

# PROMOTING ENERGY EFFICIENCY

## IMPROVED STOVES AND ENERGY STRATEGIES FOR VILLAGES

### Shortage of energy resources

Energy saving and the efficient use of energy are key elements of any sustainable development. In Central Asia, the disintegration of the former centralized and large scale energy systems as well as the constant gradual increase of costs for energy carriers has led to serious social and economic problems affecting particularly the inhabitants of remote mountain villages.

*Due to insufficient insulation, up to 60% of the energy of private and public buildings in rural areas is usually lost. (Jegge et al. 2001)*

As a consequence, in rural areas about 50% of the annual household budget is spent on heating purposes. This is mainly because houses are usually insufficiently insulated and fuels such as coal, wood and dung are used inefficiently. Due to the current difficult economic situation many households are forced to use their own energy sources i.e. dried manure (on average up to three tons per household per heating period). This leads to a decrease in soil fertility since less manure is available as fertilizer. Moreover the cutting of trees and forests contributes to soil erosion. Ultimately all these processes contribute to the increase of carbonic acid in the atmosphere,

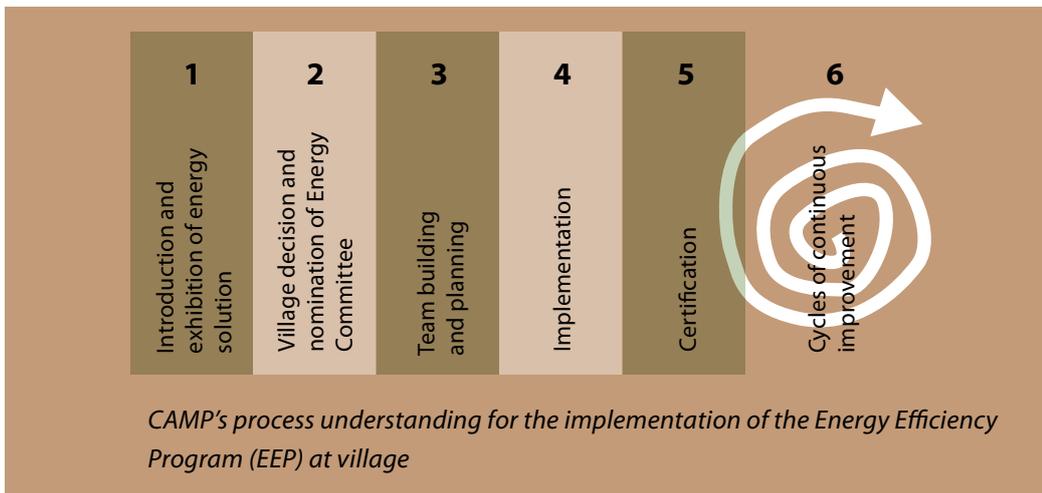
the destruction of natural resource cycles, and global warming.

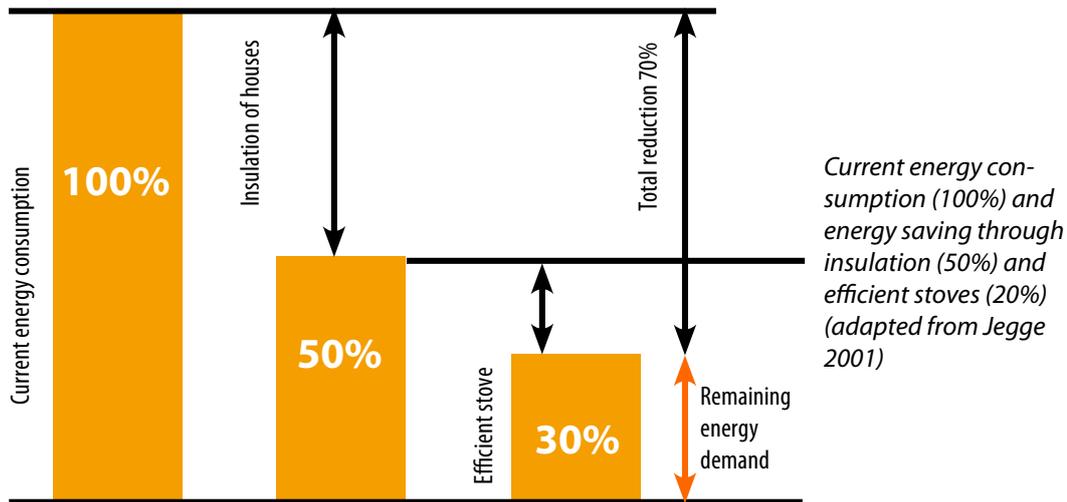
This explains why improving energy efficiency at different levels is crucial for Central Asia which can benefit both local population (e.g. by improving health, saving household expenditures and decreasing women's and children's work load related to fuel wood collection) as well as the environment (e.g. by reducing CO<sub>2</sub> and slowing down the degradation of resources).

This is why one of the major goals of the CAMP Program is to raise awareness about energy saving and to propose ways and means to the local population on how to improve their living conditions.

### Reducing energy consumption by constructing efficient stoves

As in the rest of the world, the energy consumption of private and industrial buildings in Central Asia is steadily growing and the Earth's natural resources are rapidly diminishing. Moreover, the efforts required to extract new energy carriers is becoming more and more expensive in Central Asia. Heating rural housings is mainly done with individual stoves. In the majority of cases they are ineffective and don't meet conventional environmental protection standards. The construction of more efficient stoves can thus cut energy consumption by 20%.





### Typical heating scheme and traditional stoves

Typically a house is heated solely by one oven without a specific distribution system. Usually, different needs such as heating water, drying clothes and cooking are not provided by a single heating device. Ideally however, these various functions could be fulfilled by a single stove. Thus the continuous development of heating technologies tries to meet the following requirements:

- become economically more efficient
- be better adapted to local available fuel types
- be easy to learn for 'do it yourself' application
- be multifunctional

### Demand for vocational training by local craftsmen

During Soviet times the traditional local energy production and its distribution network were replaced by centralized large scale electrical stations with a wide distribution network. Electricity was considered a strategically important resource that was subsidized by the state.

The regular use of electricity for heating led to the disappearance of stove-making skills. Therefore local craftsmen requested practical training and specific knowledge from external specialists. As a response to this demand, regional vocational training workshops were organized. The training was conceived as on the job training where new stoves were installed in people's houses.

The main implementation steps were:

- To collect detailed information about typical stove facilities in rural areas and to analyse their efficiency
- To develop simple construction technologies

for effective stoves

- To evaluate different construction materials and their economic costs
- To organise a regional vocational training for craftsmen concerning the construction of effective stoves
- To elaborate and publish a construction manual for effective stoves in rural areas by using local materials
- To disseminate the gained experience in rural areas through partners

### 'Miracle stoves' save money and improve living comfort

The development of multi-purpose ('miracle') stoves has many advantages for the household which invests in such new technology. Such stoves heat more than one room and can be used for baking. Moreover they are attractive pieces of furniture. However, rural inhabitants usually only pay attention to their stoves during the heating period while in spring and summer – when necessary maintenance work could be carried out – the financial means for reconstruction are frequently lacking.

The construction of more effective stoves thus means:

- Less investment due to the use of local construction materials (100 – 150 USD/stove)
- Job opportunities in rural areas for local craftsmen specialised in stove construction
- Harmony with nature by preserving and protecting natural resources through their more efficient use

To date more than 50 stove craftsmen have been trained in local areas of Kazakhstan, Kyrgyzstan and Tajikistan to be able to construct such effi-

cient stoves on their on. They were provided with practical workshops which include theoretical know-how about heating principles. Up to now more than 30 stoves have been constructed providing experience to these craftsmen and showing that there is a considerable demand for such stoves by villagers. This demand might increase even more in future, as the pricing of electricity is progressing, too.



*More comfort and less expenditure with new multipurpose 'miracle stoves'*

### Further development and dissemination

In order to promote the construction of efficient stoves in the pilot mountain villages, revolving funds were established in the form of public foundations ('Micro Credit Agency') in Jergetal and Balaaiylchy village providing financial support to both craftsmen and clients. For further dissemination of these energy saving measures, the help of other partner organizations and the financial support of the Small Grant Programs (SGP) will be crucial, as more and more villagers from different regions are asking for similar training.

The dissemination of knowledge and experience regarding the technical improvement and construction of energy saving devices is becoming more and more relevant given the increasing efforts of villages to develop own energy strategies.

In this context the CAMP agencies understand the necessary process needed to promote the implementation of energy saving measures at

village level by following of 6 steps. The first step consists in introducing and exhibiting energy solutions as a phase of broad information about energy efficiency and re-newable energy options, conditions and benefits of taking part in CAMP's Energy Efficiency Program (EEP). The second step is devoted to village decisions and the nomination of a 'Village Energy Committee' (VEC) based on a formal application containing the list of energy members communicated to the CAMP agencies. The third step is devoted to team building and planning. A three day workshop conducted by the CAMP agencies for the members of the VEC and representatives of local authorities addresses the issue of a village energy strategy. The participants learn about team building, agree on individual roles and responsibilities, become familiar with decision-making processes and devise first ideas for a sustainable energy strategy for their village.

Step four consists in implementing first concrete activities according to the developed action plan and in raising confidence among the members of the VEC and of the village population with regard to the committee. In step five a first evaluation is carried out assessing the EEP. It is usually conducted earliest one year after the team building and planning workshop.

Finally step six seeks to support continuous improvement by permanent planning, implementation, certification and labelling which commonly starts right after the first certification. In order to support this approach, the organization of practical demonstrations for inhabitants, partner organizations, mass media and representatives of village administration in houses with already functioning devices during winter time, is envisaged.

Energy source	Without effective stove	With effective stove
Electricity	1000 kWh	200 kWh
Coal	4-5 t	2-2,5 t
Wood	2 t	0,5 t
Dung	3-5 t	1,5-2 t
Oil	50 l	20 l

*Average annual household energy consumption without and with more effective stove (example of Jergetal village, Kyrgyzstan)*

## Creation of Village Energy Committees (VECs)

So far, 16 VECs have been established in Kyrgyzstan (11), Tajikistan (3), and Kazakhstan (2). The main tasks of these energy committees are:

- to develop a long term energy strategy for the village and a corresponding concrete action plan for one year
- to promote energy saving activities and the use of renewable energy resources
- to promote awareness raising of villagers regarding energy saving measures
- to initiate and support the organization of practical trainings on house insulation and the construction of efficient stoves
- to support the creation of micro credit agencies at village level
- to disseminate relevant information among the villagers

CAMP agencies are continuously helping in designing project proposals to promote the support for creating more VECs.

## Shortcomings

The experience gained so far has shown that different obstacles have to be overcome to make 'miracle stoves' a success story:

- provide continuous backstopping support to local craftsmen
- ensure correct and sufficient instruction for owners regarding use and maintenance (e.g. cleaning) of new stoves
- develop fact sheets allowing calculating costs, duration of the heat preservation of the stoves and saving potential through different measures
- create an understanding regarding the time needed for constructing high quality products among both customers and clients

## Out of experiences made so far we can recommend to:

- Create construction teams consisting of energy craftsmen contributing to job creation and development at village level
- Establish micro credit agencies which provide financial support both for stove masters and clients
- Invest in improved stove construction only after insulating houses
- Conclude a contract between the master and the client to secure high quality services and further instructions and consultations
- Further study the multifunctionality of effective stoves for example as attractive furniture or useful element of the room



*Improved heating comfort and health through re-utilisation of hot ash and embers in a rural Tajik house*

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