UNITED NATIONS DEVELOPMENT PROGRAM
GLOBAL ENVIRONMENT FACILITY

PROPOSAL FOR PDF BLOCK B&C GRANTS

Country: Republic of Kazakhstan

Project Title: Capacity Building to Reduce Key Barriers to Energy Efficiency in Heat and Hot Water Supply

GEF Focal Area: Climate Change

PDF Funding Requested: US $ 236,900

Cofunding: US $ 30,000 Ministry of Ecology and Natural Resources
US $ 50,000 KAZNIIEnergetic (of which $20,000 in-kind)
US $ 30,000 JSC ATKE
US $ 50,000 Almaty Power Consolidators (APC)

Duration: 12 months

Executing Agency: Ministry of Ecology and Natural Resources

GEF Implementing Agency: UNDP

Gov. Implementing Agency: Ministry of Energy, Industry and Trade, in co-operation with KAZNIIEnergetic, JSC ATKE and APC

Block B X **Block C**_____

Block A Grant Awarded: Yes

I. Summary Project Objectives and Description

The objective of the full-scale project to be developed with the PDF resources requested here is to remove barriers towards improved energy efficiency of hot water and heat supply in Kazakhstan, thereby lowering the overall fossil fuel consumption and the associated greenhouse gas emissions. By promoting measures and technologies, which are justifiable not only in environmental, but also in economic terms, the project is expected to improve also the general economic and social situation in Kazakhstan, by reducing the overall costs of heating and hot water supply to the population.

The project objectives are envisioned to be achieved by means of: (a) developing a consumption based metering and billing system; (b) evaluating and demonstrating the technical, economic and

environmental feasibility of selected energy efficiency measures on the supply and demand side; (c) strengthening the legal and regulatory framework dealing with energy efficiency; (d) building institutional capacity to implement the existing laws and regulations; (e) training to conduct energy audits and feasibility studies and to develop "bankable" energy efficiency proposals; and (f) exploring and developing suitable financing mechanisms to finance the selected energy efficiency measures.

The project will deal with the following three subject areas: 1) provision of incentives and means for reducing the consumption of heat and hot water by the end users; 2) provision of incentives and means to improve the energy efficiency and reduce the losses in production and distribution of the heat and hot water (also by further developing co-generation, if economic analysis and overall situation favors this); and 3) evaluate, develop and apply modern building codes and standards for the construction of new buildings and renovation of the old ones, paying specific attention to energy efficiency and otherwise environmentally friendly measures and practices.

The objective of this project preparatory phase is to clarify the technical, economic, environmental, financial and institutional aspects of the project, and to develop a full scale proposal for the next phase, including a "bankable" proposal and agreement on co-funding to implement selected energy efficiency measures at the first demonstration site.

II. Project Rationale and Justification

The break-up of the Soviet Union resulted in a serious economic and energy crisis in most countries of its former territory. The rapidly raising prices, major institutional changes that took place, lack of adequate funds for maintenance, and the fact that relatively little attention was paid to energy efficiency when the heat and hot water supply systems were originally designed have resulted in that many of these systems have fallen into disuse, or they are currently operating with very poor efficiency at high operating costs.

The pressing need to rehabilitate (or restructure, as feasible) the municipal heat and hot water supply systems provides a unique and timely opportunity to introduce measures and technologies that beside the technical and economic considerations take fully into account the local and global environmental aspects. The total CO2 emissions of Kazakhstan were estimated to about 200 million tons in 1990, of which the thermal power stations and "heat only" district heating boilers, together with the individual residential boilers and stoves, contributed about 65 per cent. Given the considerable overall share of the greenhouse gas emissions raising from the municipal heat and hot water supply and the remarkable potential to improve the energy efficiency of the existing system (up to 25% or more), the strategic decisions made today will have a significant impact on country's greenhouse gas emissions over the decades to come.

While the situation and problems with the heat and hot water supply in the CIS countries have many similarities; still each country is facing its specific problems and barriers that have to be dealt by each country separately. During the Soviet era, a similar concept for heat and hot water supply was basically replicated all over the vast country, without considering the very different climatic and other conditions in the different parts of it. Paradoxically, also the more recent

studies sometimes fall into the same "trap" recommending certain measures all over the region, without fully analyzing the different options based on the specific local conditions. Especially, this applies to the discussion dealing with the advantages of centralized vs. decentralized systems. A common feature of many studies has also been that very little attention (if not totally ignored) has been paid on the impact of the different measures and strategies on country's greenhouse gas emissions.

One main objective of the project is to build local capacity to analyze the different strategies, not only from the technical and economic, but also from the greenhouse gas reduction point of view. During the implementation of the project, full exchange of results and experiences between the other approved GEF projects dealing fully or partially with the same subject area in Armenia, Bulgaria, Georgia, Romania, Russia and Uzbekistan will be encouraged and facilitated. In addition, exchange of experiences and provision of training between Kazakhstan and selected OECD countries will be facilitated.

Under a PDF A grant, a workshop was organized in June 98 to discuss the project approach and to clarify the institutional arrangements of its implementation. Based on 40 invitations, over 50 people from different institutions participated in the workshop, which demonstrates the actuality of the theme and the interest of the different institutions in it. The proposal for the PDF B grant has been developed based on the conclusions of the workshop, and letters of commitments from several institutions have been received to participate and support the implementation of the project. The Ministry of Ecology and Natural Resources has also endorsed the project as a priority project to be submitted to the GEF within the framework of the National Environmental Action Plan of the Republic of Kazakhstan.

The participants of the workshop highlighted the specific importance of improving the energy efficiency of the heating sector in promoting the sustainable economic development of the country. In general, the situation was described as extremely complicated one. Practically all the cities in Kazakhstan have problems in trying to improve the energy efficiency of the system, and to provide heat and hot water to their residents at affordable costs. There are a number of barriers, which prevent any energy efficiency measures of taking place; even they would be economically feasible. Lack of financing, high banking rates of local banks, absence of consumption based heat metering and billing and the related payment problem, stiff tariff policy, and lack of information and experience in preparing feasibility studies, business plans and "bankable" energy efficiency proposals to international financing institutions were mentioned as key barriers to this effect.

At the policy level, the rules and regulations for the production and consumption of heat should be reviewed, and the capacity of the responsible authorities to implement the existing laws and regulations should be strengthened. New building norms and standards would be of great importance. A recommendation was also made to develop a specific Government program and body to support and supervise the development of the heating sector as a whole.
These and several other recommendations put forward in the workshop will be further analyzed, discussed and, as feasible, implemented during the project.

III. Description of Proposed PDF Activities

The overall project activities are envisioned to consist of several phases, whereas the first phase described in this proposal will facilitate the preparation of the proposal for the main project. The following activities have been identified as necessary to undertake this task:

1. Undertake an overall assessment of the situation in the heat and hot water supply and demand sector in Kazakhstan focusing on:

   a) the overall potential to reduce the greenhouse gas emissions in the sector concerned and a preliminary analysis of the available measures and technologies to meet this potential;

   b) the identification of all the key barriers to improved energy efficiency of heat and hot water supply in Kazakhstan, and estimate the extent that these barriers hamper the cost-effective implementation of the selected energy efficiency measures;

   c) clarifying the situation in the different regions and cities in the country, identifying the main obstacles to increased energy efficiency of heat and hot water supply, and current direction of the development (building, as possible, on the existing work already done in this field by local and international institutions);

   d) the investment needs and potential financial resources/arrangements to utilize the available potential for energy efficiency; and

   e) the consistency of the proposed project activities with the general development plan of the energy sector in Kazakhstan.

2. Implement and analyze the performance of selected test installations (financed by the local contributions) and conduct targeted studies to fill the gaps in the technical, economic, environmental and "social" feasibility analysis of proposed energy efficiency measures;

3. Establish a Project Steering Committee and strengthen the national focal point for energy efficiency projects, in order to ensure a proper coordination and implementation of the projects and full information sharing between them;

4. Follow-up the experiences gained in other CIS-countries to foster the cooperation and exchange of lessons learned;

5. Develop a proposal to remove all the main barriers to the implementation of selected energy efficiency measures, and identify and initiate negotiations with the relevant national and international partners to co-finance the project;

6. Undertake an independent evaluation of the proposal identifying potential risks that can prevent meeting the short or long term objectives of the project, and suggesting changes that should be made to meet those objectives; and

7. Finalize the proposal based on the specific requirements of the GEF (as stipulated under the section IV: "PDF Outputs") and on the requirements of other organizations sharing the costs of the project.

The project will be supervised by the Project Steering Committee, chaired by the national project co-ordinator from the Ministry of Ecology and Natural Resources as the executing agency for the project. A full time project manager (reporting to the PSC and UNDP) will be hired to manage the project on a day to day basis.

Concerning the feasibility analysis of the different measures and technologies, it is envisioned that three working groups will be established with broad participation from the different institutions: One dealing with the improvement of the energy efficiency of the heat production, one dealing with the analysis and development of the measuring and billing system and reduction of consumption on the demand side (incl. distribution), and one dealing with the building codes and standards. Beside the feasibility analysis, the working groups will identify and analyze the existing barriers and with the help of international experts, formulate and implement a strategy to overcome them. New applications and arrangements will be first tested in a small scale, and lessons learnt will be fed back to the process. The crosscutting aspects between the three subject areas will be co-ordinated by the project manager and through regular meetings between the representatives of the working groups.

When establishing co-operation with the international experts, specific emphasis will be placed on building the local problem solving capacity based on modern resource planning principals, and strengthening the local capacity to evaluate and decide on economically and environmentally viable energy efficiency measures on a case-by-case basis. The focus will be on elaborating the short, medium and long term planning steps, assessment of long-run versus short term advantages of different options, potential for cost reductions, possible financing arrangements, environmental and social aspects. During the project, negotiations with potential international partners for technical cooperation and funding (including possible joint ventures) will be initiated and widened.

The detailed institutional arrangements for project's implementation will be agreed during the preparation of the project document.

IV. PDF Outputs

The output of the PDF B phase will be a project brief for the main project demonstrating the ability to achieve the goals set for the project, including:

a) an assessment of the size of the market, the quantity of financial resources required, and the contribution that fulfilling the full scope of the project would make in mitigating greenhouse gas emissions in Kazakhstan;

b) a plan for involvement of all the key stakeholders, including the communication with potential national, bilateral and/or multilateral investors at an early stage of the project;

c) a description of all the key barriers to energy efficiency in the sectors concerned and a strategy and proposed set of measures to remove those barriers;

d) a technical, economic, social and environmental feasibility study of proposed measures;

e) a detailed incremental cost analysis following the GEF guidelines;

f) a financing plan and agreements on co-funding of the project, and an initial analysis of the potential financial resources available for future energy efficiency investments;

g) a plan and a set of measures for monitoring and evaluating the programmatic benefits of the project.

V. Eligibility

Kazakhstan ratified the Climate Change Convention on 17 May 1995.

Kazakhstan is the largest emitter of greenhouse gases in Central Asia. A recent inventory conducted under the US Country Study Program concluded that the total emissions of Kazakhstan were equivalent to about 65 million tons of carbon in 1990. Of this amount, the energy sector contributed almost 90%.

Because of the existing inefficiencies in energy production and consumption, the improvement of energy efficiency both in the supply side (especially by further developing the co-generation) and demand side has been identified as the most efficient measure to mitigate GHG emissions. District heating represents a big part of energy consumption in Kazakhstan and it is believed, that some of the best opportunities for improving the energy-efficiency and consequent CO2 reductions come from improvements in heating boilers, district-heat distribution pipelines, heating system controls in buildings, and better insulation of buildings. The energy use could be reduced by factors, if in OECD countries typical technologies and management practices were applied. Almost all heat supplied to Kazakhstan's population and industry comes from fossil fuel based co-generation plants or centralized boiler houses, distributed by highly standardized centralized district heating systems.

There are currently no major ongoing international activities funded by the EU, bilateral donors or multilateral banks to support the improvement of the energy efficiency of the heat and hot water supply sector in Kazakhstan. Absence of consumption based heat metering and billing, stiff tariff policy, institutional weaknesses, lack of suitable financing mechanisms and lack of information and local capacity to prepare feasibility studies, business plans and "bankable" energy efficiency proposals are some of the key barriers that the proposed GEF project is going to deal with. By addressing these barriers, the project is expected to prepare ground for major investment projects to improve the energy efficiency of the system and widespread replication of the identified energy efficiency measures, thereby facilitating the actual realization of the existing GHG reduction potential. The complementarity of the proposed GEF project is raising from the fact, that no other project to facilitate this process is currently planned or implemented in Kazakhstan and in the absence of it, the realization of the identified energy efficiency

measures is not foreseen to take place. The available GEF support will also ensure that beside the technical and economic considerations, the GHG emission reduction aspects can be fully taken into account in the formulation of projects in the heat and hot water supply sector and when developing a strategy for and setting the Government priorities for the development of this sector as a whole.

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

VI. National Level Support

Recent developments and legislative actions in the country have taken energy efficiency more into consideration. Recognizing the importance of energy efficiency, the Government has launched and approved a "Program of Energy Saving" in 1995, which is recognized as a priority for the country. In 1996, the Program on "Urgent Measures on Energy Development" and the "Government Regulation on Measures Regarding Implementation of Energy Saving" were put into action. Two more laws, "A Law on Energy Policy" and a "Law on Energy Efficiency" are currently under consideration.

The first Kazakhstan Scoping Workshop on Climate Change, was held in May 1997 as a coordinating meeting for the Preparation of the National Action Plan on Climate Change (NAPCC). The meeting concluded that the activities to reduce GHG emissions in Kazakhstan should focus on increasing the energy efficiency and developing renewable energy sources. Regarding energy efficiency, the conclusions suggested that the mitigation measures in the energy sector should be prioritized as follows: (i) improving the energy efficiency in the electric power sector and district heating; (ii) identifying barriers towards energy efficiency management; (iii) elaborating strategies to address and remove these barriers; (iv) preparing regulations on GHG emissions; (v) increasing energy efficiency and implement energy savings measures, (vi) creating a legal mechanism to support the realization of GHG mitigation projects; and (vii) strengthening knowledge and building local capacity on energy efficiency issues.

The Government of Kazakhstan has demonstrated serious interest to increase the efficiency of the energy sector. During this year, it has adopted a regulation to install heat-metering devices nationwide. USAID is currently assisting the Government in legal and regulatory aspects regarding the transition towards market economy in the energy sector. Although this work is focusing mainly on the power sector, the rationalization of energy prices to reflect the real prices and market forces is expected to effect also the heat market.

The personnel of the local counterpart agencies are highly qualified to implement the various activities of the project, but extensive training, substantial backstopping, 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.

Regarding the co-funding, the Government of Kazakhstan and the local counterpart agencies and district heating companies will contribute an amount equivalent to US $ 160,000 to the project.

Of this amount, US $ 130,000 will be provided by the three local district heating companies in Almaty, covering the investment costs and analysis of selected testing installations. The Ministry of Ecology and Natural Resources has agreed to participate the project preparatory phase with US $ 30,000.

VII. Items to be financed

Output	GEF (US $)	Local (US $)
An assessment of the size of the market, the quantity of financial resources required, and the contribution that fulfilling the full scope of the project would make in mitigating greenhouse gases in Kazakhstan	15,000	
A plan for involvement of all the key stakeholders	5,000	
A description of all the key barriers to energy efficiency in the sectors concerned and a strategy and proposed set of measures to remove those barriers	40,000	
A technical, economic, social and environmental feasibility study of proposed measures	100,000	130,000
A detailed incremental cost analysis following the GEF guidelines;	15,000	
A financing plan and agreements on co-funding of the project, and an initial analysis of the potential financial resources available for future energy efficiency investments	25,000	
A plan and a set of measures for monitoring and evaluating the programmatic benefits of the project	10,000	
Finalizing the project proposal and project document for the main project	20,000	30,000
Subtotal	230,000	160,000
Project Support Services (3%)	6,900	

VIII. Special Features

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 has changed. Many observers feel that important energy efficiency actions in the future will come from local initiatives. Authority to decide on many matters of energy policy, tariffs, and energy regulation is increasingly being turned over to the regional and local administrations. National laws establish general guidelines, but require local and regional authorities to develop implementation mechanisms and to take actions that will remove barriers to market-oriented activities.

The national program for energy savings and efficiency and pre-feasibility studies for energy efficiency projects have been prepared by USAID in cooperation with the state organization EC-Kazakhstan Energy Center. It was concluded that great prospects for successful introduction of a

variety of energy efficiency measures exist, but further work is needed to gain additional information on various technical, economic, social, environmental, logistical and financial aspects.

With exception of no-cost energy efficiency improvements, all energy efficiency measures are only viable, if the financial burden for investments is lower than the actual cost for energy supply, thus creating financial incentives for adopting such measures. Currently available small loans and credits in Kazakhstan expect pay back times of one year and shorter while at the same time asking for interest rates of 30 % and more. Under these circumstances, the financial viability of many energy efficiency investments is not given. Sometimes the customers can not access the loans, because the creditors consider the risk too high and/or the customers are lacking adequate securities. To overcome this barrier, different financing possibilities and arrangements have to be evaluated, including the possible loans and credit lines by multilateral banks; third party and/or vendor financing; equipment leasing; grant, revolving and/or guarantee funds established by the GEF or other environmental funds etc.

To ensure financial returns from the investments, the problem of non-payment has to be addressed. In this regards, existing incentives for on-time payments have to be improved and mechanisms to decrease the non-payment mentality has to be developed and adopted. Gas and heat prices have risen to Western European levels, and as these full costs are passed on to households, residents are hard-pressed to pay monthly heating bills that approach one-third to one-half of their average monthly wage. Also, social tensions are raising as many people are paid with delay or are at all without work. In addition, hot water and heat consumption is still relatively high compared to many OECD countries, but as only bulk rates and no consumption based billing applies, incentives for decreasing the use of hot water and thereby lowering the monthly heat bill are not given.

Overcentralization 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. A detailed study on the feasibility of the different strategies in Kazakhstan, both from the economic and the environmental point of view, is still to be undertaken.

Another important issue in promoting the energy efficiency is the general deficiency in skills and capacity to identify, develop, evaluate, and propose "bankable" energy-efficiency investment projects for multilateral or private-sector financing. While Kazakhstan in most of its population centers possess great scientific and engineering skills, deficiencies are acute in the areas of economic and financial analysis, and in the institutional capacity to develop and propose projects according to the criteria of multilateral, western and local commercial lenders.

Finally, building codes and standards represent a key area for improving the energy efficiency in heating and hot water supply in the longer term. Building codes and standards are an essential and effective part of any energy efficiency policy. Given the current economic situation, it is expected that the rate of new building constructions will - with the exception of Astana - remain relatively low for the next few years. However, the experience has shown that developing and implementing new building codes and standards usually takes many years to become operational. Time is needed to disseminate information and to build up the capacity of the local stakeholders to evaluate, administer, implement and enforce such measures. In addition, Kazakhstan being the ninth biggest country in the world with its territory occupying land in the south part of Siberia down to the desserts bordering with Uzbekistan, special consideration has to be given to the rather different climatic conditions in the country, under which these codes and standards shall be applicable. A truly unique possibility is given to start the process of adapting modern building codes in Astana, by the fact that due to the relocation of the capital of Kazakhstan from Almaty to Astana, a huge number of buildings needs to be constructed in the new capital. Given the average lifetime of a building being 50 to 80 or more years, decisions in the planning and construction phase concerning the insulation, heating and hot water supply systems have a tremendous impact on the energy consumption and the operating costs of the building over the decades to come.