in July 2000: (i) Implementing decree on property administration has been accepted. Some municipalities have already accepted by-laws for property administrators. (ii) However, mandatory membership to HOAs was struck down by Constitutional Court in December 2000.

<p>*Housing Lending Program (Bustas) improved in 1998 (less subsidies) and in 1999 (requiring funding by banking sector).</p> <p>*Energy Tariffs increased essentially to full cost recovery in 1997, and full recovery maintained since then.</p> <p>*Parts of energy subsidy policy slightly revised at end of 1997 benefitting needy project beneficiaries.</p>	<p>Government commitment to review Bustas Program.</p>	<p>Government has asked Bank for new Housing Reform program and has maintained the reforms (though not perfect) undertaken in 1999.</p> <p>Energy tariffs are maintained at acceptable levels.</p> <p>Revision of energy subsidy policy maintained.</p>
--	--	---

Output Indicators:

Indicator/Matrix	Projected in last PSR ¹	Actual/Latest Estimate

¹ End of project

Note: Output/Impact indicators were presented in one table in the Staff Appraisal Report.

Annex 2. Project Costs and Financing

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

Project Cost By Component	Appraisal Estimate US\$ million	Actual/Latest Estimate US\$ million	Percentage of Appraisal
Residential Rehabilitation	15.10	8.48	
Rehabilitation of Schools	2.20	5.88	
Institutional Development and Technical Assistance	2.80	4.10	
Total Baseline Cost	20.10	18.46	
Physical Contingencies	0.50		
Total Project Costs	20.60	18.46	
Total Financing Required	20.60	18.46	

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

Expenditure Category	ICB	Procurement Method ¹		N.B.F.	Total Cost
		NCB	Other ²		
1. Works	0.00 (0.00)	1.80 (1.40)	15.70 (8.40)	0.00 (0.00)	17.50 (9.80)
2. Goods	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
3. Services	0.00 (0.00)	0.00 (0.00)	0.20 (0.20)	2.90 (0.00)	3.10 (0.20)
4. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
5. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
6. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total	0.00 (0.00)	1.80 (1.40)	15.90 (8.60)	2.90 (0.00)	20.60 (10.00)

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

Expenditure Category	ICB	Procurement Method ¹		N.B.F.	Total Cost
		NCB	Other		
1. Works	1.71 (1.37)	4.06 (3.24)	8.59 (5.38)	0.00 (0.00)	14.36 (9.99)
2. Goods	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
3. Services	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	4.10 (0.00)	4.10 (0.00)
4. Miscellaneous	0.00	0.00	0.00	0.00	0.00

	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
5. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
6. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total	1.71 (1.37)	4.06 (3.24)	8.59 (5.38)	4.10 (0.00)	18.46 (9.99)

^{1/} Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

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

Project Financing by Component (in US\$ million equivalent)

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	Govt.	CoF.	Bank	Govt.	CoF.	Bank	Govt.	CoF.
Residential Rehabilitation	8.20	7.20		5.30	3.18		64.6	44.2	
Rehabilitation of Schools	1.70	0.60		4.69	1.19		275.9	198.3	
Institutional Development and Technical Assistance	0.10	0.80	2.00	0.00	0.53	3.57	0.0	66.3	178.5

Annex 3. Economic Costs and Benefits

This section describes in more detail the methodology that underlined the economic analysis and the calculation of the project's internal rate of return (IRR). All data and household expenditure used in the model were in Lithuanian Litas. The projects costs and benefits were evaluated over a twenty year period. Table A3.1 shows the project's actual investments, along with the economic (resource) and financial costs to households and schools.

**Table A3.1 Investment, Economic and Financial Costs, 1997-2001
(Lithuanian Litas)**

	Actual Investment	Economic Cost	Financial Cost
Household Investment Cost	33,925,886	27,819,227	21,581,756
School Rehabilitation Cost	23,527,728	19,292,737	19,292,737
Total Cost	57,453,614	47,111,963	40,874,493

The project's actual investment costs, as measured by the amount of expenditures on energy savings rehabilitations, were adjusted to economic costs by netting out taxes (VAT of 18% for 100% of the investment in schools and for 90% of household investment). For the further adjustment to financial costs perceived by participating households, the subsidy (upper bound of 30% per apartment) given to households (either directly or via HOAs) was netted out. .

Table A3.2 provides a summary of the energy savings that accrued to the monitored schools and households at the end of the project, expressed as a percent of initial heat expenditures (i.e. before the project started).

**Table A3.2 Energy Savings Rates, 2001
(Percent of pre-project expenditures)**

	Reduced Consumption	Comfort Adjusted
Households	13.2%	22.6%
Schools	27.7%	51.1%

Savings were calculated in "pure" financial terms, reflecting solely reductions in the levels of energy consumption (reduced-consumption savings rate). This measure is a misleading indicator of consumers' true financial benefits. Based on observations at the end of the project, the investments were made to increase comfort levels first and to reduce overall heat consumption second (only after a minimum temperature/level of comfort was attained). The project's financial benefits were thus calculated in terms of the monetary savings resulting from lower energy consumption and increased comfort levels due to lower heat loss and thereby greater affordability of higher inside temperatures (comfort-adjusted savings rate). The project produced a financial internal rate of return (FIRR) of 12.1% (see Table A3.3).

**Table A3.3 Project Rates of Return
(Lithuanian Litas)**

	Financial	Economic
Internal Rate of Return	12.1%	8.6%

Since it was prohibitively expensive before the project was implemented for households to heat their apartments to the desired temperature, the economic analysis takes into account the fact that beneficiaries started out in a situation in which energy consumption was below its desired level due to the high marginal cost of heating. Since consumers were not heating their apartments (schools) to temperatures they

considered optimal, notional (desired) demand at the start of the project was higher than observed demand. This is borne out by the results of the social assessment that was done before project appraisal, where many households considered their apartments colder than they would like it to be and many were using alternative heat sources to increase their level of comfort. Implementing the project was tantamount to effectively reducing the marginal cost of heat (per unit of comfort as measured by degrees centigrade) to the end-users. In the Staff Appraisal Report (SAR) it was assumed that notional and observed demand were equal, whereas the effective demand for energy turned out to be higher than expected, since consumers were faced with lower unit heat costs (as measured by the cost per degree centigrade). Given the importance of heat purchases in the household budget, this decrease in relative price led to both an income effect (an increase in the household's real purchasing power) and price effect, both of which led to a less than expected reduction in heat consumption. This leads to a welfare gain that is not captured by changes in the total value of energy consumed.

The lack of data makes it impossible to rigorously estimate a demand function. The notional demand was therefore calculated by taking the pre-project level of energy expenditure and increasing it by a factor that would make the consumer as comfortable as they would be at the end of the project. The factor used to adjust pre-project expenditures to the higher (pre-project) notional demand is the rate of comfort-adjusted savings shown in Table A3.2. The difference between the notional demand before the project and the actual expenditures at the end of the project provides a proxy for the societal welfare gains generated by the project. By taking into account such a welfare gain and the cost of the subsidy, the project produced an economic internal rate of return (EIRR) of 8.6%.

The project's FIRR exceeded its EIRR largely because of the size of the government subsidy provided to households and HOAs. As was the case in the SAR, the calculation of benefits does not take into account the fact that households and municipalities made investments with longer payback periods that contribute partly to energy efficiency, but also lengthen the productive life of the assets. Despite the stated importance of this benefit in household surveys, the value of benefits that resulted from improving the physical condition of the assets were not quantified due to lack of data, and the EIRR calculated therefore underestimates the true economic return to households and society.

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating		
	Month/Year	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation					
	November 1993	4	3 Economists, 1 Architect		
	February 1994	3	2 Economists, 1 Division Chief		
	May 1994	3	2 Economists, 1 Consultant		
	July/Aug. 1994	2	Economists		
	October 1994	2	Economists		
Appraisal/Negotiation					
	Sept./Oct. 1995	6	4 Economists, 1 Architect, 1 Social Scientist		
	Apr./May 1996	2	Economists		
Supervision					
	July 1996	2	Team Leader, Energy Consultant	S	S
	Aug./Sept. 1996	8	Team Leader, 3 Economists, 1 Operations Analyst, 1 Energy Consultant, 1 Public Information Consultant, 1 Institutional Consultant	S	S
	February 1997	3	Team Leader, Economist	S	S
	June 1997	5	2 Economists, 1 Operations Analyst, 1 Energy Consultant, 1 Public Information Consultant	S	S
	February 1998	2	Team Leader, Energy Consultant	S	S
	May/June 1998	5	Team Leader, Operations Analyst, Social Scientist, Public Information, Engineer	S	S
	June 1999	5	Team Leader, Operations Analyst, 2 Social Scientists, Public Information	S	S
	February 2000	5	Team Leader, Economist, Operations Officer, Procurement Specialist, Engineer	S	S
	June 2000	4	Team Leader, PTL, 2 Consultants	S	S
	September 2000	5	Team Leader, PTL, Engineer, Operations Officer, Financial/Municipal Consultant	S	S
	February 2001	1	Team Leader	S	S
ICR					

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation	2.2	19.9
Appraisal/Negotiation		
Supervision	59.1	360.9
ICR		
Total	61.3	380.8

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

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

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

Annex 6. Ratings of Bank and Borrower Performance

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

6.1 Bank performance

Rating

Lending

HS S U HU

Supervision

HS S U HU

Overall

HS S U HU

6.2 Borrower performance

Rating

Preparation

HS S U HU

Government implementation performance

HS S U HU

Implementation agency performance

HS S U HU

Overall

HS S U HU

Annex 7. List of Supporting Documents

1. Staff Appraisal Report No. 15397-LT, June 7, 1996
2. Supervision Mission Back-to-Office Report, October 9, 1996
3. Supervision Mission Back-to-Office Report, March 19, 1997
4. Supervision Mission Back-to-Office Report, June 26, 1997
5. Project Status Report (non-mission update), January 16, 1998
6. Supervision Mission Back-to-Office Report, March 19, 1998
7. Supervision Mission/Mid-Term Review Back-to-Office Report, June 15, 1998
8. Project Status Report (non-mission update), February 9, 1999
9. Supervision Mission Back-to-Office Report, June 25, 1999
10. Project Status Report (non-mission update), December 20, 1999
11. Supervision Mission Back-to-Office Report, February 18, 2000
12. Supervision Mission Back-to-Office Report, July 10, 2000
13. Supervision Mission Back-to-Office Report, August 16, 2000
14. Supervision Mission Back-to-Office Report, October 10, 2000
15. Supervision Mission Back-to-Office Report, February 16, 2001
16. Technical Mission, Back-to-Office Report, September 24, 2001
17. PIU Quarterly Progress Reports
18. The Kaliningrad Center for Social Surveys, "The Results of the Poll (Head of Household Interview) Vilnius-city", Russian Federation, May 1999.
19. Economic Commission for Europe, *United Nations Country Profiles on the Housing Sector -- Lithuania*, New York and Geneva, 2000.
20. Peitsman, H. and Vijfwinkel, W., "Energy Renovation in Schools: Experiences and Lessons Learned," Netherlands, 2001. (Consultants from TNO Dutch Consulting Firm.)
21. Ramboll (Danish Consulting Firm), "Energy Efficiency Housing Pilot Project -- Social Monitoring and Beneficiary Assessment and Minutes from Final Workshop 8 September 1998," October 1998.

Additional Annex 8. Borrower's Contribution

Improving Energy Efficiency in Residential and Public Buildings in Lithuania: The Energy Efficiency Housing Pilot Project

Summary

Combined efforts of active homeowners, private businesses, the project coordination unit, state authorities, donor countries and international financing institutions led to successful implementation of the Energy Efficiency Housing Pilot Project (EEHPP) in Lithuania. This project was aimed at supporting private and public initiatives to reduce energy use in residential and public buildings and supporting the Lithuanian Government in the housing privatization process via increased private initiative in housing maintenance. The project objectives should have been achieved through: (a) provision of loans for technically and economically attractive packages of energy efficiency measures; (b) introduction of the concept of long-term lending for housing improvement to the commercial banking sector; (c) development of energy consulting services; (d) comprehensive assistance to homeowners implementing energy efficiency projects; and (e) support for municipalities in the energy efficiency rehabilitation of schools. Appropriate financing, workable legal framework, and extensive support network enabled more than 200 homeowners' associations and owners of individual houses as well as 12 municipalities to implement various packages of energy efficiency measures in their buildings. Within the project framework approximately US\$8.5 million were invested in renovation of residential buildings, US\$5.9 million in rehabilitation of schools and US\$2.9 million in institutional strengthening and technical assistance.

The major focus of the project was improvement of energy efficiency in residential multi-family buildings managed by Homeowners Associations (HOAs). Figure 1 shows the set up of this project component. Financing for investments was made available for Homeowners Associations via local commercial bank(s). A support network consisting of five Advisory centers provided free of charge advice on technical, legal, financial and managerial issues to members of associations and individual homeowners. Private energy consultants supported HOAs with preparation and supervision of renovation projects. Private contractors were involved in the implementation of building renovation works.

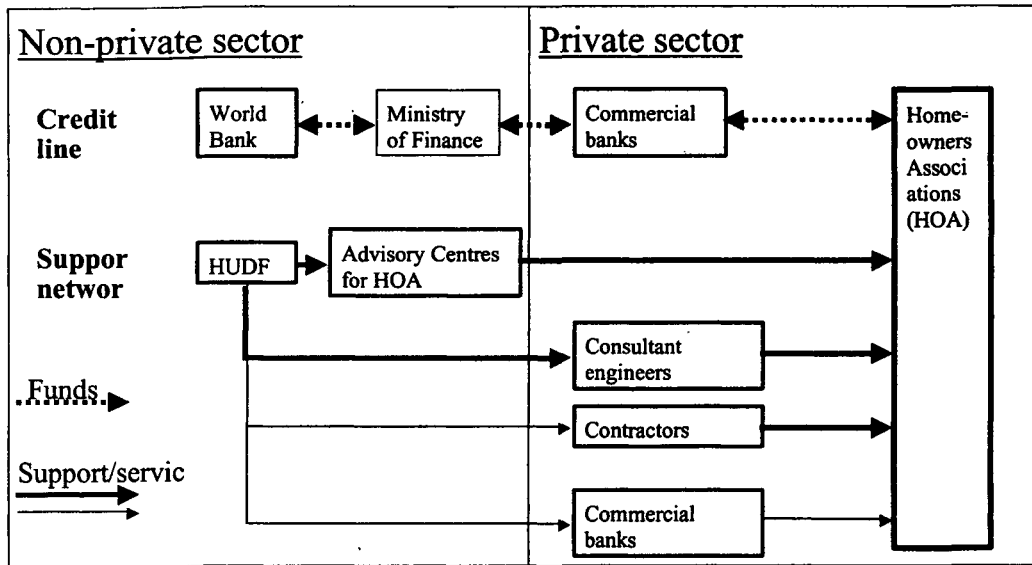


Figure 1 - The objectives should have been achieved through provision of loans to HOAs and establishment of a support network enabling HOA to benefit from the credit line. The Housing and Urban Development Foundation acted as the project coordination unit.

Within the project framework capacity of private energy consultants was enhanced and a comprehensive public information program was conducted. These undertakings improved Lithuanian public awareness on energy efficiency issues and enabled 207 HOAs and 25 owners of single family houses to implement various packages of energy efficiency measures in their buildings - Figure 2. Monitoring of the implemented projects showed very large variation in achieved savings and pay back times, but seen together the investments were cost effective.

	1996-1997	1998	1999	2000	2001	Total
Total amount of loans (used loan amount) to HOAs (period – according to the end of works), US\$	74,300	206,000	1,161,000	3,375,500	2,401,200	7,218,000
Amount of grant provided, US\$			442,300	905,500	695,200	2,043,000
No. of Projects implemented by HOAs (some HOAs implemented more than one project)	5	18	49	111	46	229
No. of HOAs advised	87	113	312	113	101	726
No. of buildings audited	46	54	141	66	24	331
No. of Investment Proposals prepared	27	45	134	75	23	304
Average loan, US\$	14,850	11,460	23,700	30,400	52,200	31,500

Figure 2 - Summary of the EEHPP results (for HOAs only).

The EEHPP was a pilot project that attracted large donor support for technical assistance, which effectively supported the implementation. The project addressed only a fraction of the total demand for

renovation and energy efficiency in the country. Nevertheless the project aim to initiate development and demonstrate practical solutions was fulfilled. Financing possibilities for Homeowners Associations were at the end of the project insufficient and the project failed to involve private banks to meet this demand. New initiatives to meet this growing demand were initiated and should be supported.

Project background

Prior to the EEHPP implementation the housing sector situation can be summarized as: (1) poorly maintained buildings with excessive energy intensity; (2) lack of financing opportunities for owners of newly privatized of apartments; (3) poor managerial capacity of homeowners and lack of traditions for communal undertakings; and (4) undeveloped energy consulting services.

Lithuania's dependence on imported fuel and the rapidly increasing energy prices made the wasteful energy consumption an unaffordable burden for income constrained consumers. A number of studies suggested that there was a significant potential for cost effective implementation of energy efficiency measures in residential buildings and that it was difficult for homeowners to finance the required investments without the involvement of credit institutions.

Housing sector privatization started from privatization of apartments of multi-family buildings and the EEHPP was designed to demonstrate ways to complete the privatization via stimulation of private initiative in housing maintenance and renovation.

Project implementation

The Housing and Urban Development Foundation (HUDF) was responsible for the project implementation together with the Ministry of Finance and the project was implemented in the period of 1996-2001. The extensive technical support program was mainly sponsored by the Danish Ministry of Housing and Urban Affairs and the Dutch Ministry of Economics. Governments and agencies of Sweden, Norway and the EU provided limited support. The project implementation team, the World Bank and donors were very determined on a success and this enthusiasm greatly contributed to a successful implementation.

Funds for school renovation were channelled to participating municipalities via the Ministry of Finance of Lithuania. 12 municipalities benefited from the project and implemented energy efficiency measures in 53 schools and kindergartens, benefiting 26,745 pupils. Technical monitoring of 18 retrofitted secondary schools demonstrated average heat savings of 24 percent. Successful implementation of public school renovation projects generated significant demand from the municipalities for further loans.

Figure 3 shows main events of the residential project component. The project developed as a genuine pilot project with numerous modifications and an effective integration of lessons. Three performed policy studies significantly assisted the project implementation team and the Government to make necessary amendments of laws and procedures to ensure efficient disbursement of allocated funds.

It proved to be difficult to motivate homeowners to take a common bank loan and implement energy efficiency measures due to household resistance against using bank loans for communal undertakings. There were many barriers to overcome and only a few HOAs succeeded in the first year of the project implementation. These few examples were used in public campaigns which increased interest in the project. The real break through came after introduction of a 30% State grant on the loan principal - see Figure 4.

	Project preparation and mobilisation	HOA loan procedures	Support network to HOAs, Energy Consultants	Support network to HOAs, Advisory Centres	Actions towards main target group	Learning's	Modifications
1994	preparation and contracting						
1995	Operating procedures and implementation agreements						
1996	Planning and setting up of procedures and forms						
1997	Inception report	1st version prepared (described in inception report)	Contraction and training of private energy consultants	Establishment of 2 Advisory Centres Staff training beginning of support to HOA	Advertise loan possibility to HOA (Brochure and television)	Small number of HOA express interest	Project review mission Interest rate reduced from 15 to 11 percent Procedures and forms for Energy Audit and Investment Proposal simplified
1998		Revised version of loan procedures issued				Only 10 loan agreements signed by end of 1997	Intensified Public Information
			Energy Consultants services improved	Three more Advisory Centres established Advisory centres becomes more involved in Public Information (before made by PCU)	Public information intensified, case stories used in television 1st version of newsletter with success stories issued in April	The first few loans signed and implemented Advisory Centres seem to be promoting the loan better than Energy Consultants	Number of Advisory Centres increased from 2 to 5
1999		Loan procedures simplified and initial technical advice by Advisory Centres included		Technical staff for Advisory Centres employed and trained		Registration of interested HOA increases Preparation of Energy Audits can not meet the demand	Decided to improve "product" MOF and GOL asked to approve that counterpart funds is used as a upfront grant Approved Dec 1998 Agreed to include technical advisor in Advisory Centres to involve in initial project preparation
		Loan procedures further simplified and clarified Procedures for grant prepared and improved	Energy Consultants intensify support with procurement and supervision of works	Advisory centres prepare simplified energy audits for HOA discussion and decision	Massive Public Information 200000 copies of Jaukus Namal to advertise grant	Project review performed Number of projects still not satisfactory. Survey show that additional public information will not work. "Product" not attractive enough	Grant approved by the GOL in December 1998
2000				Intensified support with project implementation		Large Increase in number of applicants and applications	Further streamlining procedures and data collection
2001						Dutch support to Energy Consultants expires H	Decided that HOA should pay for procurement and supervision themselves Added to the loan
						Forecast show that all funds will be disbursed	Public Information activities are reduced
						All funds disbursed (June 2001)	Closing date extended by 8 month till June 2001

Figure 3 - Main events of the residential project component from preparation until disbursement of all funds.

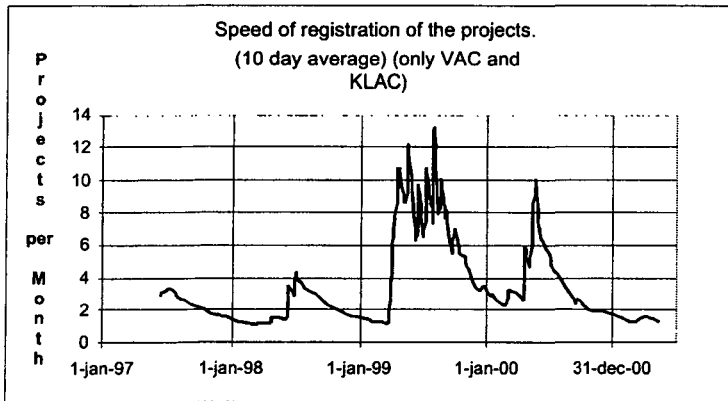


Figure 4 - Number of HOAs initiating building renovation projects per month. Includes only projects, which were later completed. The 30% grant was introduced in early 1999.

The loan

The loans for HOAs were offered in local currency Lit (4Lt = US\$1) at 11% interest rate with 10% down-payment (could be replaced by investments already made) and maximum 10 year maturity. The State grant was calculated as 30% of the loan principal but not exceeding 50 Lt (US\$12.5) per m² of living area. In addition to the grant there was a partial VAT exemption for HOAs and individual homeowners. Figure 5 shows a typical example of the financing scheme.

Project financed with ETB loan and grant		Lt	Litas/m ²
A	Total investment including VAT	100,000.00	50.00
B	Downpayment, cash	5,000.00	2.50
C	Downpayment, presented invoice for investment already made	5,000.00	2.50
D	To be financed	95,000.00	47.50
E	VAT exception	13,725.00	6.86
F	To be financed excluding VAT	81,275.00	40.64
G	30% Grant	24,382.50	12.19
H	To be financed by ETB loan	56,892.50	28.45
I	Actual investment	61,892.50	30.95
	% of total investment paid by HOA	62%	
	% of total investment as support	38%	

Figure 5 - Example of 100,000 Lt (US\$25,000) investment for a 2000 m² building.

The loan repayment was shared between homeowners according to an agreement made in General Meeting, typically according to an apartment size. In numerous projects including window replacement some homeowners did not replace windows and thus paid less. The repayment schedule was linear with equal repayment of principal and payment of accruing interest, which made repayment calculations rather time consuming. The bank was accepting premature repayments.

The implemented renovation projects

Measures

Initially most projects were limited to renovation of a heating system, but after introduction of the grant replacement of windows and insulation of walls became more popular, in particular among more wealthy homeowners in Vilnius and Klaipeda. A total of 982 energy efficiency measures were included in 229 projects, amounting to 4.3 per project. Figure 6 shows an overview of implemented measures. Selection of measures was based on two principles: (1) to include measures which would ensure increased energy efficiency; and (2) to include measures that would prolong the lifetime of the buildings and by that increase the amount of energy saved. The latter included measures important for building maintenance: replacement of pipes and radiators, replacement of valves, repair of walls and joints between panels in panel buildings, repair of sewage system and repair of leaking roofs.

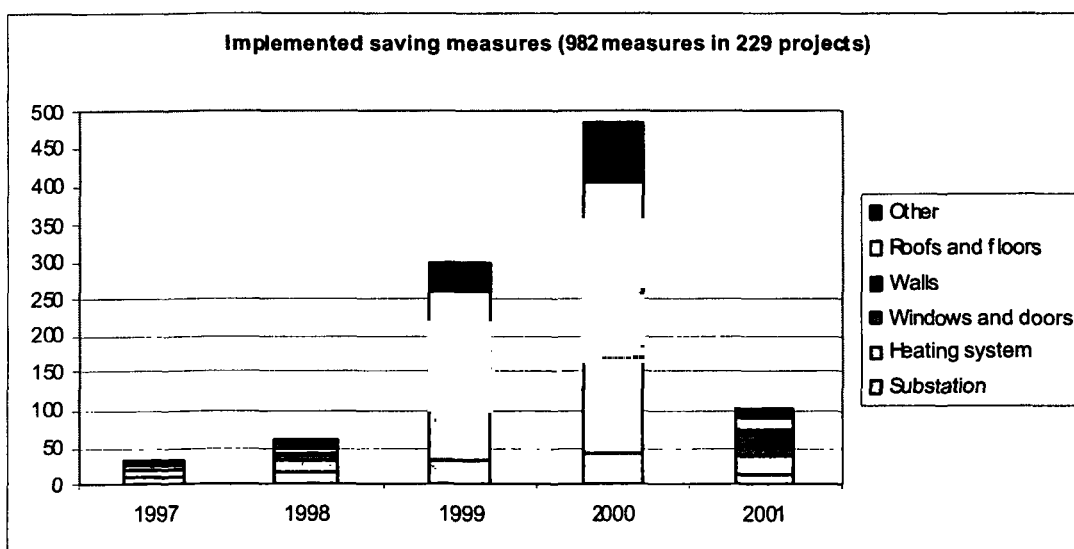


Figure 6 - Implemented measures in 229 projects by year.

Savings

For 96 out of 229 implemented projects by HOAs a rough estimation of savings was performed based on consumption data during heating seasons before and after implementation. The investments in these 96 projects varied from less than US\$ 250 per apartment to more than US\$ 3,500 per apartment with an average close to US\$ 1,000.

The monitoring showed a very large spread in savings, from significant additional consumption to more than 50% reduction (see Figure 7) with an average value for normal year of 17% (without adjustment for comfort change). In reality many homeowners preferred increased comfort for savings and raised indoor temperature (see Figure 8). A rough estimation showed that without this increase the average saving would have been 25% - Figure 7.

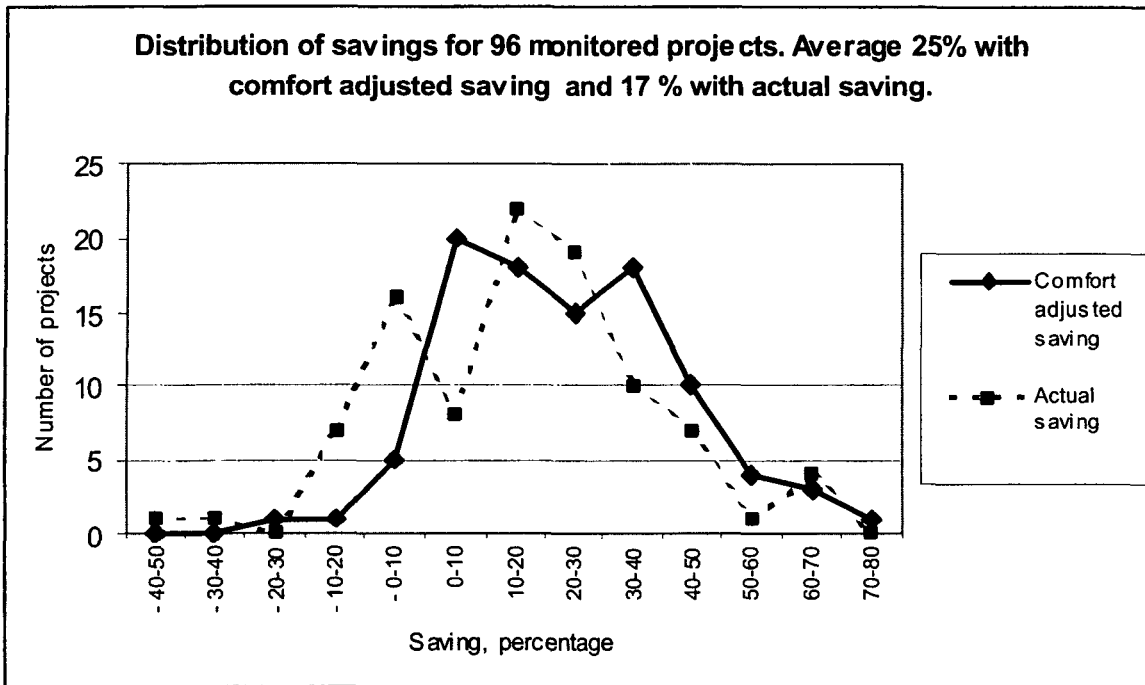


Figure 7 - Distribution of savings for 96 monitored projects. The actual saving is based on consumption before/after renovation referred to the normative year. The comfort adjusted savings take into account increased comfort level after renovation.

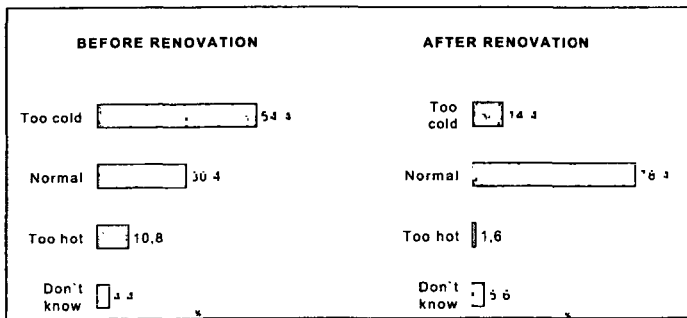


Figure 8 - Indoor comfort before and after building renovation Source: Survey of 250 homeowners in 50 HOAs, Baltic Surveys, October 2001

Higher investments generally resulted in higher savings but there were rather large variations. Figure 9 indicates a comfort adjusted savings of about 40% for investments of about US\$ 2,500 per apartment dropping to 20% for investments below US\$ 750. The large spread means that it is very difficult to forecast savings for a particular building. Savings do not only depend on the measures implemented but very much on the specific conditions before implementation and in particular on management of energy

consumption. Therefore further initiatives in demand side management are important.

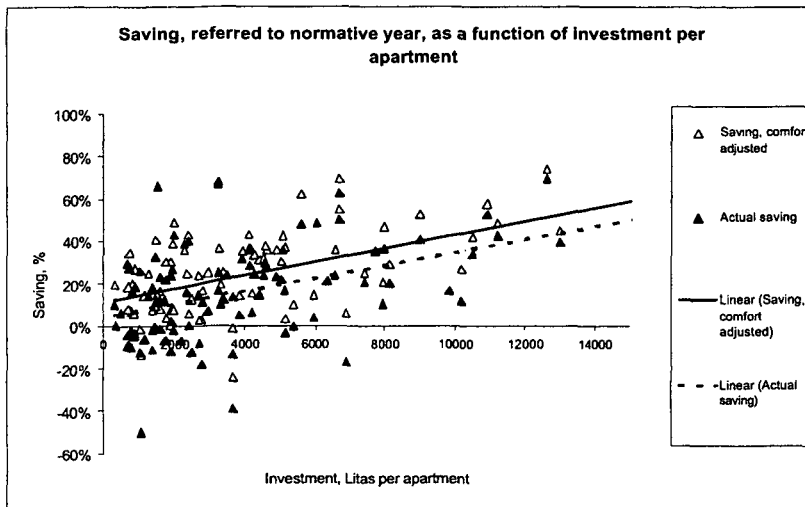


Figure 9 - Savings for 96 monitored projects as a function of the investment (including VAT and grant) per apartment. Actual savings and comfort adjusted savings. (4 Lt = US\$1)

Figure 10 shows the relation between achieved savings and the specific consumption of the building before renovation. It is clear that renovation of buildings and heating systems in buildings with very low consumption before renovation (underheated) resulted in an increased consumption. High initial specific consumption generally meant higher savings, but still with very large spread. This indicates that a forecast of energy savings should include an analysis of specific consumption for the particular type of building and a comparison with other similar buildings.

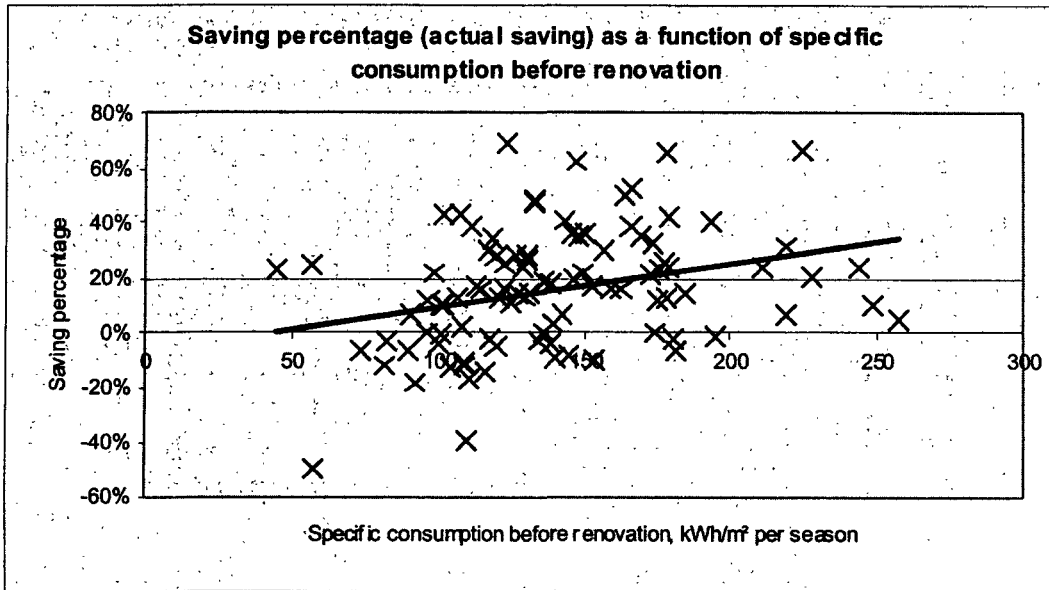


Figure 10 - The actual savings for 96 monitored projects, consumption before/after renovation referred to normative year as a function of the specific consumption before renovation.

Financial benefits and loan repayment

Pay back time

The simple pay back time from the consumer point of view is calculated by dividing actual investment (down payment plus loan amount) by savings achieved during the first year. The pay back time for the 96 monitored projects is presented in Figure 11. As can be seen the State grant was required to make the investments more attractive for homeowners. The spread in savings leads to similarly large variations in simple pay back times for implemented projects as illustrated in Figure 12.

	Based on total investment	Based on homeowner's investment (VAT exemption and grant).
Based on comfort adjusted savings	11	7
Based on actual savings	17	12

Figure 11 – Simple pay back times for the monitored projects considered together as one project (for normal year, heat cost of US\$37.5 per MWh).

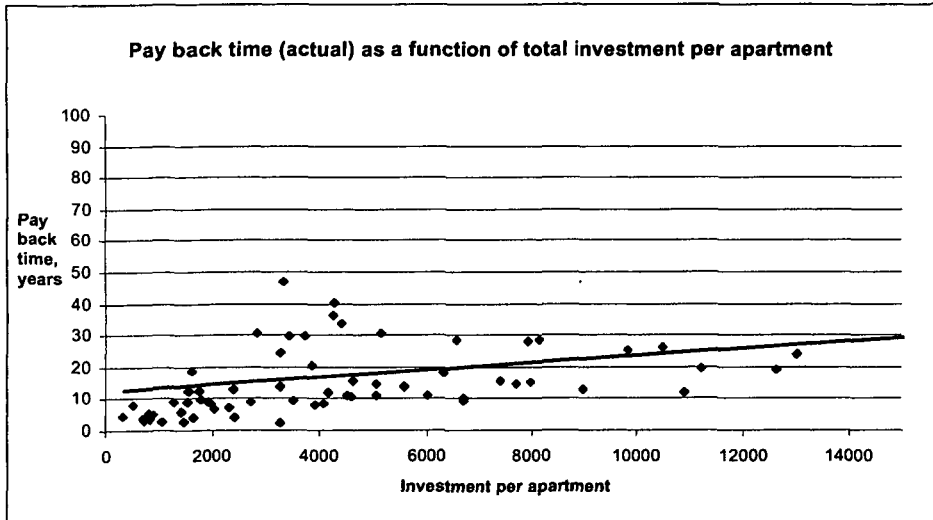


Figure 12 - The pay back time based on the actual savings as a function of the investment per apartment. Cost of energy US\$37.5 per MWh. Includes only the monitored projects with positive savings.

Net present value

The net present value gives better evaluation of the project. Figure 13 shows the sum of net present values (for HOAs) for all 96 monitored projects using a discount rate of 7% and a cost of heating of US\$37.5 per MWh. Expenses include downpayment and monthly payments for the loan. Incomes are heat savings.

The net present value for all projects after 10 years based on actual savings is – US\$ 1.5 million. It could be expected that homeowners will increase the comfort when they can afford it and when the heating system allows it. It is therefore most relevant to consider the net present value based on comfort adjusted savings. With a 10 year period this is still negative, but becomes positive if a period of 15 years is considered, or if a part of investment is considered as a maintenance or renovation cost and not included in the net present value calculation. An increase in cost of energy above inflation lead to a substantial increase in net present value.

		NPV, US\$ mln.
1	NPV: After 10 years, based on actual saving.	-1.5
2	NPV: After 10 years, based on comfort adjusted saving	-0.425
3	NPV: After 10 years, based on comfort adjusted savings. Assuming 50% of expenses and payments is for maintenance.	0.975
4	NPV: After 15 years, based on comfort adjusted saving.	0.375
5	NPV: After 15 years, based on comfort adjusted saving. Assuming 3% yearly net-increase in cost of energy.	1.075

Figure 13 - The sum of net present values for the 96 monitored projects on different conditions. Discount rate 7%. Cost of energy at the outset US\$37.5 per MWh.

Loan repayment

During the project preparation period there were many concerns regarding loan repayment, i.e. that homeowners would not be able or willing to repay the loan. The experience showed that repayment caused fewer problems and many loans were repaid in advance, even though one third of the surveyed homeowners found the loan repayment a significant burden - see Figure 14. Some homeowners repaid their part of the loan immediately indicating that loan repayment was not a burden for them at all.

Assessment of the burden is clearly dependent on income level, even taking into consideration that the majority of low-income households were eligible for heating subsidies. About 35% found the repayment a significant burden and 2% unbearable, indicating that investments could not be much higher.

Importance of loan burden on household budget	Monthly household income					All
	Up to 500 Lt	501-700 Lt	701-1000 Lt	1001-1400 Lt	1401 Lt and more	
Unbearable	9.7%	3.0%	-	-	-	2.0%
Significant	64.5%	48.5%	33.3%	33.3%	16.4%	34.8%
Insignificant	19.4%	30.3%	38.3%	47.1%	41.8%	36.8%
Negligible	-	18.2%	26.7%	19.6%	41.8%	24.8%
Don't know	6.5%	-	1.7%	-	-	1.6%
Number of respondents*	31	33	60	51	55	250

Figure 14 - Loan burden on household budgets for different income groups (4Lt = US\$1). Source: Survey of 250 homeowners in 50 HOAs, Baltic Surveys, October 2001

According to the survey about ¼ of homeowners found that the loan is financed by the savings, and more than half that it was an extra burden - Figure 15. The tariffs for district heating increased in most cases and this may have influenced the response. A social subsidy scheme (available for project participants) helped low income families to cope with the loan repayment and enabled them to participate in the project. Seven percent of the surveyed claimed that the allowances covered the loan repayment.

Source	% of resp.
Loan repayment is covered by savings in heating costs	23
Loan repayment is covered by heating subsidy	7
Loan repayment is an extra expenditure compared to before renovation	61
Don't know	9
Total	100

Figure 15 - Where does the money for loan repayment come from. Survey of 250 homeowners in 50 HOAs, Baltic Surveys, October 2001

Institutional development

The institutional development resulting from, or supported by the EEHPP was rather substantial. Awareness and organizational level of numerous HOAs increased. Surveys showed that HOAs which participated in the project changed their attitude towards loan financing of building renovation projects as 57% of them are willing to take another loan and 90% would recommend other associations to do so.

A pool of private consultants gained valuable experience in servicing homeowners and have now access to relevant tools and methodologies. Advisory Centers have gained valuable experience and their skilled staff is currently involved in training of housing administrators and supporting municipalities in housing sector related issues. The HUDF have developed into a capable institution involved in implementation of large multilateral projects.

Concluding remarks

The main barriers for investments in energy efficiency and building renovation were: (1) lack of trust in higher volume communal undertakings; (2) resistance against communal financial arrangements involving banks; (3) resistance from needy homeowners who can not afford to participate in building improvements; and (4) expectations that somebody else (municipality, State) should take care of multi-family buildings.

The Energy Efficiency Housing Pilot Project demonstrated that homeowners are able to overcome these barriers, at least in the pilot project arrangement, if sufficiently supported. A precondition for communal investments is an adequate legal framework enabling homeowners to: (1) form associations; (2) make majority decisions; and (3) ensure enforcement of obligations of individual homeowners.

Repayment of loans can be a significant burden for the poorest part of homeowners and thus a support system that enables them to participate in common projects is needed. In the longer term a greater mobility in the housing market is preferable because the society should not pay for homeowners who live in apartments they can not afford.

Housing maintenance is not a major priority for households therefore financing of common building improvements via bank credits is a significant challenge. Experience from the Energy Efficiency Housing Pilot Project shows that very direct and independent organizational support is important, which was provided by the regional Advisory Centers. A second success constituent was effectively performed building renovations which were publicized via information campaigns and social contacts in the neighborhood.

Although the recorded increase in energy efficiency have been achieved in many projects, the financial pay back time of investments was somehow larger than expected, and varied a lot from building to building. Many investments were not feasible from exclusively energy saving point of view and therefore it is important to consider other aspects of renovation, i.e. prolongation of building lifetime and reduction of future maintenance expenses.

The 30% State grant helped homeowners to overcome initial resistance and make investments. This grant is justified by associated societal benefits related to reduced energy consumption and fuel imports, increased employment, additional tax revenues and positive environmental impact.

The project funds available for improvements of residential buildings were limited. Local commercial banks are still not interested in this market segment and therefore main financial sources for multi-family building improvements remain household monthly incomes and cash savings. Therefore it is important to ensure sustainable financing of multifamily building retrofits. Future undertakings should utilize the potential demand and capacity established in the framework of the Energy Efficiency Housing Pilot Project and find credit enhancements designed to attract local commercial lending to this market segment.

Additional Annex 9. Cofinancier's Contribution

Comments received from the Dutch Ministry of Economic Affairs (excerpt from Consultant's Final Report under the Project which is on file):

1. LESSONS LEARNED and RECOMMENDATIONS

1.1 Reference Data for Energy Consumption of School Buildings

The full consultant's report presents a one page overview with performance indicators. This sheet is based only on the three schools in Kaunas. To provide municipalities with short information about possibilities, we suggest to develop this page further in Excel with some simple calculation sheets behind this presentation form. This form can be made more specific for a certain school.

1.2 Renovation of Windows

In the three examples presented in this report, most of the windows are replaced by new ones. We propose also to investigate the opportunities for refurbishment of the window frames.

1.3 Detailed Monitoring in Schools

An analysis of the correct operation of the substation is necessary to check whether the activities are correctly executed by the installer. We suggest to start detailed monitoring for a short period during the heating season. One short period of three weeks at the start-up of the heating season and three weeks in a real winter period. We propose to invite students from polytechnical high schools or from technical universities for the execution;

1.4 Hydraulic Balancing of the Heating System

The experience till now shows that a good hydraulic balancing of the heating system is the basis for a good functioning of the system. This item is really underestimated. It is not clear for us whether the installers well trained and equipped for this job. We suggest to investigate which tools are required for the support of the installers;

1.5 Renovation Investment versus Energy Saving Investments

The experience till now shows that a big part of the implemented energy saving measures are more related to 'cure' the lack of maintenance. We propose to split up clearly the investments between measures related to maintenance and measures related to energy savings. The pay-back calculation what belongs to energy saving will be more realistic;

1.6 Energy Prices

The experience till now shows that the price for energy will continuously increase, each year. This has a positive effect on the pay-back time.

1.7 The School Building Stock

The energy performance of the current school building stock is generally very poor. Therefore actions to invest in energy saving activities are very favorable. Measures in energy saving actions are very profitable, giving a good pay-back performance.

1.8 Planning of the Maintenance

The new investments have to fit into a sustainable policy. The school owners have make yearly budget allocations for maintenance. There are three methods for maintenance budgeting:

1. failure maintenance;
2. preventive maintenance by using maintenance cycle and cost; and
3. condition-based maintenance by regular inspecting.

The planning of the maintenance depends on the method of budgeting.

We have no clear view what the state of the art is in Lithuania. We propose to give strong attention to this item.

1.9 New technologies

Introduction of new technology, like solar energy, Photo Voltaic etc. are too expensive till now. Promotion of sustainable energy can be realized by special incentives.

1.10 Introduction of energy saving incentives

A start is already made by the introduction of subsidies for energy saving investments.

1.11 Further recommendations

With regard to the monitoring of schools and the further development of technical assistance with preparation and implementation of school projects we would like to give the following items into consideration:

Monitoring of schools

The set up and execution of *monitoring cannot be seen apart* from the project preparation and project implementation. The same information structure and most of the data that is used for the energy audit report and the investment project is needed for the monitoring reports of the schools. We therefore suggest:

- To develop formats for energy audit reports and investment projects for school projects and to require formally that these formats will be used for the reports. As example the formats of the reports presented in the “Guidelines and Tools for Energy Consultants” could be taken. In this way the consultants are not troubled with new methods/approaches and can continue their work in a smooth way;
- To identify the data needed for the HUDF, the Ministry of Education, the Consultants etc.;
- To set up a database for project data and monitor data of schools. When the energy audit reports

and investment project reports have an uniform structure, it requires only limited effort to enter the project data in each phase of the project. For the information to be included in the database we would like to refer to the data presented in the document "Proposed monitoring report for schools". Furthermore it would be useful to review the preparative works for the school renovation program that have been executed for the Ministry of Education. As far as we know, Eksergija, Siltas Namas, the technical University of Vilnius were involved. For this project the information need was analyzed (for energy efficiency as well as due maintenance and modernization), a database was set up and analyses of the results were performed; and

- To include in the loan agreement the obligation for the municipality to provide monitoring reports according to the required format after the implementation of the project. Preferably the monitoring period will be three years with every year a report. These obligations can be included in the contract of the energy consultant who assists with the project preparation and implementation.

Energy Management

Energy Management and a regular check of the settings and functioning of automatic control systems are needed to avoid spilling of energy. The monitoring of the school projects shows that in most cases no attention was paid to proper adjustment of control equipment and regular checks during operation. Because of this lack of attention the energy consumption in the monitored schools was about 7 – 10 % higher than needed. To tackle these problems the advise is to introduce a method for energy management and to agree with the actors involved on their role and tasks. We would like to make the following recommendations:

- Formalize in the loan agreements that an energy management program has to be introduced by the municipality after the implementation of the project. During the first three years after implementation of the project, the municipality has to report about the results of the energy management;

- Set up a structure for energy management. The methodology for energy management is well known and has been worked out already for apartment buildings, so it should not be difficult to work out a tailor made approach for the schools in Lithuania;

- Include in the terms of reference for the suppliers of the heating installations the obligation that they have to adjust and test the automatic control systems. In the Netherlands this is arranged in such a way that after the start of the heating season during one week the main parameters of the heating installation are recorded on the basis of which the adjustments are optimized. After about three months i.e. in mid winter, the main parameters are recorded again during one week and the adjustments are optimized. This approach could also be used in Lithuania, or it could for example be arranged through a separate service contract with a maintenance company; and

- As it is the experience that it is difficult to keep people motivated to continue with energy management on the long term, it is recommended to build in incentives in the energy management approach. Such incentives could for example be that the school can benefit of the saved energy costs (to buy schoolbooks etc) and/or to use the energy management program as education for the students. In the Netherlands, a reference energy consumption is determined for each school; when the real energy consumption is lower then the reference, the school gets the cost savings for their own benefit, but in case the energy consumption is higher the school has to pay the extra costs from its own pocket. Several packages of education material are available and we know that Cedra developed a draft set of material including environmental issues.

For energy management, the following actions can be taken:

- one person in the school must be selected and instructed;
- the work will consist of reading out of the heat meter, the outside air temperature and some inside air temperatures (e.g. with min/max thermometers) on a regular basis;
- registration of thermometer values of the substation on regular basis; and
- analysis of this data with an expert during the heating season.

Advisory Centers

The Advisory Centers (AC) could arrange the *organization* around the monitoring and energy management. In this case it is recommended that:

- Clear arrangements with the energy consultants (Lithuanian Association of Energy Consultants) will be made about the work division. For example, the support to the municipalities and energy education will be provided by the AC and more technical parts like testing and adjustment of automation equipment, analyses of energy consumption for monitoring purposes etc. will be done by the energy consultants;
- Provisions will be made for the transfer of monitor and energy management data from the AC to the HUDF database. This could for example be included in the information network that will be built with Dutch Technical assistance; and
- The AC and the energy consultants will get training about the monitoring and energy management approach to be introduced.

Guidelines tools

The development and revision of guidelines and tools for energy consultants for energy renovation of schools. Most of the material can be used with limited adaptations. However, some parts need a more substantial revision:

- The calculation method for the analyses of the energy consumption and the calculation of the savings has to be revised. This is rather important because there is a need for a uniform calculation method to get accurate monitoring results;
- The formats for Energy Audit, the Investment Project and the monitoring report have to be updated; and
- Monitoring results of schools have to be included;
- Procurement procedures have to be adjusted.