Small-scale rice farmers, especially in small islands, often face difficulties in reaching milling services and usually do not have access to grid electricity. Local renewable energy systems can provide electricity and heat for productive activities, hence improving production and reducing food losses in remote rural areas.

In off-grid areas the gasification of rice husks and solar-powered domestic rice milling interventions, assessed here as case studies, can be financially viable as well as provide social and environmental co-benefits.

Adoption of clean energy technologies in the rice value chain can be facilitated through targets and strategies for rural electrification, the introduction of financing and insurance products, technical assistance to manufacturers and consumers, capacity building and improving energy literacy.

**COSTS AND BENEFITS OF CLEAN ENERGY TECHNOLOGIES IN THE PHILIPPINES’ RICE VALUE CHAIN**

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**ENERGY TECHNOLOGIES IN THE PHILIPPINES’ RICE VALUE CHAIN**

Rice represents the most important staple crop in the Philippines. There are about 2.4 million rice farmers with an average farm size of about 1.2 ha. In recent years, domestic rice production has been increasing, due to both increased land area cultivated and improved yields per hectare.

Some remote rural communities still do not have access to grid electricity and rely on diesel-generators to power the mills. Renewable energy (RE) systems can therefore provide solutions for those remote areas by improving access to energy for farmers and rice processors. A key factor to determine the viability of RE investments lies in the local price of fossil fuels.

The initial capital investment needed for RE technologies can be a key challenge for small-scale rice producers and processors. Tailored financing for smallholders and access to credit schemes are lacking. Access to credit is a particular problem for farmers who do not own their land, as they cannot use land as collateral. Often, collective actions, for instance through farmers’ associations, are needed for a new technology to be deployed, but farmer groups and cooperatives often face credit market constraints.

Other barriers to the adoption of RE applications include poor awareness about the technical potential; lack of supplier networks, maintenance companies and support services in rural areas and especially on small islands; and variability of price that can affect the attractiveness of investments in this sector.

In traditional rice farming systems, women provide most of the labour for production and post-production tasks as well as marketing. Men are more involved at the input stage. Nevertheless, gender inequality continues to pervade rural areas and the agricultural sector, which limits equitable economic growth and development.

**CASE STUDIES**

Gasification of rice husks and solar-powered domestic rice milling technologies were analysed as case studies. Their technical potential was estimated to be around 75 and 3 600 installations, respectively.

Gasification of rice husks for electricity generation is hardly competitive with grid electricity today, but it is a competitive option when it replaces a diesel generator used for rice milling. The gasifier and gas engine to drive a generator can be installed at or close to a mill site, or can serve a cluster of small local mills. The financial profitability of a system depends on the husk processing...
Solar-powered domestic rice milling can be adopted in off-grid areas and in small islands where production quantities are not high or where rice has to be transported over long distances before being processed, usually in a diesel-powered mill. This energy intervention is financially viable, and becomes even more appealing when social and environmental co-benefits are factored in.

### Solar-powered domestic rice milling

Solar-powered domestic rice milling technologies can be financially attractive and have several socio-economic and environmental benefits, including; subsidy and tax reduction, added value along the supply chain, GHG emissions avoided, access to energy, employment creation, water use and efficiency and reduced fossil fuel consumption. However, adoption of this technology remains low due to lack of awareness, low efficiency, poor coverage of supply and maintenance networks, and difficult access to credit for potential adopters.

For more information on the INVESTA project and a description of the case studies please visit: [www.fao.org/energy/agrifood-chains/investa](http://www.fao.org/energy/agrifood-chains/investa)