



Global Environment Facility

Mohamed T. El-Ashry
Chief Executive Officer
and Chairman

1818 H Street, NW
Washington, DC 20433 USA
Tel: 202.473.3202
Fax: 202.522.3240/3245
Email: melashry@worldbank.org

June 6, 2002



Dear Council Member,

UNDP, as the Implementing Agency for the project, *Ukraine: Climate Change Mitigation in Ukraine Through Energy Efficiency in Municipal District Heating (Pilot Project in Rivne) Stage 1*, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with UNDP procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by the Council in February 2001 and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by UNDP satisfactorily details how Council's comments and those of the STAP have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at www.gefweb.org. If you do not have access to the Web, you may request the local field office of the World Bank or UNDP to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,


 Mohamed T. El-Ashry
Chief Executive Officer and Chairman

cc: Alternate, Implementing Agencies, STAP



United Nations Development Programme
GLOBAL ENVIRONMENT FACILITY (GEF)



16 May 2002

Dear Mr. El-Ashry,

**Subject: UKR/01/G31/A/1G/99 - Climate Change Mitigation
In Ukraine through Energy Efficiency in Municipal
District Heating (Pilot Project in Rivne) Stage 1**

I am pleased to enclose the proposal for Ukraine entitled **Climate Change Mitigation in Ukraine through Energy Efficiency in Municipal District Heating (Pilot Project in Rivne) Stage 1** which was approved by the GEF Executive Council in February 2001. The response to comments from Council Members is also attached and these comments have been addressed in the project document.

As per paragraph 29 and 30 of the GEF Project Cycle, we are submitting this project to you for circulation to the Executive Council Members for comments and, subsequently, for your final endorsement.

Thank you in advance for expediting the review and approval of this project.

Yours sincerely,

Frank Pinto
Executive Coordinator

Mr. Mohamed El-Ashry
Chief Executive Officer
Global Environment Facility
Room G6005
1776 G Street
Washington, D.C. 20433
PM

**Removing Barriers to Greenhouse Gas Emissions Mitigation through
Energy Efficiency in the District Heating System, Stage I:**

RESPONSE TO COMMENTS FROM COUNCIL MEMBERS

COUNCIL MEMBERS' COMMENTS	UNDP'S RESPONSE TO COMMENTS
<p>COMMENTS BY FRANCE</p> <p>Le thème est effectivement prioritaire en Ukraine et a déjà donné lieu à de nombreuses actions de coopération bilatérales européennes en particulier . Un bilan explicite de ces différentes actions mériterait d'être donné. Compte tenu de ces projets antérieurs , le coût de la première phase du projet (correspondant au montage du projet) paraît élevé (1,8 M\$). Il est aussi proposé un mixage de nombreuses banques pour financer l'investissement en phase 2, ce qui complexifie le montage.</p> <p>Une évaluation des projets d'ESCO soutenus par le GEF avec la Banque mondiale d'une part, le PNUD d'autre part serait intéressante (résultats, outils mis en place, procédures...), pour diffuser l'expérience acquise dans ces premiers projets pour la suite du FEM et pour les pays engagés dans ces processus .</p> <p>[translation]</p> <p>The topic is indeed a priority in the Ukraine and already is the subject of many European bilateral co-operation projects. An explicit assessment of these other various activities would be useful. Taking into account these other projects, the cost of the first phase of the project (corresponding to the initial implementation of the project) appears high (1.8 M\$). It is also proposed that a mix of banks will finance the investment in Phase 2, which complicates the implementation. An evaluation of ESCO projects supported by the GEF with the World Bank on the one hand, and the UNDP on the other hand, would be interesting (results, tools installed, procedures, etc.), to disseminate the experience gained in these initial projects for the continuation of the FEM and the countries engaged in these processes.</p>	<p>RESPONSE TO FRANCE'S COMMENTS</p> <p>This project is considered to be a priority for Ukraine, and Stage I project funds will address several activities that are not simply preparatory: the ESCO establishment, the pilot investment in the city of Rivne, compilation of information on lessons learned from district heating financing and ESCOs (including preliminary information dissemination), and monitoring and evaluation for the first months of the project. Stage II will be submitted as a separate project to be submitted to Council for review as part of a future work programme.</p> <p>The compilation of information on lessons learned from district heating financing and ESCOs will be disseminated widely and will be shared with FEM and other interested countries in the region. The compilation of lessons learned has been included in the project document as a distinct activity.</p>

SWITZERLAND

General Commentaries

This project promotes demand-side energy-efficiency improvements in the district heating system for one pilot city in Ukraine. The proposed GEF involvement is designed to complement a mainly private investor financed project to set up an ESCO (Energy Saving Company) in the city of Rivne. While for setting up the ESCO (phase 1) GEF is the main financing agency (GEF contribution 640'000 USD out of total cost of 740'000 USD) the lead changes in the investment programme under phase 2 where private investors, the local and national government, the EBRD and foreign banks provide a major co-financing of 20 million USD (GEF grant contribution 4 million).

Ukraine is an economy in transition with among the world-wide greatest emission levels per unit of GDP. The project has the potential to increase building energy efficiency at district heat supplier and end user level. The project takes into consideration experiences gained with the establishment of state owned UkrEsco under a 30 million EBRD loan in 1998. The proposed project is putting high emphasis on private finance equity participation and shall establish a model for public and private energy service providers within the Ukraine. Output expected from the project is (i) to make energy-efficiency investments in the district heating system and in residential buildings connected to the system; (ii) to strengthen the regulatory and institutional frameworks and a municipal program that create greater incentives for energy efficiency; and (iii) to invest about USD 24m in the district heating network and buildings.

Main Concerns

- (1) Neither the cover note of the work programme nor the project brief provide any reasoning why only phase 1 (GEF contribution of USD 2.030 million, total cost of USD 2.130 m as project brief, USD 3.03 m as per cover note) is proposed for approval now, and whether the document would be modified (in what respect?) for a later council approval of phase 2. Further, the project brief does not provide a clear picture of the cost breakdown claimed for phase 1: Annex 2 of the project brief displays the GEF contribution to setting up the ESCO of 740'000 USD compared to totally claimed phase 1 cost to GEF of 2.030 m USD. Does it

RESPONSE TO SWITZERLAND'S COMMENTS

The segmentation of the project was done in consultation with the GEF Secretariat, in response to the current load in the portfolio and the Secretariat's desire to develop the financing mechanism before proceeding with the full-scale investment. Accordingly, the Project Document for this project corresponds to Phase I only. A clear cost breakdown is provided in the Project Document (see Annex 2 – Budgets). The Phase II will be informed by the results of Phase I, and will be submitted to Council as a separate project for review as part of a future work programme.

The project document has been revised to allow the State Committee on Energy Conservation, the same agency that provided oversight on the EBRD's UKR-ESCO project, to serve as the executing agency. UNDP thinks that this implementation modality will allow for conscientious oversight of the project. UNDP staff will also provide constant oversight during the first phase of the project, both through the country office in Kyiv and the UNDP-GEF regional unit in Bratislava

make sense to set up the ESCO without also approving the investment programme foreseen under phase 2?

- (2) Based on Swiss experience in working with the local implementing agency ARENA Eco in promoting energy efficiency measures in residential buildings, the risks outlined by the STAP reviews relating to the incentive structure on the side of the local heat supply company to comply with the objectives of energy efficiency pursued by this project merit close monitoring from the side of the implementing agencies and the project team. Though ESCO experiences are available in the Ukraine, systematic monitoring of risks needs to be strengthened along with the capacity building efforts under this project.

Conclusions and Recommendations

The project is recommended for approval upon receipt of a plausible and transparent explanation why only phase 1 should be approved at this stage and for what purpose phase 1 GEF funds shall be spent. At the time of drafting these comments we are still awaiting the clarifications UNDP has promised. While confident that the necessary explanations will be provided by the IA, we would recommend that GEFSEC monitor this issue, also with a view to providing some explanations to other Council Members, if necessary, and to avoid bad precedent. Our additional comments, if considered valid by GEF, IA and the Government of Ukraine, should be considered in the further development of this promising project.

OTHER COUNCIL MEMBERS

No comments specific to the Ukraine project were made in the official Council comments provided by Germany, Sweden, Indonesia and the U.S.

**UNITED NATIONS DEVELOPMENT PROGRAMME
PROJECT OF THE GOVERNMENT OF UKRAINE
Project Document**

Project Number: UKR/01/G31/A/1G/99
Project Title: Climate Change Mitigation in Ukraine
 Through Energy Efficiency in Municipal
 District Heating (Pilot Project in Rivne) Stage 1
Starting Date: May 2002
End Date: February 2004
Duration: 22 months
Project Site: Rivne, Ukraine
Executing Agent: NEX – State Committee for Energy Conservation
Implementing Agent: NEX – State Committee for Energy Conservation
ACC/UNDP Sector/Subsector: Energy Planning and Conservation- Promoting
 Environment and Natural Resources Sustainability
DCAS S Sector/Subsector: Energy Conservation – Promotion of Sustainable
 Energy and Atmospheric Quality
Primary Type Intervention: Capacity Building – Capital Assistance
Sec. Type of Intervention: Capacity Building – Technology Adaptation
Primary Target Beneficiaries: Target place (environmental habitat)–Natural features–Atmosphere;
 local government/municipal services

Summary of UNDP and Co-financing Inputs In US\$ as per attached budget(s)	
Inputs, Implementation Stage I	
UNDP:	
1G – Global Environment Trust Fund	1,840,000
Co-financing:	
Country contribution	265,000
External Investors/Financiers	25,000
Co-financing sub-totals	315,000
Total Inputs	2,155,000
Total	2,155,000
LPAC approval date: 25/1 0/2001	

Brief Description:

The proposed project addresses a key issue in the reduction of greenhouse gas emissions through large-scale improvements in energy efficiency in Ukraine's communal heat supply sector. These improvements will result from a four-part approach: (1) capacity building to create the basis for systematic energy efficiency activities at the local level; (2) an integrated approach of supply and demand-side improvements to achieve maximum fuel savings and emissions reduction; (3) attraction of external investment resources for an energy efficiency program in a pilot city; and, (4) project-specific replication measures including development of relevant procedures, guidelines, information materials and their dissemination, and public awareness-raising through the involvement of NGO's, in particular those concerned with environmental and energy efficiency problems.

The project consists of two main components: (1) establishment of the municipal energy service company (ESCO) and (2) demonstration of the energy saving program. The potential municipality selected, in consultation with the government and executing agent, is Rivne. Implementation of the energy saving program will be done in two phases; (1) implementation of the demonstration program through funding available in this project and (2) implementation of the city-wide energy saving program in Rivne and its replication to other cities through investments allocated in addition. The full project is divided into the two stages. Stage 1 includes establishment of the municipal energy service company (ESCO), demonstration implementation of energy efficiency measures, and part of project replication and dissemination activities. Stage 2 starts upon successful completion of the Stage 1 and includes implementation of city-wide energy efficiency investment program and larger replication activities. Reference to Stage II has been included in this project document to provide information on the context of the larger project; however, the financial commitments included in this project document are limited to Stage I activities only.

Approved on behalf of:	Signature:	Date:	Name /:Title
UNDP:	_____	_____	Douglas Gardner, Resident Representative UNDP
Government / Executing Agent: State Committee of Ukraine for Energy Conservation	_____	_____	Yuriy Shulga, Chairman of the State Committee

CONTENTS

A.	CONTEXT	3
A1.	Description of the Sub sector	3
A2.	Host country strategy	4
A3.	Prior and ongoing assistance	4
B.	strategy for the use of undp resources	5
B1.	Program strategy	5
B2.	Expected end-of-project situation.....	9
B3.	Target beneficiaries.....	10
B4.	Project strategy and implementation arrangements.....	10
B5.	Reasons for Assistance from UNDP/GEF	11
B6.	Special Considerations	11
B7.	Coordination/management arrangements	12
C.	OBJECTIVES, OUTPUTS, INDICATORS AND ACTIVITIES	13
D.	INPUTS	16
D1.	UNDP/GEF Input	16
D2.	Local input	17
D3.	Main equipment.....	17
E.	RISKS:.....	18
F.	PRIOR OBLIGATIONS AND PREREQUISITES:	19
G.	MONITORING AND EVALUATION.....	20
H.	LEGAL CONTEXT	21
	ANNEX 1. WORK PLAN	22
	ANNEX 2. BUDGETS	26
	ANNEX 3. RIVNE ESCO FINANCING AND OPERATION SCHEME.....	31
	ANNEX 4. INVESTMENT DETAILS	32
	ANNEX 5. TERMS OF REFERENCE.....	35
	ANNEX 6. STANDARD BASIC ASSISTANCE AGREEMENT.....	40
	ANNEX 7. PROJECT PLANNING MATRIX.....	41
	ANNEX 8. INCREMENTAL COSTS	46
	ANNEX 9. CRITERIA FOR CONTINUATION TO STAGE II: A CHECKLIST.....	52

A. CONTEXT

A1. Description of the Sub sector

Ukraine is one of the least energy efficient countries in the world and has the greatest emissions level per unit of GDP among CIS countries. A recent inventory estimated that total emissions from Ukraine in 1990 were 246 million tons of carbon equivalent, placing it sixth in the world. Per capita emissions of CO₂ were 4.75 tons of carbon per year. This figure significantly exceeds the levels in most European countries and is also one of the highest in the world.

Problems in Ukrainian district heating are similar to those facing other countries of the former Soviet Union. Sharp increase in fuel prices up to the world level with heat tariffs lagging behind considerably worsened the financial state of all district heating companies. Lack of the funds for modernization of generating capacities and heat networks impacted the level of service, which in combination with consumers' lower ability to pay significantly reduced payments collection level. Heat supply infrastructure is operated beyond the service life and requires large investments for maintaining it in operating condition and covering existing heat demand.

At the same time, it is this inefficiency of existing heat supply and consumption systems that creates significant potential for fuel and energy saving, which increases interest to this sphere in connection with environment protection problems. Heat supply in the buildings sector accounts for approximately 15% of all fuel consumed in Ukraine, and there is a huge potential for energy efficiency improvement in this sector illustrated by the following figures. Specific fuel consumption for heat generation in communal energy sector of Ukraine is 0.180-0.200 t.c.e. per 1 Gcal compared to 0.150-0.160 t.c.e. in Western countries. Specific heat consumption for heating and hot water supply of Ukrainian buildings is 1.5-2 times higher than in Western countries with similar climate conditions.

High energy intensity of municipal heat supply in Ukraine is a very serious problem that has the following important implications:

- growing dependence on external fuel supplies (mainly from Russia) purchased at world prices;
- high fuel component of heat tariffs and consequently high level of tariffs themselves, overstraining the budgets of most families and leading to significant non-payments by households;
- higher than necessary consumption of fossil fuel by utilities, with a considerable potential for fuel saving and corresponding greenhouse gas (GHG) emissions reduction.

There exist a number of barriers that hinder supply and demand side energy efficiency improvement in district heating systems. These include: macro-economic conditions (such as high taxes and unstable taxation policy, unstable local currency), inconsistency of regulatory and legal policies, non-payment crisis, imperfect pricing policy, institutional weaknesses, ownership inefficiency, lack of information and about existing opportunities for energy efficiency and relevant experience, high transaction costs for relatively small energy efficiency projects, unsatisfactory financial state of district heating companies, consumers and local budgets, difficulties in arranging financing for efficiency projects, lack of capacity and experience in preparing, implementing and managing energy efficiency projects, technical deficiencies of heat supplier and consumer systems, absence of incentives to energy saving for majority of heat consumers.

Increased energy prices in the Central and Eastern European countries after the collapse of the Soviet Union and development of market economy opened opportunities for energy service companies that reduce energy costs for their clients and reimburse themselves from the savings produced. ESCO business is also appearing in Ukraine. There already exist a state-owned company UkrEsco, and several private ESCOs, which is an indication that there is a healthy market for ESCOs in the country.

A2. Host country strategy

Improvement of municipal district heating energy efficiency on both supply and demand side is an important development objective pursued by Ukrainian government. Reaching this objective would contribute to lower dependence on imported fuel and reduction of GHG emissions, and have a significant social impact. Ukraine's strategy in improving the efficiency of its economy in general and district heating sector in particular is reflected in a number of legislative and regulatory documents, such as the Law of Ukraine "On Energy Conservation" (1994), National Energy Program of Ukraine (1996), Comprehensive National Program on Energy Conservation (1997, revised and supplemented in 2000), Decrees of the President and the Cabinet of Ministers of Ukraine. In communal heat supply, the target for state support is set for priority implementation of the most cost-effective energy efficiency measures to achieve about 4.5 million t.c.e. fuel and energy saving over the period 2000-2004, with estimated investment requirements of about UAH 1.5 billion (about \$300 million) over the same period. Special attention is paid to improvement of energy usage efficiency in public sector, with the target of 25% energy consumption reduction by public sector institutions, to be achieved by 2004.

Main directions defined by the government of Ukraine for fulfillment of the tasks on improvement of energy efficiency include, among others, the following: economic incentives to introduction of energy efficiency technologies at enterprises, improving taxation and tariff policy, promoting wide-scale application of leasing operations, obtaining investment support from the EBRD and other sources, improvement of the efficiency of heat generation and delivery, mass-scale introduction of energy metering, improvement of subsidy allocation mechanism to create incentives to energy saving by subsidized households, awareness raising through mass media, etc. It is also recommended to support commercialization of activities in the sphere of energy efficiency through the usage of energy performance contracting and application of UkrEsco experience to expand the activity on establishing energy service companies in the regions of Ukraine, involving in their equity financing funds from local budgets and interested enterprises and institutions. It is emphasized that changing situation in fuel and energy sector, such as emerging non-state ownership and new economic relations require higher reliance on market rather than administrative methods, and further reforming of this sector.

In the area of climate change, Ukraine's First National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) prepared in 1998 identifies improvements in energy efficiency as one of the main mitigation options for reducing GHG emissions in Ukraine.

A3. Prior and ongoing assistance

There have been several recent activities in district heating and/or energy efficiency involving international financial institutions (IFIs), first of all, three World Bank loans a EBRD loan.

In December 1998, the World Bank approved \$200 million loan to Kiev district heating company through the government of Ukraine for rehabilitation of Kiev heat supply system. The loan was provided under a sovereign guarantee and local co-financing at \$50 million. Project implementation

is well under way. However, there was a significant delay between the loan approval and its ratification by Ukrainian Parliament.

Another World Bank's loan finances demand-side energy efficiency under the Kiev Public Buildings Energy Efficiency Project.. The loan in the amount of \$18.3 million was approved by the Bank in January 2000 and also required a sovereign guarantee. The Kiev Municipality serves as the implementing agency for this project, which showed a good progress since the loan approval.

The third World Bank loan, for supply side energy efficiency, is provided for modernization of Sevastopol district heating system. The loan in the amount of \$28.2 million was approved in March 2001.

There are also two World Bank projects under preparation, aimed at improving district heating systems in Kharkiv, Ukraine's second largest city, and Odessa, large city in Southern Ukraine. Currently, full-scale feasibility studies financed by the grants from the U.S. Trade and Development Agency are being prepared.

In 1998, the EBRD provided a sovereign loan of \$30 million to establish the first Ukrainian ESCO, UkrEsco, with the mandate is to identify and implement energy-saving investments in small and medium-size enterprises and public sector institutions. UkrEsco is state-owned, and it has also involved the participation of private sector operator, Bechtel and Econoler. UkrEsco's start-up was delayed significantly due to the need to obtain a sovereign guarantee. Despite initial delays, UkrEsco has an active portfolio, which indicates that ESCOs can indeed operate in the Ukrainian market. In fact, there are currently plans to privatize UkrEsco.

The experience of national and international partners indicates that there is a great potential for successful supply and demand side energy efficiency projects in Ukrainian district heating. Major barriers preventing realization of this potential are insufficient internal financing and lack of local institutional capacity to identify, prepare and implement bankable projects.

B. STRATEGY FOR THE USE OF UNDP RESOURCES

B1. Program strategy

The overall project strategy is to promote municipal energy efficiency in Ukraine, through demonstration schemes in a pilot municipality and to facilitate the replication of successful experience in other medium and large-sized Ukrainian cities. This will be done by reducing major institutional and financial barriers (see Section A.1) at municipal level.

Experience gained by UNDP and other donors in Ukraine and in the CIS region shows that many of the barriers to energy efficiency improvement, particularly a lack of relevant capacity, can be mitigated by adopting a municipal (or local) approach. This approach also allows the forging of local partnerships and increased ownership that are critical for successful implementation. This project aims to create an enabling environment for implementation of municipal energy efficiency initiatives in a pilot city while reducing green house gas emissions. Positive results and experience gained in the course of the project will be replicated in other cities of Ukraine.

Accordingly, the project will focus on capacity building at the municipal level through the establishment of a municipal energy service company (ESCO). While capacity building will focus on institutional requirements, it will also be linked to the phased implementation and demonstration

of the municipal energy saving program. All these will include district heating supply and demand side energy efficiency activities on a sustainable basis. The experience in developing the institutional capacity and demonstration schemes for energy efficiency will be further utilized, as a second phase of assistance, to launch a city-wide energy efficiency program and, as mentioned, in replicating the experience to other cities in Ukraine.

The pilot municipality, which has been selected in consultation with the government and executing agency, is Rivne. The full project is divided into the two stages. Stage 1 includes establishment of the municipal energy service company (ESCO), demonstration implementation of energy efficiency measures, and part of project replication and dissemination activities. Stage 2 starts upon successful completion of the Stage 1 and includes implementation of city-wide energy efficiency investment program and larger replication activities. The duration of the first stage is expected to be 12 months and the second stage 46 months that follow the completion of the first stage.

Transition to the Stage 2 of the project is conditioned on successful fulfillment of the Stage 1 objectives and milestones. Major results to be achieved at the Stage 1 include fully functional municipal ESCO working on cost-recovery basis with its district heating supply and demand side clients, successful implementation of a demonstration project (from both technical and institutional viewpoint), and financial commitments for the Stage 2 in the ratio of at least 3:1 to expected UNDP/GEF financing. Preparation of the brief and project document for the Stage 2 project will begin at the end of the Stage 1 in coordination with UNDP and national executing agency, and with involvement of the project team that worked on the Stage 1 implementation. Major issues to be developed for the Stage 2 include: exact scope of UNDP/GEF participation in the city-wide energy efficiency program, provisions for usage of UNDP/GEF grant funding and arrangements with other co-financing parties, detailed project replication plan. Prior to Stage 2 of the project, which is to be funded as a separate UNDP/GEF project that must be approved by the GEF Council, the results of the Stage 1 project will be verified through an independent technical and financial review. A checklist of criteria to be considered prior to continuation to Stage II is provided in Annex 9.

It is also the strategy of the project to ensure result-based annual and quarterly work planning and progress reporting. A performance and impact monitoring system will be developed to closely monitor and evaluate the implementation process.

[a] Establishment of a Municipal ESCO in the city of Rivne (Stage1):

The main project focus is on local capacity building through creation of a municipal ESCO, which will provide organizational basis for conducting energy efficiency activities at the municipal and regional level. The role of the ESCO is to design, realize and finance all necessary and cost effective investments in the municipal buildings, the district heating network or other energy consuming local facilities through energy performance contracts (EPCs) or other applicable contracts, aimed at providing up-front investments, reducing the facilities' energy, operation and maintenance costs, and reimbursing the investments through a portion of the savings actually realized. The ESCO presents the most effective way for systematic energy efficiency activities at municipal level because it is oriented for operation with numerous clients of various types, possesses necessary expertise for projects preparation and implementation, is quick and flexible in making decisions about financing the projects and is intrinsically interested in multiplying energy efficiency activities through expansion of its customer base. The ESCO reduces transaction costs and can tackle a large number of similar and relatively small-scale projects that could not be financed separately using traditional approach.

The ESCO in the city of Rivne will begin as a pilot municipal company. During the implementation process, alternative institutional options for the involvement of external investors will be explored and considered. As a first step in setting up the ESCO, an energy office will be established at the municipality with the support of the project. Local staff will be selected and receive training in the course of implementing the demonstration project (see below). In parallel, local business environment will be analyzed in detail with regard to important legal and fiscal issues for ESCO operation, and necessary legal documents and operational procedures will be developed. Options for sustainable ESCO operation will be considered based on existing experience of financing district heating efficiency improvements in Eastern and Central Europe and former Soviet Union.

It is planned that Rivne ESCO will be registered as a communal joint-stock company with participation of the regional government, municipality and the district heating company. However, operation scale for such purely communal ESCO is limited by financing capabilities of local budgets and heat supplier. In order to increase the financial capacity of the ESCO for the city-wide investment program, the strategy is to involve participation of private sector investor(s) with relevant experience, mobilize interested international financial institutions (IFI), tap into local resources and implement cost-recovery schemes for its services. For this purpose, the project will, through participatory processes, develop the institutional framework for a self-sustaining municipal energy company. As required, the project will conduct full-scale feasibility study and prepare necessary materials for mobilization of local resources, cost recovery schemes and for loan/equity approval processes.

In order to ensure that the institutional basis for sustenance is established, the project will provide its assistance to the Rivne municipality based on a “Terms of Partnership”. The Terms of Partnership will specify the obligations to be met by each partner. Besides the assistance to be provided by the project, as provided for in this document, such a partnership arrangement will include the mobilization of local resources and linkage building of the regular initiatives of the municipality on energy development with the initiatives to be undertaken by this project.

[b] Demonstration of the Energy Saving Initiative (Stage 1):

The strategy is to implement the demonstration scheme in a typical sector of the Rivne city district heating system. The selection will be done based on consultations with the municipal authorities. The criterion for selection will include defining municipal neighborhood(s) that have the most critical problems and also to cover demonstration of energy saving schemes in the distribution system, public as well as residential buildings. Several measures that will be undertaken as part of the demonstration scheme are:

- ❑ Testing and refining the EPC mechanism and other ESCO procedures.
- ❑ Introduction of the consumption-based billing in all demonstration buildings to provide incentives for end users to regulate their heat consumption.
- ❑ Streamlining the technical aspects of concurrent supply and demand side efficiency improvements, verify cost performance of efficiency measures and thus reduce implementation risk for the city-wide program.
- ❑ Verification of the management and implementation capabilities through application of energy saving initiatives.
- ❑ Identification of important issues that should be included into the planning of full-scale implementation.

Implementation of the demonstration schemes will be done in close partnership with the beneficiary communities. For this, the intended beneficiaries will be mobilized and organized into “interest groups” covering public (schools or health services), residential buildings or commercial buildings. These “interest groups” can be developed in the form of “neighborhood committees”, for example for residential buildings, to plan, manage and implement, through their ownership, the energy saving initiatives. Thus, the selection of the project area (section of the heating system) will be done based on the willingness of the beneficiary community to contribute and be part of the project. Such an approach is very important from the perspective of ensuring successful implementation.

To achieve maximum fuel savings and emissions reduction, the municipal energy efficiency program (see Annex 4 for details) will advocate an integrated approach of supply and demand-side improvements. Efficiency measures will be installed at boiler plants, heat transportation system (pipelines and substations) and buildings (public, residential and commercial).

UNDP/GEF support will cover the majority of demonstration project cost. In order to maximize the resources available for expanding the project, proportional returns on UNDP/GEF funds for the demonstration project and the city-wide investment may be placed back into the ESCO. This will increase the equity of local stakeholders for subsequent investments in municipal sector efficiency undertaken by the ESCO as long as resources remain over the course of the project period. It will also be the intention of the project to mobilize local resources, including from the municipality and from the participating beneficiary community who will benefit from improved services. Support to commercial building will only be provided on a full cost recovery basis.

[c] Phased implementation of municipal energy efficiency program (full-scale implementation at the Stage 2):

During Stage 2, the ESCO will perform a full-scale implementation of the city-wide energy efficiency program, with the estimated cost of about \$23 million. It will be financed using ESCO's equity resources, UNDP/GEF grant funding, debt financing from IFI and commercial banks, and a local ongoing financing (see Annex 2, Table 4 for financing structure details). The UNDP/GEF grant funding under the investment program will finance the implementation of longer-payback measures (like pipe replacement and measures in buildings), less economically attractive and more risky for private investors. This will help to reduce the risks and ensure involvement of private financing in the project.

Prior to Stage 2 of the project, which is to be funded as a separate UNDP/GEF project that must be approved by the GEF Council, the results of the Stage 1 project will be verified through an independent technical and financial review.

[d] Project Replication Strategy (Stage 1 and 2):

The following essential barriers prevent wide-scale expansion of even commercially viable energy efficiency activities: 1) lack of information about efficiency improvement opportunities and difficulties in obtaining competent consultations; 2) lack of experience in establishing ESCOs and their commercial operation based on EPCs; 3) insufficient experience in preparing bankable projects in accordance with the necessary standards; and 4) lack of public awareness about the environmental problems associated with fossil fuel combustion.

Replication measures will be conducted in several directions: informational, methodological, and educational. Materials prepared for setting up of the Rivne ESCO (model EPC, analysis of legal and fiscal issues, necessary local commitments to attract investors etc.) will be freely circulated and provided to other municipalities willing to replicate the project. Information will be disseminated through mass media, project web site, seminars, workshops and targeted consultations. Project replication activities will be conducted with participation of the SCEC, Association of Ukrainian Cities, leading Ukrainian NGOs dealing with energy efficiency and environmental problems.

Stage 1 will focus on producing and distributing a report on district heating energy efficiency financing experience in Eastern Europe and former Soviet Union and its applicability to Ukraine's conditions; creating a project website and publishing a brochure on project operations; and disseminating project information through mass-media. Stage 2 will address improving awareness of officials and population about energy and environmental issues, formation of favorable public opinion, facilitation of access to informational and methodological materials, promotion of the ESCO-approach to efficiency activities and facilitation of its setting up process achieved by means of preparing and widely disseminating relevant informational, methodological, technical materials and providing targeted consultations.

B2 Expected end-of-project situation

The expected situation **at the end of the project's Stage 1** will be:

1. Necessary materials for municipal ESCO establishment and operation (model EPCs, agreements, founding documents, operational procedures) will be prepared and ready for dissemination.
2. The ESCO will be established and operating, having concluded EPCs with demonstration project clients. Local capacity to identify, prepare, finance and implement energy efficiency projects will be increased.
3. Full-scale feasibility study for city-wide energy efficiency program will be prepared and participation of external investors/financiers negotiated.
4. Financial arrangements for the project's Stage 2 will be defined, including draft city-wide energy performance contracts.
5. Demonstration project installations will be performed and consumption-based billing system for all demonstration buildings introduced.
6. Report on district heating energy efficiency financing experience in Eastern Europe and former Soviet Union and its applicability to Ukraine's conditions will be prepared and distributed.
7. Project web site created and brochure on project operation published
8. Project information disseminated through mass-media.
9. Energy saving verification procedures developed in accordance with the International Performance Measurement and Verification Protocol.
10. Energy audits on demonstration project facilities conducted, baseline consumption and emissions level determined and project impact calculated based on the latest verification data. Draft technical report on energy savings and emissions reduction prepared.
11. Project implementation monitored and evaluated according to UNDP/GEF procedures.

At the end of the project's Stage 2, the expected situation will be:

1. Municipal energy efficiency improved through the integrated approach to supply and demand side measures in the district heating system under city-wide investment program conducted by the ESCO.

2. Rivne ESCO will be operating on a self-sustainable basis, having involved additional financing at the ratio of at least 3:1 to UNDP/GEF funding.
3. Other energy efficiency projects in the city/region for expansion of the ESCO's activities identified and draft energy performance contracts prepared.
4. Better awareness of officials and population about energy and environmental issues, formation of favorable public opinion, facilitation of access to informational and methodological materials, promotion of the ESCO-approach to efficiency activities and facilitation of its setting up process achieved by means of preparing and widely disseminating relevant informational, methodological, technical materials and providing targeted consultations.

B3 Target beneficiaries

Target beneficiaries of the project include, first of all, Ukraine's government, as the proposed project contributes to implementation of the national strategy of increasing the energy efficiency. A direct beneficiary will be the State Committee for Energy Conservation responsible for implementation of the national energy policy and promoting energy efficiency activities in Ukraine. Local authorities, District Heat Supplier and the community of Rivne will benefit from reduction of budgetary expenditures on energy bills of public buildings and on residential subsidies. Establishment of a municipal ESCO will also increase local capacity to prepare bankable projects and, in this way, facilitate the access to external financing sources. At the same time, it may provide the most viable institutional mechanism as well. Expansion of energy efficiency activities also contributes to development of the market of efficient equipment and technologies that is important in Ukraine. Finally, the target beneficiaries must be seen in a global context, because climate change is a world community concern. By implementing a measure to fulfill the commitments of Ukraine to the UNFCCC, the project will contribute to the global effort to address climate change and its adverse impacts.

B4 Project strategy and implementation arrangements

In 1995 Ukraine created a special ministry-level institution -- the State Committee of Ukraine for Energy Conservation (SCEC) with the responsibilities of formulating and implementing the national policy in the sphere of energy efficiency. The SCEC receives state budget funding for energy efficiency and is responsible for directing it to priority financing of investment projects in this sphere. In heat supply sector, most district heating companies are in communal ownership, subordinated either to municipalities or regional (oblast) governments. The Ministry of Ecology and Natural Resources is responsible for development and implementation of the national policy regarding environmental issues in Ukraine. The State Committee on Construction, Architecture and Housing Policy is develops building codes, norms and standards for district heating and defines district heating tariff policy. A non-governmental organization, Association of Ukrainian Cities helps to disseminate positive experience among the municipalities, including best practices in communal district heating and in some regions, there is an ongoing process of privatizing district heating and creating joint-stock companies. On the demand side, majority of public buildings (schools, kindergartens, polyclinics, hospitals, cultural and administration buildings) are owned and financed by municipalities. A significant number of public buildings are financed from the state budget (in particular, higher education and healthcare) and from oblast budget (healthcare and administration). In the residential sector, the majority of apartment buildings are owned by municipalities, with ongoing apartment privatization. A significant number of buildings are owned by housing cooperatives and emerging condominiums. Municipal budgets provide subsidies for utility services to underprivileged households.

B5. Reasons for Assistance from UNDP/GEF

Ukraine signed the UNFCCC in June 1992, ratified it on October 29, 1996, and became a Party in August 1997. As a Party to the Convention, Ukraine has accepted a commitment to formulate, implement, publish and regularly update national and (where appropriate) regional programs containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not covered by the Montreal Protocol. The Government of Ukraine also signed the Kyoto Protocol in March 1999. The proposed activity is a part of the Government's strategy to fulfill its commitments to the UNFCCC while simultaneously addressing local problems related to the inefficient use of fossil fuel.

As an economy in transition, and in accordance with its commitments to the UNFCCC, the Government of Ukraine has requested support from UNDP/GEF to overcome barriers to the measures reducing GHG emissions, such as improvement of energy efficiency and promotion of the use of renewable energy technologies. Further consultations with the Government of Ukraine identified the removal of barriers to the improvement of demand and supply side energy efficiency in district heating systems as a priority area for GEF financing.

Operationally the project falls under the GEF Operational Program # 5, "Removing Barriers to Energy Efficiency and Energy Conservation".

GEF participation accounts for 21% in the total project cost and would ensure financial leverage at the ratio of about 1:4.

B6. Special Considerations

As a result of the decline of the centrally planned economy and the privatization of many enterprises, the role of national authorities and government bodies in Ukraine has changed. Many observers feel that important energy efficiency actions in the future will come from local initiatives. The authority to decide many issues in energy policy, tariffs, and energy regulation is increasingly being turned over to regional and local governments. National laws have established general guidelines, but local and regional authorities must then develop implementation mechanisms and take the necessary actions to remove barriers to market-oriented activities.

Probably the most serious problem is a shortage of affordable financial resources for energy efficiency investments. The situation in the Ukrainian banking sector is such that interest rates (18-40% in US\$ and 60-120% in local currency) are virtually prohibitive for energy efficiency projects. Ukrainian commercial banks prefer to finance export-oriented and trading companies with short-term loans. Usual loan terms last several months and do not exceed \$100,000, requiring collateral of about 200% of the loan amount. To overcome this barrier, different possibilities and financial mechanisms have to be evaluated, including long-term revolving funds, guarantee funds, targeted budgetary allocations, municipal bonds, energy service companies, vendor financing, possible loans and credit lines by multilateral banks, various forms of involvement of foreign private investors, equipment leasing etc.

To ensure financial returns on investments, the problem of non-payments must also be addressed. Existing incentives for timely payments must be improved, and mechanisms to discourage the "non-payment mentality" must be developed and adopted. Fuel prices have risen to world levels, and as this cost burden is passed on to households, residents are hard-pressed to pay monthly heating bills

that approach 30-50% of their average monthly wage. In addition, social tensions are rising as many people face delays in receiving their salaries or are unemployed. The payment issue is made worse by the fact that hot water and heat consumption are still relatively high compared to many OECD countries, but the existing bulk rate billing system provides no incentives for reducing hot water use as a means of lowering the monthly heating bill.

Implementation of efficiency measures both at boiler plants and connected buildings are capable of producing significant combined effect. Elimination of large consumer substations and installation of individual heat controls and hot water equipment in buildings, together with adjustment of heat output from generating capacities will also produce substantial heat energy savings both in heating and hot water systems.

Over-centralization of heat supply sometimes results in a lower overall energy efficiency than would be optimal from the technical, economic and environmental point of view. It is recognized that for greater efficiency, more decentralized heat production could play a bigger role. On the other hand, a major advantage of the centralized systems is the possibility for co-generation, which is one of the most effective ways to use primary energy and to reduce the associated greenhouse gas emissions. The possibilities for co-generation could eventually be used also in smaller systems, which in principle work in a same way as previously planned big centralized combined heat and power plants, but reducing the overall losses by being smaller and providing heat to some thousands rather than tens or even hundreds of thousands of people. Another option is small autonomous gas heaters and boilers, when, however, the possibilities for co-generation are lost.

All options for achieving maximum effect from combined supply-side and demand-side efficiency improvements will be analyzed during project preparation phase.

The personnel of the local counterpart agencies are highly qualified to implement the various activities of the project, but extensive training and access to the latest available information on topics such as available new technologies, market oriented planning and operation practices, and project financing (incl. support and incentives to attract domestic and foreign investments) is essential.

B7. Coordination/management arrangements

The project will be executed by the State Committee on Energy Efficiency. The Executing Agent will be guided by a consultative forum, in the form of the Steering Committee. The Steering Committee will bring together representatives from:

- State Committee for Energy Conservation (SCEC);
- United Nations Development Program;
- Ministry of Ecology and Natural Resources (Minecology);
- Association of Ukrainian Cities (AUC);
- Rivne Municipality;
- Arena-Eco NGO (lead implementing agency at the stage PDF-B).

The State Committee on Energy Efficiency, as the Executing Agent, will appoint the National Project Director (NPD). The Executing Agent will be supported by a Program Management Unit, consisting of a Program Manager, Program Assistant and short-term consultants, to successfully implement the project. The Program Management Unit will be established as part of the State Committee on Energy Efficiency in Kyiv with the assistance of UNDP. Besides supporting the

successful implementation of the project, the Program Management Unit will provide necessary support in developing a coalition of partners, mobilizing resources and strengthening partnerships with municipalities with the intention of disseminating project experience and replication. A

Project implementation at the municipal level will be based on a “Terms of Partnership”. Support for capacity building will be provided in setting up the Municipal Energy Service Company Office, including through its implementation of the demonstration schemes. In establishing the municipal ESCO close cooperation will be ensured by the project management with the municipality of Rivne and the district heating company as well. During the course of implementation, through capacity building, it is the intention of this project to sustain the operations of the municipal ESCO as a self-governing and self-financing entity whether in the municipal, semi-government or private sector.

The main responsibilities of the national project director are: 1) ensuring effective communications between the partners and monitoring of progress towards expected results; 2) convening and chairing PSC meetings; and 3) reviewing quarterly work plans and requests for funding submitted by the project manager. Project Manager and Project Assistant for the Project Support Office in Kyiv will be selected on the competitive basis and appointed by SCEC in consultation with UNDP. Staff for Project Implementation Office in Rivne will be selected on the competitive basis and appointed in consultation with Rivne municipality and UNDP. Capacity of the Project Implementation Office in Rivne will be strengthened through training conducted by project management as well as by subcontractors. Similarly, specialized technical assistance will also be provided through subcontractors determined by tender and subcontracted in accordance with UNDP procedures.

Project replication and monitoring activities will be managed by Project offices in Kyiv and Rivne under the supervision of the national executing agency and in coordination with the PSC, UNDP Country Office, Minecology, AUC, and other project participants. Monitoring will be performed during the whole project period as presented below and will follow the guidance provided by the UNDP/GEF Information Kit on Monitoring and Evaluation. In order to ensure high quality evaluation of the project outcomes independent technical and financial evaluators will be subcontracted.

C. OBJECTIVES, OUTPUTS, INDICATORS AND ACTIVITIES

Development objective

The Objective is removing existing barriers to implementation of integrated approach to supply and demand side energy efficiency improvements to district heating systems in Ukraine, thereby reducing associated greenhouse gas emissions. The objective is to be reached by means of achieving the following immediate objectives:

Immediate Objective 1:

Immediate Objective 1 is to strengthen local institutional capacity in the city of Rivne for identifying, preparing and implementing supply and demand side energy efficiency projects in the district heating system.

Success Indicators:

- ⇒ By the end of the month 4 of the project, a prototype municipal ESCO office is established in partnership with the local authorities.
- ⇒ Analysis of the business environment performed and necessary materials for pilot municipal ESCO establishment and operation prepared by the end of the month 7 of the project.
- ⇒ By end of this pilot phase, a sustainable municipal ESCO is fully functional based on cost-recovery from its services and investments from the government, local authority and private sector.

Output 1.1: Municipal ESCO is established.

Activities for Output 1.1:

- 1.1.1. Compile the results and analysis of work to date conducted in the EE/NIS region on district heating financing.
- 1.1.2. Perform necessary analysis of legal and fiscal issues regarding ESCO operation in the country, develop possible local regulatory changes for improvement of ESCO business environment, and determine the ESCO operational setup.
- 1.1.3. Negotiate the details of municipal ESCO establishment with local project stakeholders (municipality, regional government, district heating company).
- 1.1.4. Prepare supporting materials for ESCO operation, including model energy performance contract, other legal documents, operational procedures and draft founding documents.

Output 1.2: Municipal ESCO developed as a self-sustaining entity.

Activities for Output 1.2:

- 1.2.1 Develop capacity of the local staff, including on energy audits.
- 1.2.2. Develop and formulate necessary commitments to be made by the local stakeholders for attracting external investors, and study options for increased internal financing.
- 1.2.3. Prepare and distribute to possible investors/financiers project description materials and requests for participation.
- 1.2.4. Develop a full-scale feasibility study and prepare supporting materials for loan/equity approval process.
- 1.2.5 Conduct negotiations, select investors/financiers, develop and sign ESCO financial agreements.

Immediate Objective 2:

Immediate Objective 2 is to develop viable approaches to sustainable energy saving or efficiency through demonstration schemes in the pilot city for wider replication in Ukraine.

Success Indicators:

- ⇒ Demonstration project is implemented and energy efficiency measures are undertaken.
- ⇒ Regular investments made by the municipality for energy development and saving initiatives are fully incorporated into the project initiatives during the first year.
- ⇒ All beneficiary households in the selected residential areas fully participate in implementing energy saving initiatives, including with their contributions.

- ⇒ Beneficiary communities and the municipality experience savings in cost by the end of this project.
- ⇒ Demand for replication of the demonstration schemes in other municipalities significantly increases by the end of this project.
- ⇒ Total amount of investments obtained for implementation of city-wide energy efficiency program.

Output 2.1:

District heating supply and demand side measures on demonstration project facilities are implemented and consumption-based billing system for demonstration buildings introduced.

Activities for Output 2.1:

- 2.1.1. Prepare working designs and plan for energy efficiency measures.
- 2.1.2. Mobilize and organize participating officials of public facilities and beneficiary communities of residential areas to undertake demonstration schemes.
- 2.1.3. Support with energy efficient equipment and installation services.
- 2.1.4. Develop billing and accounting system, including software, for shifting to consumption-based billing.
- 2.1.5. Implement demonstration schemes, covering distribution system as well as public and residential facilities.
- 2.1.7. Develop and undertake energy performance contracts for the heating system.

Output 2.2

Capacity for optimization of the integrated district heating system financing is strengthened.

Activities for Output 2.2:

- 2.2.1. Prepare capacity development plan for the municipalities to facilitate the shift to consumption-based billing systems, introduction of regulatory changes to motivate energy saving, adjustment of subsidy allocations, and other regulatory changes.
- 2.2.2. Making the materials prepared for setting up of the Rivne ESCO widely accessible (including the model ESCO charter and foundation agreement, the model energy performance contract, the analysis of legal and fiscal issues, the local commitments necessary to attract investors, etc.).
- 2.2.3. Provide consultations to municipalities and district heating companies regarding technical solutions, energy saving and emissions reduction potential for supply and demand side energy efficiency improvements in district heating system, preparation of bankable projects, and the ESCO approach to financing energy-saving project, and policy reform issues.
- 2.2.4. Mobilize and organize beneficiary communities to plan, manage and implement energy efficiency initiatives.

Output 2.3: Project experience, including implementation processes, documented and disseminated for replication.

Activities for Output 2.3:

- 2.3.1. Document the experience of financing district heating efficiency in the EE/NIS region and its relevance to Ukraine, and release in Ukrainian and English for key target audiences.

- 2.3.2. Create the project web site and disseminate information about the project through the internet and mass media.
- 2.3.3. Conduct seminars and workshops to provide targeted training for municipalities and district heating companies.

D. INPUTS

D1 UNDP/GEF Input

Project budget estimates are presented in Annex 2. The UNDP/GEF input to the Stage 1 of the project is \$1,840,000 divided as follows:

a) Personnel	\$145,500
b) Subcontracts	\$964,500
d) Training	\$115,000
e) Equipment	\$595,000
f) Miscellaneous	\$20,000

These figures provide indicative breakdown of costs and may have to be adjusted in the future between the budgetary items within the fixed overall budget.

Between the project components it is distributed as follows:

• Rivne municipal ESCO establishment	\$640,000
• Demonstration project implementation	\$900,000
• Information dissemination/replication measures	\$130,000
• Monitoring and evaluation	\$170,000

Main expenditure items within each project component for the Stage 1 are:

Rivne municipal ESCO establishment:

- development of a full-scale feasibility study
- preparation of supporting materials for loan/equity approval process
- legal and fiscal analysis of ESCO business environment
- development of company's founding documents
- development of model performance contract
- preparation of other legal documents (collateral, leasing, trade credit agreements etc.)
- development of a set of operational procedures (energy audit, design, installation and acceptance, verification, procurement, accounting etc.)
- selection of local staff and its training, including energy audits on demonstration project facilities
- purchase of energy audit and office equipment

Demonstration project implementation:

- preparation of designs for energy efficiency measures
- purchase and installation of energy efficient equipment and materials
- procurement of billing and accounting software for shifting to consumption-based billing, and necessary hardware

Information dissemination/replication measures:

- developing a report on DH financing experience in EE/NIS region and relevance to Ukraine
- creation of a web site for the project, publicizing project in mass media, conducting seminars and workshops

- distributing ESCO establishment supporting materials
- providing consultations to municipalities and district heating companies

Monitoring and evaluation:

- measurement and verification of energy savings and emissions reduction from demonstration project and preparation of technical report
- author supervision of working designs preparation
- collection of regular feedback from project stakeholders and all interested parties through workshops, meetings, and questionnaires
- preparation of all necessary reports as described in Section G

D2. Local input

For the Stage 1 of the project, the Ukrainian project partners have agreed to contribute \$265,000 (partially in-kind), to be provided from the following sources:

- | | |
|----------------------------------|-----------|
| • Rivne Municipality | \$70,000 |
| • Rivne District Heating Company | \$115,000 |
| • SCEC (state budget) | \$80,000 |

Demonstration project financing from the State Committee for Energy Conservation (SCEC) in the amount of UAH 450,000 (\$80,000) is provided from the state budget on application of the Rivne Municipality.

These inputs will co-finance the following activities:

- | | |
|---|-----------|
| • Rivne ESCO establishment | \$50,000 |
| (\$25,000 from the municipality and \$25,000 from the district heating company) | |
| • Demonstration project implementation | \$200,000 |
| (\$40,000 from the municipality, \$80,000 from the district heating company, and \$80,000 from the SCEC) | |
| • Monitoring and evaluation | \$15,000 |
| (\$5,000 from the municipality and \$10,000 from the district heating company). | |

The costs covered by local co-financing include:

- involvement of qualified specialists from relevant institutions to support project activities;
- office space for the prototype municipal ESCO office / ESCO;
- part of demonstration project procurement and installation costs;
- equity contributions of local project stakeholders for initial ESCO capitalization.

D3. Main equipment

Main equipment to be procured for the Stage 1 project activities is:

- for the demonstration project implementation: 1 modern boiler, 3 heat recovery units, 2 convective packages, 7 burners, 4 automation systems for boilers and auxiliary equipment, 1 boiler plant information system, 1 packaged water treatment system, 7 frequency converters for electric engines of fans, ventilators and circulation pumps, 2 heat exchangers with automatic controls, 3.2 km of pre-insulated pipes, 50 shut-off valves for pipelines, 1 automatic dispatch management system, 21 heat meters, 8 building heating control systems; 1 server, computer, modem and printer.

- for the ESCO: clamp-on flow meter, thickness meter, leakage detector, 2 multi-channel data loggers, portable computer, infrared thermometer, combustion analyzer, electricity multimeter, anemometer, office equipment.

E. RISKS:

The crucial elements determining the success of the project are:

Financial risk, connected with the possibility that targeted participation of investors/financiers in the ESCO and investment program may not be realized to the planned extent, which would mean lower returns on UNDP/GEF funding in terms of GHG emissions reductions. This risk is mitigated by structuring the project into the two stages described above and conditioning Stage 2 grant allocation on successful completion of the Stage 1 activities.

Major indicator impacting the size of the Stage 2 investment grant will be the total amount of the funds committed to participation in the project. It is anticipated that this participation would include 2-3 major investors in addition to the municipality and the municipal district heating company, that these investors would be committed by month 18 of the project's operations, and that the ratio of external funds to UNDP/GEF funds would be at least 3:1. Full amount of the UNDP/GEF \$3.1 million Stage 2 investment grant will be allocated if targeted financing from other sources is confirmed. In case if targeted level of ESCO equity/debt financing is not reached within the planned period, the ESCO will proceed with smaller-scale investment activities. Actions (developed in course of ESCO preparation) will be taken to expand internal financing for the project and attract external investor through privatization of already operating municipal entity. The extent of the UNDP/GEF Stage 2 support will depend on success of these actions.

UNDP/GEF investment grant usage risk, connected with considered involvement of private investors in municipal ESCO, and possibility that the proceeds from this investment grant may go to private sector. This risk is mitigated by addressing the contingent nature of the UNDP/GEF funds in ESCO financial arrangements, meaning that the UNDP/GEF investment grant to local project stakeholders is to be used for energy-saving projects and will not go into any profits made by private equity investors. The mechanism to handle these funds will be developed and approved with UNDP/GEF and local stakeholders.

Institutional risk, arising from the fact that the project is dealing with a subject area in which broad consultations and involvement of all the relevant stakeholders are of crucial importance to make the project a success. These include key government ministries, local authorities, heat supplier etc, whose positions and expectations have to be taken into account during project implementation. The project has addressed this risk by establishing the Project Steering Committee (PSC), thereby seeking to facilitate active cooperation and coordination between the key stakeholders of the project.

The following are the main risks and mitigation measures for investors/financiers that may be involved in establishment of the ESCO and implementation of the energy efficiency investment program.

Technical risk, or the risk of actual energy savings being lower than expected. It is mitigated by the high level of expertise and conservative approach used in prepared technical estimates, as well as by independent technical review of the pre-feasibility study estimates. Besides, the private investor of

the ESCO will be selected to have substantial experience in energy efficiency, which will reduce technical risks to acceptable level.

Implementation risk, or the risk that the project will not be fully implemented even though necessary resources will have been engaged. This may happen if implementation costs will prove to be higher than expected. This risk is mitigated by accurate cost estimates based on the latest quotations from suppliers and by 10% contingency added to cost estimates in the pre-feasibility study. ESCO's own experience is also a significant risk mitigation factor. Besides demonstration project implementation will further reduce this risk by verifying the estimates and allowing necessary adjustment of the full-scale program.

Credit risk is connected with the client's ability or willingness to meet its obligations on EPCs. To mitigate this risk, ESCO can introduce sufficient securities into each EPC. As a risk mitigation factor, municipal/regional authorities will make necessary commitments, such as keeping tariffs unchanged during investment amortization period, ensuring full and timely payments on heat bills of budgetary institutions and subsidies for residential consumers etc.

Price risk, or changes in prices for energy resources addressed by the project. This risk is mitigated by the fact that the dynamics of gas and heat prices over the project period was estimated in a conservative way. Based on its experience, the ESCO will introduce appropriate provisions into EPCs with its clients to eliminate this factor of uncertainty.

Commercial risk is connected with the overall legal situation in the country and possible disputes with clients in the course of ESCO operation. This risk is mitigated by the work to be performed during the process of setting up the ESCO when the model EPCs complying with Ukrainian situation will be developed, legal and fiscal issues will be addressed to elaborate the options for repayment guarantees, currency exchange and transfer procedures, arbitration of disputes etc.

Currency exchange risk is associated with the purchasing power of the loans denominated in a foreign currency, and hard-currency value of repayments collected in a local currency. To mitigate this risk, the ESCO will likely start with shorter-payback EPCs; may try to stipulate hard currency repayments in EPCs (which is difficult) or introduce additional margin into the cost of its services.

Political risk is connected with political changes at the state or municipal level that may adversely impact operational environment for the ESCO. For possible investors/financiers this risk will be substantially mitigated by IFI's participation in the project because of its political influence.

F. PRIOR OBLIGATIONS AND PREREQUISITES:

a) Prior Obligations

Ukraine ratified the UN Framework Convention on Climate Change on 29 October, 1996. As a party to the Convention, the Government of Ukraine has committed to formulate, implement, publish and regularly update national and where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and measures to facilitate adequate adaptation of climate change.

b) Prerequisites

The Project Document will be signed by the representatives of the Government of Ukraine and the UNDP. Assistance for the project will be provided only if the prerequisites stipulated in the project document have been fulfilled or are likely to be fulfilled. When anticipated fulfillment of one or more prerequisites fails to materialize, UNDP may, at its discretion, either suspend or terminate its assistance. Main prerequisites related to the local project support are:

- 1) Cost-sharing as described in Section D (Inputs).
- 2) Materials developed under EBRD/TACIS UkrEsco effort (model energy performance contracts, trade credit, leasing, collateral agreements etc.) are made available to the UNDP/GEF project implementing agency to adapt them to Rivne ESCO situation and, in this way, reduce ESCO start up time. The SCEC was a beneficiary of the support provided by EBRD/TACIS, and as an executing agency for the proposed UNDP/GEF will also ensure that there is no duplication of effort.

G. MONITORING AND EVALUATION

Monitoring and evaluation activities follow the guidelines contained in the UNDP/GEF Information Kit on Monitoring and Evaluation and will include:

- a) Fulfillment of the standard UNDP/GEF procedures during the project cycle (Annual Project Report, Tripartite Review, Project Implementation Review, Mid-term and Final evaluations, Terminal Report and Audit).
- b) Measurement and verification of energy savings and emissions reduction from demonstration project and preparation of technical report on demonstration project results. The technical report will present actual achieved energy savings and emissions reduction figures determined using the International Performance Measurement and Verification Protocol developed by the U.S. Department of Energy for energy efficiency projects.
- c) Preparation of working designs for efficiency measures.
- d) Monitoring to track the achievement of expected results during setting up of the ESCO, arrangement of financing, operation of the ESCO.
- e) Monitoring the progress in full-scale implementation of the municipal energy efficiency program.
- f) Collection of regular feedback from project stakeholders and all interested parties through workshops, meetings, and questionnaires.
- g) Preparation and submission of regular progress reports that will include the feedback collected from project stakeholders together with indicators reflecting the overall performance of the project and each of its components.
- h) Supervision of project progress through regular meetings of the PSC.

Overall responsibility for monitoring and evaluation tasks will be assumed by the national executing agency assisted by UNDP. The Project Manager will prepare regular reports on the progress of the project and its constituting activities and submit the reports to the UNDP Country Office and the national executing agency. Establishing a monitoring, evaluation and feedback mechanism for the project components will be the task of the Monitoring and Evaluation Specialist (see Annex 5 for the terms of reference) and will be developed in parallel with the start up of the project. Updated information about the intermediate and final results of the project, as well as its overall progress, will be disseminated to relevant stakeholders through a number of channels, including a project homepage to be established on the internet.

The project will be subject to tripartite review once every 12 months, the first such meeting to be held within the first 12 months of the start of the Stage 1 implementation. The project manager, in consultation with the UNDP program officer in Kiev, shall prepare and submit to each tripartite review meeting an Annual Project Report. A Project Terminal Report will be prepared for consideration at the terminal tripartite review meeting. It shall be prepared in draft sufficiently in advance to allow review and technical clearance by the executing agency at least four months prior to the terminal tripartite review. The Government will provide UNDP with certified periodic financial statements relating to the status of UNDP/GEF funds, including an annual audit of these financial statements according to the UNDP procedures. Project objectives, activities outputs and emerging issues will be regularly reviewed and evaluated by the competent bodies of the executing and implementing agencies (including UNDP/GEF).

The annual review will focus on performance (effectiveness, efficiency and timeliness) and evaluate the results in applying the defined progress indicators. At the Steering Group Meeting, the Project will

submit and present an APR (Annual Project/Programme Report) in line with UNDP requirements and also participate in the GEF's PIR (Project Implementation Review) exercise each year.

H. LEGAL CONTEXT

The project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of Ukraine and UNDP, signed in 1993 (see Annex 6). The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

The following types of revisions may be made to this project document with the signature of the UNDP 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 rearrangement of inputs agreed to or by cost increases due to inflation; and
- c) Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility.

ANNEX 1. WORK PLAN¹

Output/Activity	Responsibility ²	Schedule (months by two years of the project)																							
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Output 1.1. Municipal ESCO is established Activities:																									
.1.1. Analyze district heating financing activities in the EE/NIS region	IA	XX	XX	XX																					
.1.2. Analyze legal and fiscal issues of ESCO operation and develop possible local regulatory changes for improvement of ESCO business environment	IA		XX	XX	XX	XX	XX	XX																	
.1.3. Negotiate the details of municipal ESCO establishment with local project stakeholders	IA/ MUN			XX	XX	XX	XX	XX	XX																
.1.4. Prepare supporting materials for ESCO operation (model energy performance contract, other legal documents, operational procedures and draft founding documents)	IA			XX	XX	XX	XX	XX	XX	XX															
Output 1.2. 1.2. Municipal ESCO developed as a self-sustaining entity																									
.2.1. Develop capacity of the local staff, including on energy audits	IA/ MUN			XX	XX	XX	XX	XX	XX	XX	XX														

The tentative work plan for the Stage 1 of the project is to be finalized by the Project Manager within the first 5 months after beginning of the Stage 1. EA=Executing Agency, IA=Implementing Agency, PM=Project Manager, MUN=Municipality, DHC=District Heating Company

Output/Activity	Responsibility ²	Schedule (months by two years of the project)																							
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
.2.2. Develop and formulate local commitments for attracting external investors, and study options for increased internal financing	IA/ MUN				XX	XX	XX	XX	XX	XX	XX														
.2.3. Prepare and distribute to possible investors/financiers project description materials and requests for participation	IA/ MUN		XX	XX	XX	XX																			
.2.4. Develop a full-scale feasibility study and prepare supporting materials for loan/equity approval process	IA			XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX									
.2.5. Conduct negotiations, select investors/financiers, develop and sign ESCO financial agreements	IA/ MUN						XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX							
Output 2.1. Demonstration project implemented Activities:																									
.1.1. Prepare working designs for energy efficiency measures	IA/ DHC		XX	XX	XX	XX	XX	XX	XX																
.1.2. Mobilize and organize participating officials and beneficiary communities to undertake demonstration schemes	IA/ MUN				XX	XX	XX	XX	XX	XX	XX	XX													
.1.3. Support with procurement of energy efficient equipment and installation services	IA/ DHC					XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX					
.1.4. Develop billing and accounting system or shifting to consumption-based billing	IA/ DHC					XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX									

Output/Activity	Responsibility ²	Schedule (months by two years of the project)																							
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
..1.5. Develop and undertake energy performance contracts for the demonstration project facilities	IA/ESCO					XX	XX	XX	XX	XX	XX														
..1.6. Implement demonstration schemes, covering heat supply system as well as public and residential facilities	IA/ESCO										XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	X X	XX	XX	XX
Output 2.2. Capacity or optimization of the integrated district heating system financing is strengthened activities:																									
..2.1. Prepare capacity development plan for the municipalities	IA/EA							XX	XX	XX	XX														
..2.2. Make the materials prepared for setting up of the Rivne ESCO widely accessible	IA/EA							XX	XX	XX	XX	XX													
..2.3. Provide consultations to municipalities and district heating companies	IA								XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	X X	XX	XX	XX
..2.4. Mobilize and organize beneficiary communities to plan, manage and implement energy efficiency initiatives	IA/MUN											XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	X X	XX	XX	XX
Output 2.3. Project experience documented and disseminated for replication activities:																									
..3.1. Document district heating experience and release or key target audiences	IA				XX	XX	XX	XX	XX	XX															

Output/Activity	Responsibility ²	Schedule (months by two years of the project)																							
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
..3.2. Create the project web site and disseminate information about the project through the internet and mass media	IA/EA							XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
..3.3. Conduct seminars and workshops to provide targeted training for municipalities and district eating companies	IA/EA										XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

ANNEX 2. BUDGETS

United Nations Development Programme
UKR/01/G31 - ENERGY EFFICIENCY (RIVNE)
Budget " A "

Main Source of Funds: 1G - Global Environment Trust Fund
Executing Agency: SCEC - State Committee for Energy Conservation

Sbln	Description	Implementing	Funding	Total	2001	2002	2003
10	PERSONNEL						
11	International Consultants						
11.51	International Experts	SCEC	Net Amount	30 000		15 000	15 000
			W/M	2	0	1	1
			Total	30 000		15 000	15 000
11.99	Line Total	-----	Net Amount	30 000		15 000	15 000
			W/M	2	0	1	1
			Total	30 000		15 000	15 000
13	Administrative Support						
13.01	Administrative Assistant	SCEC	Net Amount	8 400		4 200	4 200
			W/M	24	0	12	12
			Total	8 400		4 200	4 200
13.02	Administrative Assistant Rivne	SCEC	Net Amount	8 400		4 200	4 200
			W/M	124	0	12	112
			Total	8 400		4 200	4 200
13.99	Line Total	-----	Net Amount	16 800		8 400	8 400
			W/M	148	0	24	124
			Total	16 800		8 400	8 400
15	Monitoring and Evaluation						
15.01	Duty travel (in-country)	SCEC	Net Amount	9 900		5 000	4 900
			Total	9 900		5 000	4 900
15.02	Duty Travel (UNDP)	UNDP	Net Amount	7 000		3 500	3 500
			Total	7 000		3 500	3 500
15.99	Line Total	-----	Net Amount	16 900		8 500	8 400
			Total	16 900		8 500	8 400
16	Mission Costs						
16.01	Mission Costs	SCEC	Net Amount	5 000		2 500	2 500
			Total	5 000		2 500	2 500
16.99	Line Total	-----	Net Amount	5 000		2 500	2 500
			Total	5 000		2 500	2 500
17	National Consultants						
17.01	Project Manager	SCEC	Net Amount	28 800		14 400	14 400

			W/M	24	0	12	12
			Total	28 800		14 400	14 400
17.02	Rivne Local PM	SCEC	Net Amount	24 000		12 000	12 000
			W/M	24	0	12	12
			Total	24 000		12 000	12 000
17.03	Demonstration Project Manager	SCEC	Net Amount	24 000		12 000	12 000
			W/M	24	0	12	12
			Total	24 000		12 000	12 000
17.99	Line Total	-----	Net Amount	76 800		38 400	38 400
			W/M	72	0	36	36
			Total	76 800		38 400	38 400
19	PROJECT PERSONNEL TOTAL	-----	Net Amount	145 500		72 800	72 700
			W/M	222	0	61	161
			Total	145 500		72 800	72 700
20	CONTRACTS						
21	Contract A						
21.01	Technical support and Training	SCEC	Net Amount	80 000		40 000	40 000
			Total	80 000		40 000	40 000
21.99	Line Total	-----	Net Amount	80 000		40 000	40 000
			Total	80 000		40 000	40 000
22	Contract B						
22.01	Feasibility Study, ESCO	SCEC	Net Amount	388 000		230 000	158 000
			Total	388 000		230 000	158 000
22.02	Demonstration Scheme	SCEC	Net Amount	396 500		264 500	132 000
			Total	396 500		264 500	132 000
22.03	Monitoring and Evaluation	UNDP	Net Amount	40 000		20 000	20 000
			Total	40 000		20 000	20 000
22.04	Technical Verification	SCEC	Net Amount	60 000		30 000	30 000
			Total	60 000		30 000	30 000
22.99	Line Total	-----	Net Amount	884 500		544 500	340 000
			Total	884 500		544 500	340 000
29	SUBCONTRACTS TOTAL	-----	Net Amount	964 500		584 500	380 000
			Total	964 500		584 500	380 000
30	TRAINING						
32	Other Training						
32.01	Project Inception Workshop	SCEC	Net Amount	3 000		3 000	
			Total	3 000		3 000	
32.02	Final Workshop	SCEC	Net Amount	5 000			5 000
			Total	5 000			5 000
32.03	Training Workshops	SCEC	Net Amount	71 000		44 000	27 000
			Total	71 000		44 000	27 000

32.04	Study tour	SCEC	Net Amount	36 000	18 000	18 000
			Total	36 000	18 000	18 000
32.99	Line Total	-----	Net Amount	115 000	65 000	50 000
			Total	115 000	65 000	50 000
39	TRAINING TOTAL	-----	Net Amount	115 000	65 000	50 000
			Total	115 000	65 000	50 000
40	EQUIPMENT					
45	Equipment					
45.01	Expendable Equipment	SCEC	Net Amount	37 000	24 000	13 000
			Total	37 000	24 000	13 000
45.02	Non-expendable Equipment	SCEC	Net Amount	548 000	368 000	180 000
			Total	548 000	368 000	180 000
45.03	Office Operation & Maint Kiev	SCEC	Net Amount	5 000	2 500	2 500
			Total	5 000	2 500	2 500
45.04	Office Operation & Maint Rivne	SCEC	Net Amount	5 000	2 500	2 500
			Total	5 000	2 500	2 500
45.99	Line Total	-----	Net Amount	595 000	397 000	198 000
			Total	595 000	397 000	198 000
49	EQUIPMENT TOTAL	-----	Net Amount	595 000	397 000	198 000
			Total	595 000	397 000	198 000
50	MISCELLANEOUS					
52	Reporting Costs					
52.01	Reporting Costs	SCEC	Net Amount	10 000	5 000	5 000
			Total	10 000	5 000	5 000
52.99	Line Total	-----	Net Amount	10 000	5 000	5 000
			Total	10 000	5 000	5 000
53	Sundries					
53.01	Sundries	SCEC	Net Amount	10 000	5 000	5 000
			Total	10 000	5 000	5 000
53.99	Line Total	-----	Net Amount	10 000	5 000	5 000
			Total	10 000	5 000	5 000
59	MISCELLANEOUS TOTAL	-----	Net Amount	20 000	10 000	10 000
			Total	20 000	10 000	10 000
99	BUDGET TOTAL	-----	Net Amount	1 840 000	0	1 129 300
			W/M	222	0	61
			Total	1 840 000	0	1 129 300

Table 2. Stage 1 project budget by sources and components, US\$.

Component	UNDP/ GEF	Other				Total
		City	RDHC	SCEC	External Investors	
Rivne ESCO Establishment	640 000	25 000	25 000	0	50 000	740 000
Demonstration Project	900 000	40 000	80 000	80 000	0	1 100 000
Info. Dissemination/Replication	130 000	0	0	0	0	130 000
Monitoring and Evaluation	170 000	5 000	10 000	0	0	185 000
Total Stage I	1 840 000	70 000	115 000	80 000	50 000	2 155 000

Table 3. Consolidated project budget (Stage 1 and 2) by sources and components, US\$1000

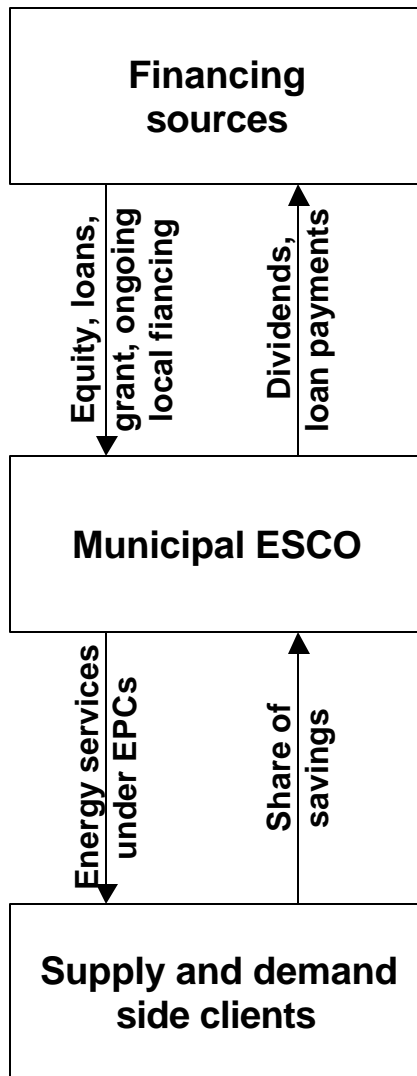
Sources of Financing	Project Components				
	ESCO Establishment	Investment Program	Replication	Monitoring and Evaluation	TOTAL
UNDP/GEF	640	4 000	334	360	5 334
City	25	1 600		25	1 650
RDHC	25	1 700		25	1 750
Region		400			400
SCEC		80	20		100
Private investor	30	2 400			2 430
Foreign banks	20	4 800			4 820
Local banks		2 020			2 020
IFI		7 000			7 000
Total	740	24 000	354	410	25 504

Table 4. Investment component by types and sources of financing, US\$1000

Sources of Financing	Types of Financing				
	Grant	ESCO Equity	Debt Financing	Ongoing Local Financing	TOTAL
UNDP/GEF	4 000				4 000
City		400		1 200	1 600
RDHC		400		1 300	1 700
Region		400			400
SCEC				80	80

Private investor		2 400			2 400
Foreign banks			4 800		4 800
Local banks			2 020		2 020
IFI		400	6 600		7 000
Total	4 000	4 000	13 500	2 500	24 000

ANNEX 3. RIVNE ESCO FINANCING AND OPERATION SCHEME



Financing sources:

- Municipality (equity, ongoing financing)
- Regional government (equity, ongoing financing)
- District heating company (equity, ongoing financing)
- State budget (ongoing financing)
- GEF (grant)
- Private investor(s) (equity)
- IFIs (equity, loan)
- Foreign banks (loan)
- Local banks (loan)

ESCO: Municipal company with private sector and international financial institution investments

Clients:

- District heating company (boiler plants, networks, substations)
- Municipal, regional and state budgetary institutions (public buildings)
- Municipality (residential buildings)
- Housing cooperatives and condominiums (residential buildings)

ANNEX 4. INVESTMENT DETAILS

Suggested program of measures to improve energy efficiency was determined in the pre-feasibility study during PDF Block B phase. It includes a typical fragment of the heat supply system and its users, targeted for demonstration implementation, and a city-wide program extrapolated from detailed estimates of demonstration fragment.

Demonstration project.

The demonstration project will include a typical medium-sized boiler plant (partial modernization) and a part of its heat transportation network and consumers. The physical scope of the project (as described in the pre-feasibility study developed under PDFB phase) is determined by the requirement of achieving tangible effects in the form of reduced fuel consumption when the heat consumption in buildings decreases. Technical measures are representative of the city-wide program; estimates of their financial and environmental performance are presented in the following table.

Energy saving measures	Costs, \$1000	Annual average benefits, \$1000	Simple pay-back period, years	Discounted pay-back period, years	NPV, \$1000	IRR, %	Gas savings, million m ³	Reduction of CO ₂ emissions, 1000 tons	Specific costs, \$ / ton CO ₂
1. HEAT SOURCES									
1.1. New boiler installation	112.0	24.7	4.8	6.9	90.3	21.0	5.4	10.7	10.4
1.2. Retrofitting of two existing boilers	60.4	25.0	2.6	3.6	138.0	45.0	5.8	11.8	5.1
1.3. Whole-plant efficiency measures	87.2	32.0	3.0	4.2	164.0	36.0	7.1	15.1	5.8
1.4. Dispatch management system	57.2	10.3	5.6	8.5	31.4	16.2	2.9	5.4	10.5
SUB-TOTAL FOR HEAT SOURCES	317.0	92.0	3.7	5.2	424.0	28.6	21.2	43.0	7.4
2. HEAT TRANSPORTATION SYSTEM									
2.1. Replacement of pipes	501.6	72.0	7.0	10.8	144.0	13.0	15.8	29.8	16.8
2.2. Modernization of group heat substations	46.6	9.7	4.8	6.9	38.0	21.0	2.8	5.2	9.0
TOTAL FOR DH SYSTEM (1+2)	865.0	166.3	5.2	7.3	606.0	20.0	39.8	78.0	11.1
3. BUILDINGS									
Building-level heat metering	43.8								
Heating system controls	17.3	7.0	2.5	3.5	42.0	46.5	2.0	3.7	4.7
Apartment-level hot water metering	73.9	17.1	4.3	5.3	78.0	27.1	3.3	6.2	12.0
Insulation of pipes	21.2	10.4	2.0	2.3	69.0	77.0	3.0	5.6	3.8
Radiator reflectors	10.0	2.1	4.7	6.2	9.0	23.5	0.6	1.1	8.8
TOTAL FOR BUILDINGS	170.6	36.6	4.7	6.1	154.0	23.6	8.9	16.6	10.3
TOTAL	1035.0	211.0	5.1	7.1	760.0	20.2	48.7	94.5	11.0

In addition to technical measures, the demonstration project will include shifting to a consumption-based billing system and developing the necessary billing software, as well as introducing regulatory changes to stimulate energy saving, including the adjustment of subsidies allocation system. The total cost of the demonstration project is estimated at about \$1.1 million, with \$0.9 million provided by the UNDP/GEF.

City-wide investment program details.

Energy efficiency measures proposed for the district heating system and its users consist of the following:

- *Supply-side measures for large and medium-size boiler plants:* Retrofitting the existing boilers (making the boiler furnace and gas ducts air-tight; installing high-quality insulation over the boiler surfaces, fittings and heat pipes; improving the air distribution system of the burners; installing modern burners; reconstructing convective shafts and convective surfaces; heat recovery from exhaust gases; re-circulation of exhaust gases; installing automatic controls for combustion processes; installing variable speed drives on boiler fans and ventilators); replacement of boilers (together with installing re-circulation of exhaust gases); measures for the boiler plants as a whole (automated water treatment; anticorrosive make-up water treatment; automatic control of the technological processes at the boiler plant; variable speed drives on circulating pumps; information system for the operation of the boiler plant); and a heating region dispatch management system with a commercial metering subsystem.
- *Supply-side measures for small boiler plants:* Replacing the boilers and heat recovery from exhaust gases; automating the water treatment and information systems for boiler plant operation.
- *Supply-side measures for the heat transportation system (transmission/distribution pipelines and heat substations):* Replacing transmission and distribution pipelines with pre-insulated pipes; retrofitting part of the existing group substations (installing modern heat exchangers, controls, etc.; creating an information system for group substation operation); decentralizing the hot water supply by eliminating part of the group substations and installing individual building-level substations.
- *Demand-side measures:* installing commercial metering of heat consumption; heating system controls; hot water apartment-level metering; heat insulation of pipes; installation of radiator reflectors.

In evaluating financial returns from the investment program, achievable energy and cost savings were estimated on a conservative basis; cost estimates were based on current quotations of suppliers and include 10% contingency. The following assumptions were used in cash flow analysis: 10% nominal discount rate; 5-year investment period; period of analysis -- 20 years; gas price (practically only fuel consumed by the heat supply system) -- \$47 per 1000 m³ in the year 2002 with annual growth rate at 4.5%; electricity price at \$0.04 per kWh with 3.5% annual growth rate.

The energy efficiency investment program has the following economic parameters:

Objects	Cost, \$million (nominal)	Annual average benefits, \$million	Simple payback period, years	Discounted payback period, years	NPV, \$million	IRR, %
District heating system, including:	19.4	3.4	6.0	10.0	12.9	19.6
Boiler plants	5.7	1.4	4.5	7.5	6.7	28.5
Transmission/distribution networks	12.1	1.7	7.4	12.4	4.7	14.8
Group heat substations	0.6	0.2	3.8	6.8	0.9	33.8
Individual heat substations	1.0	0.2	6.3	9.2	0.6	19.0
Buildings	4.3	0.6	6.6	10.9	2.3	18.2
TOTAL	23.7	4.0	6.1	10.1	15.3	19.4

An analysis of the environmental impact of efficiency measures was made based on IPCC methodology. The main results concerning greenhouse gas emissions reduction are the following:

Objects	Gas savings, million m ³	CO ₂ emissions reduction, 1000 tons	Specific cost, US\$ / ton CO ₂ (nominal)
District heating system, including:	827	1 607	12.1
Boiler plants	367	741	7.7
Transmission/distribution networks	362	685	17.7
Group heat substations	49	91	6.3
Individual heat substations	49	90	10.9
Buildings	207	384	11.2
TOTAL	1 034	1 991	11.9

The emissions reduction depicted is almost totally due to reduced gas consumption. Emissions reductions due to electricity savings account for less than 4% of the total and are calculated based on the average emission factors for power production in Ukraine.

The UNDP/GEF funding (\$4 million) under the investment program will finance the major part of demonstration project implementation and also the implementation of longer-payback measures (like pipe replacement and measures in buildings), less economically attractive and more risky for private investors. These measures may also receive the majority of financing provided by local stakeholders. This approach will help to reduce the risks and ensure involvement of private financing in the project.

ANNEX 5. TERMS OF REFERENCE

Project Manager (Kyiv)

Principal Responsibilities:

Under the responsibility of the National Project Director (see Section F for details of implementation arrangements) the Project Manager has the following principal responsibilities:

1. Define major strategy issues for the project design and participate in its detailed development in collaboration with concerned managers and assisting experts, including the preparation of the terms of reference of consultants, national experts and subcontractors recruited under the project, forward planning of project activities and budget expenditures, activity scheduling, and reporting.
2. Supervise the day to day management of the project and the project staff, including administration of the project according to UNDP procedures, accounting for the project, technical management of the project, and the timeliness of project implementation.
3. Support operation of the Project Implementation Office in Rivne
4. Ensure full compliance of project activities with all financial and technical rules, regulations and procedures relevant for the project implementation (both UNDP and national).
5. Supervise all project financial operations and budget expenditures and provide, in accordance with the standard UNDP rules and procedures and any additional requirements specified by the national executing agency and UNDP office in the project agreement with the national implementing agency.
6. Assist in the selection of consultants and short term experts recruited under the project, in full accordance with relevant Ukrainian and UNDP rules, regulations, and procedures.
7. Participate in selection staff (both project staff and other relevant staff of participating organizations) for local and/or overseas training.
8. Solve ongoing project strategy and policy issues and present the project at any high-level meetings with Ukrainian and foreign governmental organizations, international institutions and investors/financiers.
9. Ensure liaison with the Project Steering Committee and UNDP office, and ensure that the decisions and recommendations of the Project Steering Committee, and the opinions of the UNDP, are fully incorporated within the scope of the project implementation.
10. Ensure full liaison with the GEF Operational Focal Point at the Ministry of Ecology and Natural Resources.

Duration: The appointment of the project manager will be for the full duration of the project.

Qualifications and experience:

- masters degree in engineering or economics;
- minimum of 10 years of professional experience;
- experience with the design and implementation of energy efficiency programmes and projects;
- extensive experience of cooperation with Ukrainian and foreign governmental organizations and international financial institutions;
- extensive experience with project management and a demonstrated ability to manage complex technical assistance projects;
- good interpersonal skills;
- PC skills;

- English language knowledge.

Reporting requirements:

The Project Manager should submit quarterly reports to the National Project Director. These reports should indicate the progress achieved in the implementation of the project over the reporting period, and highlight any problems encountered or foreseen, and the proposed solutions to these problems. Deviations from the foreseen timetable for implementation should also be reported.

The members of the Steering Committee may also be provided with copies of the quarterly progress reports of the project manager for information (at the discretion of the National Project Director).

Administrative Assistant (Kyiv)**Principal Responsibilities:**

Under the supervision of the Project Manager, the Administrative Assistant will perform a variety of information collecting, monitoring, technical and administrative services in support of project activities. The project assistant will be responsible for the following duties:

1. Assist in maintaining close contacts with the government, executing agency, project partners, and other counterparts through direct contacts, collection and summarizing of information, proposals, incoming and outgoing documents, drafting letters, organizing meetings etc.
2. Provide operational support in project activities.
3. Supervise collecting the data and other information for project activities; maintaining, logging, filing and updating records in prescribed format for subsequent use.
4. Contribute to the preparation of status and progress reports by providing information, preparing tables and drafting selected sections of it. Prepare background material for use in discussions and briefing sessions.
5. Assist in monitoring project activities by reviewing a variety of records, including correspondence, reports, project inputs, budgets and financial expenditures in accordance with UNDP requirements. Prepare and file correspondence and materials relevant to the above.
6. Assist in preparation of terms of reference for subcontractors and consultants.
7. Assist in the organization of and logistical preparation for workshops, seminars, presentations, visiting missions, field trips, etc.

Duration: The appointment of the Administrative Assistant will be for the full duration of the project.

Qualifications and experience:

- higher education in energy, environmental management or other field relevant to the project;
- 5 years experience of organizational and administrative work preferably connected with environmental issues;
- experience in coordinating the work of expert groups for the achievement of strategic goals;
- computer skills;
- good command of Ukrainian, Russian and English.

Local Project Manager (Rivne)

Principal responsibilities:

1. The Local Project Manager will have the following responsibilities:
2. Continuously interact with the Project Manager and concerned activity managers and provide inputs to planning of project activities, scheduling and reporting.
3. Organize and supervise the work of the staff allocated by the local authorities and district heating company for implementation of project tasks.
4. Ensure liaison with the oblast administration, municipality and district heating company, and ensure that the opinions of the local project stakeholders are fully incorporated within the scope of the project implementation.
5. Assist in identifying areas of capacity development activities where international and/or national experts are required to assist in relation to information and outreach, such as facilitating the shift to consumption-based billing systems, introduction of regulatory changes to motivate energy saving, adjustment of subsidy allocations, and other regulatory changes, and prepare specifications for task requests for international and/or national experts.
6. Undertake the analysis of the information needs of the local authorities in order to identify the targets for dissemination and outreach, and, in cooperation with the Technical Coordinator and Information Specialist, prepare complete capacity development plan for the pilot city municipality.
7. The Local Project Manager should be the first point of contact for local press enquiry's, and should participate in planning a press relations strategy to ensure a wide dissemination of information concerning the objective of the project, the progress of the project, and the concrete outputs and achievements of the project.
8. Provide necessary inputs for the project monitoring and evaluation purposes, assist in collection of regular feedback from project stakeholders and all interested parties.
9. Assist in the organization of and logistical preparation for workshops, seminars, presentations, visiting missions, field trips, etc conducted in the city of Rivne.

Duration: The Local Project Manager will be recruited for the full duration of the project.

Qualifications:

- education to masters degree level;
- minimum of 5 years professional experience;
- knowledge of municipal management issues and municipal infrastructure problems;
- proven managerial and interpersonal skills;
- experience in organizing and conducting training seminars;
- experience in the field of energy efficiency would be an advantage;
- PC skills;
- knowledge of the English language.

Demonstration Project Manager (Rivne)

Principal Responsibilities:

Under the responsibility of the Local Project Manager (Rivne), the Demonstration Project Manager has the following principal responsibilities:

1. Assist in developing the detailed project design, activity scheduling, and reporting that concerns the demonstration project component.
2. Prepare the tender between design organizations for development of demonstration project designs and participate in tender commission and selection of candidates.
3. Prepare the scope of work and terms of reference for a detailed audit of the demonstration project facilities during the 2001/2002 heating season, and participate in the audit.
4. Prepare the scope of work and terms of reference for development of working designs for energy efficiency measures on demonstration objects (heat sources, networks, consumers) and for other subcontracts under demonstration project implementation.
5. Review (together with subcontractors) of the principal technical solutions (working designs' sections to be confirmed), finalize and approve them together with the ESCO and clients.
6. Together with subcontractors, review and finalize completed sections of working designs and equipment specifications.
7. Participate, together with Project Manager, in the preparation of the tender for procurement of demonstration project equipment and in the work of tender commission.
8. Develop a detailed schedule for installation of energy efficiency measures on demonstration objects (heat sources, networks, consumers).
9. Lead the author supervision of design organizations and demonstration project installation works.
10. Participate in commissioning and acceptance of demonstration project installations.
11. Assist in developing a monitoring and verification plan for demonstration project facilities; and participate in monitoring and verification activities.
12. Analyze the demonstration project performance and update the technical and economic estimates for efficiency measures.
13. Based on demonstration project results, develop necessary modifications to the city-wide energy efficiency program.

Duration: The Demonstration Project Manager will be appointed for the full duration of the project.

Qualifications and experience:

- masters degree in engineering;
- experience of energy installations design (various heat sources and district heating networks, fuel supply systems);
- minimum of 5 years of work in a design organization as a principal designer or lead specialist;
- experience with the design of experimental energy objects;
- experience of commissioning and acceptance of energy objects;
- experience of preparation of terms of reference and contracting with design organizations;
- PC skills;
- English language knowledge.

Project Implementation Office Assistant (Rivne)

Principal Responsibilities:

The Interpreter / Secretary will be responsible for the following duties:

1. Coordinate translation services, prepare unofficial translations and act as an interpreter when necessary.

2. Prepare letters, reports, and other documents.
3. Process and circulate working papers.
4. Collect data and other information for project activities.
5. Administer the filing system; maintain, log, file and update records in prescribed format for subsequent use.
6. Schedule and provide records of meetings.
7. Coordinate travel arrangements.
8. Assist in the logistical preparation for workshops, seminars, presentations, visiting missions, field trips, etc.

Duration: The appointment of the Interpreter / Secretary will be for the full duration of the project.

Qualifications and experience:

- higher education in linguistics, environmental management or other field relevant to the project;
- experience of interpreting/translating and secretarial/clerical work preferably connected with environmental issues;
- knowledge of office hardware and software (word processing, spreadsheet, and presentation programs);
- good command of Ukrainian, Russian and English.

ANNEX 6. STANDARD BASIC ASSISTANCE AGREEMENT

MEMORANDUM OF MUTUAL UNDERSTANDING BETWEEN THE GOVERNMENT OF UKRAINE AND THE UNITED NATIONS DEVELOPMENT PROGRAMME

1. Ukraine has recently been reborn as a sovereign nation, ranking among the six largest European countries in terms of population. It is facing a rather unique situation which is placing considerable and unusual demands on its people and its institutions. Compounding this complex re-birth is a process of comprehensive economic reform.
2. The Government of Ukraine has initiated a process of economic reform with the objective of stabilizing the economy, creating a favourable macro-economic environment for the introduction of market relations and bringing about a fundamental structural transformation. The achievement of economic reform will lead to the full integration of Ukraine into the global economy. Ukraine requires assistance from the international community, particularly in the form of technical assistance, for the effective realization of the transitional process.
3. The permanent mission of the United Nations was opened in Kiev in November 1992. Amongst the responsibilities of the UN Mission is the mobilisation of resources for technical assistance and their utilization, drawing upon the experience of other countries in transition in the world.
4. Bearing in mind the mandate of UNDP, the Government of Ukraine and UNDP agree on the need to establish appropriate priorities for UNDP assistance, and on the need to elaborate the principles of coordination and a general strategy for technical assistance.
5. The National Centre for the Implementation of International Technical Assistance to Ukraine will, on behalf of the Government of Ukraine, undertake the coordination of technical assistance provided by external donors, and maintain direct contact with UNDP regarding the definition of the national technical assistance strategy.
6. In accordance with the desires of the Government of Ukraine, UNDP resources will be utilized as "seed money" on a grant basis. Such funds will be used for the financing of projects in support of the reform process and will, in addition, attract funding from other external sources.
7. Technical assistance from UNDP will commence with the implementation of a comprehensive project which encompasses consultancy services, and urgent short-term training. The means of providing assistance, which is responsive and economical, includes the provision of the services of experts from the UN system. At the same time, the Government of Ukraine and UNDP agree that the implementation of technical assistance will be most effective through the cooperation of foreign with Ukrainian experts in all spheres of activity.
8. The general emphasis of technical assistance provided by UNDP, procedural aspects and implementation, shall, in their entirety, correspond to the needs of Ukraine in support of reform and the rebirth of the independent state. Activities of UNDP, through the UN Mission, shall play an essential role in cooperation between Ukraine and the UN during the period of transition to a market economy.

Done in Kiev on 3 May 1993.

For the Government
of Ukraine



For the United Nations
Development Programme

ANNEX 7. PROJECT PLANNING MATRIX

Goals/Purposes	Verification	Sources of Verification	Assumptions
Goal			
Mitigate existing barriers to implementation of integrated approach to supply and demand side energy efficiency improvements to district heating systems in Ukraine, thereby reducing associated greenhouse gas emissions.	<p>CO₂ emissions are reduced by more than 90,000 tons as a result of the demonstration project.</p> <p>Cumulative natural gas consumption at demonstration project facilities is reduced by at least 45 million m³.</p>	<p>Demonstration project technical report.</p> <p>Yearly reports of the Rivne ESCO and DH company.</p>	
Purpose			
1. Strengthen local institutional capacity in the city of Rivne for identifying, preparing and implementing supply and demand side energy efficiency projects in the district heating system.	<p>By the end of the month 4 of the project, a prototype municipal ESCO office is established in partnership with the local authorities.</p> <p>Analysis of the business environment performed and necessary materials for pilot municipal ESCO establishment and operation prepared by the end of the month 7 of the project.</p> <p>By end of this pilot phase, a sustainable municipal ESCO is fully functional based on cost-recovery from its services and investments from the government, local authority and private sector.</p>	Project progress reports and yearly reports of Rivne ESCO.	<p>Positive trends in local business environment continue.</p> <p>Current trends in the Ukrainian investment climate and exchange rate continue.</p>

<p>2. Develop viable approaches to sustainable energy saving or efficiency through demonstration schemes in the pilot city for wider replication in Ukraine.</p>	<p>Demonstration project is implemented and energy efficiency measures are undertaken.</p> <p>Regular investments made by the municipality for energy development and saving initiatives are fully incorporated into the project initiatives during the first year.</p> <p>All beneficiary households in the selected residential areas fully participate in implementing energy saving initiatives.</p> <p>Beneficiary communities and the municipality experience savings in cost by the end of this project.</p> <p>Demand for replication of the demonstration schemes in other municipalities significantly increases by the end of this project.</p>	<p>Demonstration project technical report.</p> <p>Project reports.</p> <p>Yearly reports of Rivne ESCO.</p>	<p>Progress in management of DH systems continues.</p> <p>Positive trends in local business environment continue.</p>
Results:			
<p>1.1. Municipal ESCO is established.</p>	<p>Supporting materials for the ESCO operation are developed.</p> <p>A municipal ESCO is created by the end of the first year of the project, including the ESCO charter and registration.</p>	<p>Model energy performance contract and other project materials.</p> <p>Project reports.</p>	<p>Positive trends in local business environment continue.</p>

<p>1.2. Municipal ESCO developed as a self-sustaining entity.</p>	<p>ESCO staff is trained and energy audit equipment procured.</p> <p>Local commitments are confirmed.</p> <p>Full-scale feasibility study for city-wide energy efficiency program is developed.</p> <p>Negotiations are conducted and ESCO financial agreements reached.</p> <p>Total amount of investments obtained for implementation of city-wide energy efficiency program.</p>	<p>Project reports.</p> <p>Feasibility study report.</p>	<p>Current trends in the Ukrainian investment climate and exchange rate continue.</p>
<p>2.1. District heating supply and demand side measures on demonstration project facilities are implemented and consumption-based billing system for demonstration buildings introduced.</p>	<p>Local investments for energy development and saving initiatives are fully incorporated into the project.</p> <p>Energy efficiency measures under demonstration project are implemented.</p> <p>Energy performance contracts for demonstration project are signed.</p>	<p>Contracts and project progress reports.</p> <p>Demonstration project technical report.</p>	<p>Positive trends in local business environment continue.</p>
<p>2.2. Capacity for optimization of the integrated district heating system financing is strengthened.</p>	<p>Project materials are prepared for dissemination.</p> <p>Lessons learned are documented and made available to investors and Government.</p> <p>Beneficiary households in the selected residential areas and the municipality fully participate in implementing energy saving initiatives and experience savings in cost by the end of this project.</p> <p>Consultations to municipalities and district heating companies are provided.</p>	<p>Project reports.</p> <p>Demonstration project technical report.</p>	<p>Progress in management of DH systems continues.</p>

<p>2.3. Project experience, including implementation processes, documented and disseminated for replication.</p>	<p>By the end of the project at least 2 additional contracts for the Rivne ESCO at the local and/or regional level are signed.</p> <p>Project is mentioned in the media at least 2 times/year.</p> <p>Project website is created.</p> <p>Project workshops are conducted.</p>	<p>Contracts and project reports.</p>	<p>Progress in management of DH systems continues.</p>
--	---	---------------------------------------	--

Activities:

- 1.1.1. Compile the results and analysis of work to date conducted in the EE/NIS region on district heating financing.
- 1.1.2. Perform necessary analysis of legal and fiscal issues regarding ESCO operation in the country, develop possible local regulatory changes for improvement of ESCO business environment, and determine the ESCO operational setup.
- 1.1.3. Negotiate the details of municipal ESCO establishment with local project stakeholders (municipality, regional government, district heating company).
- 1.1.4. Prepare supporting materials for ESCO operation, including model energy performance contract, other legal documents, operational procedures and draft founding documents.
- 1.2.1. Develop capacity of the local staff, including on energy audits.
- 1.2.2. Develop and formulate necessary commitments to be made by the local stakeholders for attracting external investors, and study options for increased internal financing.
- 1.2.3. Prepare and distribute to possible investors/financiers project description materials and requests for participation.
- 1.2.4. Develop a full-scale feasibility study and prepare supporting materials for loan/equity approval process.
- 1.2.5. Conduct negotiations, select investors/financiers, develop and sign ESCO financial agreements.

- 2.1.1. Prepare working designs and plan for energy efficiency measures.
- 2.1.2. Mobilize and organize participating officials of public facilities and beneficiary communities of residential areas to undertake demonstration schemes.
- 2.1.3. Support with energy efficient equipment and installation services.
- 2.1.4. Develop billing and accounting system, including software, for shifting to consumption-based billing.
- 2.1.5. Implement demonstration schemes, covering distribution system as well as public and residential facilities.
- 2.1.6. Develop and undertake energy performance contracts for the demonstration project facilities.
- 2.2.1. Prepare capacity development plan for the municipalities to facilitate the shift to consumption-based billing systems, introduction of regulatory changes to motivate energy saving, adjustment of subsidy allocations, and other regulatory changes.
- 2.2.2. Making the materials prepared for setting up of the Rivne ESCO widely accessible (including the model ESCO charter and foundation agreement, the model energy performance contract, the analysis of legal and fiscal issues, the local commitments necessary to attract investors, etc.).
- 2.2.3. Provide consultations to municipalities and district heating companies regarding technical solutions, energy saving and emissions reduction potential for supply and demand side energy efficiency improvements in district heating system, preparation of bankable projects, and the ESCO approach to financing energy-saving project, and policy reform issues.
- 2.2.4. Mobilize and organize beneficiary communities to plan, manage and implement energy efficiency initiatives.
- 2.3.1. Document the experience of financing district heating efficiency in the EE/NIS region and its relevance to Ukraine, and release in Ukrainian and English for key target audiences.
- 2.3.2. Create the project web site and disseminate information about the project through the internet and mass media.
- 2.3.3. Conduct seminars and workshops to provide targeted training for municipalities and district heating companies.

ANNEX 8. INCREMENTAL COSTS

The analysis of incremental costs presented below was based on the Stage I and II proposed project. Specific reference to Stage I and II is provided in the Incremental Cost Matrix at the end of this Annex.

Baseline:

In the absence of GEF support, energy efficiency in municipal district heating system and buildings will improve slowly, and many technically feasible and financially attractive opportunities will not be realized. The level of locally possible efficiency activities in the city of Rivne is determined by available financing resources envisioned in the "Municipal Comprehensive Energy Efficiency Program for the Period 1999-2010". The program was adopted by the City Council and introduced by the city mayor's decree #2574-p of December 30, 1988 in pursuance of the Cabinet of Ministers' Decrees #148 of February 5, 1997 "On the Comprehensive National Program on Energy Conservation in Ukraine" and #731 of July 10, 1997 "On Comprehensive Measures for Implementation of the National Energy Program of Ukraine until 2010".

According to the municipal program, expenditures of the city budget and district heating company during proposed investment period (2002-2006) are about \$0.45 million annually or \$2.25 million over the whole investment period. This amount presents realistic baseline investment level achievable without GEF support. Estimated potential for cost-effective investments in supply and demand side energy efficiency is about \$ 24 million. So in the absence of the GEF support, limited financial resources would allow to realize only about 9% of the cost-effective potential.

In the municipal program it is planned to use these resources for a number of projects in the district heating system and the public sector. A major part of the funding should be used to modernize the heat supply system by shutting down some inefficient boiler plants and connecting their load to more efficient plants, replace a number of obsolete boilers by more efficient ones, partially replace heat transmission pipes by pre-insulated ones, and implement some other lower-cost measures. Plans concerning the heat consumption are limited to installing heat meters and controls for a part of consumers.

Baseline activities under the other three suggested project components (setting up of the ESCO, replication measures, measurement and evaluation) are practically absent.

GEF alternative intervention:

With GEF assistance, major financial and institutional barriers in the pilot city will be reduced through establishment of the Rivne ESCO and leveraging financing for the investment program from the private sector and international financial institutions. Setting up of the ESCO will provide necessary capacity building to prepare, manage and implement suggested investment program and possible other energy efficiency projects in the region.

Under the suggested energy efficiency investment program, all technically feasible and cost-effective opportunities will be realized both in the district heating system and connected buildings. In the district heating system, retrofitting/replacement of generating capacity will be performed. Where it is cost-effective, pipes in transmission/distribution network will be replaced by pre-

insulated ones. Based on economic criteria, it is envisioned to eliminate part of group substations and replace them with modern individual substations in buildings. Modern heat supply management system will be introduced. In buildings it is planned to install heat meters and controls, apartment-level hot water meters, heat insulation of pipes and other measures. Consumption-based metering and billing will provide incentives for households and budgetary organization to take appropriate steps to improve the energy efficiency of their buildings and to start saving heat and hot water.

Implementation of the investment program will result in reducing about 2 million tons of GHG emissions in CO₂ equivalent over the project lifetime. As the investments are realized through commercially viable ESCO-mechanism, the project is sustainable and can be replicated in other Ukrainian cities.

The measures promoting project replication include preparing and making available supporting materials for setting up of ESCOs, providing necessary consultations, information dissemination, awareness raising etc. Project replication potential for communal heat supply sector in other cities makes up about 64 million tons of CO₂ equivalent.

Domestic benefits:

Project implementation provides several domestic benefits. Most essential of them are: positive economic and financial returns from investments, higher level of heat supply service and reliability of district heating system operation, lower air pollution (in particular by NO_x), creation of incentives to energy savings in public and residential sector, reduction of budgetary expenditures on residential subsidies and institutional buildings' heat bills, improvement of the qualification of district heating company personnel and its management capacity. Operating ESCO will be able to further expand its activity to the region as a whole and implement energy saving measures in industry and infrastructure sectors, thus achieving additional economic and environmental benefits. Creation of the ESCO and expansion of its activity will contribute to the development of local energy service market.

For the country as a whole, the project will help reduce the level of dependence on external gas supplies. Successful operation of the Rivne ESCO will facilitate setting up of similar ESCOs in other cities and attracting foreign private capital and experience to Ukraine. Replication of the project in other Ukrainian cities will bring additional domestic and global benefits, although these benefits cannot to be exactly quantified.

Notes on Calculating Incremental Costs:

Incremental costs were calculated for 5-year investment period (2002-2006) as a difference between the total project cost (\$25.52 million) and local baseline expenditures over the same period (\$2.26 million). In this case the incremental costs are equal \$23.26 million and does not take into account cost saving due to reduced gas, electricity and water consumption and avoided O&M and other costs. Comparison of these total incremental costs with the incremental global environmental benefits (CO₂ emissions reduction in the amount of 1.8 million tons) yields incremental specific reduction cost at the level of \$12.9 per tonne CO₂.

The cost savings (from reduced energy consumption and avoided costs) over the investment period make up \$9.58 million). If these cost savings are taken into account, incremental costs will reduce to \$13.68 million. In this case, incremental specific reduction cost will be \$7.6 per tonne CO₂.

Even with cost savings factored into the calculations, incremental costs (\$13.68 million) exceed the GEF share in the project (\$5.35 million). The difference is covered by leveraging external financing and local contribution. GEF funding provides necessary risks mitigation to attract external resources, primarily from private investors.

The municipal investment program is the only program in which net incremental costs (as calculated assuming risk-free investment conditions) would be negative. For this reason, the project must ensure that returns to the Rivne ESCO, a public-private partnership, continue to generate global benefits. During the course of Activity 1 (Establishing the Rivne ESCO), the project team will structure the model performance contract and the subsequent city-wide contract so that returns from the projects proportional to the involvement of GEF investments and equity contributions are recovered for use as equity in future municipal efficiency projects.

Table 3-1. Incremental cost matrix

Component	Benefits/ Costs	Baseline	Alternative	Increment
1. Setting up of a municipal ESCO	Global Environmental Benefits	No systematic activity to improve energy efficiency (EE) in heat supply system and buildings in residential and public sectors.	Systematic energy saving activity on municipal level to provide efficiency improvements.	Systematic energy saving activity on municipal level to provide efficiency improvements.
	Domestic Benefits	No organization specialized in implementation of EE measures both in municipal district heating system and buildings sector.	Municipal ESCO to provide implementation of EE measures both in municipal DH system and buildings sector on sustainable basis.	Municipal ESCO to provide implementation of EE measures both in municipal DH system and buildings sector on sustainable basis.
	Costs	\$0	Municipality: \$25,000 DH company: \$25,000 GEF contribution: \$640,000 Private investor: \$30,000 Foreign banks: \$20,000 Total: \$740,000	Municipality: \$25,000 DH company: \$25,000 GEF Phase I: \$640,000 Private investor: \$30,000 Foreign banks: \$20,000 Total: \$740,000
2. Whole-city investment program	Global Environmental Benefits	Slow and limited reduction of GHG emissions (0.19 million tons of GHG reduced over 20 year project period).	Significant GHG emissions reduction (1.99million tons of GHG reduced over 20 year project period). Leverage of financial resources for large-scale energy saving and emissions reduction activities.	Additional GHG emissions reduction (1.8 million tons of GHG reduced over 20 year project period). Leverage of financial resources for large-scale energy saving and emissions reduction activities.
	Domestic Benefits	Benefits correspond to a low level of energy-efficiency related investments being made.	Benefits correspond to investments facilitated through whole-city investment program. Creation of the pilot city ESCO with the prospect of expanding its activity to other energy efficiency projects in the region (including municipal infrastructure and industry)	Comprehensive retrofitting of municipal DH system. Improved heat comfort level. Consumption-based heat and hot water metering and billing in residential sector and public buildings. Creation of the pilot city ESCO with the prospect of expanding its activity to other energy efficiency projects in the region (including municipal infrastructure and

Component	Benefits/ Costs	Baseline	Alternative	Increment
				industry)
	Costs	Municipality: \$1,100,000 DH company \$1,150,000 <i>Total (over the 5 year program investment period): \$2,250,000</i>	Municipality: \$1,600,000 DH company: \$1,700,000 Region: \$400,000 Private investor: \$2,400,000 Foreign banks: \$4,800,000 Local banks: \$2,100,000 EBRD Financing: \$7,000,000 GEF Contribution: \$4,000,000 <i>Total: \$24,000,000</i>	Municipality: \$500,000 DH company: \$5500,000 Region: \$400,000 Private investor: \$2,400,000 Foreign banks: \$4,800,000 Local banks: \$2,100,000 EBRD Financing: \$7,000,000 GEF Stage I: \$900,000 GEF Stage II: \$3,100,000 <i>Total: \$21,500,000</i>
3. Project replication measures	Global Environmental Benefits	None	Reduction of GHG emission through replication of the ESCO-approach in other cities.	Reduction of GHG emission through replication of the ESCO approach in other cities.
	Domestic Benefits	Slow and spontaneous removing of the institutional and financial barriers without any supervision and sound organizational support.	Expansion of energy saving activities through information dissemination, training, specific cost-reduction measures, new financing mechanisms. Creation of ESCO infrastructure and energy service market development.	Promotion of ESCO activities in their commercial operations based on performance contracting mechanism and creation of energy saving infrastructure in Ukrainian regions.
	Costs	\$0	Government: \$20,000 GEF Contribution: \$160,000 <i>Total: \$180,000</i>	Government: \$20,000 GEF Stage I: \$130,000 GEF Stage II: \$30,000 <i>Total: \$180,000</i>
4. Monitoring and evaluation	Global Environmental Benefits	None	Monitoring and evaluation of all project components, including setting up and operation of ESCO, demonstration project, investment program and replication measures.	Monitoring and evaluation of all project components, including setting up and operation of ESCO, demonstration project, investment program and replication measures.
	Domestic Benefits	Limited monitoring and evaluation of the baseline-related activities	Investment program and project replication is monitored and	Investment program and project replication is monitored and

Component	Benefits/ Costs	Baseline	Alternative	Increment
			evaluated and thus can more reliably reach their objectives.	evaluated and thus can more reliably reach their objectives.
	Costs	Municipality: \$5,000 DH company: \$5,000 <i>Total: \$10,000</i>	Municipality: \$25,000 DH company: \$25,000 GEF Contribution: \$550,000 <i>Total: \$600,000</i>	Municipality: \$20,000 DH company: \$20,000 GEF Stage I: \$170,000 GEF Stage II: \$380,000 <i>Total: \$590,000</i>
Total	Global Environmental Benefits	Existing institutional and financial barriers make energy efficiency investments happen slowly. Limited reduction of GHG emissions (0.19 million tons of GHG reduced over 20 year project period).	Institutional and financial barriers to energy efficiency on municipal level are removed to essential degree. Significant reduction of GHG emissions (1.99 million tons of GHG reduced over 20 year project period).	Institutional and financial barrier to energy efficiency on municipa level are removed to essential degree. Significant additional decrease o GHG emissions (1.8 million tons of GHG reduced over 20 year project period).
	Domestic Benefits	Limited improvement of energy efficiency with low financial, economic and environmental benefits.	Substantial improvement of energy efficiency with considerable financial, economic and environmental benefits.	Significant additional improvement of energy efficienc with essential financial, economi and environmental benefits.
	Costs	Municipality: \$1,105,000 DH company: \$1,155,000 <i>Total: \$2,260,000</i>	Municipality: \$1,650,000 DH company: \$1,750,000 GEF Contribution: \$5,350,000 Government: \$20,000 Region: \$400,000 EBRD Financing: \$7,000,000 Private investor: \$2,430,000 Foreign banks: \$4,820,000 Local banks: \$2,100,000 <i>Total: \$25,520,000</i>	Municipality: \$545,000 DH company: \$595,000 GEF Stage I: \$1,840,000 GEF Stage II: \$3,510,000 Government: \$20,000 Region: \$400,000 EBRD Financing: \$7,000,000 Private investor: \$2,430,000 Foreign banks: \$4,820,000 Local banks: \$2,100,000 <i>Total: \$23,260,000</i>

ANNEX 9. CRITERIA FOR CONTINUATION TO STAGE II: A CHECKLIST

Overarching condition: “A sustainable municipal ESCO is fully functional based on cost recovery from its services and investments from the government, local authorities, and the private sector.”

Enabling Environment Conditions

- Software for billing/accounting by consumption of energy developed and in use for all buildings in demonstration project
- Model energy performance contract (EPC) developed and mechanism tested through pilot measures
- Legislation/regulation allowing the transfer of funds saved through energy efficiency into the municipal ESCO; i.e., cost recovery scheme developed and implemented
- Funds allocated by the municipality for energy subsidies adjusted
- Requests from at least 2 other municipalities for services (in the form of an official Letter of Interest)

Financial Institutional Conditions

- Full-scale feasibility study for Stage II investment project completed, including an analysis of the current business environment in Rivne
- Documents for equity/loan approval processes drafted
- Investment materials promoting ESCO developed and distributed to potential investors in the relevant language(s)
- Commitments by local stakeholders sufficient to attract external investors formulated
- Investors/financiers for ESCO selected
- ESCO financial agreements signed
- Successful transfer of the savings from the UNDP funds into the municipal ESCO

Other Institutional Conditions

- Pilot municipal company established
- Operational procedures of the ESCO finalized
- Terms of Partnership with the City of Rivne drafted, signed, and shown to be adhered to during the pilot project
- Supply-side and demand-side measures installed during the demonstration and verified
- Cost performance of energy efficiency measures demonstrated
- Energy savings and emission reductions verified independently
- ESCO staff trained in conducting energy audits and capable of conducting audits without external support

Note: The above criteria will be assessed during a technical and financial review of the project based on an evaluation mission by a 1-2-person international expert team at the conclusion of Stage I. In the event that an item is not achieved but does not jeopardize the sustainability of the project, the reviewer(s) will need to elaborate.