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Resilient nations

*UNDP/GEF PROJECT “Removing barriers to energy efficiency
improvement in municipal heat and hot water supply”*

INFORMATION CASE

ON THEME

**“Conditions of energy service companies (ESCO) development for energy
efficiency improvement of municipal heat and hot water supply in Kazakhstan”**

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Brief summary

Information case contains main survey results, conducted by “Ecocontroler” company experts upon UNDP request on ESCO development issues in Kazakhstan. There are given basic notions and definitions for ESCO and performance contracts (EEPC), models description, types of ESCO and performance contracts formats, mechanisms of financing.

Brief review of international experience on ESCO and EEPC development is provided.

Analysis of conditions for ESCO development in the sphere of municipal heat and hot water supply in Kazakhstan, barriers to ESCO development and guidelines for their eliminations is done.

1. Energy service companies (ESCO) and energy service contracts (performance contracts (EEPC) in the sphere of energy saving and energy efficiency improvement.

Energy service companies (ESCO) and energy service contracts (energy efficiency performance contracts (EEPC) became widely spread in business sphere of service delivery to energy consumers (ESCO clients) for energy saving and energy efficiency improvement.

Basic concept of ESCO business model consists of the fact that a client must not look for any primary capital investments but he takes responsibility for investments payback, made or organized by ESCO, in favor of a client.

ESCO develops, implements and submits or organizes primary investments financing in energy saving for clients. Payments from received savings allow clients compensation of ESCO costs on monitoring, metering and control as well as risk-taking on EEPC or third party financing (TFP).

Thus, ESCO is a company that performs energy services (service) and/or other measures on energy saving for a client and takes part of financial risk. Payments for performed services are based (completely or partly) on energy saving results, recieved by a client.

Performance contracts (EEPC) are agreements signed between a client – benefit receiver and a service provider (usually, ESCO) on energy saving, regarding which investments in energy saving are paid under the contract according to the results of energy saving.

Third party financing (TPF) or financing by a third party is an agreement concluded under the contract, involving a third party, in addition, to a service provider and a client – benefit receiver, that provides capital investments for EE measures implementation and adds part of energy savings, acheived as a result of EE measures to a client’s account. ESCO can be or cannot be such a third party.

Typical ESCO project consists of the following stages:

- Energy audit;
- Definition of measures list on energy saving and energy efficiency improvement;

- Development of project and technical solutions;
- Definition of project results planned to be achieved (for instance, volume of resources saving);
- Development of methodology and procedures allowing to secure project results achievement;
- Definition of contract relations structure between project participants and project financing structure;
- Measures implementation (equipment delivery, installation and commissioning);
- Maintenance and general servicing of installed equipment for the period of contract validity;
- Project close-out, results analysis of its implementation and securement of achieved experience.

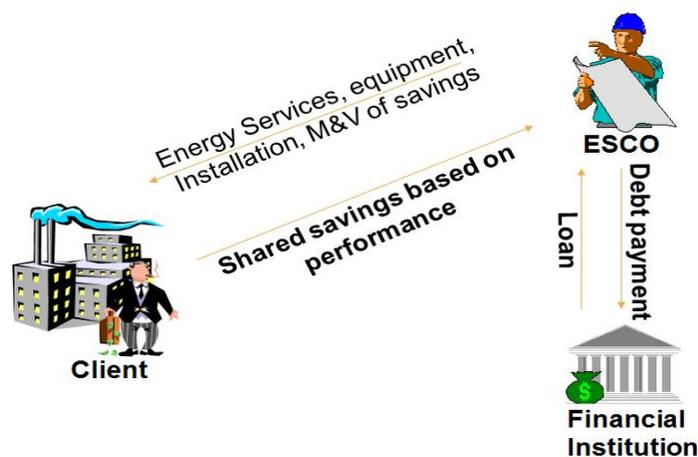
ESCO basic function consists of energy saving project management, however, part of the above mentioned measures can be taken by ESCO and other part can be done by sub-contractors.

ESCO and EEPC models. Stages of EEPC development and financing.

Interrelation between ESCO and a client in the sphere of energy saving performance on a client's object are settled within performance contract (EEPC). There are two main EEPC models: a model with savings division, received as a result of EE measures implementation, and a model of guaranteed savings. In Europe, there is also a third approach called «Chauffage».

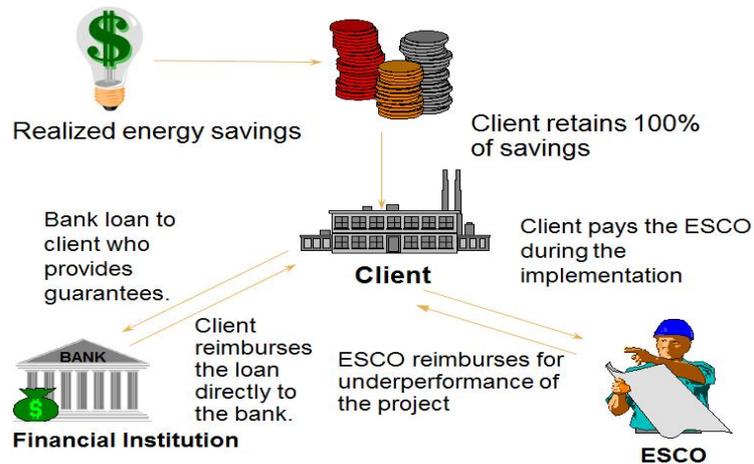
Using EEPC model with savings division, ESCO finances all primary project costs, along with full responsibility for funds payback, provided by a creditor. A client pays ESCO a certain percent (this can be also a fixed amount) of received savings, so that ESCO can return costs on project and receive agreed income. The rest part of savings is left for a client.

There is a model of savings division on EEPC demonstrated on pic.1.



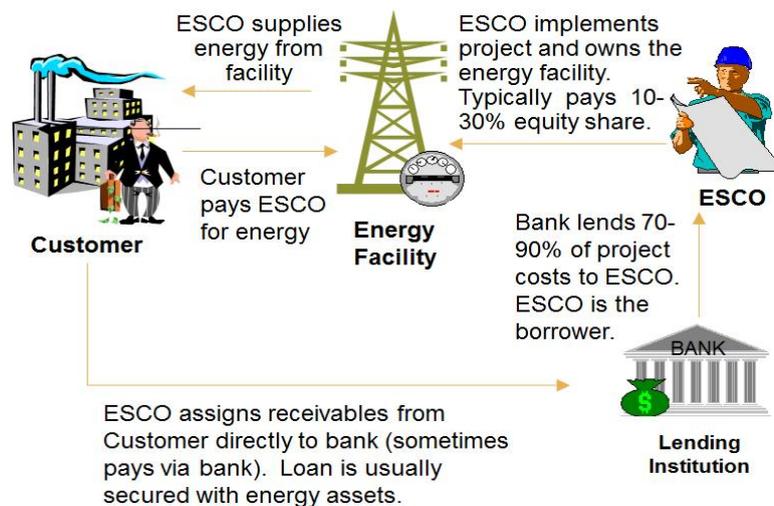
Picture 1. Financial model of savings division

According to EEP model with guaranteed savings (Picture 2) a client raises a loan, finances a project and, periodically, pays debt to financial institution. ESCO does not take any direct contractual obligations on debt payback to a creditor as the given obligation arises for a client. ESCO savings guarantee is not an assurance of a debt payback to a creditor; it guarantees savings receipt by a client, enough in equivalent value, to payback his debt to a creditor.



Picture 2: Financial model of guaranteed savings

In «Chauffage» model (Picture 3), ESCO adopts a role of energy provider to a client on agreed price. The given concept is traced back to a French approach, based on concluding an agreement for energy services delivery by a private company to a state body or other private company (owner of estate in entirety). It was called “A contract on property maintenance “Chauffage” that leads to using term “Chauffage” for the given EEP form.



Picture 3: Financial model «Chauffage»

ESCO types

Independent ESCO

ESCO are independent to the extent that they do not belong to a power energy or gas enterprise, equipment/control and management device producer or a company – energy supplier.

ESCO of equipment producers

Producers of equipment, or control and management devices, are the owners of the given ESCO type, many of them have a vast network of affiliate branches that ensure national (and international) coverage, sales offices and specialized national staff present solutions on EE, renewable energy sources and distributed generation for a client's market segments.

ESCO of public utility companies

The owners of the given ESCO type are regulated or state power energy or gas enterprises. Presently, many ESCO of the given type are concentrated on regional markets or service territories of their own central public utility companies.

ESCO of energy/engineer companies

The given ESCO type belongs to international oil and gas companies, unregulated energy suppliers or large engineering companies.

To a certain scale, ESCO can differentiate, based on their marketing approach: technologies (boilers, devices, lighting, etc.); sales approach; sectors (buildings, industry, etc.); type of energy (electric power, heat/cold, etc.).

Mechanisms of energy efficiency financing

ESCO business in developing countries can develop if EE financing is available on local level. There are known several variants of EE financing on new developing markets:

1) Stage of energy audit and project assessment – state grants, loans of established revolving funds).

2) Stage of project implementation – financing from own reserves; loans of international and private financial institutions; guarantees from different sources, including warranty funds; third party financing (TPF).

Third party financing (TPF), or financing by a third party, is a key instrument for project financing on sustainable energy, as it has advantage to ensure off-balance EE measures financing that can be used instead of debt financing. ESCO acts as a third party financier, accepting responsibility of financing for most EEP models. In other words, TPF is a creative development for energy consumers, including those, who work in industrial sphere, on energy saving financing without advance payments and debt growth.

2. International experience of ESCO and energy service contracts (EEPC) development

ESCO application for service delivery of energy saving and energy efficiency improvement to energy consumers started since second part of 20th century. France is believed to be a motherland of ESCO. ESCO became, mostly, distributed in the US, Canada and Europe. ESCO market of the US has annual turnover approximately US\$6 bln. ESCO markets of European countries are at different stages of development. Some countries (Germany, Italy) have many ESCO companies, in some countries there are only several ESCOs at the stage of development (Latvia, Romania, Denmark) or there are not any at all (Albania, Serbia). Furthermore, ESCO market in some countries is decreasing (Hungary); in other countries ESCO industry is in the process of development (Estonia, Greece, and Belorussia) or is expanding (Italy, France). European market potential is estimated about €5-10 bln./year. In Eastern European and CIS countries ESCO is at the stage of early development.

Success of ESCO development depends on risks and profitability and is identified by a level of state policy in the sphere of energy saving, available legal framework and available financial sources. A brief review of ESCO development in Eastern Europe and CIS countries is given below.

The Czech Republic

Successful experience of ESCO development. There are 17 ESCO. Main clients are state sector (municipal buildings, etc.). Type of EEP used is guaranteed savings. Legislative support – provision about obligatory energy audit conduction for large energy consumers, in accordance with law dated 2001. Source of financing is international financial institutions (IFI).

Basic barriers are that projects with short payback terms are implemented; there is misunderstanding on part of managers.

Slovakia

There were 30 operating ESCO by 2006. ESCO type is a state private enterprise. Main clients are state sector (buildings, etc.), buildings renovation, public lighting. ESCO development support consists of state requirements to energy efficiency of new and existing buildings.

Basic barriers are that payment according to energy consumption norms is still used; there is misunderstanding of ESCO on part of banking sector.

Croatia

There is one state ESCO with participation of a state energy system. Main clients are state sector (HPP, buildings and public lighting, industry). 31 projects have been implemented. Sources of financing are IFI on the security of government, Environmental protection and energy efficiency Fund.

Basic barriers are the absence of consumers' interest to EE, low awareness about ESCO, complicated mechanism of public procurement.

Poland

From 8 to 13 ESCO, using **ЭСК**, including subdivisions of several large international companies (Dalkia, MVV, Simmens). Main trends are thermo renovation of buildings, heat sources, public lighting, etc. Sources of financing are commercial banks, private sources. Support for EE is a scheme of EE financing in the form of Environmental Protection Fund.

Basic barriers are the absence of industrial sphere interest to ESCO, absence of functional financial institutions for ESCO.

Ukrain

There are three large ESCO in Ukrain. “UkrESCO” and “ESCO-Rovno” are state enterprises. “Energeticheski Alians” was established in 2004 as private ESCO. There are several small private ESCOs. Main ESCO trends are industrial and municipal sphere. There is legislative base for EEPc utilization in state sector.

Basic barriers are that subsidized tariffs on energy, absence or unavailable financing for energy saving projects.

Russia

ESCO market of RF is on the stage of formation. Number of ESCO is unknown. ESCO basically provide consulting services. Main trend is consulting services in the sphere of heat supply. ESCO activity is limited by several pilot projects that were initiated by foreign companies and covered by foreign investors and financial institutions.

Basic barriers are the absence of state organization on development and methodology of energy saving in the country. Low level of payments for energy use.

Belorussia

ESCO in Belorussia was established in 2005 as a project. ESCO type is a private ESCO with foreign stockholders. ESCO project in Belorussia is a commissioning of co-generation station in large industry. Amount of investments in the given project accounted for €10mln. ESCO is financed by a loan from foreign bank with guarantee of local bank or by interested parties from Europe. It is expected that 5 more similar projects will be implemented per year. Residential sphere is not attractive for ESCO.

Thus, ESCO and EEPc are rather widely used world-wide, as mechanisms, facilitating continuous energy use by means of energy efficiency improvement and renewable energy sources utilization. ESCO and EEPc assist to overcome financial restrictions for investments and pay primary costs at the expense of costs savings on energy, received thanks to energy consumption reduction. In CIS counties, ESCO are at the stage of early development, which is caused by insufficient level of state policy, legal framework, absence of available financial sources and low prices on energy resources that call into doubt profitability of investments in energy efficiency.

3. Conditions for ESCO development in the sphere of municipal heat and hot water supply in Kazakhstan.

Present condition and state policy in the sphere of energy saving.

Energy consumption of the RK economy overgrows, considerably, energy consumption of other countries economy. According to the data of Annual Energy Statistics 2011¹, in 2010, GDP energy consumption in Kazakhstan was estimated as 0,48 TOE/1000 US\$ ППС, or more than twice bigger than world average level and three

¹ <http://yearbook.enerdata.net/#/2010-energy-intensity-GDP-by-region.html>.

times more than average level for EC. Economy energy efficiency improvement is one of principal development priorities for Kazakhstan. In Program documents there were set goals for decreasing GDP energy consumption level in the country by, at least, 10% by 2015, and by 25% by 2020.

Municipal heat and hot water supply.

Residential sphere is one of the largest energy consumers that expends about 40% of produced heat energy. As of 2009, housing stock made up about 160 mln m², most of it is old, inefficient buildings, which were built in Soviet time. Specific heat consumption of buildings reaches up to 250-270 kWh/m² per year, which is more than twice exceeds values for European countries with similar climate conditions. High heat consumption is explained by technical condition, inefficient heat supply systems and absence of consumers interest in heat saving. Residential buildings, equipped with heat metering devices, amounts to only about 10%, and consumers pay for heat according to consumption norms per m² of heated area.

Complex plan of energy efficiency improvement for 2012-2015 considers set of measures for energy efficiency improvement in all key economic sectors to achieve 10% reduction of energy consumption per GDP unit by 2015 against level of 2008. Complex plan involves opportunities to conduct energy audit for budget objects, introduction of energy efficiency criteria and heat supply system renovation, reconstruction of budget buildings with thermal characteristics improvement.

Program of housing and public utilities renovation for 2011-2020.

In 2011, implementation of Program of housing and public utilities renovation in the RK for 2011-2020 started. Program is targeted to the development and taking measures on municipal infrastructure renovation, residential buildings reconstruction, among them heating system renovation, foundation of optimal model of housing and improvement of housing and public utility services for tenants. Program ensures reconstruction of 31 000km of heating networks and 11 624 apartment buildings. As a result of thermo renovation of residential buildings, heat saving must gain from 10 to 30%. Program provides schemes of financing leverage for residential buildings reconstruction through the establishment of specialized state institutions and granting loans to consumers for general maintenance with payback term of 7 years.

The Law of the Republic of Kazakhstan "About energy saving and energy efficiency improvement", adopted in 2012.

The law creates a legal basis for energy savings and energy efficiency in different economic sectors of Kazakhstan, including municipal heat and hot water supply. Firstly, in the framework of this law, objects of construction projects, consuming energy resources, particularly, but not exclusively heat, have to apply energy saving materials and energy metering devices, and also, automatic heat consumption control systems. For new apartment buildings, application of energy saving materials, heat metering devices installation, hot water metering devices, automatic heat consumption control systems are compulsory. New object commissioning, not equipped with energy metering devices and automatic heat consumption control systems, is prohibited. Consumers have to pay for consumed heat energy according to tariffs, differentiated depending on presence or absence of heat energy metering devices, approved in conformity with legislation of the Republic of Kazakhstan about natural monopolies.

Tariff regulation

Tariffs on heat production, transfer, distribution and supply are regulated through local departments of ARNM. Tariffs are calculated on the basis of cost estimate for heat production and distribution plus profit. There are no set differences between fixed and variable costs that leads to very volatile incomes of heat supplying companies, depending on heat consumption volume as well as serious load for tenants' budget during winter.

For buildings, not equipped with heat metering devices, bills for heat use are calculated in accordance with average norms of heat consumption per m² of heated area. The existing methods of norms consumption calculation are not accurate, they do not reflect heat consumption by certain buildings, and as a result, there is a gap between actual heat consumption and normative heat consumption that affects payment for heat.

Initiatives for ESCO development in municipal heat and hot water supply sphere.

There are no operating ESCO, apart from private ESCO in Karaganda, founded on "Removing barriers to energy efficiency improvement for municipal heat and hot water supply" UNDP/GEF project initiative. There are several engineer consulting companies, operating in the sphere of energy efficiency, mainly, in industrial sphere.

Private ESCO in Karaganda city.

In 2009, a private ESCO for energy efficiency projects in residential sphere of Karaganda city was established by initiative of "Removing barriers to energy efficiency improvement for municipal heat and hot water supply" UNDP/GEF project for energy efficiency improvement in municipal heat and hot water supply. ESCO was founded on the basis of private company "Ergonomika" LLC, with local authorities support and financial support of UNDP/GEF project. During two years, ESCO performed several pilot projects on energy saving in Karaganda city residential sphere. Projects included energy audit of buildings, installation of metering devices and automatic heat consumption control systems. Key moments, received from these projects, are given below:

- > It took time to agree forms of agreements for services delivery on heat supply with interested parties, including association of apartment owners (AAOs), Karaganda city administration, heat supplying companies and ARNM. Original form of agreement on the basis of ESCO model where heat supplying company would settle payments for energy saving services directly to ESCO account was rejected. Used business model, on which implementation of performance contract was based, requires conclusion of AAO separate agreement with ESCO for energy saving services.
- > Payment on the basis of actual heat consumption aroused misunderstanding on part of buildings tenants, where measures on energy saving were applied. This is connected with the fact that, according to metering devices, payment for heat energy consumption in cold period was by 20% higher than payment according to consumption norms. And off-season, bills for actual heat consumption on the basis of metering devices were by 30% lower than according to consumption norms. As a result, energy saving varied exceedingly during heating season. This situation embarrassed apartment owners as they used to pay monthly fixed amount according to consumption norms

- > ESCO faced difficulties when marketing its services for buildings. This is connected with the fact that apartment owners have no incentives for heat metering devices installation and energy saving measures implementation in residential buildings. The existing rules allow using heat without installation of metering devices and paying heat consumption according to consumption norms.

Therefore, despite of positive experience and practical results, received during two years of private ESCO activity, several critical barriers still remain on the way of ESCO development in Kazakhstan.

4. Barriers to ESCO development in Kazakhstan and guidelines for their elimination.

There were identified the following basic categories of barriers for ESCO development in municipal heat and hot water supply of Kazakhstan: 1) legal, institutional and administrative barriers; 2) economic and financial; 3) technical barriers and, 4) informational barriers.

Legal and administrative barriers lie in poor execution of legislative requirements of the Republic of Kazakhstan in the sphere of energy saving and also poor institutional base that is demonstrated in the absence of specialized institutions, responsible for development, introduction and monitoring of EE policy and programs implementation in the sphere of municipal heat and hot water supply.

Economic and financial barriers include low tariff level for heat services, absence of national financial mechanisms and incentives, that make municipal heat and hot water supply not attractive for investments in energy saving and, thus, is a barrier for ESCO and performance contracts foundation and development.

Technical barriers are divided into the following: 1) poor professional skills and absence of experience in the sphere of energy saving and ESCO development, financing and performance contract implementation, 2) predominance of calculations for heat according to consumption norms and absence of heat metering devices at consumers' residential sphere.

Informational barriers involve absence of sufficient awareness among residential sphere and municipal managers about energy efficiency in municipal heat and hot water supply.

The following certain recommendations are offered by international experts on ESCO development in municipal heat and hot water supply of Kazakhstan:

In a short-term prospect:

In order to solve the assigned tasks on energy efficiency improvement of municipal heat and hot water supply, **it is recommended to establish a municipal ESCO**, belonging to municipalities. Such approach will allow accumulation of practical experience of ESCO development, and develop general interest to energy saving and energy efficiency in municipal heat and hot water supply sphere, that induce private companies and individuals interest to ESCO establishment, provided that adequate information campaign about the achieved results in this sphere is conducted.

It is offered also to encourage international companies, entering heat and hot water supply sphere. This will facilitate leverage of international investments in energy efficiency of municipal heat and hot water supply, expansion of technical and financial opportunities and know-how for energy services on energy saving. It is reasonable to found joint enterprises for technologies transfer and capacity building.

In mid-term prospect:

It is necessary to create adequate and favorable conditions for activity development on energy saving and energy efficiency in Kazakhstan, so the following recommendations are offered:

In the sphere of institutional and administrative opportunities development.

- Development and introduction of a complex program for energy efficiency improvement in municipal heat and hot water supply. In order to reach its targets, Complex program has to be based on application of performance contracts for energy efficiency.
- Promotion of institutional reforms on national level that will be useful for municipal heat and hot water supply, with the help of introduction and strengthening of EE agency opportunities, that is directly connected with EE promotion in the given sphere.

In the sphere of tariff regulation.

- Revision of tariff policy on heat in order to raise heat tariffs up to the level of complete expenses reimbursement, with adequate support provision for vulnerable tenants to cover their main needs.

In the sphere of national financial mechanisms development.

- On national and municipal levels of public financial mechanisms introduction such as grants and revolving funds together with performance contracts as alternative variants for measures taking for urgent investment necessity in EE improvement of municipal heat and hot water supply.

In the sphere of energy efficiency promotion.

- Creation of adequate financial incentives as provided by the Law of the RK “About energy saving and energy efficiency improvement”.

Transition to payment according to actual heat consumption.

- High ranking officials, regulators, heat supplying companies and associations of consumers have to work together, in order to facilitate transition to payment of heat supply services according to actual heat consumption on the basis of metering devices.

Development of technical skills.

- Development of skills of all key participants in elaboration, implementation and monitoring of EE projects in municipal heat and hot water supply.

Development of awareness on EE issues in municipal heat and hot water supply.

- To create information network and web-site that will be a basis for dissemination of knowledge and information on EE and projects in municipal heat and hot water supply.

G.A.Doroshyn. National consultant of UNDP/GEF project.

List of literature:

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4. International energy service experience and opportunities of its application in Russia. <http://www.portal-energo.ru/articles/details/id/417>
5. Project document "Removing barriers *to energy efficiency improvement for energy use in municipal heat and hot water supply*". UNDP/GEF, 2006.

BRIEF INFORMATION ABOUT PROJECT

"Removing barriers to energy efficiency improvement for energy use in municipal heat and hot water supply" UNDP/GEF and the Government of Kazakhstan project is aimed at assistance in solving a wide range of issues in legislative framework, institutional basis, tariff policy, investment and informational opportunities of interested parties for introduction of energy efficient buildings heat supply systems and formation of basis for energy services sustainable development, taking into account environmental impact on local and global levels.

Expected results:

- Creation of legislative and regulating framework for promotion and provision of energy efficiency improvement incentives in heat and hot water supply in Kazakhstan, including specific incentives and other mechanisms of energy saving;
 - Introduction of new institutional and financial models for investments leverage in energy efficiency, strengthening of interested parties potential for further implementation and replication;
 - Collection, analysis and dissemination of results and lessons received from project, involving monitoring of greenhouse gases emissions reduction for efficient replication in Kazakhstan and other CIS countries/municipalities with similar situation.

Engaged partners:

- Ministry of environmental protection
- Ministry of industry and new technologies
- Agency of the RK for regulation of natural monopolies
- Akimats, including Astana, Almaty and Karaganda cities
- "Kazakhstan center for renovation and development of housing and public utilities" JSC
- Local societies and non-governmental organizations

- Scientific research institutes
- Business companies on heat supply and energy saving

Main beneficiaries:

Agency of the RK for construction, housing and utilities

Project duration:

2007 – 2013

Project budget:

Global environmental fund \$3 290 000

Co-financing:

State – 1 500 000 \$ CША

Private sector - 500 000 \$ CША

Other resources - 2 500 000 \$ CША

Contacts:

Office 409, Imanov Str.13

010000, Astana

The Republic of Kazakhstan

tel/fax: +7 (7172) 901636

Project manager – **Alexander Belyi**: alexandr.belyi@undp.org

National project consultant – **Gennady Doroshyn**: gennady.doroshin@undp.org

National project expert on AAOs – **Natalia Druz**: natdruz@mail.ru

Expert on procurement – **Ainur Amirkhanova**: ainur.amirkhanova@undp.org

Public relations expert – **Ainur Baigozha**: abaigoga@mail.ru

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