



## EQUAL ACCESS TO ENERGY SERVICES



2012 INTERNATIONAL YEAR OF  
SUSTAINABLE ENERGY  
FOR ALL



UN Secretary – General Ban Ki – Moon is leading a “**Sustainable Energy for all Initiative**” to ensure universal access to modern energy services; improve efficiency and use of renewable sources of energy. The initiative is aimed to achieve three the following key goals by 2030:

- **provide universal access to modern energy services;**
- **reduce intensity of the world power consumption by 40%;**
- **increase the share of renewable energy in the global energy mix up to 30%.**

Access to energy, especially to their sustainable types is an integral part of creating a sustainable future for the developing world and can not only change the lives of the energy-poor countries, but also:

- widen an income generation - for example, through the use of pumps functioning on solar energy for irrigation or power generation for small business;
- provide electricity to community hospitals, refrigerators for storage of drugs, as well as mobile telephone communication, which plays an important role in the commerce;
- reduce the time for hard work to collect firewood contributing to introduction of cleaner and more efficient options for heating and cooking;
- provide lighting so that children can continue to learn;
- ensure uninterrupted functioning the enterprises and create new opportunities for entrepreneurs.

- One in five people worldwide still lacks access to modern electricity;
- Almost 1,6 billion lack access to electricity and even the services on power supply are available, millions of poor people are not capable to pay for these services;
- 2,4 billion of people lack access to modern types of fuel for cooking and heating their houses. About 3 billion people depend on traditional biomass such as firewood and vegetable remains which are used for cooking and heating;
- Energy sector is a dominant factor in the sphere of climate change and it accounts about 60% of global greenhouse gas emissions;
- Reduction in the intensity of carbon emissions in the energy sector is a key challenge in achieving long-term objectives in the fight against climate change;
- Increasing energy demand per capita together with population growth in the world give rise to such levels of consumption that modern power systems are not capable to maintain.

## ABOUT THE CENTRAL ASIA REGIONAL MIGRATION PROGRAMME:

The purpose of this program is to promote poverty reduction in Central Asia by improving the living conditions of families of migrant workers. The program is targeted at protecting the rights and strengthening the social and economic opportunities for families of migrant workers, including men, women and their families. Within the programme, UN Women in Tajikistan and Kyrgyzstan assists the most vulnerable families of migrant workers by creating the self help groups (SHGs) and provides them support to implement joint sustainable income-generating initiatives. The structure of the UN Women as part of its regional strategy and action plan for 2012-2013 intends to contribute to the improvement of access to gender-oriented services (transport, public utilities, markets, water and energy resources, etc) in order to improve the living standards of the most vulnerable groups of women. For this purpose, the UN Women has supported beneficiaries of RPMSA in Kyrgyzstan and Tajikistan to study the existing good practices and local opportunities on use of renewable and efficient sources of energy for households' needs and the development of their income-generating activities.

**These activities were aimed at:** the awareness raising and strengthening the understanding of the family members of migrant workers in the Kyrgyz Republic and Republic of Tajikistan on the prospects of using energy efficient and energy-saving technologies in order to improve their living conditions as well as opportunities for conducting their own businesses.

# KYRGYZ REPUBLIC:

## ENERGY CONSERVATION IN LIVING CONDITIONS OF THE RURAL AREA – BASIC EDUCATIONAL TRAINING IN TOKTONALIEV VILLAGE, CHUI PROVINCE

Conducted by Public Fund “CEEBA” with organizational support of NGO “Community Development Alliance” (partner – UN Women in Kyrgyz Republic)

The educational training was attended by 16 people who were members of the Village Funds (VFs) and self help groups (SHGs) of pilot communities from nine villages of Chui Province.

The theoretical part of the training allowed to provide basic information on the following topics:

1. Energy and concept of energy
2. The needs of the rural area households in energy
3. Types of fuel and their cost
4. Energy supply for lighting, heating and cooking meals



### PRACTICAL TRAINING:

#### 1. Heat insulation of the eastern wall with reed mats

This method of insulation allows reducing thermal energy loss through the exterior wall structure by using reeds - natural materials that are broadly available in many rural areas. Heat insulation reed mats are manufactured out of dried reeds, which are then mounted on the outside of the existing walls and plastered with a protective layer (clay + lime-sand plaster).



*Preparation of rolls from reeds*



*Plastering mat wall that made from reeds*

## 2. Heat insulation of the northern wall with the foam plastic in a wooden frame.

This method of heat insulation also allows reducing thermal energy loss through the structure of the outer walls, but as a heat insulation material (insulation) it was used organic heat insulating material of industrial production - polystyrene plates (foam plastic). As the foam plastic itself is very difficult to attach directly to the clay wall, the thermal insulation boards was installed with the use of supplementary wooden frame consisting of strips. Also a protective layer of lime - sand grout is applied to the foam plastic on the grid with a small amount of cement.



*Placement of the heat-insulating material (foam plastic) in wooden frame made from strips*      *Application of second layer of plaster out of lime-sand grout*

## 3. Heat insulation of the garret floor.

It is observed that up to 25% of heat losses from total amount of loss take place through garret floor that is related to its small thickness as well as the lack of heat saving material, so the garret floor heat insulation can considerably reduce the amount of heat loss through these structure. During the practical training two rooms of a garret floor were covered with the glass wool roll material «Isover» and vapor sealing film.



*Explanation on heat insulation*

*Laying vapor sealing and heat insulation material*

#### 4. Heat insulation of timber floors.

Heat insulation of the timber floors and concrete floors contacting with the soil is an important event. It is necessary not only for the conserving heat in the house, but also for maintaining a comfortable temperature of the floor surface, as most of the rural population (mainly women and children) as a matter of common practice sit on the floor, which is very cold in winter that as a result leads to frequent colds and other diseases.

Due to the fact that the time allocated for practical training was not sufficient to complete the required insulation of timber floors, so it was performed a minimal heat insulation of timber floors in two rooms with folgoizol (foamed polyethylene, 3mm thickness with a foil) and placed on top of a timber floor and covered with carpeting.



*Laying folgoizol on timber floor*

#### 5. Rehabilitation and sealing old timber wooden frame.

Normally a large amount of heat energy is lost to heat the cold air that enters through cracks and leaks of windows, so during the practical training, the participants completed the reconstruction and hermetic sealing of six old wooden windows, which were tightly installed in their own window cases.



*Preparation of old window frame*



*Air-tight glazing of a window frame*



*Air-tight installation of frames in window case*

## 6. Heat insulation and hermetic sealing of the entrance door.

Heat insulation and hermetic sealing of external door is also necessary because of its direct interaction with the outside cold air. Due to the fact that the design of the door is thin, so sufficiently large amount of heat loss takes place through it. It happens very often that old external doors have large gaps and large amount outside cold air enters a room causing a draught.

During the training heat insulation of the external door was performed from foam rubber and leather vinilis, which will allow to reduce heat loss and unwanted door deformations due to large temperature difference of the inside and outside air.



*Heat –insulation of the external door*

## 7. Construction of energy efficient outdoor furnace (hearth)

In rural area women often cook outdoors on homemade hearth, which is usually called “Ochok” (in Russian – очаг (hearth). As hearths are mainly constructed by women from at hand materials (stone, brick and clay) and lack of knowledge of the correctness of their efficient design, so at cooking time it is observed a high consumption of fuel (wood and dung), i.e. it is not effectively used. This is due to the fact that the design of the furnace itself does not provide good air intake that is required for intensive burning a fuel. Therefore it is occurred an incomplete burning, strong fuming and soot formation.

During the practical training, the female participants were explained and shown how they can build energy efficient and modified hearth for cauldron by themselves that are widely used in many rural areas of Tajikistan. The modified design of the hearth allows to save a lot of firewood by its good and complete burning and thus it is extracted only a small amount of white smoke.



*Instruction on construction of a hearth*



*Clay and straw preparation to make a hearth*



*Construction of the second hearth*



*Explanation of the operation principle*



*Testing of the energy efficient hearth*



*Modified hearth in Tokmonaliev village*

*Participants of the training session*

### Further steps:

- Develop and hand over 2 informational banners to head of the household and resource center in Toktonaliev village regarding the process of practical training;
- Technical monitoring of the implemented activities related to energy efficiency and applied technologies by CEEBA in winter period to conduct further assessment of energy efficiency in the demonstration household.

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## II. PROVIDE TRAINING FOR SHG MEMBERS ON ENERGY EFFICIENCY AND RENEWABLE SOURCES OF ENERGY FOR FUTURE APPLICATION OF THE ACQUIRED KNOWLEDGE INTO PRACTICE UNDER FRAMEWORK OF THEIR OWN INITIATIVES ON CONSTRUCTION AND OPERATION OF ENERGY-EFFICIENT GREENHOUSES

Implementer – PO “Ecological Movement – BIOM”

### Directions:

- A two-day orientation training for representatives of seven Village Funds (VF), which plan to build greenhouses;
- Consultations for representatives of the VFs on energy-efficient and energy-saving technologies; construction and subsequent operation of greenhouses in three target areas – Svetlaya polyana (Bright glade) village, Issyk-Kul Province, Jal village, Chui Province and Ak-Tash village, Osh Province.
- The models’ demonstration of energy-efficient technologies with a trip to operating greenhouses and having meetings with the service personnel in Chui Province.

As part of the workshop and field trip to greenhouses it was conducted a video filming to produce the informational and educational short film. The film will include video presentations of experts, charts and graphs that are required for a better perception of the information on construction of solar greenhouses, principles of their operation, organization of agronomy and selection of the most productive and adapted crop varieties to grow in the greenhouse. The film includes interviews with experts, users of greenhouses as well as the participants. Duration of the film is 30 minutes. The film is prepared in Russian with subtitles in Kyrgyz language.

### Consultation on construction of greenhouses for Public Fund (PF) “Altin Ayil” – Svetlaya Polyana village, Jetti –Oguz district, Issik –Kul Province.

The greenhouse to be planned is designed to provide family members of the PF “Altyn Ail” with fresh produce of green leafy vegetable crops in winter period, as well as obtain additional income from sale of the products in the market. In the greenhouse it is planned to grow cucumbers, tomatoes, leafy green crops and in the spring – valerian’s seedlings, tomatoes and other crops. The greenhouse will be registered in the balance of PF “Altyn Ail”. The land, on which it is planned to build a greenhouse, is taken for the long-term lease for 20 years with its possible extension. During the questioning the fund members it was jointly decided to use the greenhouse in the following conditions:

1. In north side of the greenhouse it will be grown cucumbers and tomatoes alternately with one year crop rotation. It is planned to get the crop yield within period from November to April, when price for tomatoes is kept quite high (100-200 som / kg) and cucumbers (80-180 som / kg).
2. In south side of the greenhouse it will be grown green leafy crops (dill, jusay, lettuce, parsley and etc.) within the period from September to May.
3. In spring from February to April it is planned to grow seedlings, especially valerian, as well as tomatoes, cabbage and other crops in the free areas of the greenhouse.



The greenhouse project is developed by the representatives of Public Fund “Altyn Ail” and builders as a result of the advisory visit, thus it was taken into consideration the local conditions, ability and willingness of future greenhouse users. Thus, it came into being a need to make a night heat insulation of the greenhouse from reed mats. Due to request of users it was decided to make a concrete foundation.



*Discussion of the greenhouse project with representatives of the PF “Altyn Ayil”*

Due to the fact that in the greenhouse it is expected to grow heat – loving crops - tomatoes and cucumbers, so at least a temperature  $+18-20^{\circ}\text{C}$  is required for vegetation of these crops; an auxiliary heating system should be provided for the greenhouse design. The heating system has been proposed by Alysheva Taalaibek, local skilled stove maker who lives in a neighboring village. In agreement with him it was proposed to install the heating system in the greenhouse with the boiler running on wood, charcoal and dung along its northern wall and heating coil from the profile section of pipe  $50 \times 30 \text{ mm}$  in 4 rows.

### **Consultations on the construction technology and materials**

Consultations were provided on specifics of the energy-efficient solar greenhouses’ construction to members of PF “Birimdik” in accordance with the guidelines for construction of greenhouses and with gained experience of their operation in Kyrgyzstan. It is recommended that the materials to be used for construction of greenhouses can be purchased in the local market. It is also recommended to build a greenhouse foundation from stone – clay material. Reeds will be used as a heat insulation material. Zinc-coated corrugated sheeting will be used a cover material for the greenhouse roof.



*Consultation on the construction technology of the energy efficient greenhouses and used materials*

During visits made to Svetlaya Polyana and Ak-Tash villages the design of future greenhouses were updated to increase their energy efficiency and durability. Also it was taken into account the owners wishes. In the process of marking territory, some site layouts were revised taking into account the correct orientation of the greenhouses with respect to the sides of the earth. In majority of greenhouses it is planned to install additional heating system to grow heat - loving crops in winter period (tomatoes, cucumbers, peppers).

A list of construction materials is agreed with all PFs on their availability on site. Thus it was proposed to replace part of the construction materials with local cheap materials. Currently, fund managers are leading a preparatory works to construct greenhouses and finalize the project materials.

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*Site markings for greenhouse.  
Laying out the foundation for additional raising walls.*

# TAJIKISTAN

## I. PECULIARITIES OF THE INTRODUCTION AND USE OF ENERGY - EFFICIENT, ENERGY-SAVING TECHNOLOGIES AND RENEWABLE ENERGY SOURCES IN HOUSEHOLDS – PROVISION OF TRAINING FOR THE SELF HELP GROUPS

Trainings were conducted by Public Organization “Agency of Development Process Support Nau”, ADPS Nau, with assistance of the Association “Women and Society” (partner – UN Women)

Venue -

- Gonchi district, “Kalininabad” jamoat, Shokhon village, Secondary School # 31
- Isfara district, Isfara town, office “Paivand”
- B. Gafurov district, Gafurov town, office “Yodgorjon”

The training participants: members of the self help groups (SHGs), Manager of the Association “Women and Society” (partner – UN Women), lawyers and others.

In the course of the practical part of the trainings conducted in Ganchi district, the participants familiarized with the construction and operation of a portable solar kitchen, solar collector device, efficient hearths, solar power stations, biogas plants and solar dry kilns.

Module and program of the training, “Peculiarities of introducing and using energy-efficient, energy-saving technologies as well as renewable energy sources in households”, developed by trainer, NGO “Agency of Support Development Processes Nau” (ASDP Nau) on the basis of similar training, as well as the experience of the organization in implementation of specific initiatives on use of renewable energy. The training subject:

- **Types of energy – traditional and alternative:**

Developing diagram of traditional energy supplies in households

Actuality of using the alternative energy sources (social aspects, lack of fuel energy resources, ecological compatibility)

The general concept of renewable and alternative energy sources, principles of their actions and their arrangement:

- solar collectors, solar dry kiln, solar panels, solar oven, a biogas plant
- the effectiveness of hearths and ovens in households

Peculiarities of installation and construction of the renewable sources of energy in households and (ЦРЖ) CBC

- familiarization with devices and the solar collector assembling diagram for getting hot water

- **Energy efficiency:**

- General concepts about energy- efficiency and effective use of energy in households;
- Provide information on the documents “master plan on effective use of energy in Tajikistan”;
- the energy loss structure due to inefficiency and imperfection of structure (energy loss at heating, in traditional hearths, indoors, in electrical appliances and etc.).

- **Energy efficient technologies:**

- General concept on energy efficiency. What is the meaning of this term according to regulatory documents and laws;
- limitation - is not energy conservation as well as is not a saving;
- ways of energy conservation at home, advantages and disadvantages of energy-efficient lamps;
- solar oven, domestic hearths, heat insulation of premises, ecohouse, tambour unit entrances into premises, use of biomass and dung bricks for extracting biogas and bio-fertilizers;
- compost – preparation technique

- **Practical study – work in small groups:**

- installation of a solar furnace
- Peculiarities of biogas generation in households
- solar dry kiln for dried fruit
- efficient hearths

- **Demonstration of the energy efficient technologies and renewable sources of energy constructed by ADPS Nau:**

- experience in implementing and operating the solar dry kilns, solar ovens, biogas plant, efficient stoves and eco-toilets
- Peculiarities of biogas generation in households
- Solar dry kilns for dried fruits
- Efficient hearths
- Composting facilities
- Solar greenhouses, greenhouses and tunnel construction

All the participants were introduced to the practical use of solar kitchen, peculiarities of the biogas generation in Uzokova’ s household, solar collectors’ design, solar dry kiln and efficient hearths constructed in the school kitchen. All of them were given an opportunity to talk with the women of Shohon village that operate these facilities. Visits were arranged to households where the renewable sources of energy are used – solar dry kilns, compost pits, efficient stoves and other technologies.





Study visit to B. Gafurov district, Jamoat Zarzamin and J.Rasulov district, Jamoat Gulakandoz

The purpose of the visit is a practical demonstration of models and examples of introduction and use of energy-efficient technologies and renewable sources of energy in households to members of SHG, including the following models:

**Model – A helium greenhouse and a compost structure in a household**



**Model – a tunnel type greenhouse. The main objective that was pursued during construction of the tunnel greenhouse was to protect the vegetables from the strong winds and heavy rains.**



**Model - energy –efficient stove – it is used not only for heating premises and cooking meal, but also for getting hot water with small consumption of coal and firewood.**



**Model – solar dry kiln, fixed type**

Apricots and other fruits are dried with the use of this facility that functions on solar energy. A man, head of the hosting household explained to participants the construction method of the solar dry kiln, types of materials needed as well as operational principle of the facility. Participants from Isfara district were particularly interested in solar dry kiln as they are normally trying to produce qualitative dried products during each apricot’s harvest season. Also, participants were shown a compost facility, in order to make compost it is used dead leaves, manure and other organic wastes that are stored here for about six months. In six months, when the compost is ready, it can be used to apply it in land during sowing campaign instead of chemical fertilizers.



**Model – A solar greenhouse constructed in the household on Chinese technology (pic.6), where it was expected to get a crop yield in the end of December.**



### Model – biogas plant

The members of SHG were demonstrated the process of biogas production. Since plant on generating biogas is located near the greenhouse, so it can be used for its heating as well as.



**Model – Solar collector  
(mounted on top of the school  
# 40, J. Rasulov district)**



**Model – solar collector that provides  
heating water in the kitchen**

Participants of the visit intend to use acquired skills and knowledge in their households as well as in the activities of groups that is very topical problem and relevant taking into account limits of electricity in the period of autumn and winter in Tajikistan.

### CONTACT PERSONS AND ORGANIZATIONS:

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**RIO+20**  
United Nations  
Conference on  
Sustainable  
Development

# FUTURE WE WANT - OUTCOME DOCUMENT

ADOPTED AT UNITED NATIONS CONFERENCE  
ON SUSTAINABLE DEVELOPMENT, RIO+20

RIO DE JANEIRO, BRAZIL, 20-22 JUNE 2012

## ENERGY

- We recognize the critical role that energy plays in the development process, as access to sustainable modern energy services contributes to poverty eradication, saves lives, improves health and helps provide for basic human needs. We stress that these services are essential to social inclusion and gender equality, and that energy is also a key input to production. We commit to facilitate support for access to these services by 1.4 billion people worldwide who are currently without them. We recognize that access to these services is critical for achieving sustainable development.
- We emphasize the need to address the challenge of access to sustainable modern energy services for all, in particular for the poor, who are unable to afford these services even when they are available. We emphasize the need to take further action to improve this situation, including by mobilizing adequate financial resources, so as to provide these services in a reliable, affordable, economically viable and socially and environmentally acceptable manner in developing countries.
- We reaffirm support for the implementation of national and subnational policies and strategies, based on individual national circumstances and development aspirations, using an appropriate energy mix to meet developmental needs, including through increased use of renewable energy sources and other low-emission technologies, the more efficient use of energy, greater reliance on advanced energy technologies, including cleaner fossil fuel technologies, and the sustainable use of traditional energy resources. We commit to promoting sustainable modern energy services for all through national and subnational efforts, inter alia, on electrification and dissemination of sustainable cooking and heating solutions, including through collaborative actions to share best practices and adopt policies, as appropriate. We urge governments to create enabling environments that facilitate public and private sector investment in relevant and needed cleaner energy technologies.
- We recognize that improving energy efficiency, increasing the share of renewable energy and cleaner and energy-efficient technologies are important for sustainable development, including in addressing climate change. We also recognize the need for energy efficiency measures in urban planning, buildings and transportation, and in the production of goods and services and the design of products. We also recognize the importance of promoting incentives in favour of, and removing disincentives to, energy efficiency and the diversification of the energy mix, including promoting research and development in all countries, including developing countries.
- We note the launching of the initiative by the Secretary-General on Sustainable Energy for All, which focuses on access to energy, energy efficiency and renewable energies. We are all determined to act to make sustainable energy for all a reality and, through this, help to eradicate poverty and lead to sustainable development and global prosperity. We recognize that the activities of countries in broader energy-related matters are of great importance and are prioritized according to their specific challenges, capacities and circumstances, including their energy mix.