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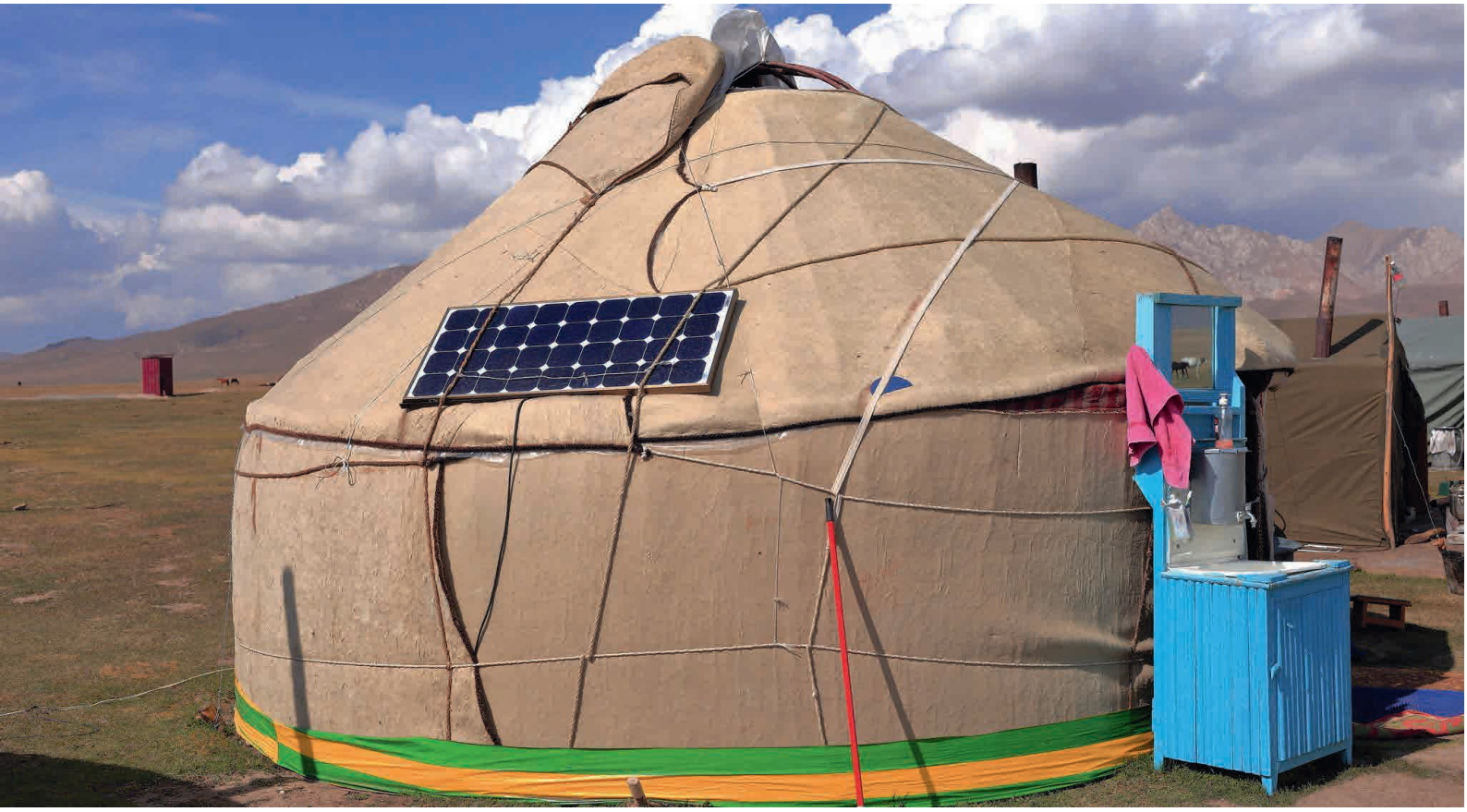

Fig. 1: Solar panel on a yurt in high altitude grazing area, Song Kol Lake, September 2016. Photo: Thomas Depenbursch

Supporting energy efficiency and renewables uptake in rural communities in mountainous Kyrgyzstan

Energy is a defining issue in modern Kyrgyzstan. Despite the country enjoying one of the lowest energy tariffs in the world, large-scale hydropower infrastructure and abundant water resources, for many people living in mountainous regions, enduring long, cold winters, accessing energy is expensive to the point of unaffordability. Dung bricks, made laboriously from cattle and sheep dung and earth clods, remain a household energy staple in rural areas, although homes are generally connected to electricity infrastructure.

Wintertime energy needs are large in these high altitude regions, where sub-zero temperatures continue for five to six months each year, and are met (or not) by a complex arrangement of different energy sources, determined by household residents based on cost and availability, income level, and access opportunities.

KEY MESSAGES

- Despite low energy tariffs, many households in rural mountainous Kyrgyzstan struggle to meet wintertime energy needs.
- Improving energy efficiency in homes can significantly reduce energy consumption.
- Small-scale, (offgrid) renewable technologies, such as biogas, floating water wheels, and solar PV, can provide affordable and appropriate energy sources for mountain communities.
- Community development projects promoting energy efficiency and renewables use should ensure longterm engagement and ongoing options for uptake to overcome initial financial barriers.
- The support of governments is crucial in developing and promoting the energy efficiency and renewables sectors e.g. through financial incentives and tax breaks.
- Support for experimentation, research, and development of novel technologies is essential for developing a robust renewables and energy efficiency sector in Kyrgyzstan.

At the same time, energy losses are high because of energy inefficient buildings, infrastructure, and appliances. Small-scale renewables appear to be of interest to inhabitants of mountain areas and single solar PV panels are increasingly popular amongst shepherding families who migrate to the high altitude grazing areas in the summer (fig. 1), although there is little uptake of renewables in most villages, and little diversity in the technologies used.

Creating awareness about and access to energy efficiency

Accessing energy is a costly task for many households in rural mountainous areas, and many do not meet their needs. Despite this, systems and infrastructures for energy use are far from efficient. Electricity supply infrastructure is renowned for energy losses; these are further compounded in the home by the use household appliances with low energy efficiency ratings. Houses built according to the popular local method tend to be inherently energy inefficient, constructed from inefficient materials and with walls and windows cracking within a few years (fig. 2).

While leaky windows and doors are commonly replaced after some time, quality energy efficient replacements are financially far out of the reach of most rural households. Heating appliances are generally old and run down (hot water batteries become clogged with calcium carbonate build-up and fire-fuelled stoves leak heat) and are fuelled at least in part by low energy efficient substances (dung; however coal is also used).

Moreover, standard behaviour rarely involves considered energy efficient practices, and indeed energy saving is often limited to closing off rooms in winter or moving to a smaller winter house. While this undoubtedly reduces energy needs, the widespread inefficient behaviour of the Soviet period is clearly mirrored in energy use practices today. Often, simple energy-saving measures are unknown or ignored. Improving energy efficiency in homes is a key factor to reducing energy use and removing a dominating barrier to meeting energy needs.

Effective energy savings can be made simply and at low cost, using local materials and labour, while energy efficient behaviour, such as closing doors to prevent heat escaping, keeping windows covered with thick curtains, and turning off electronic items – especially televisions – when not in use, can also contribute to significant savings. Trainings and workshops on energy efficient homes and practices would likely be of great value to many rural mountainous communities, but must be implemented soundly.

Fig.2: A typical village house in Naryn, in the Kyrgyz central Tian Shan mountains. Photo: E. Haab

Access to financing for purchasing energy efficient equipment and household refurbishment is an issue particularly in poor, rural communities. While certain financing programmes support the uptake of energy efficiency products through discounts and grants, these are too expensive for poorer communities and are impractical for rural-dwellers located far from city-based suppliers. Future programs could aim to provide short-term financial gains to encourage participation and enable access to these items, and incentivise suppliers to expand their coverage.

Renewable technologies uptake: creating awareness, access, and supporting experimentation

Due to the increasingly affordable prices of small-scale renewables, solar PV panels are becoming popular amongst shepherds who spend months away from the electricity grid. However, uptake of other small-scale renewable technologies is limited in mountain villages and towns, and the few cases of rooftop solar PV have generally been established through international donor-funded projects.

Small-scale renewable energy technologies (off-grid) have the potential to revolutionise energy use in rural, mountainous areas. Knowledge of a scant handful of technologies exists locally, even if these technologies are not employed in the neighbourhood, but with the renewables sector flourishing worldwide, a diversity of technologies could be relevant for communities in Kyrgyzstan – many small-scale (e.g. 5-100 kW), low-cost (e.g. several hundred dollars or less), and open source (e.g. floating water wheels) (fig. 4). Space for testing, experimenting, and adapting novel renewables could catalyse uptake. Financing technological experimentation will likely be key in introducing renewable technologies into communities, and donor-funded projects would

be wise to consider covering this in projects promoting renewables, rather than simply re-introducing the same unpopular items. Overcoming the initial cost barrier of even low-end renewable technologies is also critical in encouraging uptake. Programmes that reduce initial costs of renewables, or push back costs to create short-term and long-term financial wins will likely be more successful in encouraging participation.

Supporting on-going engagement with communities to offer real uptake opportunities

The vast majority of energy efficiency measures and renewables are introduced to communities and villages through internationally sponsored development projects, often with little input or investment from government or agreement for long-term engagement. While these projects are able to impart valuable and novel information, in many instances projects are short in duration and uptake is low. Lasting knowledge transfer and sustained use of new energy efficiency measures and renewables generally occurs more organically and over longer period as information about new technologies filters through to communities and one or two individuals or households trial the novel technologies. Learning from neighbours is widely held to be the method of preference in Kyrgyzstan, and once a technology is established to be functional and desirable, often other community members will adapt.

Extending the engagement period of development projects and ensuring they contain certain key activities would improve the success of skills and technology uptake. For instance, creating a demonstration building used by community members could provide a visible example of new methods and technologies. Trainings and workshops could accompany this and local labour could be hired to assist with the construction/ refurbishment. Options for uptake of new skills and methods after the initial training period could be supported, for e.g. through ensuring discounted rates for materials for a certain period, or a low interest, long-term/small collateral loan scheme for project participants to purchase necessary items. Similarly, small grant programmes for participants to refurbish homes could be instigated. Projects would also benefit from establishing permanent links between communities and renewable energy suppliers and regional demonstration centres.

These steps would also support demand for specific technologies, which would continue the employment of

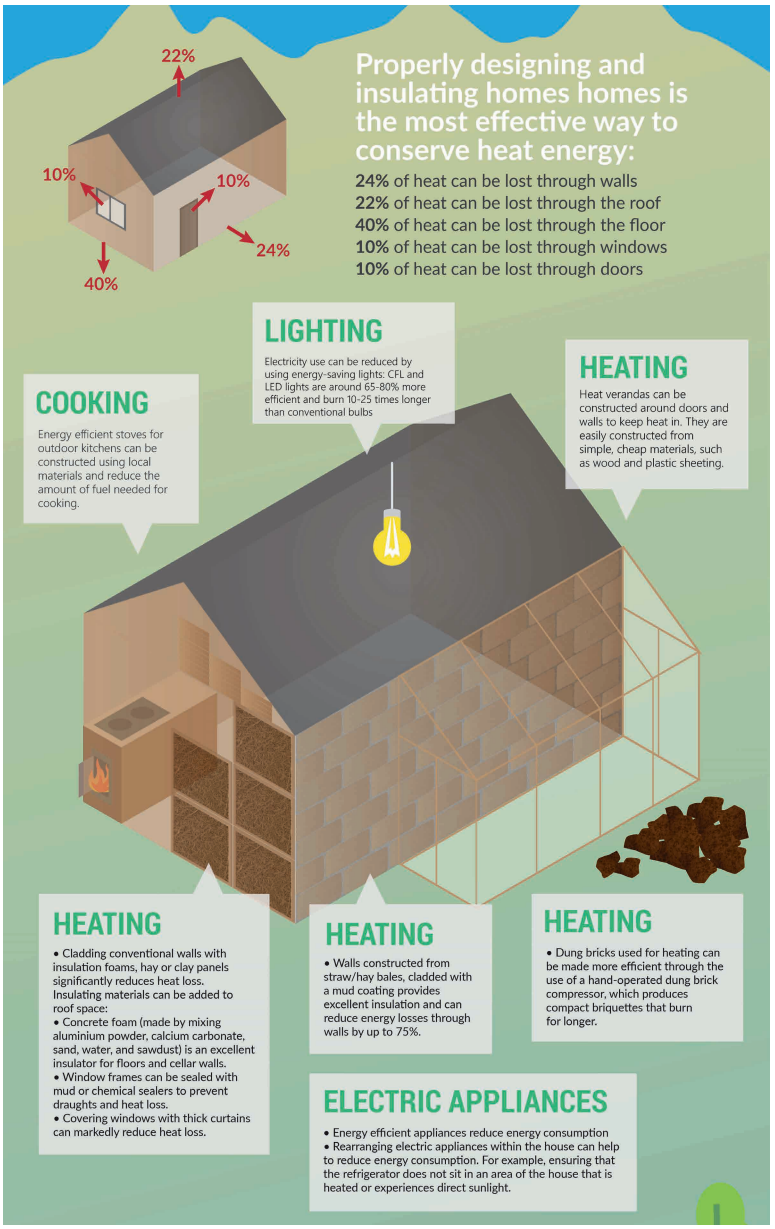

Fig. 3: Energy efficiency measures appropriate for mountain village homes

people who have developed special skills or sector-specific knowledge through initial project training. Ideally, all donor-sponsored projects would seek to raise awareness about issues of energy efficiency and small-scale renewables, lobbying regional and national governments for support.

Developing government policy to promote the energy efficiency and renewables sectors

Kyrgyzstan's energy system is caught between the assumptions and practices of a Soviet-era past, and the pressure of neo-liberal reforms. The transition from a planned to a free-market system has so far proven a bumpy ride, hampered by conflicting values and belief paradigms, citizen discontent, and pressure from international actors (World Bank, EBRD, etc). The development of the energy efficiency and renewable sectors could help ease this transition by providing

affordable, accessible energy and reducing overall energy consumption.

Despite this, there is a lack of support for the industries. Government support at national and local levels for the sectors is necessary for developing the industry, encouraging investment, and supporting uptake. Policy that provides incentives to businesses (e.g. business tax and import tax cuts) and finances local developments and technical education institutions would encourage the growth of the industry and invest in local expertise. Government support could also be offered to relevant to businesses operating in regional and rural locations.

Regional and municipal governments could devise strategies to improve energy efficiency measures and targets for renewables uptake, particularly in mountain communities, where wintertime energy costs provoke serious civil discontent. Although this would require a large capital investment, it would bring distinct political, social, and environmental benefits.

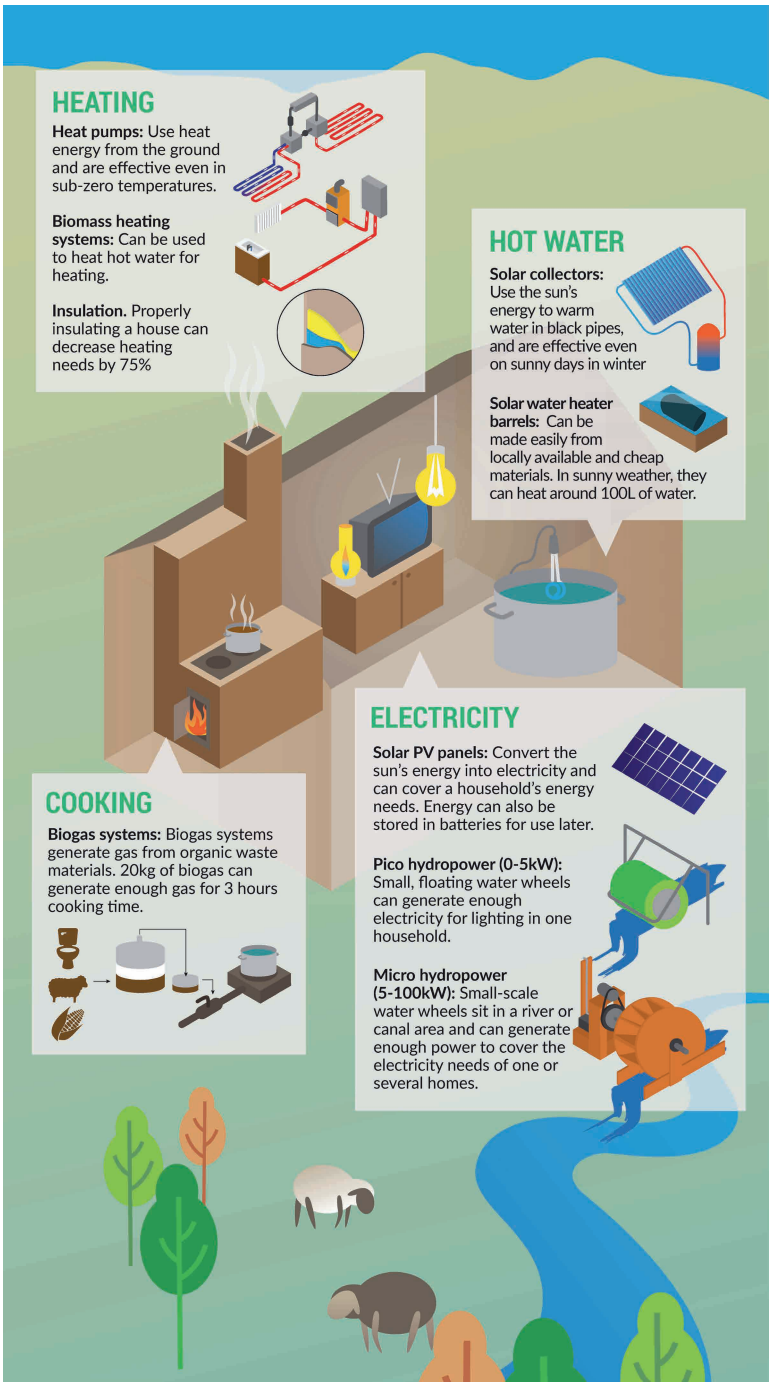

Fig. 4: Renewable energy technologies with potential for use in mountainous areas in Kyrgyzstan

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