Document of
The World Bank

Report No: ICR0000881

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IBRD-46010)

ON A

LOAN

IN THE AMOUNT OF US$85.0 MILLION

TO THE

RUSSIAN FEDERATION

FOR A

MUNICIPAL HEATING PROJECT

December 10, 2008

Sustainable Development Department
Europe and Central Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 23, 2008

Currency Unit = Russian Rubble (RUB)
1.00 = US$ 0.04
US$ 1.00 = RUB 26.56

FISCAL YEAR

ABBREVIATIONS AND ACRONYMS

CAS	Country Assistance Strategy
CHS	Central Heat Substations
CPIU	Central Project Implementation Unit
FMCA	Financial Management Capacity Assessment
FMRs	Financial Management Reports
IBRD	International Bank for Reconstruction and Development
IHS	Individual Heating Sub-Station
INT	Department of Institutional Integrity
ISRs	Implementation Status Reports
LPMUs	Local Project Management Units
M&E	Monitoring and Evaluation
MTR	Midterm Review
NFHR	National Foundation for Housing Reform
PAD	Project Appraisal Document
PEG	Procurement and Engineering Group
PDO	Project Development Objective
SIAs	Subproject Implementation Agreements
SLAs	Sub-Loan Agreements

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Russian Federation
Municipal Heating Project

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A. Basic Information

Country:	Russian Federation	Project Name:	Municipal Heating Project
Project ID:	P038551	L/C/TF Number(s):	IBRD-46010
ICR Date:	12/10/2008	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	RUSSIAN FEDERATION
Original Total Commitment:	USD 85.0M	Disbursed Amount:	USD 78.0M

Environmental Category: B

Implementing Agencies:
National Foundation for Housing Reform

Cofinanciers and Other External Partners:

B. Key Dates

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	01/24/2002	Effectiveness:	04/08/2003	04/08/2003
Appraisal:	03/25/2002	Restructuring(s):		
Approval:	05/30/2002	Mid-term Review:	03/20/2006	10/05/2006
		Closing:	06/30/2006	06/30/2008

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes:	Satisfactory
Risk to Development Outcome:	Moderate
Bank Performance:	Moderately Satisfactory
Borrower Performance:	Moderately Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)

Bank	Ratings	Borrower	Ratings
Quality at Entry:	Satisfactory	Government:	Satisfactory
Quality of Supervision:	Moderately Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance:	Moderately Satisfactory	**Overall Borrower Performance:**	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators

Implementation Performance	Indicators	QAG Assessments (if any)	Rating
Potential Problem Project	Yes	Quality at Entry	None

at any time (Yes/No):		(QEA):	
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA):	None
DO rating before Closing/Inactive status:	Satisfactory		

D. Sector and Theme Codes		
	Original	Actual
Sector Code (as % of total Bank financing)		
Central government administration	3	3
District heating and energy efficiency services	97	97
Theme Code (Primary/Secondary)		
Access to urban services and housing	Primary	Primary
Climate change	Secondary	Secondary
Municipal finance	Primary	Primary
Other financial and private sector development	Secondary	Secondary
Other urban development	Primary	Primary

E. Bank Staff		
Positions	At ICR	At Approval
Vice President:	Shigeo Katsu	Johannes F. Linn
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F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document**)**

The overall objective of the Municipal Heating Project is to alleviate the financial burden on municipal governments associated with the supply of district heating to the local population by: (i) improving the operating efficiency of district heating systems through investments to save energy and reduce heat losses; (ii) promoting sound cost recovery policies and commercial practices; and (iii) supporting government efforts to improve the cost-effectiveness of subsidy programs through better targeting and delivery of subsidies to low-income households.

Revised Project Development Objectives (as approved by original approving authority)
The objectives were not revised.

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Reduction of level of support of participating heating companies by their municipalities.			
Value quantitative or Qualitative)	a) Funds spent by all participating cities for heating services, in comparable inflation-adjusted prices, RUR 2002 mln/year. Value: 535 b) Percent ratio of municipal payments in the revenues of district heating (DH) companies. Value: 17%	Funds spent by each participating city for heating services (including subsidies and operating losses of heating companies) will decrease, in comparable inflation-adjusted prices.		a) Spending by all project cities for heating services, in comparable inflation-adjusted prices, RUR 2002 mln/year, has dropped sharply. Value:78 b) Percent ratio of municipal payments in the revenues of DH companies has dropped sharply. Value:2.5%
Date achieved	12/31/2002	06/30/2008		06/30/2008
Comments (incl. % achievement)	The phase out of the municipal subsidies provided through DH company tariffs proceeded steadily and accelerated during the last two years of the project. At project completion, these payments amount to a mere fraction of their baseline level in 2002.			
Indicator 2 :	Quality and energy efficiency of heat and hot water services.			
Value quantitative or Qualitative)	Heat supply based on temperature control at DH plant and constant water flow. This supply-driven system caused overheating to some and underheating to others. Energy efficiency of the DH systems was poor due to massive overheating and high network losses	Quality of heat and hot water services has improved significantly compared to baseline conditions. Energy efficiency has improved significantly compared to baseline conditions.		Most project cities partially moved to variable flow DH systems and temperature control at building level. This system is more customer-oriented. In the modernized heating areas, heat consumption fell 12-17%, and DHW by 5-10%, without affecting quality
Date achieved	12/31/2002	06/30/2008		06/30/2008

Comments (incl. % achievement)	The beneficiary assessment conducted at project closing confirms the much improved quality of heating services in the city areas renovated under the project.			
Indicator 3 :	Cost recovery ratio (%) demonstrating that DH charges (tariffs) are set at a level sufficient to cover all prudently incurred costs of operation, including depreciation, as well as local cost of sub-projects and reasonable level of profitability			
Value quantitative or Qualitative)	The average ratio of tariff to operating costs for DH companies in aggregate was slightly above 100%. Value: 110%	Percent ratio of average tariff to operating costs >100% for all participating heating companies.		With both the tariffs and operating costs rapidly growing, the average ratio of tariff to operating costs for DH companies in aggregate remains only slightly above 100%. Three out of ten DH companies still have this ratio below 100%. Value: 111%
Date achieved	12/31/2002	06/30/2008		06/30/2008
Comments (incl. % achievement)	Average cost recovery ratio is about the same as in 2002 (DH tariffs have generally escalated in proportion to the operating costs). This is not a small achievement, as operating costs (fuel, electricity, water, labor) more than doubled since 2002			
Indicator 4 :	Better targeting of heating subsidies to low-income households.			
Value quantitative or Qualitative)	All 100% residential consumers of DH received municipal heating subsidies through DH companies. Housing allowances, specifically targeted to low-income residents, were just about to be introduced on a significant scale.	All Participating Cities provide housing allowances directly to low-income households.		Housing allowances have been introduced in all project cities. As a whole, housing allowances are better targeted than the old DH subsidies (covering today 20 - 25% of the population vs 100% of DH consumers under the old DH subsidies)
Date achieved	12/31/2002	06/30/2008		06/30/2008
Comments (incl. % achievement)	It must be noted that the overall share of housing allowances as a proportion of municipal budget expenditures has been observed to steadily increase in some cities. However, no complete set of data could be obtained to evaluate this trend further.			

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Reduced fuel consumption in the project district heating systems.			
Value (quantitative or Qualitative)	Fuel consumed by the participating heating companies to supply heat from the segments of the DH systems renovated under the project, thousand Gcal/year. Value: 2230	Fuel consumption reduced by 15%		Fuel consumed by the participating heating companies to supply heat from the segments of the DH systems renovated under the project, thousand Gcal/year, has decreased by 19.5% Value: 1796
Date achieved	12/31/2002	06/30/2008		06/30/2008
Comments (incl. % achievement)	The % decrease exceeded the target value.			
Indicator 2 :	Reduced water consumption in the project district heating systems.			
Value (quantitative or Qualitative)	Volume of water consumed by the participating heating companies to supply heat from the segments of the DH systems renovated under the project, thousand m3/year. Value: 46535	Water consumption reduced by 10%.		Volume of water consumed by the participating heating companies to supply heat from the segments of the DH systems renovated under the project, thousand m3/year, has decreased by 54.5% Value: 21189
Date achieved	12/31/2002	06/30/2008		06/30/2008
Comments (incl. % achievement)	The % decrease exceeded the target value by far.			
Indicator 3 :	Reduced heat losses in the project district heating systems.			
Value (quantitative or Qualitative)	Heat lost in the networks by the participating heating companies in the segments of the DH systems renovated under the project, thousand	Heat losses reduced by 20%		Heat lost in the networks by the participating heating companies in the segments of the DH systems

	Gcal/year. Value: 329			renovated under the project, thousand Gcal/year, has decreased by 35.5%. Value: 212
Date achieved	12/31/2002	06/30/2008		06/30/2008
Comments (incl. % achievement)	The % decrease significantly exceeded the target value.			
Indicator 4 :	Level of cost recovery in the tariffs paid by the households.			
Value (quantitative or Qualitative)	Tariff paid by the population of the participating cities was about 70% of the average tariff paid by all groups of DH consumers. It was not greater than 85% in any city.	The level of cost recovery in the DH tariffs paid by the households is 100% (i.e., tariff paid by the population is not less than the prudently incurred costs of operation) in all participating cities.		7 out of 10 DH companies have achieved or exceeded the 100% target. The average percentage across the cities is about 110%. The lowest level of cost recovery in the DH tariffs paid by the households (83%) is observed in the city of Neryungri.
Date achieved	12/31/2002	06/30/2008		06/30/2008
Comments (incl. % achievement)	The tariff paid by population has reached 100% of the average tariff for all groups of customers in eight cities out of ten. It is 94% in Neryungri and 97% in Tambov			
Indicator 5 :	Payment collection ratio to total billings.			
Value (quantitative or Qualitative)	The average collection ratio across the cities was about 85%	Collection ratio >95% in all heating companies.		The average collection ratio across the cities is about 95%. 5 out of 10 heating companies have met the target. The overall ratio of 88% and 83% specifically for households are the lowest observed (in Syzran and Krasnoyarsk, respectively)
Date achieved	12/31/2001	06/30/2008		06/30/2008
Comments (incl. %	A collection ratio of 95% is a high standard to apply in the DH sector in Russia.			

achievement)				
Indicator 6 :	Rate of collections in cash.			
Value (quantitative or Qualitative)	Levels of cash payments collection were slightly below 100%.	Collection in cash 100% in all cities.		Collection in cash 100% in all cities.
Date achieved	12/31/2002	06/30/2008		06/30/2008
Comments (incl. % achievement)	The objective is fully achieved.			
Indicator 7 :	Operating cost reduction in comparable inflation-adjusted prices.			
Value (quantitative or Qualitative)	Operating costs of the participating heating companies to supply heat from the segments of the DH systems renovated under the project - in comparable inflation-adjusted prices, RUR 2002 million/year. Value: 1023	Reduced operating costs in the segments of the district heating systems renovated under the project.		Operating costs of the participating heating companies to supply heat from the segments of the DH systems renovated under the project - in comparable inflation-adjusted prices, RUR 2002 million/year - have decreased by 26%. Value: 757
Date achieved	12/31/2002	06/30/2008		06/30/2008
Comments (incl. % achievement)	To calculate this value, constant 2002 prices of each of the inputs (fuel, electricity, water, labor) were used.			

G. Ratings of Project Performance in ISRs

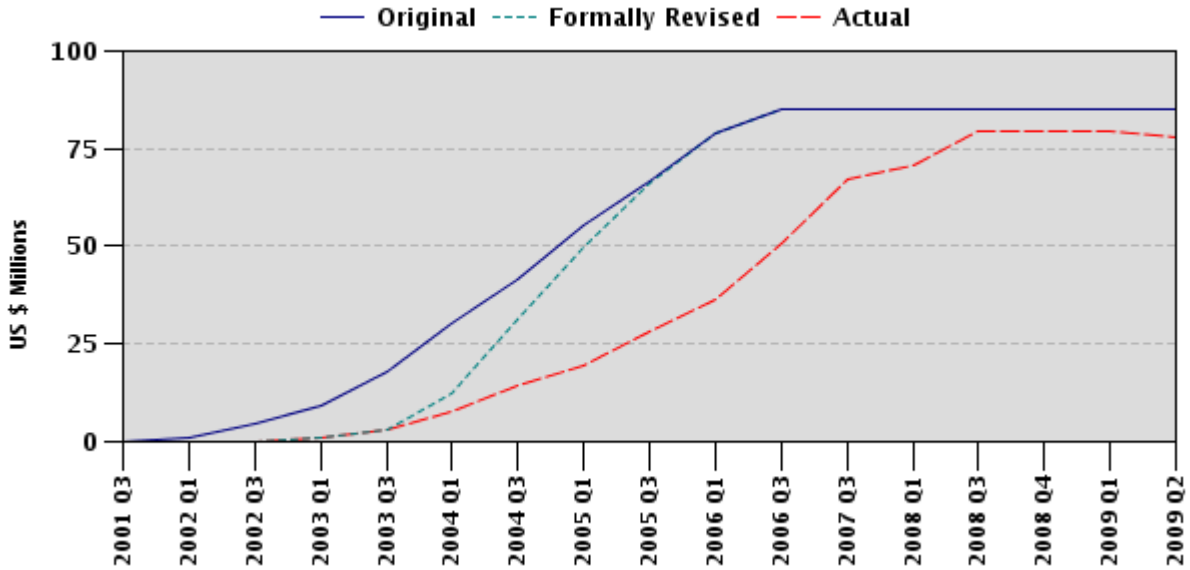
No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	06/29/2001	Satisfactory	Satisfactory	0.00
2	12/26/2001	Unsatisfactory	Unsatisfactory	0.00
3	06/28/2002	Unsatisfactory	Unsatisfactory	0.00
4	12/05/2002	Unsatisfactory	Unsatisfactory	0.85
5	06/03/2003	Unsatisfactory	Unsatisfactory	4.11
6	06/25/2003	Satisfactory	Satisfactory	4.11
7	10/16/2003	Satisfactory	Satisfactory	11.55
8	01/12/2004	Satisfactory	Satisfactory	14.18
9	03/09/2004	Satisfactory	Satisfactory	14.18
10	10/13/2004	Satisfactory	Satisfactory	19.37
11	04/15/2005	Moderately Satisfactory	Moderately Unsatisfactory	29.48
12	01/04/2006	Satisfactory	Satisfactory	43.61

13	10/30/2006	Satisfactory	Satisfactory	56.75
14	05/09/2007	Satisfactory	Satisfactory	67.22
15	12/10/2007	Satisfactory	Satisfactory	70.98
16	05/28/2008	Satisfactory	Satisfactory	78.77
17	10/27/2008	Satisfactory	Satisfactory	79.58

H. Restructuring (if any)

Not Applicable

I. Disbursement Profile



1. Project Context, Development Objectives and Design

1.1 Context at Appraisal

Country and Sector Background: The breakdown of the Soviet economic system in late 1991 and the transition to a market economy had proved particularly difficult for many of the infrastructure services in Russia. The problems in the heating sector were exacerbated by an old infrastructure that was designed without regard for energy efficiency and by a perception that municipal heating was a public service which should be supplied on non-commercial terms, particularly in light of the general hardships associated with the transition. As a result, the heating sector faced a number of major issues, including:

- *Lack of investment funds.* Municipal funding was scarce, at least in part because of inadequate tariffs for heat supply. In addition, the sector was not attractive to private sector investments owing to the lack of a suitable legal and regulatory framework, low profit potential, high investment needs, and high risks both at the country and the local level.

- *Generally high cost of supply.* The infrastructure had been poorly maintained and was inefficiently designed and operated due to the lack of guiding price signals. Downstream infrastructure was characterized by high heat and water losses.

- *Inflexible technical design* (constant flow/variable temperature). The system was supply driven. Consumers had virtually no control over their heat consumption or comfort level.

- *Inadequate tariffs.* Typically, district heating tariffs did not provide sufficient cost recovery to provide for sustainable operations of the networks. Depreciation, which was based on outdated asset values, was insufficient to provide adequate cash flow for asset replacement.

- *Arrears.* Non-payment was generally high, often due to lack of payment discipline and lack of available remedies, or willingness to use available remedies.

Rationale for Bank assistance: The Country Assistance Strategy[1] (CAS) (December 1, 1999) and CAS progress report (February 6, 2001) focused on an interim program for assistance during what was expected to be a difficult period in terms of promoting a long-term reform agenda in Russia. It reaffirmed the need for a long-term relationship; focused on poverty reduction by re-establishing foundations for growth and strengthening targeted social safety nets; focused on institutional barriers to growth and governance issues; and, specified an intensive portfolio management to improve impact in the Bank's lending program. Among the targeted areas of Bank assistance were three critical areas of fiscal management: (i) intergovernmental fiscal arrangements; (ii) sub-national fiscal management; and (iii) analysis of expenditure efficiency. The project addressed in particular the issue of sub-national fiscal management, where the CAS objective was to "strengthen financial management policies and practices at these levels of government". It also addressed expenditure analysis, which was to "focus primarily on efficiency

[1] Document number: 19897-RU

and equity issues in expenditures for education, health, and social protection". In addition, the project would contribute to an improved standard of living in selected cities by improving the quality and reliability of heat supply and by supporting the redirection of subsidies towards low-income households.

1.2 Original Project Development Objectives (PDO) and Key Indicators (*as approved*)

The overall objective of the project was to alleviate the financial burden on municipal governments associated with the supply of district heating to the local population by: (i) improving the operating efficiency of district heating systems through investments to save energy and reduce heat losses; (ii) promoting sound cost recovery policies and commercial practices; and (iii) supporting government efforts to improve the cost-effectiveness of subsidy programs through better targeting and delivery of subsidies to low-income households.

Key Indicators were: (i) Reduced fuel and water consumption; (ii) Reduced heat losses; (iii) Promoting sound cost recovery to cover costs, adequate maintenance etc.; (iv) Collection rate to reach 100%; and (v) Better targeted and more adequate subsidies.

1.3 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

The objective was not revised.

1.4 Main Beneficiaries

The beneficiaries of the project included:

- *Heating companies*. Benefits to participating heating companies would include: (i) extension of the life of heating network assets; (ii) reduced fuel consumption through more efficient equipment and reduced losses; (iii) more efficient delivery of heat through better temperature controls and upgrading of substations; (iv) reduced operation and maintenance costs, as well as avoided investment in pipes and substations; and (v) improved quality of heating services.

- *Consumers*. The heating customers (primarily households and institutions) in areas of the municipalities which were being rehabilitated would benefit from lower heating costs.

- *Municipalities* would benefit from the reduction in subsidy burdens placed on municipal administrations, and also lower levels of heating-related costs to be paid by them.

1.5 Original Components (*as approved*)

The project consisted of four components as follows:

Component 1. System Rehabilitation. Original cost: US$70.36 million

The system rehabilitation component of the project included a number of high-priority investments in repairing and replacing sections of the district heating systems in the participating cities and upgrading these sections to modern more efficient technology. While the investments program varied from city to city, depending on needs, the project generally included such

investments as replacing central heat substations (CHS) with building-level individual heat substations (IHS) and converting from a four-pipe to a two-pipe system, upgrading selected CHS by replacing heat exchangers and adding automated control systems, replacing sections of the transmission and distribution networks with pre-insulated pipes, boiler replacement, metering, and network re-design to optimize the efficiency of supply.

Component 2: Technical Assistance - Procurement, Engineering, Supervision. Original cost: US$4.10 million

This component would provide support to the Central Project Implementation Unit (CPIU) in project implementation. While the consultants would be expected to work in and together with the cities, their primary responsibility would be to assist the CPIU in ensuring that the projects were carried out in a timely and efficient manner, in compliance with procurement guidelines and with best practices for design, engineering and installation. The Procurement and Engineering Group (PEG) would be selected in accordance with the terms of reference included in the Project Implementation Plan. It would assist in elaboration of the bidding documents of all investments in the project, and in carrying out procurement functions in accordance with the provisions of the Loan Agreement and the Bank's Guidelines.

Component 3: Central Project Implementation. Original cost: US$ 2.90 million

The CPIU set up in the National Foundation for Housing Reform would manage and supervise project implementation on behalf of Gosstroi, the federal agency responsible for the project. The CPIU would be the main link with the Bank and fully responsible for ensuring that the project was implemented efficiently in accordance with the provisions of the Loan Agreement. This project component also included financial audit of the project accounts maintained by the CPIU, together with a review of the Special Account and Statements of Expenditure. In addition, it would include funding for monitoring of the creditworthiness and the solvency of the participating cities.

Component 4: Institutional Support. Original cost: US$2.50 million.

This component was targeted to support the overall development of the district heating and communal services sector through focused research on areas of particular relevance to achieving desired sector reforms. In particular, studies would focus on: (i) options and actions necessary to improve pricing and regulation; (ii) assessment of restructuring options for the sector (including the potential role of competition and the promotion of greater private sector involvement) together with detailed action plans to advance this process; (iii) assessment of financial structures and mechanisms which would ensure an appropriate and equitable flow of benefits to investors in the sector (including municipalities); and (iv) assessment of energy cost-related issues of social protection for low-income families.

1.6 Revised Components

The components were not revised.

1.7 Other significant changes

There were no changes in the project's design, scope and scale, and implementation arrangements. However, there were changes in the project's schedule, and funding allocation as mentioned below:

Project Schedule. The schedule of the project was revised twice. The closing date of the project was extended first by 18 months from June 30, 2006 to December 31, 2007 because the majority of participating cities were not able to complete the scheduled works before the original closing date. The main reasons for this were identified as delay in Effectiveness, lengthy evaluation procedures, and (in some cases) prolonged winters that limited the period within which works could be physically executed. It was extended for a second time for a period of an additional six months (through June 30, 2008) in order to complete the activities in the three participating cities - Krasnoyarsk, Volgograd, and Neryungri, which had the largest undisbursed amounts. If not financed from the loan, these activities would be at significant risk of remaining incomplete, thereby jeopardizing the positive results achieved thus far under the project.

Funding Allocation. An amount of $6.80 million was reallocated in August 2005 from the Category (6) "Unallocated" to the Category (2) "Goods, including local transportation and related insurance". This amount was reallocated to the city of Tambov as it needed more money to carry out project activities.

Category	Original Allocation (USD)	Reallocation –August 2005 (USD)
1) Works	300,000	300,000
2) Goods, including local transportation and related insurance	67,550,000	74,350,000
(3) Consultants' services: (a) for Part A of the Project (b) for Part B of the Project	 4,100,000 2,500,000	 4,100,000 2,500,000
4) Incremental Operating Costs	2,900,000	2,900,000
5) Fee	850,000	850,000
6) Unallocated	6,800,000	0.00
Total	**85.000,000**	**85.000,000**

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

During preparation, the project design took into account lessons learned from previous Bank-assisted projects in the energy sector in Russia and other countries. Likewise, the design considered the risk factors and appropriate measures were adopted to mitigate all major risks identified at appraisal. The project also provided a participatory framework involving stakeholders and direct beneficiaries in the decision-making processes.

Lessons learned from previous Bank-assisted projects. Lessons learned from other Bank-financed District Heating (DH) related projects under implementation in Poland, Estonia, Latvia, China, and Ukraine include the findings that:

- Strong project ownership and advanced preparation of project components is necessary for timely implementation.

- The relationship between prices and incomes changes rapidly in countries in transition, and the heating service which appears largely unaffordable may become easier to afford in a relatively short period of time. Rising incomes also affect the local costs, which should not be underestimated.
- End-user efficiency improvements, which initially appear difficult to support due to building ownership and affordability reasons, may be possible to support on a pilot level.
- Strong support from municipalities is needed to resolve collections and payment issues.
- Decentralized project management (including management of procurement) usually is more effective than centralized implementation arrangements. However, a centralized project implementation unit had proved to be a sound solution in Russia when dealing with rather small district heating enterprises and municipalities, based on the experiences from the Energy Efficiency Project.

Risks and Risk Mitigation Measures. The table below shows the risks and mitigation measures identified in the Project Appraisal Document (PAD).

Risk	Risk Rating	Mitigation Measure
Slow or ineffective implementation of components.	Substantial	• Use of supply & install contracts • Procurement and Engineering Group to assist in project supervision
Municipalities are not willing to ensure the heat company's financial viability through tariff increases and (any necessary) budget transfers.	Modest	• Up-front condition to increase tariffs to demonstrate commitment to financial principles of the project. • Intensive monitoring of compliance with financial covenants and prompt action in case of non-compliance. City's subsequent years' procurements to be canceled if loan conditions not met. • Physical investments designed to have a rapid and visible impact that make tariff increases more acceptable to the consumers. • Measures taken to protect low-income households from unaffordable tariff increases.
Fiscal situation continues to deteriorate affecting payment of domestic hot water and heating bills by budget organizations and state industries.	Modest	• Intensive monitoring of financial performance and prompt support to heating companies to find alternative approaches to secure financial viability.
Budget organizations and state industries do not pay in cash.	Modest	• Upfront condition to increase cash collection to demonstrate commitment to financial principles of project. • Dialogue between Bank and municipalities to support heating companies' efforts to increase cash collection. • Intensive monitoring of compliance with financial covenants and prompt action in case of non-compliance.
Potential corruption may erode project benefits.	Modest	• Commercial and Financial Management systems for the project will provide more transparency and improve possibilities for adequate audit and control.
Project management competence of the CPIU is unsatisfactory.	Modest	• Propose adjustments to staff. • Adjust consulting services to the specific needs.

Managerial, financial, and technical capacities in municipal heating companies are not adequate.	Modest	• Further project support through the CPIU and involved consultants. • Focused twinning efforts (trust-funded). • Cancel future components, as necessary.
Cooperation between the CPIU and municipal heating companies does not function satisfactorily.	Modest	• Ensure that learning experience from the Russian EHDP Project and the Russian Energy Efficiency Project is fully utilized. • Revise responsibilities between CPIU and LPMUs as necessary.

Adequacy of participatory processes. The project design was based on the results of the Social Assessment, taking into account the primary concerns of the consumers (largely cost and reliability of supply). Public consultations about the subprojects were held in the involved cities no less than two months prior to physical activity on the work sites, and the results of these consultations (including date and location of consultation, list of participants, and summary minutes) were provided to the Bank prior to physical activity on the work sites. Discussions involved residential district heat customers, local social workers and poverty specialists, universities, staff from district heating companies, city representatives, housing maintenance organizations, municipal social assistance offices and other civil society stakeholders.

2.2 Implementation

The project was not restructured, and no changes were made to the design. The project was at 'Risk' status until June 2003 because of: (i) late effectiveness of both the main loan and the Sub-loans to the participating municipalities; and (ii) delayed implementation for the reasons mentioned below, and the resulting low disbursement. However, the situation improved in 2003 after the Sub-Loan Agreements (SLAs) were made effective with all the participating cities, and the co-financing from these cities was assured.

The Bank conducted a Midterm Review (MTR) of the project in October 2006, and assessed progress on all project components, the implementation issues being faced, and the actions to be taken to ensure the successful completion of the project. The following factors affected project implementation:

Factors outside government control or implementation agency

- *High turnover of Task Team Leaders (TTLs)*. During the six years of the project, there were nine TTLs, and in the last three years, there were five TTLs. The frequent changes in TTL led to lack of continuity, disruption in implementation, and different approaches to the supervision of implementation.

Factors subject to government control or implementation agency

- *Delay in project effectiveness*. The project was declared effective on August 30, 2002, 17 months after it was approved by the Board on March 27, 2001. This delay was because: (i) the Russian Government only approved the loan for signing on December 18, 2001, nine months after the Board approval, resulting from the delay in finalizing the text of the SLAs and approving them; and (ii) loan effectiveness required a minimum of four sub-loans to be signed and given a satisfactory legal opinion, together with an implementation agreement between Ministry of

Finance (MOF), Gosstroi (State Committee for Construction and Housing Policy), and the National Foundation for Housing Reform (NFHR), and there was a delay in meeting these requirements.

- *Delay in SLA effectiveness*. As mentioned above, there was substantial delay in the effectiveness of SLAs. The number of days it took for the SLAs to be effective after the project became effective were as follows: Dubna (223 days); Mytischi (223 days); Tambov (47 days); Syzran (206 days); Kazan (47 days); Krasnoyarsk (347 days); Volgograd (242 days); and Nerungri (202 days). This factor was the major cause for the slow disbursement until 2004.

- *Insufficient capacity of the CPIU*. Physical progress of the project in 2004 was slower than expected – in part, due to insufficient capacity of the CPIU to assist the Local Project Management Units (LPMUs) with the high volume of procurement documentation work. This was complicated by changes in the local administrations of some cities. New administrations tended to propose revisions to the investment plans and choice of contractors. The restructuring of the Federal Government also had contributed to the slowdown as the roles of the key officials with respect to the project were being clarified.

- *Change of district heat suppliers*. In several cities (e.g., Volgograd, Tambov, Syzran), the district heat suppliers had changed since the time of the signing of the Subproject Implementation Agreements (SIA). This made the SIAs outdated and created project management and monitoring problems.

- *In 2004: (i) due to the Budget Code limitation* the city of Mytischi was not able to implement its original procurement plan. The city postponed the procurement plan significantly. Likewise, the slow decision making process of Krasnoyarsk LPMU delayed the city's investment plan; and (iii) the city of Syzran stopped implementation of the project due to the co-financing problems in the city's budget.

- *Suspension of SLAs*. The MOF had suspended for sometime all SLAs due to "up-front fee payments". The SLAs were then amended to allow the cities to use SLA funds for up-front fee payments. Suspension period ranged from two to five months depending on the city. The extremely slow bid evaluation process in the CPIU had slowed the implementation and correspondingly the disbursements from 2003 up to end of 2004. The ability of the CPIU to handle the evaluation process subsequently improved, and the process itself was significantly streamlined.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

M&E Design. The Borrower had agreed to monitor and evaluate the project on an ongoing basis, in accordance with the indicators set forth in the Loan Agreement. The indicators were closely linked to the project development objectives and were selected adequately. They were also close in substance to the indicators originally included in the PAD, but were more specific and easier to monitor. The indicators were sufficiently detailed to allow for monitoring results by city and by heating area within each city. This eventually allowed building a sufficiently comprehensive database for monitoring and analyzing project results, including economic and financial effectiveness of the investments.

The M&E design also included monitoring the impact of project investments on heat production costs and the manner in which these were translated into tariffs for the population. Further, the

project aimed to ensure that the cities adhere to commitments of reducing and abolishing untargeted heat subsidies, thereby freeing up municipal funding for social development and targeted assistance to the poor. Overall, the M&E design based on the indicators in the Loan Agreement can be considered adequate, requiring only minor adjustments during project implementation. Specifically, additional quantitative metrics were introduced for the indicator of the reduction of level of financial support by the municipalities to the heating companies.

M&E implementation. Throughout project implementation, NFHR collected and reported to the Bank the quarterly Financial Management Reports (FMRs). While the FMRs were essential for some monitoring purposes, they were not designed to track the achievement of the project development objectives. NFHR had started systematically collecting the technical and financial indicators for the M&E purposes as per the indicators in the Loan Agreement only in 2005. Remarkable progress was made since then, and a logical framework covering the data for all the indicators was completed for 2006 and 2007. A detailed database supporting the information of the logical framework is currently available at NFHR. This database is the source of information for the Results Framework Analysis in this ICR (Section F).

M&E utilization. The Results Framework proved to be an important monitoring and analytical tool for both the Bank and the Borrower. Its main value is in the relatively objective and reasonable basis that it provides for assessing the project results. Its role in decision-making and resource allocation, however, was limited. This is partly due to the fact that the framework became available relatively late in the project, but also because other decision-making mechanisms were thought to be suitable in most cases.

2.4 Safeguard and Fiduciary Compliance

Safeguard issues. There were no major safeguard issues related to the implementation of the project.

Fiduciary issues. Fiduciary compliance was generally satisfactory, except the issue mentioned below: The Bank decided not to finance one contract in Tambov in 2005, because it was discovered that the supplier who won the contract, had faked its bid security (bank guarantee), and consequently, this contract was declared a '*Misprocurement*'. The then PIU Director was arrested by the Russian authorities for fraudulent practices, and the matter was investigated by Department of Institutional Integrity (INT). The Bank had demanded to the MOF that the moneys, already paid to this supplier, be returned to the project account. Accordingly, an amount equivalent of € 426,241.20 was refunded by the Ministry in April 2008.

2.5 Post-completion Operation/Next Phase

(a) *Transition arrangements*.

After the project closure, participating cities and district heating companies would be in a position to carry on the normal activities for heating services, with the help of the technology and infrastructure acquired under the project. The staff have developed adequate knowledge, skills, and technical know-how which would help them in regular operation after project closure. District heating companies will be responsible for the service and maintenance of installed Individual Heating Sub-Stations (IHS) and pipes, and the budget for this will come out of the tariff for all participating cities. It is thus expected that operation and maintenance of the systems on a day-to-day basis will be carried out by them. The tariff rates calculated by the heating

companies will be monitored by the Federal Agency for Tariff Regulation. On the other hand, it is likely that the participating cities may not have adequate resources to finance capital investments after the project closure.

(b) *List of performance indicators.* The set of monitoring and evaluation indicators used under the project will continue to be used as part of participating municipalities' regular operations. (*See Results Framework Analysis*)

(c) *Follow-up projects***.**

Participating cities and their heating companies are interested in exploring the possibility of having follow-on projects. For example:

Kazan. Under the Program for Social and Economic Development of Kazan for 2008-2010 and the Program for District Heating in Kazan (up to 2008), the need for a potential follow-up project is currently being evaluated, and possibilities for attracting loans (of foreign banks and Russian banks) are being examined.

Mytischi. Specialists of the Mytischi District have assessed needs for a potential follow-up project for 34 km of heat mains and distribution networks are to be replaced in six street blocks in Mytischi (the cost of the component is USD 17.2 million) with installation in parallel of 263 IHSs (the cost of the component is USD 14.5 million).

Tambov. Need for a potential follow-up project has been evaluated and its results have been used to prepare a feasibility study for a follow-up District Heating Project.

(d) *Suggested priority and optimum timing of any future impact evaluation*.

It will be important to make an evaluation after two or three years, on whether the energy savings, and reduction in energy and water losses have been maintained as expected. It will also be important to evaluate the quality of service provided by the district heating companies, and whether they are carrying out regular maintenance activities.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

The project's objective is still relevant, and important to Russia's economic development. It is timely and appropriate to the current needs of the country's heating sector. For example, the Russian Government has placed high importance on improving housing and communal services (HCS) provision, and closely links service provision with improving the quality of life. The Russian Government has declared the reform of the HCS sector as one of its top priority areas. HCS reform is included in the recently approved Medium-Term Government Program for 2006-2008, which sets out the country's development priorities. In particular, the priorities include facilitating private sector participation in housing and communal services, developing targeted social assistance, and improving and measuring the quality of services provided.

3.2 Achievement of Project Development Objectives

Satisfactory. The project, which was implemented in eight Participating Municipalities[2], was successful in achieving its objective. The following achievements demonstrate the direct correlation between the project's outputs and their resulting outcomes. (*For details and examples see Annex 10*)

(i) **Objective 1:** *Improving the operating efficiency of district heating systems through investments to save energy and reduce heat losses*. Achievement: Satisfactory

- *Quality and energy efficiency of heat and hot water services*.

a) Quality of heat and hot water services has improved significantly compared to baseline conditions. Most project cities have implemented a partial transition to DH systems based on variable flow of water and automatic temperature control at the building level. This type of system is more responsive to the needs of the customers.

b) Energy efficiency has improved significantly compared to baseline conditions, where energy efficiency of the DH systems was poor due to overheating of many customers' premises and high level of losses in the pipeline networks. In those segments of the DH systems where the cities introduced variable flow of water and automatic temperature control at the building level, the level of consumption of heat decreased by about 12-17%, and domestic hot water by about 5-10%, without sacrifice to the quality of the services.

- *Reduced fuel and water consumption in the project district heating systems*

Fuel consumed by the participating heating companies to supply heat from the segments of the DH systems renovated under the project has decreased by 19.5% from 2230 thousand Gcal/year in 2002 to 1796 thousand Gcal/year at project completion. In addition, the volume of water consumed by the participating heating companies to supply heat from the segments of the DH systems renovated under the project, thousand m3/year, has decreased by 54% from 46535 thousand m3/year in 2002 to 21189 thousand m3/year at project completion.

- *Reduced heat losses in the project district heating systems*

Heat lost in the networks by the participating heating companies in the segments of the DH systems renovated under the project has decreased by 35.5% from 329 thousand Gcal/year to 212 thousand Gcal/year at project completion.

- *Operating cost reduction in comparable inflation-adjusted prices*

Operating costs of the participating heating companies to supply heat from the segments of the DH systems renovated under the project - in comparable inflation-adjusted prices, have decreased by 26% from 1023 million/year in 2002 to 757 million/year at project completion.

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[2] Participating Municipalities included: (i) Tambov; (ii) Neryungri; (iii) Krasnoyarsk; (iv) Mytischi District; (v) Kazan; (vi) Volgograd; (vii) Syzran; and (viii) Dubna.

Objective 2: *Promoting sound cost recovery policies and commercial practices*. Achievement: Moderately Satisfactory

- Cost recovery ratio (%) demonstrating that the district heating charges (tariffs) are set at a level sufficient to cover all prudently incurred costs of operation, including depreciation, as well as the local costs of sub-projects and a reasonable level of profitability.

With both the tariffs and operating costs rapidly growing, the average ratio of tariff to operating costs for DH companies in aggregate remains only slightly above 100%. Three out of ten DH companies still have this ratio below 100%. While achieving a higher cost recovery ratio would have been desirable, it must be recognized that keeping up the tariff levels with the rapidly growing costs is an achievement in itself.

- *Level of cost recovery in the tariffs paid by the households*

Seven out of ten DH companies have achieved or exceeded the 100% target. The average percentage across the cities is about 110%. The lowest level of cost recovery in the DH tariffs paid by the households - 83% - is observed in the city of Neryungri. In 2002, the tariff paid by the population of the participating cities was about 70% of the average tariff paid by all groups of DH consumers. It was not greater than 85% in any city.

- *Payment collection ratio to total billings*.

The average collection ratio across the cities is about 95%. Five out of ten heating companies have met the target. In 2002, the average collection ratio across the cities was about 85%

- *Rate of collections in cash*.

Levels of cash payments collection are about 100%. In 2002, levels of cash payments collection were slightly below 100%.

Objective 3: *Supporting government efforts to improve the cost-effectiveness of subsidy programs through better targeting and delivery of subsidies to low-income households*. Achievement: Satisfactory

- *Reduction of level of support of participating heating companies by their municipalities*.

a) The total amount of funds spent by all participating cities for heating services (including subsidies and operating losses of heating companies), in comparable inflation-adjusted prices, have decreased from 535 RUR million/year in 2002 to 78 RUR million/year at project completion.

b) Percent ratio of municipal payments in the revenues of DH companies has decreased dramatically from 17% in 2002 to 2.5% at project completion.

- *Better targeting of heating subsidies to low-income households*.

Housing allowances are being rapidly phased in as the old municipal heating subsidies delivered through DH companies can no longer support the low-income population in the conditions of steadily increasing tariffs for heat and hot water. As a whole, housing allowances are better

targeted than the old DH subsidies (covering today 20 - 25% of the population vs 100% of DH consumers under the old DH subsidies). However, the overall share of housing allowances as a proportion of municipal budget expenditures is steadily increasing. No complete set of data could be obtained to evaluate this trend further.

3.3 Efficiency

To conduct the economic and financial analysis for this ICR, a spreadsheet model was developed that calculates economic and financial return indicators for investments in each of the 41 heating regions under modernization in the eight participating cities.

The calculations were based only on those project benefits (savings) that could be expressed in terms of cash flows. For the years 2002 – 2007, savings were based on actual figures from the project cities. No environmental externalities or social effects of modernization, which undoubtedly contribute to the project's positive results, have been taken into account.

The results obtained differ considerably by heating region and by city. Payback for individual investments varies from almost immediate to more than 20 years, the economic and financial internal rates of return ranging from hundreds percent down to negative values. However, the aggregate numbers show results either approximating or exceeding those projected in the project appraisal document (PAD). **See Annex 3 for details.**

3.4 Justification of Overall Outcome Rating

Rating: ***Satisfactory***

Based on the discussion given in Sections 3.2 and 3.3, the overall outcome is rated as satisfactory.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

The project has had a positive impact on poverty alleviation. While some wealthier people may have been able to find alternatives (such as moving to homes with individual heating boilers), district heating remains the most affordable way of supplying heat and hot water to most urban population in Russia. Thus, improvements in the quality and reliability of district heating services are beneficial to all customers of participating municipalities, but especially to the poor, for whom district heating is the only viable alternative.

(b) Institutional Change/Strengthening

The project resulted in a substantial institutional development impact as demonstrated by the following:

- The project provided an opportunity to the participating cities to improve the mechanisms used to manage the district heating system. It also enabled them to acquire new mechanisms for attracting off-budget funds for implementation of infrastructure projects of urban development, study modern international approaches to technical rehabilitation, and, more importantly, to alleviate the burden on the city budget.

- The project made a substantial contribution to institutional strengthening as the government and other project participants have gained substantial experience in putting in place procedures for implementation of complex investment projects.

- Results of transformations conducted in the district heating system will definitely yield a long-term technical and economic effect and will reduce the financial burden of the budget with respect to heat consumption and will enable the consumers to receive high quality heating and domestic hot water services.

- The project resulted in training of skilled local specialists, i.e. installers, designers, engineers and technical specialists that have learned to use modern technologies and heat supplying equipment. Specialized service companies have been set up in the participating cities to maintain equipment installed at Central Heating Substations and Individual Heating Substations.

- Certain Project Participating Cities (Krasnoyarsk, Mytischi, Neryungry, Syzran) have introduced systems of dispatch control and data collection. These systems are designed for remote monitoring and management of district heating objects (boiler houses, CHSs, IHSs). Such systems would allow to improve reliability of heat supply systems and reduce expenses for maintenance and repair.

- The project also provided for strengthening of the administration capacity, financial standing and improvement of heating companies' administration efficiency in the Project Participating Cities. At the federal and municipal levels the project implementation would provide for achievement of the following housing and utilities sector reform goals: (a) support to the housing and utilities reform in Russia in the municipal heating sector; (b) local budgets restructuring through re-allocation of funds and reduction in the expenses for utilities services, to include the heat supply services; and (c) addressing the social issues related to the introduction of targeted subsidies to the low-income groups of population.

(c) Other Unintended Outcomes and Impacts (positive or negative)

There was no unintended outcome or impact of the project.

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

N/A

4. Assessment of Risk to Development Outcome

Ratings: Moderate

On the one hand:

- The equipment procured has better technical performance than the equipment used in the past, and, therefore, operations and maintenance costs are reduced and the risk of accidents during the heating season is reduced as well.

- The contract documentation sets out a legal warranty period of operation and maintenance of rehabilitated facilities. In addition, experience and technical performance of equipment put in

operation gives the hope that the equipment will have an uninterrupted term of service for some time, which is 10 years for boiler houses and not less than 35 years for heat mains.

- Contractual documents legally establish a warranty period for the operation and maintenance of the reconstructed facilities.

On the other hand:

- Sharp decline in the overall economic conditions in the country, resulting from the global world-wide financial crisis started to affect Russia since the Fall of 2008; and a subsequent sudden drop in the prices of Russia's export commodities such as oil, may become an additional challenge for keeping the heating tariffs at cost-recovery levels. Currently, there is no assurance that: (i) there will not be any back-sliding on the tariff levels and subsidy targeting; and (ii) the quality of the tariff setting process in terms of technical capacity, methodology, and independence will allow the cost-recovery level to be maintained.

Based on the above factors, the overall risk of not sustaining the project's outcome is rated as Moderate.

5. Assessment of Bank and Borrower Performance

(relating to design, implementation and outcome issues)

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: ***Satisfactory***

The Bank's performance in the identification, preparation, and appraisal of the project was satisfactory. During preparation and appraisal, the Bank took into account the adequacy of project design and all major relevant aspects, such as technical, financial, economic, and institutional, including procurement and financial management. A number of alternatives was considered for the project design. The selected alternative consisted of supporting small and affordable investments in sound long-term solutions to district heating rehabilitation in a number of municipalities. In addition, major risk factors and lessons learned from other earlier projects in the social sector were considered and incorporated into the project design.

A Financial Management Capacity Assessment (FMCA) was carried out for the project and necessary improvements for strengthening the financial management capacity of the project entities to meet the Bank's requirements were identified and discussed with the counterparts as part of the FMCA. These improvements were implemented under a time-bound Action Plan and the Bank's Financial Management Specialist certified the project as meeting minimum financial management requirements of the Bank.

Project preparation was carried out with an adequate number of specialists who provided the technical skill mix necessary to address sector concerns and a good project design. The Bank provided adequate resources in terms of staff weeks and dollar amount to ensure quality preparation and appraisal work. The project was consistent with the CAS and government priorities in the sector at the time. The Bank had a consistently good working relationship with the Borrower during preparation and appraisal.

(b) Quality of Supervision

Rating: ***Moderately Satisfactory***

The Bank's performance during the implementation of the project was moderately satisfactory. The task team focused on the project's development impact. The Bank allocated sufficient budget and staff resources, and the project was adequately supervised and closely monitored. The task team regularly prepared Aide-Memoires, alerted the government and NFHR about issues found during project execution and facilitated prompt corrective action. The Implementation Status Reports (ISRs) realistically rated the performance of the project both in terms of achievement of development objectives and project implementation.

Bank's procurement and financial management proficient staff worked with the CPIU-NFHR staff to explain the rules and procedures to be applied during project implementation, with regard to procurement of goods and works, and selection of consultants, accounts and audits, based on the Loan and Project Agreement.

In July 2004, the Bank's Financial Management Unit performed the financial management supervision of the project within the framework of the general Bank supervision mission. Based on the results of FM supervision and the results of the review of the 2003 project audited financial statements, the task team made recommendation for improvements of the contents and formats of the quarterly and annual reports. The task team carried out a Mid-Term Review in October 2006. Based on the recommendations of the MTR, measures were taken to ensure improvement in implementation performance. The task team also monitored safeguard and fiduciary compliances.

On the other hand, as mentioned in Section 2.2, there was a high turnover of TTLs during the project period was less than satisfactory. During the six years of the project, there were nine TTLs. These frequent changes created a lack of continuity and ownership, disruption in implementation, and different approaches to the supervision of project implementation. For example, because of the frequent change of TTLs, the Bank was not focusing on data collection and M&E implementation until late into the project. However, even with this constraint, the overall project development objective continued to be achieved and hence the moderately satisfactory rating.

(c) Justification of Rating for Overall Bank Performance
Rating: ***Moderately Satisfactory***

Based on the Bank performance during lending phase and supervision as discussed above, overall Bank performance is rated as Moderately Satisfactory.

5.2 Borrower Performance
(a) Government Performance

Rating: ***Satisfactory***

The government's commitment to achieve the development objectives was strong at the project concept and preparation stages. It ensured that the participatory process during project preparation was adequate. Official commitment and ownership by the government was indicated by: (a) an official endorsement of the project concept by the government; (b) the appointment of a

Project Coordinator in the State Committee for Housing and Construction Policy; and (c) the appointment of counterpart personnel at the NFHR.

Rosstroi's efforts in organizing the project selection seminar in June 1997, and the continued support during project preparation activities after the financial crisis of 1998, indicated strong public sector support for the sector reform agenda. Also, the willingness of the government to assume loan repayment for the activities of the Institutional Support Services and the financing of the CPIU indicated a keen interest by the government to include the lessons learned from this project in the sector reform.

An inter-ministerial committee was created by the government, including representatives of the MOF, the Ministry of Economy, Gosstroi and other federal agencies, responsible for the overall direction and strategic oversight of the project.

The government maintained its commitment during implementation. Financial accountability and follow-up was mostly observed; and documentation was maintained properly for periodic review. The government officials worked closely with the Bank's project team on a continual basis, and cooperated fully with the task team.

(b) Implementing Agency or Agencies Performance

Rating: ***Moderately Satisfactory***

CPIU-NFHR

*Financial Management Review***.** Project accounts and financial reporting to the Bank, both at the project and the entity level, was the responsibility of the NFHR. At the time of the initial assessment, the NFHR's financial management systems, including internal controls, accounting, and reporting were not meeting financial management requirements of the Bank. An action plan was prepared to ensure that a Bank-compliant financial management system was in place prior to Board presentation.

Overall, NFHR met the Bank's minimum requirements for financial management system, even though there were a few issues. For example: (i) there were perpetual delays in project budget approvals from the relevant Ministries. However, this issue was generic to the Russian portfolio; (ii) activities were suspended for a couple of months in summer of 2006, while the MOF was clearing the extension to the Agency agreement (following the project extension); (iii) there was a delay in counterpart funding in 2007, mainly due to the period of strained relationship between the management of NFHR and Rosstroi; and (iv) the project and NFHR audits was significantly delayed in 2005; and provided at the last minute in 2006.

Procurement Arrangements. Procurement of all works, goods and technical services under the project followed the Procurement Guidelines "*Procurement under IBRD Loans and IDA Credits*". The NFHR had sufficient experience and adequate staffing. Prior to this project, they were involved in implementation of the Russian Housing Project which was successfully completed in 2003. Traditional assessment of the NFHR at the project appraisal stage showed its qualification and capacity to implement the project. The NFHR, however, could have been more proactive in dealing with some procurement issues.

Reporting Arrangements. The NFHR submitted all required quarterly and annual reports in a timely manner. These reports were informative, and provided valuable feedback on how the project was progressing covering all project activities. The status of performance indicators were incorporated in all progress reports and served as valuable input to Bank supervision mission reports.

CPIU's capacity until 2004 was not adequate to assist LPMUs with the high volume of procurement documentation work. Besides, CPIU's evaluation process was extremely slow, which slowed the implementation and disbursement during 2003-2004.

(c) Justification of Rating for Overall Borrower Performance
Rating: ***Moderately Satisfactory***

In light of the government and NFHR performance as discussed above, the overall performance of the Borrower was moderately satisfactory.

6. Lessons Learned

Important factors for the success of a project:

- Continuity of the team working on the project, especially the TTL, is very important both for the Bank and the Borrower. Frequent change of TTL creates a certain lack of continuity and disruption, and different approaches to supervision. Project implementation could be more effective and less disruptive, if the Bank management could ensure that TTLs do not change too frequently. ***(General applicability)***

- Strong local leadership and expertise is essential for the regional development programs to succeed. Timely availability of counterpart funding is also key for ensuring the quality of project deliverables. Establishment of the local implementation capacity and arrangements for the sufficient and timely local co-financing of project activities should be assigned the highest priority at the preparation stage since it directly affects procurement and administrative efficiency during implementation. Training of the key staff involved in the project, not only from CPIU-NFHR, but from the participating municipalities and district heating companies as well, should be conducted at the very beginning of the project implementation.

Project Design:

- The project design should be realistic and not overly complex, so that implementation is kept within the scheduled time frame. Further, in complex long-term projects containing the strong institutional aspects, political risks on all the levels of the government should be taken into account and proper mitigation risk policies should be carefully identified. ***(General applicability)***

Implementation:

- Sub Loan Agreements need to be finalized before the project is presented to the Board, so that project effectiveness and implementation are not delayed. In addition, sub-loan agreements would work better if it includes the final beneficiary – in the case of MHP project it is district heating company. When a district heating company is excluded and

agreement is signed only between Ministry of Finance, Rosstroi, Oblast Administration and City Administration, district heating company is not able to influence the process and often depend on decision made by Oblast and/or City Administration (for example, in case of provision of financial guarantees)

Procurement:

- The Bank should work closely with the implementing agency staff, and encourage them to be more proactive in dealing with delays, especially on procurement issues. Close cooperation between the central PIU and the heating companies/municipalities is important on procurement matters. ***(General applicability)***

Monitoring & Evaluation:

- It is important that: (i) regular progress reports such as FMRs include indicators explicitly linked to the development objectives of the project; and (ii) the Results Framework and the accompanying performance indicators are finalized well ahead of project implementation. Otherwise, their role in decision-making and resource allocation would be very limited. ***(General applicability)***

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners
(a) Borrower/implementing agencies

See Annex 7

(b) Cofinanciers: NA

(c) Other partners and stakeholders: NA

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Components	Appraisal Estimate (USD million)	Latest Estimate (USD million)	Percentage of Appraisal (Latest Estimate)
1. System Rehabilitation	70.36	70.22	99.80
2. Technical Assistance - Procurement, Engineering Supervision	4.10	3.67	89.41
3. Central Project Implementation	2.90	2.80	96.55
4. Institutional Support	2.50	1.36	54.56
Taxes and Duties	23.02	18.66	81.04
Contingencies	9.54	0.00	0.00
Total Baseline Cost	**112.42**	**96.70**	**86.02**
Physical Contingencies	0.00	0.00	0.00
Price Contingencies	0.00	0.00	0.00
Total Project Costs	**112.42**	**96.70**	**86.02**
Interest during construction	14.61	14.61	100.00
Front-end fee IBRD	0.85	0.85	100.00
Total Financing Required	**127.88**	**112.16**	**87.71**

Note: The deviations from the appraisal estimates are mostly due to cost savings (notably, the need for contingencies did not materialize), but also due to underutilization of funds for technical assistance at the Federal level (the "Institutional Support" component). Cost savings were often associated with alternative technical solutions found during project implementation.

Financing

Source of Funds	Appraisal Estimate (USD millions)	Latest Estimate (USD millions)	Percentage of Appraisal (Latest Estimate)
Borrower	1.66	0.348	20.96

IBRD	85.00	78.90	92.82
Sub-Borrower	41.22	32.92	80.70

Note: The appraisal estimate for co-financing by the Borrower was based on the assumptions of higher level of support by the Federal government to the institutional component which ended up utilizing only $1.36m from the available $2.5m. The contributions by the Borrower towards the operating expenses of the CPIU were also lower than planned. Finally, the Government made some savings by employing contractors eligible for reduced taxation.

Annex 2. Outputs by Component

PROJECT COMPONENTS AND SUBCOMPONENTS	ACHIEVEMENTS/OUTPUTS
Component 1. System Rehabilitation	
Dubna	• Replacement and insulation of DH pipelines (4.670km), replacement and insulation of DHW pipelines (6.788km). • Replacement and insulation of DH pipelines (13,0km), replacement and insulation of DHW pipelines (6.63km). • Installation of meters and IHS (50 units), installation of a pump and shunt system for space heating, automatic temperature control equipment for space heating, heat and water meters. • Installation of meters and IHS (116 units), installation of a pump and shunt system for space heating, automatic temperature control equipment for space heating, heat and water meters. Installation of DH pipeline (13.96km). • Rehabilitation of boiler houses DPTO and TENZOR, the measure includes installation of new control & instrumentation equipment for modulation of four boilers (two hot water boilers model KVGM-30 at boiler house belonging to municipal enterprise PTD MS and two hot water boilers model PTVM-30 at boiler house belonging to municipal enterprise TENZOR) + installation of frequency converters on distribution and feeding pumps and a new metering equipment + rehabilitation of water treatment system + installation of equipment for remote computerized control &supervision system.
Kazan	• In Vahitovskiy district, replacement of DH pipes (13.3 km) and installation of Individual Heat Substations (82 pcs.) • In Vahitovskiy district, replacement of old completely depreciated boilers with new block-module boiler units in boiler houses at Vishnevskaya Str. 2/4 (2 boilers, each 2.6 Gcal/h), Volkova Str. 79 (2 boilers, each 1.5 Gcal/h), Portovaya Str.3 (3 boilers, 2 x 2.5 Gcal/h +1.5 Gcal/h) and Zhukovskogo Str. 21 (2 boilers, each 2.5 Gcal/h). • In Privolzhskiy district, replacement of DH pipes (5.54 km) and installation of Individual Heat Substations (34 pcs.) • In Privolzhskiy district, replacement of old completely depreciated boilers with new block-module boiler units in boiler houses at Rotornaya Str.9 (2 boilers, each 2 Gcal/h), Shalyapina Str.25 (2 boilers, each 2 Gcal/h) and Daurskaya Str.16 (2 boilers, each 1.5 Gcal/h). • In Sovetskiy district, replacement of old completely depreciated boilers with new block-module boiler units in boiler houses at Ershova Str. 62 (2 boilers, 1.5 Gcal/h and 2.0 Gcal/h), Zhurnalistov Str.5a (3 boilers, 2 x 2 Gcal/h and 1 x 2.5 Gcal/h), Sibirsky Trakt 4a (3 boilers, 2 x 2 Gcal/h + 1 x 1,5 Gcal/h) + In Kirovskiy district, replacement of old completely depreciated boilers with new block-module boiler units in the boiler house of Shosseynaya str. 17 (3 boilers, each 2 Gcal/h).

Krasnoyarsk	• Rehabilitation of heating system in the "Solnechnij" micro-district (a) Installation of 120 automated IHS in buildings (b) Installation of 76 heat meters (d) Installation of 68 cold water meters (e) Installation of equipment for reconstruction of 1 IHS and 4 CHS • Rehabilitation of heating system in the "Solnechnij" micro-district. Replacement of heating pipelines by the modern ones with the high quality and efficient thermal insulation (total length 2.9 km) (b) Installation of automated IHS in 9 buildings (c) Installation of a plate heat exchangers for the domestic hot water system in IHS (d) Installation of heat meters and cold water meters in 9 buildings • Rehabilitation of heating region behind boiler house No 5, Replacing heating pipelines (total length 16.6 km) with the up-to-date ones with the high quality and efficient thermal insulation, installing noiseless circulation pumps, plate heat exchangers for DHW, automation and control systems as well as metering at IHS in 65 buildings. • Installation of 69 automated IHS in buildings • Establishment of the maintenance and diagnostics service for the municipal heating systems : (a) Two mobile laboratories (specially equipped automobiles) (b) Four complete sets of clamp-on equipment to assure diagnostic and adjustment services for the heating system (c) A set of diagnostic equipment to assure diagnostic services for the departments in charge of the municipal housing stock operation and maintenance (d) Training for the personnel • Supply and Insulation of equipment for reconstruction of depreciated and laying of new pipelines (20.5km in one pipe length) using prefabricated preinsulated pipes.
Mytischi	• Installation of 52 New IHS Substations, replacement of existing system be electric circulation pumps, installation of heat exchangers for domestic hot water, automatic control systems for space heating and domestic hot water and heat meters • Replacement of 7.748 km distribution network, replacement of existing pipes with up-to-date preinsulated pipes • Replacement of 15.2 km distribution network, replacement of existing pipes with up-to-date preinsulated pipes • Replacement of 17.1 km distribution network, replacement of existing pipes with up-to-date preinsulated pipes • Installation of 50 New IHS Substations, replacement of existing system be electric circulation pumps, installation of heat exchangers for domestic hot water, automatic control systems for space heating and domestic hot water and heat meters • Replacement of 20 km distribution network, replacement of existing pipes with up-to-date preinsulated pipes • Installation of 31 New IHS Substations, replacement of existing system be electric circulation pumps, installation of heat exchangers for domestic hot water, automatic control systems for space heating and domestic hot water and heat meters • Installation of 51 New IHS Substations, replacement of existing system be electric circulation pumps, installation of heat

	exchangers for domestic hot water, automatic control systems for space heating and domestic hot water and heat meters. • Installation of 52 New IHS Substations
Syzran	• Replacement of DH-pipes, Novokashpirsky region. Total length 10.760 km (one pipe length)
Component 2: Technical Assistance - Procurement, Engineering, Supervision	
Dubna	• Preparation of the Technical documentation for Biding documents under the Lots DUB/MHP/002, DUB/MHP/004, DUB/MHP/005. • Monitoring and supervision of the Contracts execution under the Lots DUB/MHP/001-DUB/MHP/005
Kazan	• Preparation of the Technical documentation for Biding documents under the Lots KAZ/MHP/051- KAZ/MHP/055. • Monitoring and supervision of the Contracts execution under the Lots KAZ/MHP/050 - KAZ/MHP/055
Krasnoyarsk	• Preparation of the Technical documentation for Biding documents under the Lots KRA/MHP/040, KRA/MHP/042-KRA/MHP/046. • Monitoring and supervision of the Contracts execution under the Lots KRA/MHP/040-KRA/MHP/048
Mytischi	• Preparation of the Technical documentation for Biding documents under the Lots MYT/MHP/013, MYT/MHP/015 - MYT/MHP/018, MYT/MHP/020, MYT/MHP/070 • Monitoring and supervision of the Contracts execution under the Lots MYT/MHP/013-MYT/MHP/020, MYT/MHP/070.
Nerungri	• Preparation of the Technical documentation for Biding documents under the Lots NER/MHP/022 -NER/MHP/023 A, NER/MHP/025. • Monitoring and supervision of the Contracts execution under the Lots NER/MHP/021 - NER/MHP/025
Syzran	• Preparation of the Technical documentation for Biding documents under the Lots SYZ/MHP/026-027
Tambov	• Preparation of the Technical documentation for Biding documents under the Lots TAM/MHP/032 -TAM/MHP/033. • Monitoring and supervision of the Contracts execution under the Lots TAM/MHP/030-TAM/MHP/033
Volgograd	• Preparation of the Technical documentation for Biding documents under the Lots VOL/MHP/060-VOL/MHP/063, VOL/MHP/065, VOL/MHP/066. Monitoring and supervision of the Contracts execution under the Lots VOL/MHP/060-VOL/MHP/067 • Preparation of the Technical documentation for Biding documents under the Lots VOL/MHP/060-VOL/MHP/063, VOL/MHP/065, VOL/MHP/066. Monitoring and supervision of the Contracts execution under the Lots

	VOL/MHP/060-VOL/MHP/067
Component 3.	**Central Project Implementation**
	The CPIU was set up in the National Foundation for Housing Reform and it manage and supervised project implementation on behalf of Gosstroi. The project financed the financial audit of the project accounts maintained by the CPIU, together with a review of the Special Account and Statements of Expenditure. In addition, it also include funded monitoring of the creditworthiness and the Solvency of the participating cities.
Component 4.	**Institutional Support**

	• Development of system of monitoring of HCE functioning in the Russian Federation (Concept, feasibility study, TORs for system of HCE monitoring) • Implementation of fragments (pilot projects) of system of monitoring of HCE functioning in the Russian Federation. • Conducting seminars and conferences upon approval by Rosstroi • Improvement of efficiency of budget expenditures for the payment of the budget-finance institutions for the communal services • Improvement of investment attractiveness of enterprises of the housing and communal sector. • Development of new schemes of financing and functioning of municipal heating companies. Implementation of a new system of economic relationships in the housing and communal complex. • Development of Functional Requirements for Participants in the National Project "Affordable and Comfortable Housing for Citizens of Russia". • Development of basic regulation of the methodology of conducting bidding for regions selection to be financed under the HCS reforming program. • Taxation and investment risks insurance in HCS • Development of methodical recommendations with regard to forming programs of complex development of municipal entities communal infrastructure • Management of tenement - house buildings and providing communal services based on the acting legislation • Developing separate legal acts under implementation of package of measures on establishing accessible housing market

Annex 3. Economic and Financial Analysis
(including assumptions in the analysis)

Executive summary

To conduct the economic and financial analysis for this ICR, a spreadsheet model was developed that calculates economic and financial return indicators for investments in each of the 41 heating regions under modernization in the eight participating cities.

The calculations were based only on those project benefits (savings) that could be expressed in terms of cash flows. For the years 2002 – 2007, savings were based on actual figures from the project cities.

No environmental externalities or social effects of modernization, which undoubtedly contribute to the project's positive results, have been taken into account.

The results obtained differ considerably by heating region and by city. Payback for individual investments varies from almost immediate to more than 20 years, the economic and financial internal rates of return ranging from hundreds percent down to negative values. However, the aggregate numbers show results either approximating or exceeding those projected in the project appraisal document (PAD).

Scope of analysis

The total number of heating regions where the heat supply systems have been modernized under MHP amounts to 41 in 8 participating cities: 16 in Neryungri, 11 in Kazan, 5 in Mytischi, 3 in Dubna, 2 in Tambov, 2 in Krasnoyarsk, 1 in Volgograd and 1 in Syzran.

Economic and financial return calculations have been made also for the cities in total for Neryungri, Kazan, Mytischi, Tambov, and Krasnoyarsk.

Methodology

Capital costs

Capital costs of heat supply system reconstruction and modernization have been based on NFHR data broken down by years of project implementation. The breakdown between the IBRD and local financing has also been reflected.

When constructing the cash flows for capital outlays, the following approaches were taken and assumptions made:

- capital costs include only the investment component, consisting of equipment and materials costs, construction works, spare parts, mandatory training, etc.;

- other costs associated with the Project implementation (consulting services, Project management, etc.) are not included in the capital costs;
- VAT is 20% before year 2004 and 18% from 2004 onwards;
- customs duties are 10% with only the equipment cost taxable. If the actual share of equipment cost is not known, it is assumed to be 75% of the total project cost.
- the costs for economic analysis were taken in accordance with the actual project financing schedule;
- the costs financial analysis are allocated in time in accordance with the loan financing terms, and loan interest payments are also included.

Savings

Savings resulted from the project implementation were calculated for the following elements:

- fuel consumption
- electricity consumption
- cold water consumption
- treated water consumption
- maintenance costs
- repair costs
- number of personnel
- reduction of heat purchase
- additional heat sales

In general, the actual savings for the years 2002-2007 were taken from the monitoring tables as differences between "before the project" operational parameters and subsequent years' figures including project implementation and after implementation periods.

Where the data appeared insufficiently credible or where the "without-project" rather than "before-project" baseline was deemed appropriate, the following adjustments were made:

- for missing data, averages of neighbouring years were taken;
- in case of considerable reduction of heated area or population served after the project implementation, "before the project" figures were recalculated as for supplying the reduced heat loads; the comparison thus was made with the hypothetical "without" project scenario rather than with the "before the project" situation;
- similarly, in case of connection of new heat loads after project implementation, additional heat sales were taken into account;
- differences in maintenance and repair costs take into account actual inflation rates that occurred during project implementation.

Forecast of physical savings for the whole project life time is based on the figures for the last one, or final two years of monitoring.

Economic analysis assumptions

The following main assumptions were made for undertaking the project economic analysis:

- economic investment cost does not include VAT or customs duties;
- a project start year corresponds with the first year of actual investments;
- capital expenditures are distributed in time in accordance with the actual financing schedule;
- a project useful lifetime is 20 years;
- economic discount rate 12%;
- electricity price for all the cities US$ 80/MWh;
- cold water price for all the cities US$ 0.5/m^3;
- treated water price for all the cities US$ 1.5/m^3;
- exchange rate 25 rubles / 1 US dollar;
- average monthly salary US$ 800;
- economic price of the purchased heat corresponds with the economic fuel price and is calculated using generation and distribution efficiency of 80% and fuel cost share of 50% for gas and 40% for coal fired production. Economic heat prices for each city are as follows:

Table 1. Economic heat price for project cities

City	Fuel price		Heat price
	Gas, US$/000' m^3	Coal, US$/t	US$/Gcal
Neryungri	120.0		37.5
Kazan	120.0		37.5
Mytischi	120.0		37.5
Dubna	120.0		37.5
Tambov	120.0		37.5
Krasnoyarsk	-	80.0	43.86
Volgograd	120.0		37.5
Syzran	120.0		37.5

Financial analysis assumptions

The following main assumptions have been made for undertaking the project financial analysis:

- financial capital costs are distributed throughout the project cycle in accordance with the loan financing terms and include local co-financing, loan repayment and interest payment components;
- a project start year corresponds with the first year of actual investments;
- a project useful lifetime is 20 years;
- financial discount rate 12%;
- inflation rates, fuel price escalation factors, currency exchange rates and loan interest rates are taken as shown in Appendix 1 to this Annex;

- actual prices for energy resources, water and personnel salary for the years 2002-2007 for all the cities are given in Appendix 2 to this Annex;
- for future years, all prices were calculated based on inflation rates and fuel price escalation factors.

Main conclusions

The results from the model differ considerably by heating region and by city. Payback varies from almost immediate to more than 20 years, the economic and financial internal rates of return ranging from hundreds percent down to negative values.

As additional comments to these results, the following could be noted:

In the city of *Neryungri* – where, in aggregate, the best results were achieved – there are two distinct types of investments: a) CHS reconstruction and heat meter installation; and b) IHS installation and switch to 2-pipe distribution system (CHS No. 12, 10, 13, 19). The first group of measures with relatively low investment costs shows a very high economic return – mostly, because of reduction of heat purchased. It should be noted that these savings are likely to be mainly not in physical terms (actual reduction of heat consumed in Gcal) but in financial terms (billing based on actual metered amount of heat delivered - after the Project, compared to billing based on normative consumption figures - before the Project).

The second group with relatively high specific investment costs shows much more moderate results – due, to a large extent, to the abnormally high costs of supplying and installing IHS in Russia. Unit cost of an IHS in Russia often exceeds $40,000 per apartment building, while it rarely exceeds $15,000 elsewhere in Eastern Europe.

In the city of *Kazan,* the results are more similar for the heating regions considered. The reconstruction measures in almost all the cases include IHS installation, change for 2-pipes system and boiler houses modernization. An exception is the boiler house at Vishnevskogo 2/4, where after the project implementation the boiler house stopped its operation and heat is delivered and purchased from another heat source. Such a big difference between EIRR and FIRR for this heating region can be explained by a very low heat purchase price in comparison with its economic value.

For the heating region with Daurskaya 16 boiler house as a heat source, new heat consumers were connected after the project – with respective additional heat sales. Again, the difference between the economic and financial heat prices made the financial NPV negative.

It also can be noted that the lower IRR were received for those heating regions where the specific investment costs per one building (total investments divided by the number of buildings where IHS were installed) are the highest. For Daurskaya, 16 it was US$ 179.4 thousand, for Vishnevskogo 2/4 – US$ 91.3 thousand, for Rotornaya 9 – US$ 82.8 thousand, while the average figure for the city is US$ 60.9 thousand.

For the city of *Mytischi*, all the components demonstrate positive results.

In the city of *Dubna* the best relative result shows a component comprising IHS with heat meters installation in the area supplied from an outside heat source. The only type of savings generated there is a reduction of heat purchased but it is sufficient to pay back the

investments. Again, as for Neryungri, these savings are probably demonstrating the difference between the normative and consumption based billing before and after the project.

Negative NPVs and low IRR values for the heating region of Levoberezhnaya in Dubna can be explained by considerable increase of repair or maintenance costs.

In the city of *Tambov*, a notable increase of operation and maintenance costs (even with the inflation taken into account) also could be observed for the heating region of the boiler houses C-01, C-04, C-27, C-03 resulting in the negative financial indicators.

In the city of *Volgograd*, the reconstruction measures were also followed by reduction of the connected heat load that could not be fully compensated by fuel, O&M, and other savings.

The project components in the cities of *Krasnoyarsk* and *Syzran* both show positive results.

Table 3 below allows to compare the types of investments implemented in all the participating cities and the resulting IRRs. It can be noted that the highest return on investments comes from the regions where there was no metering before the project but heat was purchased from an outside heat source (Neryungri and the third component in Dubna).

Somewhat lower but still positive results can be observed for the regions where IHS were installed in the buildings (Kazan, Mytischi, Dubna, Tambov, Krasnoyarsk). This is often combined with the DH network rehabilitation or the boiler house reconstruction or both.

The negative results in most of the cases can be explained either by structural changes in the heating systems operation before and after the Project (reduction of the connected heat load, purchase of heat from an outside source instead of own boiler plant) or by considerable growth of maintenance or repair costs (likely because of insufficient financing before the Project).

Table 3. Investments types and efficiency indicators

City	No	Heating Region	Reconstruction measures										Financial indicators	
			Heat Meters	CHS Rehabilitation	CHS Redundant	IHS	DHW Pipes Demolished	DHW pipes replacement	DH Network Rehabilitation	DH pipes installation	BH rehabilitation	BH redundant	EIRR	FIRR
			pcs	pcs	pcs	pcs	km	km	km	km	pcs	pcs	%	%
Neryungri		Total for the city	175	11	5	205	41.71	0.00	8.80	0.00	0	0	146.3%	266.7%
Kazan	29	Total for the city	11	0	5	161	2.15	0.00	19.60	2.55	11	0	19.5%	33.8%
Mytischi	35	Total for the city	370	0	8	236	35.06	0.00	52.72	0.00	0	0	29.3%	25.4%
Dubna	39	Total for the city	199	0	0	140	0.00	6.18	7.88	0.00	2	0	23.9%	35.8%
Tambov	42	Total for the city	75	1	3	71	7.05	3.98	17.63	1.08	3	3	14.3%	5.7%
Krasnoyarsk	45	Total for the city	154	0	1	198	3.98	0.00	30.10	0.10	1	1	64.6%	98.9%
Volgograd	46	BH 629 district	123	1	2	123	4.08		16.56		1.0		4.9%	31.4%
Syzran	47	Novokashpirsky settlement							14.05				40.1%	54.4%

Comparison with the PAD projections

The project appraisal document (PAD) contains project cost estimates and economic and financial indices projections for 5 cities – Dubna, Kostroma, Mytischi, Neryungri and Syzran. Four of them (except Kostroma) have finally participated in the project and are considered below.

Investment program

The investment programs that were planned for the project cities at appraisal and the results of their implementation are shown in Table 4. Economic and financial investment costs are also presented.

Table 4. Investment programs and costs

City		CHS	IHS	DH Network rehabilitation	DH pipes installation	BH rehabilitation	New BH installation	Capital cost economic	Capital costs financial*
		pcs	pcs	km	km	pcs	pcs	000' $	000' $
Dubna	PAD		133	40	-	2	-	5 930	7 712
	Actual		140	14.06	-	2	-	6 200	7 851
Mytischi	PAD	18	131	41	10	-	1	11 644	15 286
	Actual		236	52.72	-	-	-	19 169	24 274
Neryungri	PAD	22	219	18	-	-	-	8 941	11 465
	Actual	11	205	8.80	-	-	-	7 307	9 321
Syzran	PAD	-	-	-	-	2	1	3 111	3 990
	Actual	-	-	14.05	-	-	-	1 269	1 607

* - financial costs shown do not include interest payments

As can be seen, the composition of the planned and implemented investment programs differs substantially. The PAD and actual investment costs are relatively close for Dubna and Neryungri. In Syzran, the actual costs are less than half those forecast in the PAD. This difference is not surprising as the technical solutions are completely different. In Mytischi, the actual investment costs are much higher than the planned costs – mostly due to bigger local contribution.

Economic and Financial Results

The project economic and financial indicators provided in the PAD and calculated on the basis of actual project performance are given in the table below.

Table 5. Comparison of economic and financial indicators

City		EIRR	FIRR	NPV economic	NPV financial
		%	%	000' US$	000' US$

City		EIRR	FIRR	NPV economic	NPV financial
		%	%	000' US$	000' US$
Dubna	PAD	37.0	20.5	7 821	5 370
	Actual	23.9	35.8	2 828	2 666
Mytischi	PAD	23.1	18.0	5 936	7 811
	Actual	29.3	25.4	9 971	8 429
Neryungri	PAD	28.9	26.1	6 592	12 836
	Actual	146.3	266.7	30 517	29 938
Syzran	PAD	25.0	21.0	1 912	3 093
	Actual	40.1	54.4	2 177	1 880

Obviously, the comparison is not to be taken too far since the scope of investments has changed considerably. It should be also noted that the assumptions made in the PAD for the financial analysis deviated from the actual reality during project implementation quite substantially. This concerns especially the exchange rate between the ruble and the dollar, which in turn affected the dollar prices of key inputs such as the price of natural gas:

	PAD Forecast, 2007	**Actual, 2007**
Gas price, US$/1000m3	45	66
Exchange rate, RUR/US$	54.07	25
Gas price, RUR/1000m3	2433	1650

Since fuel savings are a major component of return on investment in this project, the higher dollar prices of natural gas contribute to higher IRR based on cash flows expressed in dollars.

But it can be noted that, for example, for the city of Mytischi, the results are quite close to the appraisal forecast; for Dubna, the difference is also not as great. The implemented investment programs in these cities are more or less in line with those projected at appraisal.

In the city of Neryungri, the investments made are close to appraisal projections, but the economic and financial results are much better than those in the AD. The actual savings achieved are considerably higher: 123 Tcal instead of 96 Tcal reduction of heat purchase, 6.7 GWh instead of 0.7 GWh electricity savings, etc., while the capital costs are some 18% lower.

Appendix 1 to Annex 3.

Inflation rates, exchange rates, fuel price escalation rates and loan interest rates

	Domestic Inflation	Accumul. Inflation	Exchange Rate, real	Fuel Price Escalation		Interest rate
Year	%	%	RUR/US$	% (RUR)	% (US$)	%
2002	15.1%		31.35			4.5%
2003	12.0%	100.0%	30.68	100%	100%	3.7%
2004	11.7%	111.7%	28.81	121%	115%	4.0%
2005	10.9%	123.9%	28.28	151%	138%	5.9%
2006	9.0%	135.0%	27.18	166%	148%	7.6%
2007	11.9%	151.1%	25.57	200%	175%	7.7%
2008	10.7%	167.2%	23.50	250%	218%	7.1%
2009	9.6%	183.3%	23.46	319%	279%	7.1%
2010	8.7%	199.1%	23.25	367%	324%	7.1%
2011	7.8%	214.6%	23.25	397%	350%	7.1%
2012	7.0%	229.7%	23.25	419%	369%	7.1%
2013	6.3%	244.2%	23.25	442%	390%	7.1%
2014	5.7%	258.0%	23.25	467%	412%	7.1%
2015	5.7%	272.7%	23.25	493%	435%	7.1%
2016	5.7%	288.2%	23.25	521%	459%	7.1%
2017	5.7%	304.5%	23.25	550%	485%	7.1%
2018	5.7%	321.8%	23.25	581%	512%	7.1%
2019	5.7%	340.1%	23.25	614%	540%	7.1%
2020	5.7%	359.4%	23.25	648%	571%	7.1%
2021	5.7%	379.8%	23.25	684%	603%	7.1%
2022	5.7%	401.3%	23.25	722%	636%	7.1%
2023	5.7%	424.1%	23.25	763%	672%	7.1%
2024	5.7%	448.2%	23.25	806%	710%	7.1%
2025	5.7%	473.7%	23.25	851%	749%	7.1%
2026	5.7%	500.5%	23.25	898%	791%	7.1%
2027	5.7%	529.0%	23.25	949%	836%	7.1%
2028	5.7%	559.0%	23.25	1002%	883%	7.1%

Appendix 2 to Annex3. Tariffs and input prices

Neryungri

	Unit	2002	2003	2004	2005	2006	2007
Electricity	RUR/MWh	737.8	870.6	1044.7	1305.9	1466.1	1135.6
Water							
Untreated	RUR/m3	11.2	16.3	16.0	17.0	17.7	19.8
Treated	RUR/m3	26.8	33.3	35.7	40.9	42.0	45.3
Heat							
Sales	RUR/Gcal	-	-	-	-	-	-
Purchased	RUR/Gcal	284.4	320.3	361.1	391.9	439.0	644.1
Personnel							

Salary	RUR/month	7263.0	8104.0	9353.0	10500.0	10700.0	10920.0

Kazan

	Unit	2002	2003	2004	2005	2006	2007
Gas	RUR/1000nm3	602.4	795.7	1000.0	1425.2	1542.7	1734.9
Electricity	RUR/MWh	1217.0	2200.0	2200.0	1240.6	1556.6	1241.0
Water							
Untreated	RUR/m3	5.3	6.5	7.5	11.2	11.2	11.2
Treated	RUR/m3	29.3	36.1	41.9	62.8	82.4	62.8
Heat							
Sales	RUR/Gcal	105.5	131.7	153.3	423.7	482.5	550.0
Purchased	RUR/Gcal	68.7	73.6	75.2	86.5	99.4	114.3
Personnel							
Salary	RUR/month	2445.0	3737.0	5000.0	8895.1	8800.0	8895.1

Mytischi

	Unit	2002	2003	2004	2005	2006	2007
Gas	RUR/1000nm3	592.0	790.2	912.0	1119.0	1241.0	1644.0
Electricity	RUR/MWh	700.0	860.0	1000.0	1200.0	1380.0	1600.0
Water							
Untreated	RUR/m3	3.5	4.9	6.7	8.8	10.4	14.6
Treated	RUR/m3	7.9	11.3	15.5	20.3	24.0	33.6
Heat							
Sales	RUR/Gcal	282.2	399.8	709.3	790.1	767.0	866.7
Purchased	RUR/Gcal	-	-	-	-	-	-
Personnel							
Salary	RUR/month	2444.5	3737.4	4597.0	11722.0	12000.0	12000.0

Dubna

	Unit	2002	2003	2004	2005	2006	2007
Mazut	RUR/ton	1600.0	1840.0	2116.0	2433.4	2798.4	3218.2
Gas	RUR/1000nm3	628.2	882.5	1060.0	1304.0	1457.5	1707.8
Electricity	RUR/MWh	635.5	876.0	1087.0	1060.0	1200.0	1600.0
Water							
Untreated	RUR/m3	4.7	6.0	7.0	9.4	10.5	11.8
Treated	RUR/m3	10.8	13.8	16.1	21.7	24.1	27.2
Heat							
Sales	RUR/Gcal	273.5	387.5	491.6	548.1	618.9	706.5
Purchased	RUR/Gcal	304.0	426.3	475.9	547.6	631.4	720.1

Personnel Salary	RUR/month	3521.0	4896.0	6022.0	7407.0	8592.0	9623.0

Tambov

	Unit	2002	2003	2004	2005	2006	2007
Gas	RUR/1000nm3	858.0	884.0	1066.5	1309.6	1464.4	1684.1
Electricity	RUR/MWh	1100.0	1300.0	1500.0	1670.9	1850.0	2080.0
Water Untreated Treated	 RUR/m3 RUR/m3	 9.6 22.0	 12.7 29.1	 4.9 11.2	 5.5 12.7	 5.5 12.7	 6.6 15.2
Personnel Salary	RUR/month	4744.0	7856.0	7318.0	11245.0	12000.0	11507.0

Krasnoyarsk

	Unit	2002	2003	2004	2005	2006	2007
Coal	RUR/ton	111.0	150.0	159.0	159.0	243.0	270.0
Electricity	RUR/MWh	460.0	520.0	710.0	810.0	712.0	768.0
Water Untreated Treated	 RUR/m3 RUR/m3	 2.1 5.0	 3.1 5.3	 3.4 5.5	 5.7 8.7	 5.4 9.8	 6.0 10.6
Heat Sales Purchased	 RUR/Gcal RUR/Gcal	 324.2 270.1	 483.4 402.9	 620.7 517.2	 792.7 660.6	 897.7 748.1	 1077.3 897.7
Personnel Salary	RUR/month	4537.0	5077.0	7493.0	8400.0	12633.0	14359.0

Volgograd

	Unit	2002	2003	2004	2005	2006	2007
Gas	RUR/1000nm3	752.1	878.0	1071.0	1258.9	1405.0	1620.7
Electricity	RUR/MWh	808.3	1020.0	1030.0	1031.0	1055.0	1370.0
Water Untreated Treated	 RUR/m3 RUR/m3	 5.8 20.5	 6.9 20.5	 6.9 20.5	 6.5 20.5	 7.8 20.5	 8.7 27.0
Heat Sales Purchased	 RUR/Gcal RUR/Gcal	 265.1 -	 291.6 -	 380.2 -	 538.5 -	 487.1 -	 531.1 -
Personnel Salary	RUR/month	3823.0	4806.0	5432.0	7928.0	8229.0	9270.0

Syzran

	Unit	2002	2003	2004	2005	2006	2007
Gas	RUR/1000nm3	602.4	795.7	958.3	1176.0	1209.8	1527.5
Electricity	RUR/MWh	1217.0	2200.0	2550.0	1606.3	1692.4	2256.4
Water							
Untreated	RUR/m3	5.3	6.5	7.2	9.7	9.0	7.8
Treated	RUR/m3	7.5	9.0	9.9	12.8	13.5	18.9
Heat							
Sales	RUR/Gcal	469.0	416.0	546.4	588.2	663.8	766.7
Purchased	RUR/Gcal	-	-	-	-	-	-
Personnel							
Salary	RUR/month	2445.0	3737.0	4597.0	5412.1	6753.3	7211.4

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending (from Task Team in PAD Data Sheet)			
Bjom Hamso	Sr. Energy Economist	ECSSD	Team Leader
Gary Stuggins	Adviser	ETWEN	Former Team Leader
Margaret A.Wilson	Consultant	AFTEG	Financial/Economics
Pekka Kouri	Consultant	ECSSD	Technical
Arto Nuorkivi	Consultant	ECSSD	Technical
Anke Meyer	Consultant	EASTE	Economics
Raili Kajaste		ECSSD	Environment
Karl Skansing	Consultant	ESCPS	Procurement
Clifford Isaak		EAPCO	Financial Management
Lydia Petrashova		ECSPS	Financial Managements
Angela Walker Gary	Operations Officer	ECSSD	Financial
Supervision (from Task Team Members in all archived ISRs)			
Kanthan Shankar	Lead Operations Officer	ECSSD	Team Leader
Victor Loksha	Energy Economist	ECSSD	Team Leader
Bjom Hamso	Sr. Energy Economist	ECSSD	Team Leader
Vladisalv Vucetic	Lead Energy Specialist	MNSSD	Team Leader
Luiz Gabriel Azevedo	Lead Water Specialist	ECSSD	Team Leader
Vivien Foster	Lead Economist	AFTSN	Team Leader
Ranjit Lamech	Sector Leader	EASTE	Team Leader
Gevorg Sargsyan	Sr. Infrastructure Specialist	ECSSD	Team Leader
Margaret A.Wilson	Consultant	AFTEG	Financial/Economics
Pekka Kouri	Consultant	ECSSD	Technical
Vladislav Krasikov	Sr. Procurement Specialist	ECSPS	Procurement
Tatyana Shadrunova	Operations Analyst	ECSSD	Operations
Arto Nuorkivi	Consultant	ECSSD	Technical
Pekka Salminen	Sr. Energy Specialist	ECSSD	Technical
Karl Skansing	Consultant	ECSPS	Procurement

Michael Haney	Sr. Energy Specialist	SASDE	Energy
Alexandre Roukavichnikov	Procurement Specialist	ECSPS	Procurement
Alexander Mizgunov	Financial Management Spec.	ECSPS	Financial Management
Galina Kuznetsova	Sr. Financial Management Spec.	ECSPS	Financial Management

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY97		101.95
FY98		129.17
FY99		125.24
FY00	45	151.18
FY01	15	116.15
FY02		0.00
FY03		0.00
FY04		0.00
FY05		0.00
FY06		0.00
FY07		0.00
FY08		0.00
Total:	60	623.69
Supervision/ICR		
FY97		0.00
FY98		0.00
FY99		0.00
FY00		0.00
FY01	3	9.00
FY02	11	103.06
FY03	17	77.06
FY04	21	115.05
FY05	16	145.01
FY06	13	88.02
FY07	19	72.40
FY08	20	108.06
Total:	120	717.66

Annex 5. Beneficiary Survey Results

At project completion, the borrower conducted a Beneficiary Survey (the Survey) which was documented in a report entitled "Analytical Report on the Assessment of the Socio-Economic Results of the Municipal Heating Project and the Municipal Water and Wastewater Project."

This annex contains a brief summary of the report as far as the Municipal Heating Project is concerned.

The Survey aimed to evaluate the social effect of the project from the perspective of three groups of stakeholders: the city/municipal administrations participating in the project; the participating heating companies; and the end-users of their services – consumers of heat (final beneficiaries). Two cities were chosen for the Survey: Dubna, a small but economically significant science-based town near Moscow; and Kazan, a large industrial and commercial city on the Volga River. These two cities were deemed representative of the small-size and large-size cities participating in the project, respectively.

To achieve its objective, the Survey team interviewed the stakeholders aiming to: (i) determine the degree of their awareness and support of the project; (ii) solicit and assess their opinion as to whether the project was successful in meeting its stated objectives; (iii) determine their level of satisfaction with the project results; (iv) determine the perceived value of the experience from the project for future activities; and (v) identify and evaluate the direct and indirect social impacts from the project and the stakeholder's perception of these impacts.

Thirty three people were interviewed, of which 17 were from the general population of heat consumers and 16 were classified as *experts*. The latter group consisted of representatives of the municipal administrations, some of which were directly involved in the project, as well as representatives of the heating companies.

All beneficiaries confirmed the much improved quality of the heating services in the city areas renovated under the project. At the same time, the end-users generally do not see themselves as having any significant role in the project or in the operation of the housing and communal services (HCS) sector in general. Part of the reason is the long-standing skepticism among the residents about the commitment of the HCS organizations to provide quality services. For most residents, a complaint or a plea is the most common form of communication with the HCS providers.

Among the final beneficiaries, the *degree of awareness* about the project *per se* was not very high. Since information was not made an explicit component of the project, each city was free to choose its own public information strategy: from a televised campaign in Dubna to a simple public notice of service interruption appearing on one's door at the time of the construction works in Kazan.

However, awareness of the *results* of the project was high enough, and the *degree of support* of the project by the beneficiaries was noted to be high where the apparent improvements were associated with the project.

The final beneficiaries in both Dubna and Kazan noticed, first of all, the improved temperature conditions in the apartments: "the radiators are always hot enough when it's cold outside". Prior to the project, a temperature of 15^{o}C was not uncommon in some apartments in winter in Kazan. An expert in Kazan noted that complaints about hot water availability dropped dramatically over the last four years. The respondents also pointed out the improved response time in emergencies.

On the down side, the beneficiaries were keenly aware of the increased price of heat: the tariff increase by the heating company became particularly controversial in Kazan, where the project company "Kazenergo" had to compete with "Tatenergo", a company supported by the Republican (Tatarstan) Government and having the advantage of combined heat-and-power (CHP) generation cycle on its side. With the tariff charged by "Kazenergo" being 2.5 times that of "Tatenergo", the residents were right to question the authorities for the reasons why.

The experts note that the population generally reacts negatively to any tariff increase, but the heat tariff increase in this case was known to be due to the Bank project's requirement to bring the cost recovery for the population to 100%. It should be noted that this requirement often received more attention than the fact that the overall tariff level (i.e. the average tariff for all categories of customers, including industry and government buildings) went up 3-4 times during the life if the project. Indeed, the controversial "Kazenergo" tariffs are not the highest among the project participants. The main reason why they were brought into the spotlight seems to be the contrast with the low tariffs charged by "Tatenergo" in the same city, and sometimes in the community close by.

In Dubna, the heat tariff increase was accepted with relatively little resistance. Respondents in the Survey noted that this increase was commensurate with the increase in the level of income of the population. In Kazan, on the other hand, the tariff level became a very controversial issue. This was triggered by the fact that some of the communities were split between "Kazenergo" and "Tatenergo", and the tariff charged by the latter company was about one-half of the former. Some of the difference is attributed to the fact that "Tatenergo", as a company not participating in the project, was able to continue the practice of cross-subsidizing the tariff for the population – a practice inconsistent with the project objective of 100% cost recovery for the population.

The respondents recognized the success of the project in meeting its stated objectives as per the indicators included in the legal agreement. Some respondents from the heating companies noted, however, that the objectives of cost recovery did not go far enough. Focusing on *operating* cost recovery, they did not provide for inclusion of the investment cost component in the tariff. Further, the cost of the subloan debt service was treated differently by different cities, based on ad hoc political decisions.

In Kazan, further criticism of the results of the project stems from the perceived lack of foresight about the overall development strategy for the city's infrastructure. Over the life of the project, the city dramatically revised its development strategy and decided to build two new heat transmission pipelines from the "Tatenergo" plants CHP-1 and CHP-2 to the center of the city. Thus, the heat-only "Kazenergo" plants renovated under the project and producing heat at higher costs may become redundant. These plants were renovated in order to respond to the short-term heat supply shortages that seemed an overriding concern at the time. The consequences of the apparent long-term planning failure could have been more severe if not for the modular design of the "Kazenergo" boiler plants, allowing for dismantling and moving them to a more suitable location.

According to the authors of the Survey, the level of satisfaction with the project results is closely connected with the desire to continue the activities started under the project. In Dubna, the project was generally deemed "useful for the city", while the respondents in Kazan appeared reluctant to see the project continued in the future – due to the new scheme of heat supply for the center of the city based on the CHPs.

The respondents close to the project had differing opinions about the value of the operational experience gained from the project – particularly, in relation to procurement. The existence of a

double set of requirements – those of the World Bank and those of the Russian Federation – is an obvious challenge pointed out by many experts. Interestingly, both the Bank and the Russian procurement rules were perceived as favoring the least-cost bidder as opposed to encouraging the highest quality-to-price ratio. Also, the Bank's rigid requirements for experience and turnover for companies to be eligible to participate in the tenders was perceived as putting the local suppliers at a disadvantage vis-à-vis foreign suppliers or foreign-led joint ventures and consortia.

The respondents from the heating companies have complained about the limited role they ended up playing in the project design structure where the local PIUs were formed largely from the city administrations or their close associates. The power to select the suitable contractors for the construction (supply and installation) contracts was at the center of this controversy. The heating company in Kazan, in particular, believed that the lack of possibility to participate in the decisions about the selection of contractors was detrimental to the project.

Respondents have also noted the positive role of the Bank's technical consultants, who have sometimes dramatically changed the city's vision for heating infrastructure development. Most notable examples are: (i) the shift from modernization of central heating substations (CHS) to individual heating substations (IHS); (ii) the associated shift from the traditional four-pipe secondary network system to the two-pipe system; and (iii) the broad acceptance of the pre-insulated pipe technology – including, in some cases, the establishment of the required local manufacturing base.

The value of the experience from the project for future activities was generally assessed by respondents as high – particularly, in terms of creating the capacity to understand the international practices of procurement and contractual relationships, gaining exposure to modern technology and management techniques, including management of financial transactions. Some respondents plan to use this experience in other project activities financed by international or Russian crediting organizations. Interestingly, some respondents perceived their ability to reconcile conflicting requirements of the Bank's and Russian procurement rules as a special skill that could give them an edge in future activities. At the same time, some PIU staff felt that this newly acquired capacity might be lost if no further Bank-financed projects materialized.

The opinions about the social impacts from the project, while varying considerably across different stakeholders, centered on the theme of perceived commercialization of HCS services at the expense of their traditional social role. The main premise in the assessments by various stakeholders was that the Bank's overarching objective was to transform the municipal heating service into a viable business rather than a public good. Experts in Dubna generally appeared to embrace the commercialization of district heating as a positive development. In Kazan, when speaking of positive results from the project, more credit was given to its role in ensuring that the socially significant service such as district heating run without interruptions.

In assessing the significance of the project for the broader HCS reform, the Survey explores the linkages between district heating and housing management that are known to have an impact on the end user of the heating services. The ability of homeowners to organize themselves into homeowner associations and take control of their heating bills is key to taking full advantage of the new technology (such as individual heating substations) introduced under the project. The Survey concludes that the project has highlighted a certain social divide that exists between the active minority that is keen to take initiative and embrace market reform in the HCS sector and the passive majority. The latter would rather see the minimum quality of service that requires from them little or no participation in housing management.

Annex 6. Stakeholder Workshop Report and Results

Regular stakeholder workshops were conducted under the project. They were attended by representatives of the implementing agency (Rosstroi), the PIU (NFHR), the World Bank, and the key stakeholders from the participating cities. During the period of 2003 – 2005, such workshops were conducted at least once per year.

Such workshops were an essential vehicle for exchanging opinions and sharing experience of the participating cities and their respective heating companies. Some operational issues including reallocation of subloan amounts were discussed during these workshops.

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

Borrower's Evaluation Report.

A. NFHR

1. General Provisions

1.1. Brief Description of Project Structure and Loan Terms and Conditions

Loan Agreement signed	February 08, 2002
Loan amount	USD 85 mln
Total Project cost	USD 104.5 mln (with co-financing)
Scheduled commencement of financing	2002
Project implementation period	5 years
Principal loan repayment by Sub-borrowers	10 years

Initial Project Closing Date (June 30, 2006) was extended until June 30, 2008. Detailed information is presented below.

1.2. Final Borrowers and Information on Sub-Loan Agreements

Table №1

№	Borrower, Sub-Borrowers	Sub-Loan Agreement	Loan Amount, USD	Signed by Minfin of Russia	Effectiveness
0	Russian Federation	№ 4601 RU	85,000,000.00	08.02.2002	30.08.2002
1	Dubna (Moscow Oblast)	№ 01-01-06/26-53 Amendment №1	6,883,259.00	12.03.2003 18.07.2005	10.04.2003 18.07.2005
2	Mytischi (Moscow Oblast)	№ 01-01-06/26-52 Amendment №1 Amendment №2 Amendment №3	11,644,896.00 14,075,926.30	12.03.2003 18.07.2005 28.12.2005 30.03.2007	10.04.2003 18.07.2005 28.12.2005 30.03.2007
3	Neryungry (Republic of Sakha (Yakutiya)	№ 01-01-06/26-714 Amendment №1 Amendment №2	10,215,000.00 13,471,334.18	13.08.2002 18.07.2005 24.08.2007	20.03.2003 18.07.2005 24.08.2007
4	Syzran (Samara Oblast)	№ 01-01-06/26-82 Amendment №1	3,730,000.00 1,311,904.76	24.03.2003 24.08.2007	20.03.2003 24.08.2007
5	Tambov (Tambov Oblast)	№ 01-01-06/26-664 Amendment №1 Amendment №2 Amendment №3	8,000,000.00 14,658,431.00 10,200,000.00	29.07.2002 31.12.2003 25.08.2005 07.01.2007	9.10.2002 31.12.2003 25.08.2005 07.01.2007

6	Krasnoyarsk (Krasnoyarsk Krai)	№ 01-01-06/26-666 Amendment №1	13,000,000.00	29.07.2002 30.08.2005	12.08.2003 30.08.2005
7	Volgograd (Volgograd Oblast)	№ 01-01-06/26-665 Amendment №1	10,700,000.00	29.07.2002 25.08.2005	29.04.2003 25.08.2005
8	Kazan (Republic of Tatarstan)	№ 01-01-06/26-667 Amendment №1	9,600,000.00	29.07.2002 27.10.2005	9.10.2002 27.10.2005

1.3. Challenges Encountered in the Process of Project Implementation

In accordance with the Loan Agreement, the Project implementation was to start in 2002 and terminate on June 30, 2006.

However, in 2002-2003, there was a delay (almost a year) in opening Special Account and effectiveness of majority of Sub-loan agreements with borrowers (Participating Cities of the Project). Disbursement of the IBRD loan funds was impossible without proper execution of the required procedures. Actual disbursement under signed contracts for the equipment supplied, works and services fulfilled started only in 2003.

In late May 2005, Minfin of Russia suspended financing of works under the Project, for the sub-loan agreements included contradictions related to the payment mechanism for the up-front fee to Minfin by the cities (as a compensation of payment by Minfin of Russia of an up-front fee to the World Bank in amount of 1% of the loan amount). In three months, after the supplementary agreements to sub-loan agreements were re-executed in Rosstroi and Minfin of Russia, the disbursement of funds was resumed.

In September 2005, three months delay in Project financing was caused by discharge of Director of the NFHR and re-execution of authorities for the NFHR Special Account replenishment in Rosstroi and Minfin of Russia. Due to the above force-majeure circumstances in 2005, implementation of some contracts under the Project was suspended; the time of their completion (due to beginning of the heating season and impossibility of fulfilling works in wintertime) was extended to 2006.

2. Implementation of Project Development Objectives

2.1. Assessment of the project objectives

The main objective of the Project, as defined in the Loan Agreement, is to reduce the financial burden on the selected municipal governments related to the supply of district heating services to the local population. This is supposed to be achieved through: (a) improvement of efficiency of operation of district heat supply networks, (b) development of viable policy of cost recovery and commercial practices, and (c) assistance to the government bodies in the provision of subsidies targeted to low-income population.

These goals were considered highly important by the Russian Government at the time of project initiation and remain so at present, although the Project has contributed significantly to the achievement of these goals in the participant cities.

(a) Improving efficiency of operation of district heat supply networks. This Project has made a significant contribution to this goal in all the participant cities through investment in new

district heating infrastructure. A similar scope of investments could benefit most Russian cities. However, it should be noted that the investments under the project were only enough to cover certain portions of the participant cities' district heating systems. According to Rosstroi, total investment requirements for modernization of the HCS sector infrastructure could take about RUR 347 billion, or USD 12.6 billion.

(b) Development of reasonable policy of cost recovery and commercial practices. This project goal is still relevant, given that actual cost recovery remains relatively low in most Russian cities – notwithstanding considerable increase in tariffs for services to households (almost 4 times since year 2001 in nominal terms). Full cost recovery for housing and utilities services has not been achieved yet. According to certain statistical data of the Ministry for Regional Development of the Russian Federation, heat supply tariffs for population still cover only 77.2 % of respective economic costs. The cities participating in this Project are more advanced in this regard, with the average tariff paid by the population averaging 95% of the overall average tariff paid by all consumers of heat.

(c) Providing assistance to government bodies in the sphere of improvement of economic efficiency of subsidized programs. This project goal was highly relevant at project initiation and remains so today to a considerable extent. At the start of the Project, the subsidies to the consumers of heat were provided through the heat tariff to the entire population of district heat consumers. The burden of provision of the subsidy was on the municipal budget. The new system of subsidies provided directly to low-income households is a better way to provide a subsidy. The experience of the Project participant cities as well as many other Russian cities shows that targeted subsidies help both the heating companies and the low-income consumers of heat and demonstrates that it is possible to achieve better cost recovery through tariffs without significant negative social impacts.

2.2. Brief Description of Monitoring Indicators

The Loan Agreement[3] specifies eight monitoring indicators for the Project which can be summarized as follows: (1) cost recovery by participating district heating companies through district heating charges/tariffs; (2) level of cost recovery in the tariffs paid by the households; (3) payment collection ratio to total billings; (4) rate of in-cash collections; (5) quality and energy-efficiency of heat and hot water services; (6) operating cost reduction; (7) better targeting of heating subsidies to low-income households; and (8) reduction of the level of support of participating district heating companies by their municipalities.

3. Final Borrowers' Report on Project Implementation

Sub-borrowers were sent a wide list of questions related to Project implementation outcomes. Responses received allowed to state as follows:

3.1. Achievement of Tasks

The Project was implemented in the conditions of a high percentage of worn-out assets in the municipal district heating system due to inadequate funds in municipal heating companies for repairs and rehabilitation of such systems. Participating cities were not capable of rehabilitating worn-out facilities using its own resources due to financial difficulties and a lack of funds in the

[3] LA, Annex to Schedule 5: Project Monitoring and Evaluation Indicators.

city budget. A sharp increase in tariffs to cover costs for these purposes was not possible as it would have resulted in an explosion of social discontent and would have become an unbearable burden for the population due to low income of heat consumers. Interests on loans provided by Russian banks were high and did not make it possible to repay investments in the project within a reasonable timeframe. Attraction of direct foreign investments in such amounts leads to ownership of facilities rehabilitated being passed to the investor, which is not acceptable in such a strategically important sector as the heat supply sector. In addition to that, continued operation of existing worn-out equipment and networks resulted in deterioration of the environmental situation in the city due to excess of permissible concentration of emissions of pollutants into the atmosphere and continued heat losses during transportation of heat to end consumers. In this situation a decision was made to participate in the IBRD Municipal Heating Project.

Joint work of administrative city units, the operating company, the Local PIU and the Central PIU to implement the project in each city ensured that the project was implemented in a good manner. Continuous supervision to ensure that contractors achieve specified performance parameters at rehabilitated facilities and provide high quality of works and independent monitoring of project implementation by the Consultant were put in place. Tender documentation for each lot was prepared taking into account wishes and comments of residents from the apartment buildings that get heat from the district heating systems rehabilitated by the project.

The following conclusions may be drawn from the project: (a) Heat tariffs for the population were increased to the level of the heat producer tariffs, thus reducing the amount of budgetary support to the municipal heating company participating in the Project; as a result, the notion of "tariff difference compensation" ceased to exist; (b) Federal laws were passed that replaced old-style subsidies by targeted subsidies disbursed to personal accounts of the apartment residents. This allowed to increase the efficiency of the subsidy program; and (iii) supporting government efforts to improve the cost efficiency of subsidy programs through better targeting and delivery of subsidies to low-income households.

The most important achievements of the project were: The modernization of the municipal heating system allowed to:

- improve its operational efficiency and reliability;
- acquire experience in implementing projects using funds borrowed from international financial institutions
- ensure energy resource saving
- reduce heat losses and hazardous atmospheric emissions.
- gain experience of large scale application of advanced technologies in the district heating sector

Main reasons for the success in achieving the overall objective and the tasks of the project was the expedient resolution of all project implementation issues on the part of NFHR, the Bank, and Borrower. Well-coordinated joint efforts allowed to achieve the set objectives.

Certain challenges, however, emerged in the course of Project implementation. The most important achievements under the Projects, according to Sub-borrowers, are as follows: providing consumers with high quality heating and DHW services in parallel with reduction in heat generation and transportation costs; modernization of urban heat supply systems allowing to improve their operational efficiency; resources savings; reduction in heat losses and level of harmful emissions in the air; improvement of life-supporting systems reliability; experience of

implementing international projects with use of funds borrowed from international financial institutions.

In general, rehabilitated facilities in the cities were put in operation according to schedules. However, in respect of a part of facilities due dates were not met due to the following reasons:

- Project design documentation on certain completed projects was not prepared by Contractors properly; remedial measures caused delays in commissioning of these projects,
- Process of registration of municipalities' titles to commissioned rehabilitated facilities took significant time. This situation was aggravated by seasonal nature of works - all works were to be completed in summer time, when it was impossible to conduct start-up operations pending the heating season.

3.2. Evaluation of Borrower's Performance

Project preparation

Evaluations of the level of RF Government's support to the Project (Project supervising ministries and departments) at the stage of preparation and implementation by the cities were conducted.

Certain cities believe that the level of support was rather high and rated it high or satisfactory. According to the others, this support was rather weak. All cities noted inadmissible long delays caused by ministries and departments in respect of various issues at the stage of Project implementation, preparation and signing of necessary legal documents, delays in contract awards, approvals and permits, as well as contract financing.

Project participating cities noted that should a similar project be conceived for implementation in the Russian Federation in future, RF Government departments responsible for its preparation, development and implementation will have to provide for considerable reduction in time for getting approvals and execution of all required documents.

According to cities opinions, one of possible solutions might be a transfer of Borrower's responsibilities directly to municipalities, providing for elimination of the existing administrative barriers.

3.3. Evaluation of Bank's Performance

Project preparation stage

According to Project participating cities, IBRD took active part in Project preparation and implementation, providing timely support through NFHR in respect of execution of required documents and getting necessary approvals.

IBRD conducted regular Project supervision missions including visits to Project supervising ministries and departments, NFHR, and Project participating cities for the purposes of operational response to all emerging organizational problems.

The cities admitted that the activities of IBRD, aimed at understanding of tasks and achievement of consensus with RF Government were rather successful:

- Bank's specialists supervising the Project were rather qualified and sufficiently experienced and skilled to provide for successful Project preparation, implementation and closing.
- In the process of resources mobilization for Project co-financing, interaction of the Bank and RF Government was well coordinated and timely. According to Bank's requirements,

the share of co-financing of the participating cities was established at the level of 20% of total project costs.

According to Project participating cities, should a similar project be prepared by IBRD in future, the Bank will have to pay more attention to finance-ready municipal projects that are already available.

Also, closer contact between IBRD and Sub-borrowers in respect of various legal and financial issues is needed.

When developing texts, terms and conditions of contracts, it is necessary to put them in compliance with the effective Russian law. Bidding mechanisms require adjustment in terms of wider participation of local (regional) contractors and use of more flexible evaluation criteria for participants qualification.

Project implementation stage

According to Project participating cities, IBRD took active part in Project implementation.

- Bank conducted regular Project supervision missions including visits to Project supervising ministries and departments, NFHR, and Project participating cities and facilities in these cities for the purposes of operational response to all emerging problems; annual audits of Special Account and local Project accounts are conducted.
- Bank's response to ongoing changes in the country have been adequate and timely. If needed, Project validity dates were extended, amendments made to contracts, due to various reasons, were reviewed and approved on a timely basis.
- Bank's team includes highly qualified specialists with great experience and high standard of knowledge that were used to the benefit of Project successful implementation. Developed reporting formats allow for Bank's comprehensive supervision over Project implementation in the participating cities. IBRD's attitude towards permanently emerging problems in respect of Project implementation in the cities was accommodating.
- Upon request from and with support of IBRD, municipal budgets designated funds for each year of Project implementation in amounts sufficient for meeting cities' co-financing obligations under effective contracts and loan servicing; it allowed for Project implementation without interruptions caused by lack of funds.

According to cities, IBRD should use more flexible criteria in the process of procurement, which would allow for changing contract terms and conditions and sub-projects implementation depending on specific local situation. There are unnecessary and unfeasible procedures, given the seasonal nature of works, e.g. strictly limited timeframes for guarantee tests and issue of Final Completion Certificates and Acceptance Certificates.

3.4. Project Impact on Institutional Development

Project implementation has become an efficient start-up of technical upgrading and organization of municipal heat supply administration, thus providing cities with new mechanisms of attracting extra-budget funds for various projects implementation, modern approaches to technical upgrading, and, most importantly, allowing to reduce burden on municipal budgets. Participating in the Project allowed cities to accumulate rich experience of building relationships in respect of complicated issues of investment projects implementation, modernization of assets and creating efficient administrative and financial mechanisms for heat supply system operation.

The most noticeable contribution in the process of institutional development was made in the cities of Kazan, Mytischi, Neryungry, and Tambov.

- According to participating cities, Project implementation will have long-term technical and economic impacts, and will provide consumers with high-quality heating and DHW services.

Role and impact of Federal Component, according to cities, are less significant relative to components implemented in the cities.

3.5. Transition to Regular Activities

According to sub-borrowers, cities' administrations and operating heating companies will not encounter organizational difficulties after termination of Project financing from the Loan funds, as mechanisms of borrowed funds repayment have been developed, facilities are being gradually put in operation within the systems of municipal heating companies.

However, the lack of a program of rehabilitation of facilities *not included* in the Project, but linked to the systems upgraded under the Project, may negatively affect the efficiency of rehabilitated facilities operation and reduce future positive impacts.

Operation of all heat supply facilities constructed and rehabilitated under the Project is successful. Complicated equipment is serviced by highly qualified personnel. It is envisaged that upgrading of heating systems not included in rehabilitation program under the Project (boiler plants, building-level substations, etc.) will be performed by local companies with financing from municipal budgets and programs. For instance, the City of Kazan conducts corporatization and merger of MUE "PO Kazenergo" with OJSC "Kazanskaya teplosetevaya kompania" (Kazan Heating Networks Company). This will allow to level and reduce tariffs for heat, improve mechanisms of facilities operation and maintenance, and improve the level of sector management.

Within the framework of the cities' socio-economic development programs, evaluation of potential need in similar projects has been made; options of attracting borrowed funds (foreign and domestic) are being reviewed.

3.6. Key Lessons

Participation of Russian enterprises in the Project as clients, general contractors, or suppliers encourages domestic manufacturers to expand production to meet increasing demand for goods and services similar to the Project ones. It gives the Russian enterprises the opportunity to gain experience of participation in international competitive bidding conducted by IFIs.

Procurement is the most time-consuming aspect of the Bank's project cycle; eventually, it determines the length of time needed to implement the project. NFHR was aware of this issue and addressed it as follows:

- Early in the project, an agreement was reached with the Bank that the "Supply and Install" type of contract would be used for most activities under the project; this ensured that the contractors bear full responsibility for contract implementation, all the way to commissioning and testing of the installed equipment.
- At an early stage of project preparation, with the assistance of a qualified international consultant (a firm), standard Terms of Reference (TOR) were developed for the preparation of the bidding documents for conducting international competitive

bidding in accordance with the procurement guidelines of the IBRD; this resulted in a streamlined bidding process for the entire duration of the project.

- It was agreed with the Cities that the bids would be made on the basis of the standard TORs (see above) rather than on the basis of final project design documentation for the investments concerned. Both NFHR and the Cities realized that the final documentation takes time to develop and need not hold up the procurement process. This has allowed to: (a) speed up the process by about 6 months per contract; (b) make savings for the Cities on the development of the detailed designs and associated agreement process involving the local permitting authorities; (c) leave the contractor free to choose the materials and technical solutions to meet the specifications.

B. Participating Cities

On March 27, 2001, the World Bank approved the loan provided to the Russian Federation for financing the Municipal Heating Project indicating that funds would be allocated among 9-10 cities. Eight cities were eventually selected. Gosstroi of Russia conducted all the necessary negotiations and procedures with the IBRD.

1. Tambov

(i). ***Evaluation of Borrower Performance***. At the Project preparation stage and during its implementation the degree of support from relevant ministries and agencies of the Russian Government was significant. Issues arising during Project preparation and implementation with regard to technical issues, resources, processing and clearance of changes, amendments to the technical design documentation were addressed through the NFHR, which was the Central PIU under the MHP. If a similar project is implemented in the future, ministries and agencies of the Russian Government responsible for its implementation will need to substantially speed up the approval of relevant documentation.

(ii). ***Evaluation of Bank Performance***. During project preparation and implementation the IBRD conducted supervision and provided assistance through the NFHR to ensure timeliness and correctness of technical design documentation. In our view, activity undertaken by the IBRD aimed to understand tasks and achieve consensus with the Russian Government was quite successful. For successful preparation of the Municipal Heating Project, the IBRD team had sufficient experience and knowledge. For mobilization of resources for project cofinancing (including resources from the budget of Tambov), the interaction between the Bank and the Russian Government was smooth and timely. If a similar project is implemented in the future, we believe that the bidding process will need to be adjusted to allow wider participation of local contractors.

The Bank fulfilled its obligations at the project implementation stage in a timely and smooth fashion. The Bank responded to changes taking place in the country in time and adequately. During project implementation the Bank conducted successful supervision of implementation and took into account situations that arose due to events beyond control of the Borrower.

Understanding how important it was for Tambov to build a new boiler house in street block Tambov-4 and due to an early termination of the international contact TAM/MHP/O33 with the Closed Joint Stock Company UralKotloService, the Bank satisfied the request of the Tambov Administration and allowed it to renew the contract with JSC Invest-Import (Serbia and

Montenegro), extending the contract for one year. Based on results of Bank's missions, relevant explanations and recommendations were provided to the Borrower. During mobilization of resources for project cofinancing (including resources from the budget of Tambov) the Bank and the Russian Government had a smooth interaction.

(iv). ***Key Lessons***. During implementation of the IBRD Municipal Heating Project various mechanisms of interaction on financing issues, development of technical design and cost estimate documentation, application of technologies in the heat generation sector and construction, in energy savings, interaction with other entities in the housing and communal services sector in Tambov and the Tambov Oblast were tested and put in place.

2. Neryungri

(i). ***Borrower Performance***. At the Project preparation stage and during its implementation the Borrower received considerable support from relevant ministries and agencies of the Russian Government. Issues arising during Project preparation and implementation with regard to technical issues, resources, processing and clearance of changes, amendments to the technical design documentation were addressed through the NFHR, which was the Central PIU under the MHP. But in preparation and implementation of similar projects ministries and agencies of the Russian Government need to substantially simplify a number of bureaucratic procedures and reduce the timeline for clearance of relevant documentation (this refers especially to the Ministry of Finance).

(iii). ***Bank Performance***. During Project preparation and implementation, the IBRD conducted supervision, provided assistance through the NFHR to ensure timeliness and correctness of technical design documentation processing. In our view, actions of the IBRD aimed to understand tasks and achieve consensus with the Russian Government were quite successful. For successful preparation of the Municipal Heating Project the Bank team had sufficient experience and knowledge. If a similar project is implemented in the future, we think that the established practice of preparation and implementation of international projects needs to be adjusted with respect to the bidding mechanism to ensure wider participation of local (regional) contractors and use of more qualification criteria to evaluate tender participants which will generate a much larger financial and economic effect from projects implemented in participating cities. The Bank fulfilled its commitments at the Project implementation stage on time. During Project implementation the Bank conducted successful supervision of implementation, and tried to understand situations and circumstances that arose outside control of participating cities.

(iv). ***Transition Arrangements***. All heating facilities rehabilitated under the IBRD Municipal Heating Project operate successfully. Sophisticated equipment is maintained by highly skilled professionals.

(v). ***Key Lessons***. During implementation of the IBRD Municipal Heating Project various mechanisms of interaction on financing issues, development of technical design and cost estimate documentation, application of advanced energy saving technologies, training regional specialists in the area of energy saving, strengthening of metrological facilities of the regional metrology center, improvement of interaction between all entities of the housing and communal services sector of the Rayon under the HCS sector reforms were tested and put in place.

3. Krasnoyarsk

(i) ***Evaluation of Borrower Performance***

The degree of project support by the government at the implementation stage can also be evaluated as high, but a number of issues related to bidding, changes in contracts concluded were not addressed quickly enough.

(ii) ***Evaluation of Bank Performance***

- The Bank was actively involved in project implementation, there were numerous missions, but the exchange of information with the aim of exchanging positive experience among participating cities (e.g., in the form of training workshops) was clearly insufficient.
- The Bank responded adequately, which was especially clear when the Bank decided to extend the period of project implementation.
- A number of indicators of project monitoring conducted by the Bank lost their relevance over time.
- Cofinancing was not always provided on time. This issue should be given more priority in the future.
- In the future it is extremely important to change the way the cost of the contract is defined. The cost of the contract should be defined on the basis of the complete set of the technical design and cost estimate documentation, and the preparation of the technical design and cost estimate documentation should be a separate project component. It will help avoid deviation of actual results of the contracts from planned results which repeatedly occurred under the existing bidding system.

(iii) ***Transition Arrangements***

- A lack of rehabilitation of the facilities that are adjacent to the rehabilitated district heating systems may reduce the future positive effect; therefore after completion of this project the upgrade efforts should be accelerated.
- It is planned to continue upgrade of district heating systems in Krasnoyarsk under other programs.
- Need in similar projects is being assessed.

(iv) ***Key Lessons.*** A key lesson of project implementation is experience gained in implementation of large investments projects with participation of leading financial institutions.

4. Mytischi District

(i). ***Evaluation of Borrower Performance***. Project Preparation: Preparation for Project implementation was carried out with satisfactory support of the Russian Government. Gosstroi of Russia conducted all necessary negotiations and procedures with the IBRD for the loan to be provided. Project Implementation: On March 27, 2001, the World Bank approved the loan provided to the Russian Federation for financing the Municipal Heating Project indicating that funds would be allocated among 9-10 cities, including the Mytischi District.

Financing of the Municipal Heating Project was opened in 2002, but the Mytischi District did not start project implementation until the second quarter of 2003, when a multi-sided Subloan Agreement became effective. Despite the fact that a lot of preliminary work had been done to

include the Mytischi District into the project and despite the fact that documents had been already prepared we lost a year in getting clearance at the federal level (the Ministry of Finance). Before effectiveness of the Subloan Agreement, the Ministry of Finance repeatedly raised the issue on making a final decision as to whether provide a subloan to the Mytischi District or not.

The MOF made a requirement that an agreement on restructuring the debt of the Subborrower Guarantor (the Government of the Moscow Oblast) in the amount of USD 1.077 million under the Medical Equipment Project be signed. Only upon signing this agreement the Mytischi subproject under the MHP became effective.

Despite the fact that the Subloan Agreement was not signed, starting from 2001, by requests of the MOF, every year the budget of the Moscow Oblast and the budget of the Mytischi Oblast set aside required funds for guarantees and subloan servicing in order to confirm the interest of the Moscow Oblast Government in project participation. Therefore, a substantial amount of money was actually "frozen" and guarantees of the Moscow Oblast for Oblast borrowing programs of some direct budget funds beneficiaries could not be provided.

Rosstroi rendered active assistance in addressing all issues that arose between the MOF and the Sub-borrower. In addition to that, during subproject implementation and during international competitive bidding conducted to procure goods and works long delays occurred in awarding contracts and signing documents by the evaluation committee that, in its turn, resulted in postponement of contract implementation.

(iv) ***Evaluation of Bank Performance***

The Bank was actively involved in Project implementation. The Bank responded adequately and timely to changes that took place in the county and that could impact the outcome of the project. The Bank team had sufficient experience and knowledge for successful supervision of project implementation. Reporting forms developed allow the Bank to carry out supervision of subproject implementation in participating cities. For the purpose of resource and time saving, the Bank has to review the mechanism of providing loans, and provide loans directly to municipalities and heating companies rather than to the Russian Government. Appropriate changes in procedures will improve quality of project implementation.

(v) ***Contribution of the Project to Institutional Strengthening***

Participation in the Project provided an opportunity to test an integrated approach to reforming the HCS sector in the Mytischi District that includes not only upgrade of fixed assets but also creation of an efficient administrative and financial mechanism of the district heating system operation. Currently the Mytischi District intends to continue a large-scale rehabilitation of the district heating system that has been initiated, and, among other things, to rehabilitate boiler houses with the use of cogeneration and implement an innovative plasma thermal technology that uses renewable sources of heat and electricity (solid waste incineration with generation of electricity and heat).

5. Kazan

(i) ***Evaluation of Bank Performance***

- The Bank was actively involved in project implementation, there were many supervision missions, the special account and Local Project accounts are audited every year.
- By Bank requirement, the city budget had to set aside adequate amounts for cofinancing and servicing of the loan every year of project implementation making it possible to implement the project in time and without disruptions caused by a lack of funds.

(iii) **Transition Arrangements.** In accordance with federal legislation, tariffs for heat are approved by the Republican Energy Commission of the Republic of Tatarstan for each heat supplier separately. The tariff for one Gcal of heat supplied to residential premises (district heating and domestic hot water) is set for each apartment building separately, depending on the heat supplier. In 2007 the Resolution of the Executive Board of the Republican Energy Commission of the Republic of Tatarstan approved the heat tariff for MUE PO Kazenergo at the level of 649 rubles per 1 Gcal (including the VAT). This is roughly twice the level charged by Kazenergo only two years ago, and roughly twice the tariff charged by the Republican company OAO Tatenergo operating in the same city. The executive committee of the Kazan Municipality adopted measures to smooth out the drastic increase in payments made by the city residents for heat in 2007, including social support to low-income population in the form of targeted allowances.

One of the forthcoming tasks aimed to improve the Kazan district heating systems set out in the Program of Social and Economic Development of Kazan for 2008-2010 is corporatization of MUE PO Kazenergo and its merger with JSC Kazan Heat Network Company, which will make it possible to even out the heat tariffs and improve the mechanisms to operate and maintain the facilities.

(iii) ***Key Lessons.*** In Tender and Contract Documentation some terms and conditions of the contract are given more importance than local legislation (Russian and Republican). In this connection, the stage of contract completion lasts for an indefinitely long period of time. A positive factor of project implementation is use of energy saving technologies and requirements to materials which are rapidly introduced in the city. Starting from 2004, Kazan has organized production of preinsulated polyurethane foamed pipes and construction of boiler houses with modern imported equipment.

6. Volgograd

(i) ***Borrower's operation evaluation***

- We evaluate the Government support of the project at the stage of its implementation as sufficient.
- All necessary measures to ensure a successful implementation of the project (provision of staff, policies, technical aspects and resources) were taken by the Gosstroi, MOF and MEDT and other stakeholders of the Government at a sufficient level.

(ii) ***Bank's operation evaluation***

Project implementation

- Bank's activities during the project implementation stage are satisfactory
- The Bank responded to the changes that took place in the country and that could have an impact on the project outcomes in a rather adequate and timely manner

- The Bank team has an adequate knowledge level to successfully supervise the project progress.
- The Bank successfully interacted with the Government in the process of mobilization of the project co-financing resources (including from the participating cities budgets).
- If a similar project is to be implemented in future, the Bank should pay more attention to trips of the supervision mission to the field (outside Moscow).

(iii). **Transition to normal operation**

- We expect that at the initial stage the heating company may face difficulties in terms of qualification and practical experience of the staff in connection with operation of the new devices and technologies.
- Additional training would be required for the heating company staff to move to normal operations and to preserve the advantages obtained during the project (including preserving a due level of maintenance of facilities created/built/rehabilitated under the project).
- The assessment of the need in a potential proposed project was made.

(iv) ***Key lessons.*** Loans should be extended towards the projects with a complete set of design and cost estimate documents, which will make it possible to more clearly define the procurement plans under the entire project.

7. Syzran

(i) ***Achievement of Objectives.*** In 1995 when Kashpirskaya Mine transferred the Novokashpirsky Town from its books to the municipality accounts, the entire infrastructure of the town was dilapidated. Heating of the Novokasphpirsky Town of Syzran municipality was provided by the town's boiler house fed by the steam from Syzran Heat and Power Plant of Samaraenergo Joint Stock Company.

The steam conduit had not been overhauled for 30 years, its technical condition and insulation being in the extremely unsatisfactory condition with major heat loss experienced at this section, due to which Gosgortechnadzor (Technical Supervisory Agency) practically prohibited its further operation.

The City Administration was under pressure to find an investor.· more than 10,000 meters of piping were installed using an advanced no-chute technology. Preinsulated pipes were used to reduce the heat loss by a significant factor. A new system for leakage monitoring is used. This innovation will help reduce time for identification of the leakage location and its removal to save on routine maintenance of heating pipes. The pipes differ from conventional pipes as they are more durable due to high leak resistance of both pipes and joints.

(ii) ***Project's Contribution to Institutional Development Process***. Huge work on replacement of heat supply piping was completed in Novokashpirsky Town of Syzran City with the money provided by the IBRD on affordable terms, the results will have a long term effect.

(iii) ***Transition to Normal Operation***. · Syzran Municipality Administration is prepared to review new proposals from the IBRD on extension of loans for the development and implementation of the housing and communal sector projects, because there is a pressing need to get new cash flows.

(iv) ***Key Lessons.*** A fundamentally new type of investments for our city enabled the city to replace the heating supply network in Novokashpirsky town within a short time, reducing substantially the thermal loss and maintenance costs.

8. Dubna

(i) ***Evaluation of Borrower Performance***

- The degree of the project support by the Government at the project implementation stage was significant. The issues that arose during the implementation stage as regards technical aspects, resources, formalizing and approving changes and additions to the project documentation were resolved through NFHR.

(ii) ***Evaluation of Bank Performance***

- During the Project implementation stage the Bank was fulfilling its commitments in a timely and efficient manner. The Bank responded adequately and timely to changes that took place in the country and could impact the outcome of the project.
- The Bank provided effective supervision of the Project implementation and demonstrated understanding of situations caused by reasons outside the Borrower's control (when necessary, the project timeframe was extended, and contract amendments were approved).

(iii) ***Transition to Regular Activity***

- All the facilities built and rehabilitated within the framework of the IBRD Municipal Heating Project are functioning successfully.
- An assessment of the need for a potential follow-up project has been carried out. Options for attracting loan funds (foreign and domestic) are being considered and calculated.

Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

N/A

Annex 9. List of Supporting Documents

- Project Implementation Plan
- Project Appraisal Document for Russian Federation: Municipal Heating Project dated March 1, 2001 (Report No: 21153-RU)
- Aide Memoires, Back-to-Office Reports, and Implementation Status Reports.
- Project Progress Reports.
- Borrower's Evaluation Report dated October 29, 2008

*including electronic files

Annex 10: Examples of Achievement of Project Development Objectives

(i) **Objective 1:** *Improving the operating efficiency of district heating systems through investments to save energy and reduce heat losses.*

Kazan: After boiler houses were upgraded and commissioned in 2006, average gas savings amounted to 12.05%, water savings amounted to 19.64%, heat losses decreased by 41.50%, emissions into the atmosphere decreased by 12.05%. In addition, emissions of pollutants into the atmosphere were also reduced.

Mytischi. The most important subproject objective achieved was the provision of quality heating and domestic hot water services accompanied by reduction in costs to produce and transport heat. Participation in the project provided an opportunity to test an integrated approach to reforms in the HCS sector in the Mytischi District that included not only upgrading fixed assets, but also creation of an efficient administrative and financial mechanism of the district heating system operation. Natural gas consumption has decreased by 31.5%; electricity consumption has decreased by 33%. Heat losses have decreased by half. Annual savings of costs to generate and transmit heat amount to 63.95 million rubles. Starting from 2004, savings achieved are taken into account in setting heat tariffs.

Tambov. Implementation of the project resulted in reduction in losses of heat, savings of natural fuel (gas), which made it possible to significantly reduce overall energy resource quotas set for the city and, as a consequence, reduce budget funds.

New sections of heat mains and replacement of worn-out pipelines with new pre-insulated pipelines as well as conversion of a four-pipe system into a two-pipe system made it possible to reduce losses in heat mains, and, as a result, to save circulation water. Installation of modern reliable equipment at boiler houses helped reduce repairs and maintenance costs, electricity costs, reduce labor costs.

In addition, an environmental effect was achieved, such as reduction in emissions of pollutants into the atmosphere together with flue gases of boiler houses due to reduction in fuel consumption at rehabilitated boiler houses, which allowed the city to improve the environmental situation in Tambov.

Performance Indicators of District Heating Systems after Rehabilitation

Indicators	Before Rehabilitation	After Rehabilitation
Total Heat Capacity	51.2	50.76
Boiler Efficiency	71.9	91.7
Gas Consumption per 1 Gcal	158.6	137.7
Water Consumption per 1 Gcal	0.66	0.32
Electricity Consumption per 1 Gcal	24.0	28.1
Heat Losses		Reduced by 33%

Neryungri. Some of the performance indicators of the district heating systems after rehabilitation were the following:

- Savings achieved through reduced costs to conduct capital and current repairs and maintenance works of the CHSs, total savings: 14, 137,930 *rubles per year,* including:

  - savings on capital repairs: 917,700 *rubles per year or 4.2 %* of total savings;
  - savings on current repairs: 430,560 *rubles per year or 2.0 %* of total savings;
  - savings on maintenance costs: 12,789,670 *rubles per year or 58.7%* of total savings;

- Savings achieved through reduced electricity consumption after CHS rehabilitation, total savings: 1,805,900 *rubles per year or 8.3 %* of total savings.

- Savings achieved through reduced consumption of heat and water for in-house needs after CHS rehabilitation: total savings: 1,164,270 *rubles per year or 5.3%* of total savings.

- Savings achieved through reduced costs related to wage and salaries paid to operations personnel after CHS rehabilitation, total savings: 4,684,000 *rubles per year or 21.5%* of total savings.

Objective 2: ***Promoting sound cost recovery policies and commercial practices***.

Mytischi. In parallel to reduction in heat costs included in the tariff, the tariff includes costs to repay the loan. Savings achieved during implementation of the project fully cover costs related to repayment of the loan and payment of interest, while increase in tariffs is proportional to the inflation rate and increase in tariffs of natural monopolies set for energy supplying companies. The project has provided such tariff policy that allowed the municipality to repay investments in rehabilitation without additional financial burden on the population.

Tambov. When heat tariffs are regulated for each regulation period, tariffs for the heating company are set at the level that recovers all operating costs and heat production costs as well as inflation related costs. Tariffs also include required profit for the heating company. The cost recovery is more than 100%.

The cost recovery rate of the heating company in the tariff set for the residential sector is currently 100%. The tariff for industrial and other consumers has been set above the average tariff and is 116.7%.

Payments for heat in the residential sector are collected in cash, and payments by legal entities are made by money transfers through banks. The heat payment collection rate is 93-95%.

Cash collected in the form of lease payments will be transferred to the city budget to a separate account and will be accumulated in this account to repay the loan in conformity with the amortization schedule. The entire population of the city will participate in debt repayment through tariffs for heat services.

Heat Tariff (Rub/Gcal with VAT)

	Before Rehabilitation	After Rehabilitation				
	2002	2003	2004	2005	2006	2007
Wholesale tariff	223.80	342.38	474.0	553.6	615.37	643.5
Residential tariff	199.0	249.69	366.93	557.0	557.0	643.5
Tariff for other groups	306.0	360.0	474.0	553.6	615.37	752.86

Neryungri. When tariffs are regulated for each regulation period, tariffs for the heating company set at the level that recovers all operating costs and heat production costs as well as inflation-related costs. Payments for heat in the residential sector are collected in cash; payments by legal entities are made by money transfers through banks. The heat payment collection rate is 90-93%.

In order to repay the debt, in the case of Neryungri and Tambov, a mechanism for repayment of debt was worked out and a decision was made to include the principal amount to be repaid in the wholesale tariff of the heating company in the form of lease payments for using municipal district heating facilities passed over to the company under lease arrangements. All town population will participate in repayment of the debt through heat tariffs.

Dubna. Heat tariffs for the population were increased to the level of the heat producer tariffs, thus reducing the amount of budgetary support to the municipal heating company participating in the project.

Objective 3: ***Supporting government efforts to improve the cost-effectiveness of subsidy programs through better targeting and delivery of subsidies to low-income households***.

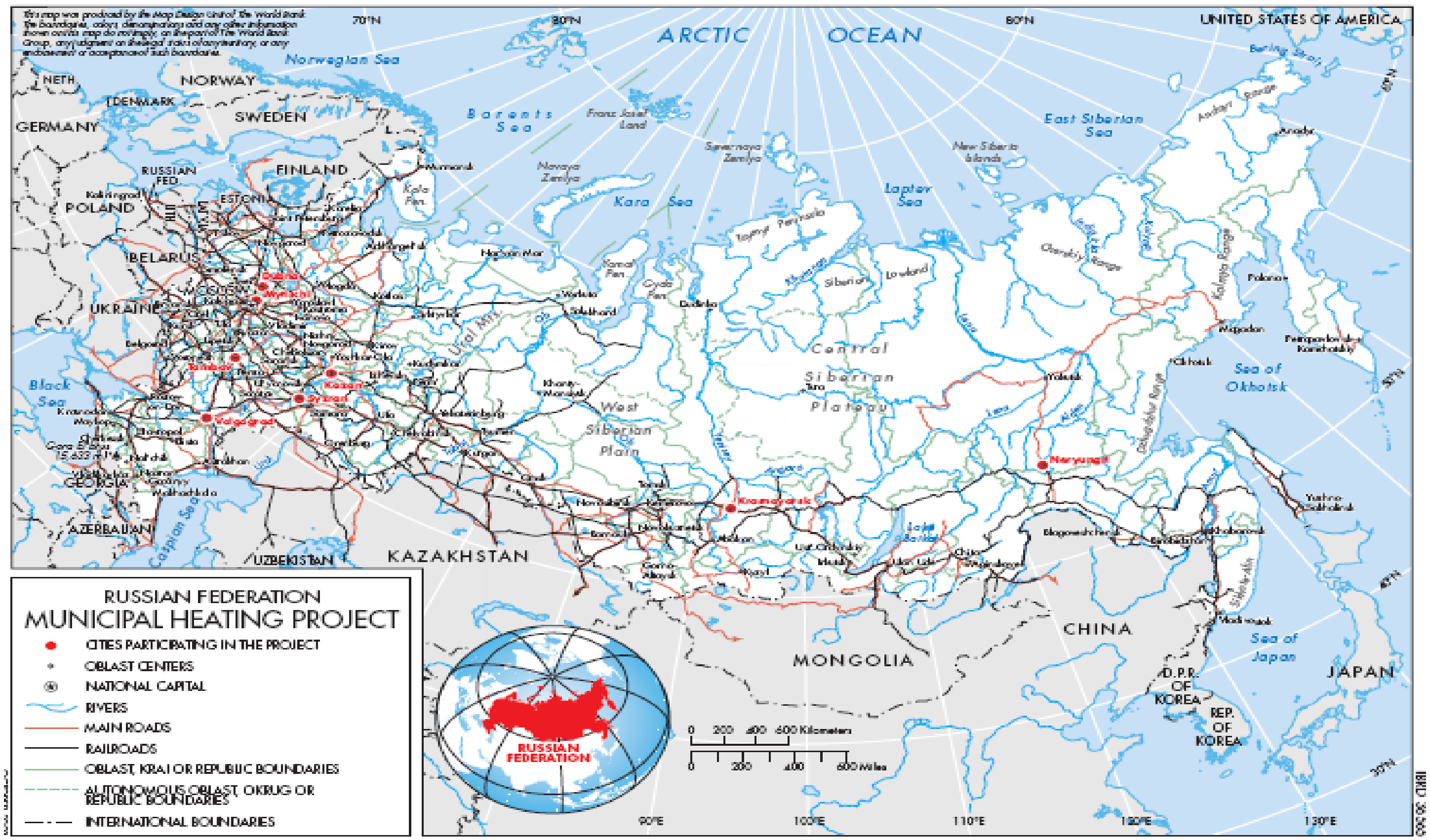
Tambov. With the aim of reducing the tariff burden on the population, the city has introduced a system of housing allowances for low income population to pay for housing and communal services using proceeds of the city budget. Housing allowances are targeted.

Allowances are calculated based on the maximum allowable percentage share of expenditures to pay for housing and communal services in the total income of the family. Housing allowances are transferred to a settlement account of residents. The threshold of expenditures to pay for housing and communal services in the total income of the family in Tambov is 22%. The number of families receiving housing allowances to the total number of families in the city is 4.5%.

Dubna. Federal laws were passed that replaced old-style subsidies by targeted subsidies disbursed to personal accounts of the apartment residents. This has allowed to increase the efficiency of the subsidy program.

Volgograd. The practice of providing the municipal subsidies for heating through heating companies is discontinued: the housing subsidies are directly provided to the low-income households.

MAP


RUSSIAN FEDERATION
MUNICIPAL HEATING PROJECT
CITIES PARTICIPATING IN THE PROJECT
OBLAST CENTERS
NATIONAL CAPITAL
RIVERS
MAIN ROADS
RAILROADS
OBLAST, KRAI OR REPUBLIC BOUNDARIES
AUTONOMOUS OBLAST, OKRUG OR REPUBLIC BOUNDARIES
INTERNATIONAL BOUNDARIES
ARCTIC OCEAN
Norwegian Sea
Barents Sea
Kara Sea
Laptev Sea
East Siberian Sea
Sea of Okhotsk
Sea of Japan
Black Sea
Caspian Sea
UNITED STATES OF AMERICA
NORWAY
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KAZAKHSTAN
MONGOLIA
CHINA
JAPAN
D.P.R. OF KOREA
REP. OF KOREA
MOSCOW
Dubna
Tambov
Kazan
Syzran
Volgograd
Krasnoyarsk
Neryungri
Central Siberian Plateau
West Siberian Plain
RUSSIAN FEDERATION
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80°N
90°E
100°E
110°E
120°E
130°E
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