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**UNITED NATIONS DEVELOPMENT PROGRAM
GLOBAL ENVIRONMENT FACILITY
Project of the Government of the Russian Federation**

PROJECT DOCUMENT

Number and Title: RUS/96/G31/C/1G/99
Capacity Building to Reduce Key Barriers to Energy Efficiency in Russian Residential Building and Heat Supply

Duration: 52 months

Project Site: Vladimir, Russian Federation

UNDP Sector and Subsector: Energy (0500), Energy planning and conservation (0510)

GEF Implementing Agency: United Nations Development Program (UNDP)

National Executing Agency: Ministry on Science and Technologies of the Russian Federation

National Implementing Agency: Department of Housing and Communal Services of the Administration of the City of Vladimir

UN Associated Agency: UN-OPS

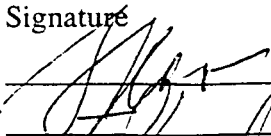
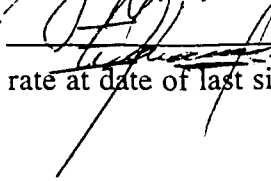
Starting Date: February 1998

Government Inputs (in-kind): 4.9 million rubles

UNDP-GEF Inputs (cash): US\$2,980,000

UNDP and cost sharing financing:	
UNDP/GEF	\$2,818,847
Other cost sharing	\$ 0
Government cost sharing	\$ 0
Agency support costs	\$ 161,153
Total:	\$2,980,000

Brief Description: The project will enhance capacities in both the private and public sectors in the city of Vladimir to overcome barriers to energy-efficiency investments in residential buildings and related heat-distribution systems. In particular, the project will: (a) develop a prototype system for consumption-based metering and billing that will create new incentives for tenants, tenant associations and district-heat distribution companies to invest in energy efficiency; (b) study and demonstrate the technical, economic, institutional, and geographical feasibility of developing autonomous (building-level) heat supplies; and (c) develop the skills to conduct the economic and financial project analyses that are required by private and public financing institutions for energy efficiency investment projects. Experience gained in the city of Vladimir will be disseminated to other cities in the Russian Federation through a network of energy efficiency demonstration zones and through two associated projects being financed with World Bank loans.

On behalf of:	Signature	Date	Name/Title
The Government:		26.02.98	V. Kostjuk, First Deputy Minister of Science & Technologies, RF
UNDP:		27.02.98	Philippe Elghouayel, Resident Representative

UN official exchange rate at date of last signature of project document: \$1 = 5,9 rubles

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A. CONTEXT

1. Description of Subsector

Because of large existing inefficiencies in energy production and consumption, some of the best opportunities for greenhouse-gas emissions reductions in the Russian Federation come from investments in energy efficiency. Many studies have shown that energy intensities in Russian energy-supply and end-use sectors are 2 - 3 times greater those found in Western countries (based upon average Western technological levels and typical management practices). Some of the best opportunities for energy-efficiency savings and consequent CO₂ reductions come from improvements in heating boilers, district-heat distribution pipelines, heating system controls in buildings, and building insulation (district-heat supply in the Russian Federation represented over 34% of total final energy consumption in 1990 in all sectors combined excluding transport). Opportunities to save 25-35% and even up to 50% are technically feasible and economically cost-effective. These opportunities are almost universal across all of the Russian Federation's 89 regions; centralized district heating systems supply heat to 80% of the population through highly standardized systems and buildings. Some CO₂ reductions as well as saving of energy could come from increasing use of natural gas instead of coal.

Besides the obvious global environmental benefits, energy efficiency improvements are of great economic importance to municipal governments throughout Russia. City governments are now spending up to one-third or more of their total annual budgets just on subsidies to residential space heat and hot water (no other forms of energy are now directly subsidized in Russia besides residential space heat and hot water). Gas and heat prices in Russia have risen to Western European levels, and as these full costs are passed on to households (as mandated by a 1994 government decree (amended in 1996), which requires elimination of subsidies by 2003), residents will be hard-pressed to pay monthly heating and hot water bills that will approach one-third to one-half of the average monthly wage.

2. Host Country Strategy

The Russian Federation ratified the Framework Convention on Climate Change in December 1994. A special Inter-Ministerial Commission was established by a presidential decree in April 1994 to implement Russia's commitments under the Convention. The scientific organization Roshydromet (Russian Federal Service for Hydrometeorology and Environmental Monitoring) is in charge of the climate change program. In 1996 Russia's national climate plan was under development; it is clear that both energy efficiency and reduction of natural gas pipeline leakage are important aspects of this plan. Improved energy metering and control especially is considered one of the more viable means of short-term mitigation of CO₂ emissions.

While very few energy-efficiency investments have taken place since the demise of the centrally-planned economy in 1992 due to enormous barriers and uncertainties, recent developments and legislative actions have focused more attention on energy efficiency. The

federal energy program "Fuel and Energy," approved by the government in 1995, outlines priorities for energy sector development and considers energy efficiency one of Russia's top priorities. The Energy Strategy of Russia, stated in a Presidential Decree in May 1995 and subsequently approved by the Government, established energy efficiency as highest energy policy priority to set the country on an energy efficient development path. This was followed by the Law of the Russian Federation on Energy Saving in April 1996, which established the legal, regulatory and institutional basis for a federal energy-efficiency program.

While these federal-level actions are encouraging, many observers feel that the majority of real energy efficiency gains in the Russian Federation will come from national and standard norms, local and regional initiatives and activities (this is true for many other aspects of the Russian Federation's economic development as well). Authority to decide many matters of energy policy, tariffs, and energy regulation is increasingly being turned over to the regional and local levels (regional and local energy commissions and administrations). Federal laws establish general guidelines, but require local and regional authorities to develop implementation mechanisms and take actions that will remove barriers to market-oriented activities. City governments are taking matters into their own hands; for example, Moscow has its own energy efficiency program, and new energy-efficiency standards for buildings have been enacted in the absence of any federal standards. And examples of a variety of energy efficiency initiatives can be found in many cities outside of Moscow.

3. Prior and On-going Assistance

The World Bank and the Russian Federation are currently undertaking three investment projects in several cities in the Russian Federation related to energy efficiency: the Enterprise Housing Divestiture Project (EHDP), an Energy Efficiency loan, and a future Gas Distribution Rehabilitation project. The city of Vladimir (population 375,000; located 180 km east of Moscow) is included in all three of these projects. The EHDP will finance end-use energy-efficiency investments (including insulation, controls, and heat meters) in residential buildings to make these buildings less costly to operate, in order to facilitate divestiture of residential buildings from enterprises to the city government. Loans from the World Bank to six cities in the Russian Federation (including Vladimir) under this project are expected to total \$300 million, with practically all of the investment going towards energy efficiency improvements. The Energy Efficiency loan has allocated \$60 million for energy efficiency improvements in a group of specific cities (including Vladimir) for projects evaluated through the Russian Energy Savings Fund (RESF). The Gas Distribution Rehabilitation loan will upgrade gas distribution systems in Vladimir and improve their efficiency. The EHDP loan was approved by the World Bank board in April 1996. The Energy Efficiency loan was approved in 1995, and project preparation for the Gas Distribution Rehabilitation loan is continuing, with board approval expected in 1998.

Other activities in Vladimir related to energy efficiency are being undertaken by USAID and private European firms. This proposal builds upon the achieved and expected outputs of these activities, and continued coordination between these projects through the city Energy Project

Management Unit (see project implementation section) will be important. In 1995, Vladimir was awarded a \$2.4 million USAID grant under the Commodity Import Program for energy efficiency improvements and analysis of the district heating systems in one district of Vladimir, including a limited study of the institutional issues involved in district heating systems in Vladimir. In 1992-93, the French firm Sofregas, as part of a self-financed market study, analyzed the heat demand at the Vladimir Tractor Factory (a privately owned enterprise) and also at a residential building near the plant. In 1994, the private German firm Ruhrgas together with another German firm conducted a (confidential) study of the district heating systems in Vladimir, including the technical potential for saving gas in heat production, distribution, and residential and public (commercial) buildings, and also proposed future development options.

The city of Vladimir has been designated as an Energy Efficiency Demonstration Zone by the Ministry on Science and Technologies of the Russian Federation and by the Ministry of Fuel and Energy of the Russian Federation. The purpose of an Energy Efficiency Demonstration Zone is to demonstrate technologies, as well as to demonstrate, on a local level, the institutional innovations, regulatory and legal changes, information dissemination, and other types of activities that are intended to remove barriers to market-based investments in greater energy efficiency (which can then be replicated elsewhere). In the Russian Federation in 1995, there were 18 such zones either existing, planned or being created (Zelenograd, Istra, Vladimir, VNIIGAS, Saratov, Chelabinsk, Belashikha, Lefortovo, Tver, Nizhny Novgorod, Kirovsk, Samara, Mytistchi, Rostov, Kaliningrad, Karelia, and St. Petersburg). The EU TACIS and THERMIE programs, as well as the Dutch TAGOS program are financing activities in some of these demonstration zones, including Vladimir. These demonstration zones were established within the framework of the Energy Efficiency 2000 program of the United Nations Economic Commission for Europe (UNECE), which is coordinating activities among similar zones throughout Eastern Europe and the former Soviet Union. As one of these zones, Vladimir is covered by the Council of Ministers Decision 998 of October 1996 on State Support for the Development of Energy Efficiency Demonstration Zones.

More recent assistance and international activities have focused directly on the problem of financing for energy efficiency. For example, in 1996, to assist foreign firms and Russian enterprise managers in implementing energy efficiency projects supported under existing government legislation. The steering committee included the representatives of the Ministry of Fuel and Energy, the Ministry on Science and Technologies, the Ministry of Economy in co-operation with UNECE, together with western governments, companies, commercial banks, and an international financial institution, jointly prepared a book of guidelines and information for investors in energy efficiency projects in the Russian Federation.

4. Institutional Framework of Subsector

Most residential buildings in the Russian Federation, except those still owned by enterprises and a very small number of cooperatives, are the responsibility of municipal governments, even though all or most of the apartments themselves may have been privatized. Currently,

city administrations pay heat suppliers (district-heating companies) for the full costs of heat delivered to residential buildings (including both space heat and hot water), measured as the heat leaves the heat production source (sometimes with a fixed standard allowance for distribution losses). City administrations then bill households a fixed monthly amount which depends upon apartment size and registered number of household members, not by actual consumption. The difference between payments to heat suppliers and receipts from households is the city's subsidy -- which in most cases is still 70-90% of the full costs). While city administrations have incentives to invest in energy efficiency in buildings (to reduce subsidy burdens), they are severely capital constrained and as subsidies decrease this incentive will weaken. Also in this situation, district heat companies have no incentive to reduce distribution line losses, and households (either individually or collectively through tenant associations) have no incentive themselves to invest in energy efficiency or to take actions to conserve energy.

B. PROJECT JUSTIFICATION

1. Problem to be Addressed: The Present Situation

Many energy efficiency improvements and conservation actions are possible in existing Russian residential buildings, but these improvements and actions are hindered by a number of barriers, including: (a) lack of available capital; (b) lack of technical design, financial evaluation, and procurement services experience and capacity; (c) building-level and apartment-level heat meters do not exist; (d) households have no incentive to improve the thermal efficiency of their buildings or to reduce their space heat and hot water consumption because they do not pay for heat and hot water consumption according to marginal consumption, but rather pay a fixed monthly amount; (e) households, even if owners of their apartments, are not responsible for maintaining the building itself; (f) households are not organized into tenant associations that can collectively make investment decisions about the building; (g) city government subsidies for heat and hot water reduce household incentives; (h) district heat companies have no incentive to invest in improving the energy efficiency of the distribution network because they charge the city administration for heat as it leaves the heat plant not as it enters buildings; and (i) apartment-level metering of heat consumption is difficult and costly because of the physical piping arrangements within buildings.

Besides renovations to the heating equipment and physical construction of buildings, investments in autonomous heating boilers offer the potential to reduce energy consumption. A 1996 UNDP/World Bank ESMAP study in the Russian Federation concluded that autonomous heating boilers were among the most economically attractive options for heat supply in certain circumstances. But there still exist large information gaps and uncertainties associated with autonomous heat supplies as an alternative to centralized district-heating systems. Few feasibility studies or demonstration projects exist from which to learn. Uncertainties include technical performance; installation and operation costs; the necessary upgrading and restructuring of gas distribution systems; and the impacts on district heating systems and their costs and profits. Institutional issues include ownership (the advantages and

constraints are not clear for potential owners such as gas suppliers, households and tenant associations, building maintenance companies, district heating companies, or municipal administrations); responsibility for operation and maintenance; metering and billing; and limitations on placement locations in buildings dictated by existing construction standards and structural factors. This last issue, placement location, is quite important for the Russian Federation on a national level, because construction standards have prohibited gas-fired equipment in building basements (one rationale was the danger of explosions) and the State Committee of Construction of the Russian Federation is reluctant to change these standards even though basement placement is common in many other countries. Other alternatives, like placement on detached buildings or on rooftop locations, may be more costly and problematic than basement locations.

The energy strategy of Russia approved by the Government of the Federation in 1995 aimed at creation of a country wide network of independent small and medium heat and power producers. The question of how penetration of autonomous heating supplies will affect gas distribution systems has not been addressed in existing activities, but has implications for effective investment decisions made under the second Gas Distribution Rehabilitation project and other gas distribution projects. Thus overcoming information and experience barriers, and understanding the future penetration and character of autonomous heat supplies will have ripple effects in district heating and gas distribution systems that over time will result in significantly greater energy efficiency of these systems. Until these information and experience barriers are overcome, private-sector actors will be reluctant to invest in autonomous heat supplies because of the uncertain returns and viability. For example, Ruhrgas has stated that it is not investigating these issues with a profit motive, but rather for public relations value in its relationship with Gazprom.

The lack of capacity to analyze the financial and economic aspects of energy efficiency projects and to prepare feasibility studies suitable for consideration by Western and domestic financing sources is an important barrier to energy efficiency investments in the Russian Federation. In general, the capacity to undertake technical analysis and to understand technical measures for energy efficient is excellent, but the parallel skills in understanding how to evaluate the financial and economic aspects of projects are poor or non-existent -- such as rates of return, sensitivity analysis, lending terms, cash flow, and cost estimation. These skills were not needed in the centrally planned economic system, but now represent a critical barrier to project finance. Many so-called "project proposals" being developed today throughout the Russian Federation are merely technical specifications of what must be done without any economic or financial analysis, nor even cost data (while cost estimation is a well-developed art in the West, it is poorly developed in the Russian Federation's new market environment). These deficiencies are also coupled with a lack of good understanding of what constitutes a project feasibility study and the requirements and appraisal methods of lenders.

In general, national-level support addressing these barriers has been inadequate because heat supply issues are considered the domain of municipalities. But municipal governments face severe budget constraints and lack the resources to properly address a variety of heating-sector issues.

2. Expected End-of-Project Situation

This project addresses three key activities that represent some of the greatest opportunities for energy efficiency improvements and energy saving in heat supply and consumption: (1) institutional changes that create incentives (where none now exist) for greater energy efficiency and energy conservation in existing distribution and end-use infrastructure; (2) much greater penetration of autonomous (decentralized to the building-level) sources of heat; and (3) the capacity to analyze the financial and economic aspects and feasibility of capital investment projects for commercial and multi-lateral financing.

(1) Profitable investments are not occurring and energy conservation actions are not taking place because households and district heating companies lack any economic incentives. Removal of these incentive-related barriers is the critical pre-condition for all other actions and for the further reduction of other barriers. Thus consumption-based heat metering and billing is an important first step towards: (a) providing incentives for energy-efficiency investments and energy-saving actions by households and by tenant associations; (b) placing incentives to reduce district-heat distribution line losses with the district heating companies that own and maintain the distribution lines; and (c) allowing financial returns from such investments to flow to those making the investment.

(2) Both Russian experts and international agencies like the World Bank have recognized that for greater efficiency, autonomous (decentralized) heat sources should play a much greater role in Russia's heat supplies in the longer term. Studies conducted in Eastern Europe have shown that the economically optimal penetration and size of centralized district-heating systems depend upon urban geography and population densities, and suggest that much of the existing infrastructure in the Russian Federation does not correspond with economically optimal solutions. This over centralization has left great opportunities for improved overall system efficiency and economic benefits through more autonomous, decentralized heat supplies. Overall district-heating system efficiency from heat production to final consumption may be as low as 50% because of production losses (up to 35%), distribution losses (up to 30%), and poor control of heat flows throughout the system from production to final consumption (resulting in large temperature imbalances and overheating and under heating of many buildings and apartments). Autonomous heat sources have the potential to produce heat at much greater overall system efficiencies where cost-effective and where gas distribution constraints can be overcome.

(3) A third important issue for energy efficiency in the Russian Federation is the general deficiency in skills and capacity to identify, evaluate, and propose energy-efficiency investment projects for multilateral or private-sector financing. While Russians possess great scientific and engineering skills, deficiencies are acute in the areas of economic and financial analysis and in the institutional capacity to develop and propose projects in the manner required by multilateral and Western and Russian commercial lenders.

Once barriers are removed, future activities can be expected by a potentially wide range of agents -- households, residential building tenant associations, district heating companies, city governments, energy service companies, housing maintenance companies, and gas suppliers. These future activities will include residential-building energy-efficiency and energy-conservation measures, district-heating distribution system rehabilitation, use of autonomous heating supplies to supplement or replace district heating where economically cost-effective, and energy efficiency projects financed through the World Bank's Energy Efficiency loan and through other financing sources.

For example, the cost pressures that households will increasingly face as subsidies for residential space heat and hot water are removed will result in no-cost energy conservation actions once incentives are in place, without any need for additional capital. Many other measures like improved insulation and manual control valves can be done at relatively low-cost. As another example, the rehabilitation of gas distribution systems will more appropriately take into account the needs and potential of autonomous heat sources, which will result in greater technical viability of energy efficiency improvements with autonomous heating boilers in the future.

3. Target Beneficiaries

The direct target beneficiaries of this project are the city administration of Vladimir, industrial enterprises of Vladimir, and households of multi-family buildings in Vladimir. All of these beneficiaries should experience financial and non-financial benefits over the life of the project and beyond. The indirect beneficiaries through the implementation of the project itself and through the understanding, dissemination and replication of experience from the project, include a wide range of groups and agencies throughout the Russian Federation:

- Tenants and households
- Municipalities
- Municipal energy management teams
- Managers of energy-saving funds of local and regional administrations
- Commercial banks
- Investment project managers
- Non-governmental organizations

These groups will benefit from the technical assistance, training and information from the project enhancing the impact of investments made by the World Bank, US AID and other investors. They will develop the management, metering and billing systems needed to transform centrally controlled heating systems to become more efficient for end consumers. Because of the wide applicability of the activities proposed here, and the importance of the key problems that they address throughout the Russian Federation, dissemination and replication of results obtained in Vladimir to other regions of the Russian Federation is critical. Logical candidates for early dissemination would be the five other cities receiving World Bank financing under the Enterprise Housing Divestiture Project and the other cities eligible to

receive energy efficiency loans under the first Gas Distribution Rehabilitation and Energy Efficiency loan by the World Bank. Local experiences in Vladimir will be disseminated first through the 12 energy efficiency demonstration zones and cities covered by World Bank investment projects as information to consumers, local authorities, energy project managers and introduced as local and national standards or regulations when applicable.

4. Project Strategy and Implementation Arrangements

Figure 1 diagrams the project implementation arrangements.

A national project Steering Committee will be responsible for the project on behalf of the Government. The Steering Committee will meet 6 months after commencement of operations and thereafter every 6 months to review the project and set major policy and implementation directions. The Steering Committee will be led by an official from the Ministry on Science and Technologies, (the National Project Director) and will include representatives from the Ministry of Fuel and Energy, the Ministry of Economy, the State Committee on Environment, the Russian Association of Energy Efficiency Demonstration Zones, the Vladimir Administration, the UNDP Moscow office, the World Bank Moscow office.

The National Project Director will be responsible for carrying out the directives of the committee and for ensuring the proper implementation of the project on behalf of the Government.

A UNDP/GEF Project Coordinator located in the UNDP Country Office will be responsible for the overall management of the project as per the Job Description provide in Annex III. The UNDP Project Coordinator will manage project activities through national co-operating agencies and the project personnel in Vladimir.

A Project Management Unit (PMU) will be established under the leadership of the UNDP Project Coordinator and will be headed by a National Project Manager in Vladimir, whose Job Description is attached (Annex IV). The Government will nominate a high level national expert who will serve as National Adviser on Policy, Coordination and Dissemination. The Job Description of the National Adviser is provided in Annex V.

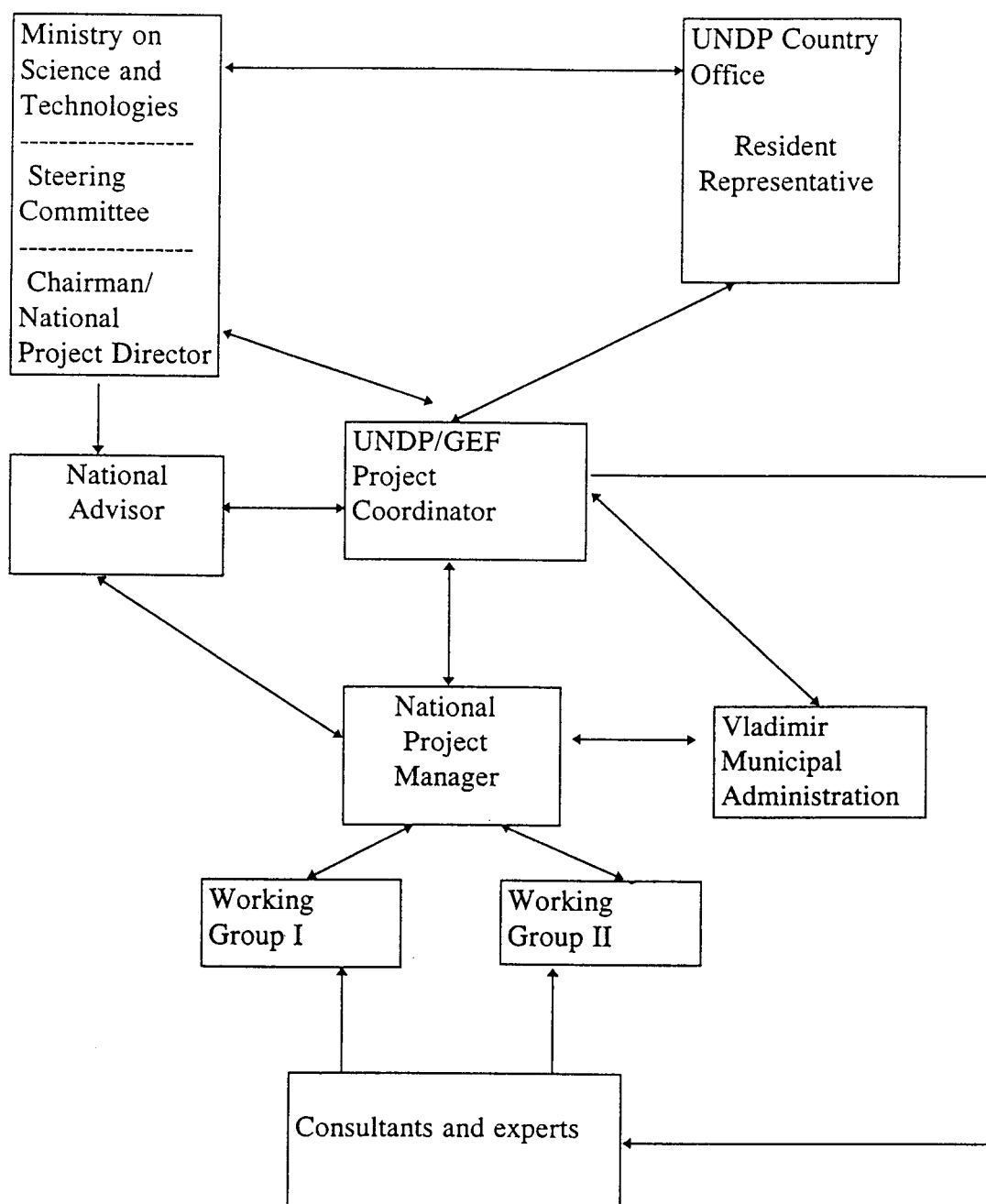
The UNDP Country Office in Moscow will be responsible for the project budget and all project expenditures. The Country Office will also be responsible for contracting with national project personnel and national subcontractors. UN-OPS, as an associated agency, will be responsible for major international competitively bid equipment procurement and contracting of international consultants and experts and procurement of international training services as needed to complement the UNDP Country Office. The UNDP Project Coordinator, in cooperation with the Vladimir Project Manager will be responsible for preparing job descriptions and term of reference, subcontract specifications and technical requirements, equipment specifications, training specifications and lists of candidate consultants or firms.

The UNDP Project Coordinator will provide close coordination with two projects financed through the World Bank loans. Project personnel in Vladimir require managerial support to provide advice on international financing requirements, identify international experts and consultants and national consultants and communication with foreign firms and experts. A large share of the projects success and global impact rests on dissemination of information and experience to other Russian cities and this responsibility has been assigned to RosDem.

In Vladimir, a National Project Manager will be responsible for implementation of the project, under the direction of the UNDP Project Coordinator in Moscow. The Vladimir Project Manager and a dedicated GEF project group (Project Management Unit) will be located in the Department of Housing and Communal Services of the Administration of the City of Vladimir. The National Project Manager will be responsible for coordinating project activities with administrative bodies and other project stakeholders (World Bank, USAID) in Vladimir.

The Vladimir Energy Efficiency Center is a non-governmental organization established to manage and coordinate all energy projects underway in the city itself and in the Vladimir region. Founders and directors of the Center include the Vladimir City Administration, the Vladimir Oblast Administration, the Vladimir Oblast Gas Utility (joint-stock company), the Vladimir Oblast Electric Utility (joint-stock company), the Vladimir City Municipal Heat Supply Enterprise, and the Russian Association of Energy Efficiency Demonstration Zones. It is likely that in the future this Centre will have responsibility for all energy efficiency projects in the city and Vladimir region. Should this happen, consideration will be given to transfer the PMU to the Centre.

FIGURE 1: PROJECT IMPLEMENTATION ARRANGEMENTS



Two working groups, consisting of 3-4 experts each, will be responsible for the successful attainment of Objectives #1 and #2 over the life of the project (see section D). The working groups will not only manage all of the activities under these objectives, but they will work substantively on major portions of these activities and be directly responsible for the completion of many of the activities. For some activities, the working group will be responsible for formulating terms of reference or subcontract specifications, and for overseeing the successful completion of the work by others. At least two of the experts from each working group will remain throughout the entire life of the project, and will be actively engaged in information and experience dissemination activities to other Russian cities in the later phases of the project. In fact, it is expected that the dissemination activities under the project (see section D) will be led by these experts. Thus these two working groups will form the core of the "retained capacity" that results from project activities under Objectives #1 and #2. Each working group will have a group leader who will report to the Project Manager. The working group offices will be located physically in the same building as the Vladimir GEF Project Unit within the Vladimir Energy Efficiency Center, and thus close coordination with other related energy efficiency projects in Vladimir will be enhanced. International consultants will work closely with each working group as necessary over the course of the project, providing support and guidance and assisting with specific activities.

The primary mechanism for dissemination and replication of project experience and information will be RosDem and its networks throughout the regions of the Russian Federation. Dissemination will also occur through the Ministry on Science and Technologies, and through direct contacts between the Vladimir Energy Efficiency Center and other cities. Additional dissemination will occur from the activities of the non-governmental organizations enlisted to provide project monitoring and evaluation.

After completion of the project, the Vladimir Administration and the Ministries on Science and Technologies will be responsible for further dissemination and continuation of project experience. In particular, the Vladimir Administration will be responsible for the continued funding and expansion of the pilot metering and billing service created under Objective #1.

An international consultant and two part-time national experts will assist with project monitoring and evaluation. These monitoring and evaluation personnel will provide support during annual UNDP Project Implementation Reviews, develop long-term impact assessment strategies and methodologies, and assist the working groups with monitoring and evaluation as necessary. Because of the importance of information dissemination and replication of the institutional models developed under the project to achieving the global (CO₂) benefits of the project, long-term impact assessment should occur throughout the life of the project and beyond its completion. Long-term impact assessment of global (CO₂) benefits for "barrier-reduction" projects is a new aspect of UNDP's monitoring and evaluation activities, but one that is recognized as critical to the success of the GEF mission. Monitoring and evaluation must include not only the effectiveness of project implementation, but also the direct and indirect impacts of project activities, including energy consumption reductions in specific buildings, decisions to install autonomous boilers beyond the original demonstrations, and new investments allocated for energy efficiency as a result of new incentives created by

consumption-based metering and billing. In addition, these direct and indirect impacts need to be linked to real CO₂ emissions reductions.

5. Reasons For Assistance From GEF/UNDP

Project objectives are consistent with GEF Operational Program #5 (Removal of Barriers to Energy Conservation and Energy Efficiency) adopted in February 1996. Because of the standardized nature and characteristics of district heating systems and residential buildings throughout Russia, capacity building activities that address barriers in one local context are relevant across most of Russia, and thus there is great CO₂ reduction potential from dissemination and replication of successful models and experiences. Because of related World Bank investments in Vladimir, GEF funding for capacity building activities will be especially effective in Vladimir because the capacities developed will support and complement the investments and capital availability. Sustainability of project benefits will occur if the barriers to energy efficiency and energy conservation are effectively removed on a permanent basis, and if the expected market-based cost-effective energy efficiency and energy conservation actions continue to occur once barriers are removed.

6. Special Considerations

The special considerations relate that if the project is successful, it will demonstrate and support energy efficiency activities in other cities and areas designated as Energy Efficiency Demonstration Zones throughout Russia.

7. Coordination Arrangements

Because the project involves several objectives that are closely linked with other projects in Vladimir and because of the importance of dissemination and replication for other Russian cities, project coordination between many different organizations is an important element of project implementation. Activities in Vladimir by the Russian Government financed through World Bank loans, by the U.S. Agency for International Development, by the European Union, by the Norwegian Government, and by others are all linked in some way with the present project. Coordination will likely take place with the following organisations:

- Ministry on Science and Technologies of the Russian Federation
- Ministry of Fuel and Energy of the Russian Federation
- Russian Association of Energy Efficiency Demonstration Zones
- Russian Foundation for Enterprise Restructuring (project implementation unit for the Enterprise Housing Divestiture Project)
- Russian Energy Savings Fund (project implementation unit for the Energy Efficiency Project)
- Russian Ministry on Environmental Protection

- United Nations Economic Commission for Europe, Energy Efficiency 2000 Project
- United States Agency for International Development
- European Union TACIS Program
- Norwegian Ministry of Industry and Energy

In particular, the National Adviser on Policy Coordination and Dissemination will ensure policy level coordination with the Moscow based project implementation unit for the World Bank funded Enterprise Housing Divestiture Project (EHDP). At the implementation level in Vladimir, close coordination between this project and EHDP will be facilitated as both projects will be implemented in the Department of Housing and Communal Services of the Vladimir City Administration. Important areas of coordination include: (a) installation of heat meters (by the EHDP) in buildings targeted for consumption-based metering and billing by the UNDP/GEF project; (b) coordination of physical construction work in buildings undergoing renovation for the EHDP with autonomous boiler construction work under the UNDP/GEF project; (c) social surveys of building residents (which will occur in both projects in the same city); (d) public information campaigns (which will occur in both projects in the same city); (e) involvement of personnel from the five other EHDP project cities (Petrozavodsk, Volkhov, Cherepoviets, Orenburg, and Ryazan) in training activities (Objectives #1 and #3); (f) dissemination of metering and billing experience to the other five EHDP project cities for replication; and (g) development of databases of building characteristics (Objective #1).

Coordination and collaboration with other non-governmental organizations working in the field of energy efficiency in Russia will occur as needed, particularly related to information dissemination, monitoring, and evaluation. In this connection and specifically with regard to the United Nations Economic Commission for Europe, once the project document is signed, UNDP will, through an exchange of letters, reflect the modalities for its involvement in the project.

8. Counterpart Support Capacity

The commitment and capacity of the Vladimir municipal administration to support consumption-based metering and billing is critical to project success. A decision by the Mayor of Vladimir, which demonstrates this commitment, is attached as Annex VII. In particular, the Vladimir administration will need to enact the necessary regulations during the course of the project to create a pilot-scale metering and billing service that actually bills households in a selected group of buildings according to their actual consumption. The Vladimir administration will need to continue to support the pilot-scale metering and billing service, established in the course of the project, after the project is completed. The resources necessary to sustain the metering and billing service after the project completion should be committed during the third or fourth year of the project.

C. DEVELOPMENT OBJECTIVE

The development objective of the project is to provide sustainable and replicable models and to build the required capacities for overcoming barriers to implementation and realization of energy-efficiency improvements and energy conservation in residential buildings and heat delivery systems in Russia. GEF grants will develop the institutional, regulatory, information, and human resource capacities necessary to reduce (three) key barriers to energy efficiency and energy conservation. These three key barriers are: (1) misplaced or missing incentives for tenants, tenant associations, and district heating companies to improve energy efficiency and reduce energy consumption in residential buildings and district heating distribution pipelines; (2) fundamental uncertainties about the feasibility of and issues (technical, economic, legal, institutional, and political) associated with autonomous sources of heat supply as replacements for overly centralized district heating systems; and (3) lack of capacity to conduct economic and financial analyses and feasibility studies of energy efficiency projects that may be financed by public and private financing institutions. GEF grants will also allow dissemination of this experience to other cities in Russia, providing sustainable global benefits through replication of successful project experience.

D. IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES

1. Objective 1: Create a Prototype Residential Heat and Hot Water Metering and Billing System on the Basis of Metered Consumption

Create a widely-applicable prototype regulatory and institutional model for consumption-based heat and hot water metering and billing. Develop the required regulatory, institutional, and software capacity in Vladimir and disseminate this model and experience to other cities in Russia. This model will include regulatory requirements, institutional arrangements (including integration with evolving municipal and private building maintenance and operation institutions and condominium formation), billing administration and payment mechanisms, schemes for building-level metering and apportionment of building-level billing across all apartments based upon heat distribution models, and regulations governing apartment-level metering and billing.

Output 1.1. Conception and design of model for consumption-based metering and billing (design includes institutions, administration, regulations, manpower needs and skills, computer hardware and software)

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
1.1.1 Understand and document existing legal and institutional arrangements	2	10/97	---	Working Group I, Rosdem
1.1.2 Design and conduct social surveys	5	12/97	---	National subcontractor
1.1.3 Investigate and propose necessary changes to existing situation	4	12/97	1.1.1 1.1.2	Working Group I and international subcontractor
1.1.4 Conduct study tour to Poland and Denmark to understand existing metering and billing systems for similar district heating systems	1	12/97	1.1.1	Working Group I
1.1.5 Facilitate discussions within the city administration on necessary changes	4	4/98	1.1.3	Working Group I
1.1.6 Evaluate hardware and software packages	2	4/98	1.1.3	National consultant
1.1.7 Formulate specifications for computer hardware and software	3	6/98	1.1.6	Working Group I
1.1.8 Formulate specifications for personnel of metering/billing service (including job descriptions and responsibilities), and training requirements for personnel	1	8/98	1.1.5	Working Group I

Output 1.2. Proposed municipal regulations necessary for consumption-based metering and billing

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
1.2.1 Investigate and specify applicable aspects of regulations from other countries to Russian conditions	3	2/98	---	International and national consultant
1.2.2 Draft regulations	12	3/98	1.4.2	Working Group I

Output 1.3. Enacted municipal regulations necessary for consumption-based metering and billing

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
1.3.1 Design and implement public information campaigns	6	9/98	1.2.2	National subcontractor
1.3.2 Provide support to city administration	6	9/98	1.2.2	Working Group I

Output 1.4. Database of building and apartment characteristics for 40-100 pilot buildings under the domain of one housing-maintenance organization (including more detailed data on 10 pilot buildings for detailed apartment-level metering).

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
1.4.1 Specify and design database	5	6/98	---	National consultant
1.4.2 Identify 40-100 buildings	2	11/98	EHDP installation of meters	Working Group I
1.4.3 Collect data on buildings and apartments	3	1/99	1.4.1	Working Group I
1.4.4 Enter buildings data into computer	3	6/99	1.4.3 1.6.3	Working Group I

Output 1.5. Ten buildings with apartment-level heat meters installed

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
1.5.1 Select 10 buildings	3	11/98	---	Working Group I
1.5.2 Purchase and install heat allocators	6	2/99	EHDP installation of meters	National or international subcontractor

Output 1.6. Established meter reading and billing service with trained and equipped personnel (with capacity to service 40-100 multifamily buildings).

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
1.6.1 Legally register service	6	3/99	---	Working Group I
1.6.2 Obtain office	3	3/99	---	Vladimir Administration
1.6.3 Purchase computer equipment and software	1	5/99	1.6.2	Working Group I
1.6.4 Hire personnel	2	6/99	1.6.2	Working Group I
1.6.5 Train personnel	1	8/99	1.6.4	Working Group I
1.6.6 Develop and program computer models and software for building-level and apartment-level metering and operationalize these programs on the computer systems	3	6/99	1.6.3	Working Group I

Output 1.7. Experience from one year of operating the meter reading and billing "system" and the metering/billing service.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
1.7.1 Operate service	12	9/99	1.6 (all)	director of service
1.7.2 Support service in identifying and obtaining any training, equipment, or software that may be necessary	12	9/99	---	Working Group I

Output 1.8. Handbook based upon experience with implementing consumption-based billing.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
1.8.1 Collect and collate experience	3	5/00	1.1-1.7	Working Group I
1.8.2 Write handbook	9	5/00	1.1-1.7	Working Group I and national consultant

Output 1.9. Ten other cities in the Russian Federation have the full information and experience from activities under Objective #1 of the project.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
1.9.1 Host officials from other cities and visit other cities (meetings, seminars)	4	2/01	1.8	Rosdem
1.9.2 Create and disseminate press and media information releases and publish experience in specialized housing/communal sector and energy-sector journals	4	2/01	1.8	Rosdem

2. Objective 2: Study and Demonstrate the Feasibility and Future Implications of Autonomous Heat Production in Residential and Public Buildings

Study and demonstrate the technical, economic and institutional feasibility of investments in autonomous (decentralized) heat supplies in residential and public buildings, and study the implications of these investments (and similar investments in commercial enterprises) for future development and investment in gas distribution networks.

Output 2.1. Collected experience from autonomous boilers already installed in the Russian Federation and Western Europe.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
2.1.1 Consultations with Russian experts and officials	3	11/97		Working Group II
2.1.2 Learn about existing international experience	3	11/97		International consultant
2.1.3 Study tour to Germany	1	12/97		Working Group II

Output 2.2. Study on technical and economic evaluation of autonomous heat supply technologies, including placement locations.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
2.2.1 Establish technical specifications for different configurations of autonomous heat supply technologies	6	1/98	2.1	Working Group II International and National Consultants
2.2.2 Collect experience and data from existing demonstration projects	6	1/98	2.1	Working Group II
2.2.3 Develop cost estimate methodologies for different configurations	6	12/97	2.1	Working Group II International Consultant
2.2.4 Conduct technical-economic evaluations of different configurations	6	1/98	2.2.3	Working Group II International Consultant
2.2.5 Write final report and give seminar on results	6	2/98	2.2.4	Working Group II

Output 2.3. Study of the types of buildings and geographical characteristics of infrastructure where autonomous boilers are technically, economically, and legally viable.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
2.3.1 Review and categorize building stock and district-heating infrastructure in Vladimir	3	2/98	---	Working Group II
2.3.2 Establish technical, legal, geographical, and economic criteria for viability	3	4/98	2.2.5 2.3.1	Working Group II International Consultant
2.3.3 Evaluate building stock against criteria and make recommendations	3	7/98	2.3.2	Working Group II
2.3.4 Write final report	3	10/98	2.3.3	Working Group II

Output 2.4. Demonstration autonomous boilers are installed and operating in three buildings.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
2.4.1 Survey candidate buildings	2	12/97	2.1	Working Group II
2.4.2 Select three specific buildings	1	9/98	2.3.3	Working Group II
2.4.3 Analyze optimum technical configuration and specify boilers	3	10/98	2.4.2	Working Group II
2.4.4 Procure boilers (design, purchase, and install)	9	1/99	2.4.3	International or national subcontractor
2.4.5 Maintain and service boilers for one year and train local personnel from the Vladimir administration	12	10/99	2.4.4	International or national subcontractor

Output 2.5. Written evaluation of the operating experience with the three installed autonomous boilers over one full year.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
2.5.1 Establish pre-installation baseline instrument and monitor heat, hot water, gas consumption, and indoor temperatures over one heating season	12	5/98	2.4.2	International or national subcontractor
2.5.2 Monitor operation of heating boilers over one heating season, including heat, hot water, and gas consumption of the buildings, and indoor temperatures	12	10/99	2.4.4	International or national subcontractor
2.5.3 Evaluate operating data	3	9/00	2.5.2	International or national subcontractor
2.5.4 Write evaluation report	3	9/00	2.5.2	International or national subcontractor

Output 2.6. Study on institutional and market issues (ownership, O&M, metering and billing, licensing, certification, legal requirements).

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
2.6.1 Solicit participation of heat suppliers and other stakeholders in study	12	9/99	---	Working Group II
2.6.2 Study barriers, institutional issues, legal issues and market issues	12	9/99	---	National expert
2.6.3 Create models of ownership, operation and maintenance, metering and billing that satisfy the various stakeholders and fit existing legal frameworks	12	9/99	---	National expert
2.6.4 Recommend appropriate policy measures and approaches to development of autonomous sources, including capacity building, and/or technical assistance to overcome critical market barriers	12	9/99	---	Working Group II International Consultant
2.6.5 Write final report	3	9/00	2.6.1-2.6.4	National expert

Output 2.7. Study on the implications for the future development needs of Vladimir's gas distribution system and district heating system of different scenarios of autonomous heat supply penetration.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
2.7.1 Create scenarios of future penetration of autonomous heat supplies	12	1/99	---	Vladimir Administration
2.7.2 Evaluate implications for district-heating systems and gas-distribution systems	12	1/99	---	Vladimir Administration
2.7.3 Write final report	3	1/00	2.7.1-2.7.2	Vladimir Administration

Output 2.8. Ten other cities in the Russian Federation have the full information and experience from activities under Objective #2 of the project.

Activities	Duration (months)	Start Date (month,/year)	Dependencies (activity #)	Responsible Agent(s)
2.8.1 Host officials from other cities and/or visit other cities (meetings, seminars)	4	2/01	2.5-2.7	Rosdem
2.8.2 Create and disseminate press and media information releases	4	2/01	2.5-2.7	Rosdem

3. Objective 3: Build the Skills and Capacity for Energy Efficiency Project Analysis and Feasibility Studies

Build the skills and capacity within the Vladimir administration and local enterprises (municipal and private) to conduct project financial and economic analyses and to undertake project feasibility studies suitable for public and private financing sources.

Output 3.1. Trained group of 20-30 selected personnel taken from the project staff, district heating companies, municipal administration, universities, and major local enterprises.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
3.1.1 Select candidates	2	11/97	---	Vladimir project unit and Rosdem
3.1.2 Identify credit requirements of selected Russian commercial banks and other sources of energy-efficiency financing	3	11/97	---	National expert
3.1.3 Develop training course materials	2	11/97	---	International subcontractor /National expert
3.1.4 Conduct training courses	18	1/98	3.1.1-3.1.3	International subcontractor /National expert

Output 3.2. Trained group of 50 people on basic energy efficiency project development and understanding of feasibility studies.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
3.2.1 Select candidates	1	11/97	---	Vladimir project unit and Rosdem
3.2.2 Develop training course materials	1	11/97	---	International subcontractor /National expert
3.2.3 Conduct training courses	2	12/97	3.2.1-3.2.2	International subcontractor /National expert

Output 3.3. Ten other cities in the Russian Federation have the full information and experience from activities under Objective #3 of the project.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
3.3.1 Document training experiences	3	6/99	3.1 3.2	National expert
3.3.2 Write a manual on energy efficiency project financing for municipal authorities	6	9/99	3.3.1	National expert
3.3.3 Document investment project plans and include in manual as case studies	3	9/99	3.1	National expert

4. Objective 4: Establish and Operate Project Implementation Units in Moscow and Vladimir

Establish and maintain the capacity of project staff to implement and monitor all of the activities under the project.

Output 4.1. Established project implementation units in Vladimir and Moscow, steering committee, and Working Groups 1 and 2.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
4.1.1 Specify and purchase office equipment in Vladimir and Moscow	3	11/97	---	Vladimir project unit
4.1.2 Establish office communications services in Vladimir and Moscow	3	11/97	---	Vladimir project unit
4.1.3 Select and hire staff in Vladimir and Moscow	3	11/97	---	UNDP-Moscow, and Vladimir project unit
4.1.4 Form steering committee	1	6/97	---	Ministry on Science and Technologies
4.1.5 Form three working groups to direct objectives #1 through #3, and select members	3	11/97	---	Vladimir project unit
4.1.6 Hire monitoring, evaluation, and impact assessment personnel	3	12/97	---	UNDP-Moscow and PIU

Output 4.2 Project coordination, committee meetings and project evaluations are accomplished over the life of the project.

Activities	Duration (months)	Start Date (month, year)	Dependencies (activity #)	Responsible Agent(s)
4.2.1 Conduct once in 6 months Steering Committee meetings	48	11/97	---	Ministry on Science and Technologies
4.2.2 Project coordination	52	2/98	---	UNDP Country Office, PMU Vladimir PIU
4.2.3 Conduct annual Project Implementation Reviews and long-term impact assessments	45	9/97	---	UNDP Country Office

E. INPUTS

Personnel Inputs

Over the life of the project, 31 national project personnel have been identified. Thirteen of these personnel are project staff who will work over most of the project's four-year duration (4 in Moscow and 9 in Vladimir), organized into two working groups for Objectives #1 and #2 and the project units in Moscow and Vladimir. The remaining national personnel, recruited primarily in Vladimir but also in Moscow when expertise is not available locally, will undertake shorter-term assignments related to specific project activities. Seven international consultants have been identified to assist with specific project activities. In addition, provision is made for additional international consultants to provide short-term expert advice as necessary for procurement and for technical, legal, institutional, and public education issues.

For Objective #1, a working group will manage implementation and will undertake many of the project activities itself (as described in section B4). The working group will consist of an institutional/legal specialist (the group leader), an economist with expertise in municipal finance and administration, an engineer specializing in metering and heating equipment, and a computer analyst for computer-based heat-allocation and billing model design. The working group will be assisted by the following national project personnel: two institutional/legal specialists (for activities 1.1.3 and 1.1.5), a computer analyst for database design (1.4.1), a computer programmer (1.6.6) to enter data and set up programs, a group of 10 data collectors to gather data about buildings (1.4.3), and a technical writer (1.8). The working group will also be assisted by the following international consultants: a district-heating metering/billing

specialist (1.1 and 1.7; could also be two different people) and a regulatory development specialist (1.2). In addition, the personnel for the pilot metering and billing service (output 1.7) will be paid by project funds for the first year of operation of the service (including a director, 3 inspectors, 2 computer operators, and 1 accountant).

For Objective #2, a second working group will manage implementation and will undertake many of the project activities itself (as described in section B4). The working group will consist of an engineer specializing in boilers and heating equipment (the group leader), an engineer specializing in buildings and infrastructure, an economist/institutional specialist, and a computer analyst. The working group will be assisted by the following national project personnel: an engineer and an economist for technical/economic analysis of autonomous boilers (2.2), an interdisciplinary analyst and a buildings/infrastructure specialist for geographical/infrastructure/economic analysis of autonomous boiler feasibility (2.3), and two institutional specialists for the institutional study. In addition, a district-heating system and gas-system planner (national project personnel post) will assist Vladimir administration experts with the long-term planning study (2.7), which will not be managed by the working group (2.6). The working group will also be assisted by the following international consultants: an engineer/economist with experience with autonomous boiler installations in Western European countries with district-heating systems (2.2), a district-heating system expert to analyze geographical/infrastructure feasibility of autonomous boilers relative to district heating systems (2.3), and an institutional specialist.

For Objective #3, national project personnel will assist training subcontractors in designing, conducting, evaluating, and documenting the training. These personnel include a financial-sector/bank specialist to identify Russian commercial bank lending requirements (3.1), a training coordinator to manage participant invitations and logistics (3.1 and 3.2), a project appraisal specialist to evaluate and document energy efficiency project proposals (3.3), and a training expert/writer who will attend some training, document successful training content and methods, and write a report documenting the experiences.

Overall project coordination, implementation, and monitoring/evaluation and dissemination will be supported by a Project Coordinator, National Senior Adviser, two secretaries, and a Coordination/Dissemination Specialist. These personnel will be assisted by two monitoring and evaluation specialists (one NPPP and one international) and an international equipment-procurement advisor. International consultants will be recruited by UNOPS.

Subcontract Inputs

Three small subcontracts with national organizations will support the activities working groups I and II. These subcontractors are for social surveys to inform the design of a metering and billing system (1.1.2), public information campaigns to accompany passage of the municipal regulations necessary for Objective #1 (1.3.1), and for participation of several organizations in Vladimir in the institutional study for autonomous boilers (2.6.1).

Two large international-competitive-bid tenders for equipment will be required. One will be a turn-key design-purchase-install-service contract for three autonomous heating boilers to be installed in three separate buildings (2.4.3-2.4.6). A second tender will be for a purchase-install contract for apartment-level heat allocators in all apartments in ten pilot buildings.

One further subcontract will be for monitoring and evaluation services and equipment (2.5) to evaluate the performance of the autonomous boiler installations performed under the subcontract described above. The subcontractor will need to install monitoring equipment in three buildings, perform continuous monitoring over two heating seasons (once before installation of the boiler and once after installation), and analyze the monitoring results and boiler performance.

Training Inputs

Three study tours are planned for Objectives #1 and #2 so that working group members, Vladimir Administration experts and officials, and other personnel from key Vladimir organizations (such as the gas distribution utility or regional energy commission) can learn from the existing experience in Eastern and Western Europe related to consumption-based metering and billing and autonomous heating boilers. Countries identified as suitable for gaining this type of experience are Poland and Denmark for project output 1.1 (consumption-based metering and billing), Germany for output 2.1 (economic parameters and viability of autonomous heating boilers), and an Eastern European country for output 2.6 (institutional issues of autonomous heating boilers). The existing experience in these countries can prove extremely valuable to the project and allow efficient use of project resources. For example, Poland has just gone through the creation of consumption-based metering and billings systems for district-heating in recent years, and the experience there is directly relevant to the Russian Federation. Each study tour will have eight participants and last approximately one week.

A series of two 1-week trainings will supplement the economic analysis skills of working group II and other national project personnel working on Objective #2.

Four 1-week seminars are planned for dissemination activities at the end of the project (outputs 1.9 and 2.8). Representatives from at least ten other Russian cities will be invited to participate in these seminars and learn from the project results and experiences.

For Objective #3, two different types of training with very different audiences are planned:

(1) The energy efficiency project analysis training (output 3.1) is designed for those who are engaged directly in energy efficiency project preparation. This training will consist of five "cycles" of training so that training groups can be small (6 participants each) and a total of 30 personnel can be trained. Each cycle will last six months and include four separate 1-week training sessions. During the cycle, participants will be developing actual investment-project proposals to submit to financing sources (only participants with viable project ideas will be allowed to participate in the training). Thus there will be a total of 20 1-week training sessions

for this output. One international and one national expert are expected to prepare and conduct this training.

(2) The energy efficiency project development training (output 3.2) is designed for high-level officials and managers who won't be preparing projects themselves but need to understand better the process of project development and feasibility studies. There will be two identical training sessions of one week each. One international and one national expert are expected to prepare and conduct this training.

Equipment Inputs

Computer and office equipment will be purchased for project offices in Moscow and in Vladimir to support the UNDP Project Coordinator and Project Manager (the premises in Vladimir are being supplied as government in-kind contributions). In addition, computer equipment will be purchased for the pilot metering and billing service (output 1.7).

F. RISKS

(1) One clear risk in terms of achieving global benefits is that energy efficiency investments and energy conservation actions may not take place once barriers are removed. The most likely barrier remaining will be the lack of credit, but credit availability should improve once uncertainty and incentive barriers are removed. Further, the economic motivations of households and the potential economic benefits are expected to become so strong that many low-cost and no-cost activities will occur regardless of credit availability once incentives are in place. The parallel experience from the building retrofits under the Enterprise Housing Divestiture Project (EHDP) will further demonstrate the value of energy efficiency and energy conservation measures, and should promote further credit availability and willingness of households to borrow. The EHDP will also make available some credits to district-heating companies. This risk also will be mitigated by the widespread dissemination of project experiences from Vladimir to other cities, particularly the six EHDP cities.

(2) For Objective #1, one risk is that heat meters will not be installed under the Enterprise Housing Divestiture Project, and therefore an operating pilot metering and billing service (Output 1.6) will not be possible.

(3) For Objective #1, a second risk is that the necessary municipal regulations may not be enacted (Output 1.3), thus preventing all remaining portions of the objective (Outputs 1.4-1.8) from being realized, and preventing the establishment of the proper incentives for future energy efficiency improvements. Further, institutional or social obstacles to consumption-based billing may delay such a transition at the later stages of Objective #1. This risk is being mitigated with a preliminary decision by the Mayor of Vladimir as a prior obligation (see section G).

(4) In the case of autonomous heat sources (Objective #2), the potential for cost-effective energy efficiency may prove less than preliminary evidence indicates, thus reducing anticipated global benefits.

(5) Global benefits from Objective #3 will depend upon the quality of energy efficiency project preparation and the success of proposals for commercial financing and for financing under the World Bank Energy Efficiency loan.

G. PRIOR OBLIGATIONS AND PREREQUISITES

(1) Activities under Objective #1 can only begin after Vladimir has completed and signed all on-lending negotiations and arrangements with the World Bank and Russian government counterparts for capital disbursement under the Enterprise Housing Divestiture Project.

(2) Specification and procurement of heat meters in Vladimir under Phase I of the Enterprise Housing Divestiture Project must be under way before activities under Output 1.4 and above are started.

(3) Prior to grant effectiveness, the Vladimir city administration will enact a decree stating its commitment to produce Output 1.3 of Objective #1. Output 1.3 is a prerequisite for further activities under Outputs 1.4 through 1.8 (Annex VII).

(4) The exact requirements of consultation and coordination with the Enterprise Housing Divestiture Project will be specified in a memorandum of understanding between the World Bank and the UNDP.

H. PROJECT REVIEW, REPORTING AND EVALUATION

The project will be subject to tripartite review (joint review by representatives of the Government, executing agency and UNDP) at least once every 12 months. The first such meeting will be held at the conclusion of the preparatory assistance phase. The executing agency will prepare and submit to each tripartite review meeting a Project Performance Evaluation Report (PPER). Additional PPERs may be requested, if necessary, during the project. There will also be a separate mid-term independent project review by an external consultant.

In addition to normal UNDP project monitoring and evaluation activities, non-governmental organizations with a history of evaluating assistance programs in the energy efficiency field in Eastern Europe, the Baltics, and Russia will be enlisted to monitor the project and provide evaluations and feedback at critical junctures. This monitoring and evaluation activity will not only provide additional feedback to the project itself, but will be used in disseminating project experience and lessons learned.

This project is being conducted to support GEF priorities to expand markets for energy efficiency through market-barrier-reduction types of activities. Thus the long-term greenhouse-gas reduction impacts must be assessed, consistent with evolving UNDP/GEF impact assessment methodologies. Impact assessment involves analyses of the linkages and mechanisms along a "chain of causation" -- project activities lead to barrier reductions, which lead to market responses, which lead to physical infrastructure changes, which finally lead to reduced greenhouse-gas emissions. Assessment must include all of these phases -- barrier reduction, market responses, infrastructure changes, and greenhouse-gas emissions reductions. Such assessment fits logically under the annual UNDP/GEF Project Implementation Review (PIR). In this project, the market responses are energy efficiency investments and behavioral changes by municipal governments, residential consumers and by district-heating companies. Market responses also include investments in autonomous boilers. Long-term impact assessment activities over the entire life of the project will include preparation of assessment baselines, analysis of future market responses, and evaluation of the linkages to actual CO₂ reductions.

I. LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of the Russian Federation and the United Nations Development Program, signed by the parties on 17 October 1993. The host country executing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government cooperating agency described in that Agreement.

The following types of revisions may be made to this project document with the signature of the UNDP resident representative only, provided he or she is assured that the other signatories of the project document have no objections to the proposed changes:

- (a) Revisions in, or addition of, any of the annexes of the project document;
- (b) Revisions which do not involve significant changes in the immediate objectives, outputs, or activities of a project, but are caused by the rearrangement of inputs already agreed to or by cost increases due to inflation; and
- (c) Mandatory annual revisions which rephrase the delivery of agreed project inputs, or reflect increased expert or other costs due to inflation, or take into account agency expenditure flexibility.

J. BUDGETS

Table 1 shows the project budget for the UNDP cash contributions. The budget is structured assuming October 1997 start date for the full project (following preparatory assistance that began in February 1997). The budget figures in Table 1 (totals and figures for 1997) include

the amounts budgeted for the preparatory assistance phase of the project in 1997 (budget revision B).

The UNDP contributions include the costs of the inputs described in section E, plus agency support costs for UNDP-Moscow and UN-OPS.

The Russian in-kind contributions shown involves: (a) the provision of experts and officials from the Vladimir Administration to assist the national project personnel with project activities; (b) national government officials and experts for consultation and review of project activities and for assistance with interpreting existing or planned national regulations and plans; (c) the participation of officials and experts from other cities in the project dissemination activities; (d) offices and equipment in Moscow for the National Adviser and project personnel Vladimir; (e) conference rooms and training facilities; (f) government officials and other non-governmental experts salaries to attend training courses and participate in study tours; (g) preparation, printing and distribution of training materials and public information; (h) local travel for government personnel; and (i) the Steering Committee.

UNDP - Moscow agency support costs are applied to all project expenditures except for (1) international consultants and experts and the large competitively bid equipment subcontracts. These two exceptions are budgeted for agency support by UNOPS.

Project No.: RU5/96/G31/C/1G/99

TOTAL CEF CONTRIBUTION: \$2,980,000

Project Title: Capacity Building to Reduce Key Barriers to Energy Efficiency in Russian Residential Building and Heat Supply
Source of Funds: IG

BL	Description	Implement. Agent	TOTAL		1997		1998		1999		2000		2001	
			m/m	Amount	ACS	m/m	Amount	ACS	m/m	Amount	ACS	m/m	Amount	ACS
PROJECT PERSONNEL														
11.51	Metering/billing specialist (1.1)	UNOPS	4.0	60,000	4,800	1.0	15,000	1,200	3.0	45,000	3,600			
11.52	Regulatory specialist (1.2)	UNOPS	3.0	51,000	4,080				3.0	51,000	4,080			
11.53	Metering/billing specialist (1.7)	UNOPS	2.0	34,000	2,720							1.0	17,000	1,360
11.54	Engineer/economist (2.2)	UNOPS	3.0	57,000	4,560	1.0	19,000	1,520	2.0	38,000	3,040			
11.55	D11 geography/feasibility (2.3)	UNOPS	2.0	31,000	2,480				2.0	31,000	2,480			
11.56	Institutional specialist (2.6)	UNOPS	3.0	45,000	3,600									
11.57	Monitoring & eval specialist (4.2.3)	UNOPS	4.0	60,000	4,800				1.0	15,000	1,200	1.0	15,000	1,200
11.58	Working group I advisor	UNOPS	6.5	97,500	7,800	1.0	15,000	1,200	1.5	22,500	1,800	1.5	22,500	1,800
11.59	Working group II advisor	UNOPS	6.5	97,500	7,800	1.0	15,000	1,200	1.5	22,500	1,800	1.5	22,500	1,800
11.60	Equipment procurement advisor	UNOPS	2.0	62,000	4,960				1.0	31,000	2,480	1.0	31,000	2,480
11.61	Project document consultant	UNOPS	2.0	34,000	2,720	2.0	34,000	2,720						
11.62	Training - Coordinator	UNOPS	10.0	175,000	14,000	2.0	35,000	2,800	4.0	70,000	5,600			
11.97	Short-term consultant (unspecified)	UNOPS	7.0	105,000	8,400	1.0	15,000	1,200	2.0	30,000	2,400	2.0	30,000	2,400
11.99	SUBTOTAL		55.0	909,000	72,720	9.0	148,000	11,840	21.0	356,000	28,480	12.0	208,000	16,640
ADMINISTRATIVE SUPPORT														
13.01	Secretary to UNDP Project Coordinator		47.0	30,016		1.0	1,250		12.0	7,500		12.0	7,500	
13.01	Secretary to NSA		47.0	30,016		1.0	1,250		12.0	7,500		12.0	7,500	
13.01	Senior Secretary/ Assistant to PM		47.0	19,200		1.0	800		12.0	4,800		12.0	4,800	
13.99	SUBTOTAL		141.0	79,232		3.0	3,300		36.0	19,800		36.0	19,800	
OFFICIAL TRAVEL														
15.01	Local Travel			50,000			5,000			10,000			15,000	
15.99	SUBTOTAL			50,000			5,000			10,000			15,000	
MISSION COSTS														
16.01	Mission Costs			60,000			12,000			12,000			12,000	
16.99	SUBTOTAL			60,000			12,000			12,000			12,000	
NATIONAL PERSONNEL														
17.01	UNDP Project Coordinator		48.0	91,200		2.0	3,800		12.0	22,800		12.0	22,800	
17.02	National Senior Advisor		44.0	74,800		2.0	3,400		12.0	20,400		12.0	20,400	
17.03	Project Manager		48.0	43,200		2.0	1,800		12.0	10,800		12.0	10,800	
17.04	Institutional/legal specialist (WG1)		46.0	34,500		1.0	750		12.0	9,000		12.0	9,000	
17.05	Economist/financier (WG1)		46.0	34,500		1.0	750		12.0	9,000		12.0	9,000	
17.06	Engineer (equipment) (WG1)		35.0	26,250		1.0	750		12.0	9,000		10.0	7,500	
17.07	Engineer (equipment) (WG1)		46.0	34,500		1.0	750		12.0	9,000		12.0	9,000	
17.08	Engineer (buildings) (WG1)		46.0	34,500		1.0	750		12.0	9,000		12.0	9,000	
17.09	Economist/institutional (WG1)		46.0	34,500		1.0	750		12.0	9,000		12.0	9,000	
17.10	Computer analyst (WG1/WG1)		35.0	26,250		1.0	750		12.0	9,000		10.0	7,500	
17.11	Coord. & Dissem. Specialist		37.0	44,400					10.0	12,000		10.0	12,000	
17.20	National Programme Officer		48.0	48,000		2.0	2,000		12.0	12,000		12.0	12,000	
17.51	Institutional/legal spec. (1.1.3/1.1.5)		6.0	7,200					5.0	6,000				
17.52	Institutional/legal spec. (1.1.3/1.1.5)		4.0	3,000					3.0	2,250				
17.53	Computer analyst/database (1.4.1)		5.0	6,000					5.0	6,000				
17.54	Computer programmer (1.6.6)		3.0	3,600					3.0	3,600				

ANNEX I. WORKPLAN

1. Overall Project Schedule

	1997		1998		1999				2000			2001				
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
OBJECTIVE #1																
1.1 Conception of model																
1.2 Proposed regulations																
1.3 Enactment of regulations																
1.4 Database of buildings																
1.5 Established service																
1.6 Operating experience																
1.7 Handbook of experience																
1.8 Information dissemination																
OBJECTIVE #2																
2.1 Existing experience																
2.2 Technical study																
2.3 Infrastructure study																
2.4 Demonstration install																
2.5 Demonstration evaluate																
2.6 Institutional study																
2.7 District Heat study																
2.8 Information dissemination																
OBJECTIVE #3																
3.1 Trained group/analysis																
3.2 Trained group/development																
3.2 Training dissemination																
OBJECTIVE #4																
4.1 Implementation Units																
4.2 Project Management																

ANNEX II. SCHEDULE OF PROJECT REVIEWS, REPORTING AND EVALUATION

The project will be reviewed and evaluated on an annual basis through the UNDP's standard Project Implementation Review (PIR). These reviews will focus in particular in the following areas:

October 1997: Preparatory assistance phase, project implementation arrangements, and hiring of project personnel.

August 1998: Design of metering and billing service and regulations (Objective #1)
Studies and installation of demonstration boilers (Objective #2)

August 1999: Enactment of regulations and design of metering and billing service (Objective #1)
Technical, Infrastructure, and Institutional Studies (Objective #2)
Completion of training and dissemination of experience (Objective #3)

August 2000: Experience with operating metering and billing service (Objective #1)
Experience with demonstration boilers (Objective #2)

August 2001: Final project review of all results

There will also be a separate mid-term independent project review by an external consultant.

In addition, each PIR will incorporate long-term project impact assessment according to UNDP/GEF guidelines. After the final review, the Russian government will support on-going monitoring and impact assessment.