



**Waste to
energy for
enterprises**



Imagine if waste turned into energy

In many parts of Indonesia, households and small and medium sized enterprises need to contend with limited access to affordable and clean energy. Investment in clean and renewable energy, while growing, is still lacking particularly in rural areas and this is compounded by a limited awareness of potential technologies.

Indonesia's 'energy poor' includes small and home-based producers of tofu, coconut sugar, cassava and other agricultural products. Many of these producers continue to use firewood which places the health of families and workers at risk and emits harmful greenhouse gases that contribute to global warming. Waste from palm oil and tofu production in particular releases significant amounts of methane gas into the atmosphere before being treated and released back into the environment.

Avoiding wasted opportunities

The up-scaling of waste to energy technologies provides enterprises and households with an opportunity to utilise waste from their agricultural or food processing activities

to produce affordable, clean, renewable energy to meet their enterprise and domestic needs.

The potential market for waste-to-energy technologies is large. In Indonesia alone, it is estimated that there are more than 250,000 small and home-based enterprises not reached by existing renewable energy interventions.

Through this initiative, SNV is leveraging its experience in biogas both within Indonesia and globally. This includes a successful project supported by EEP in Central Kalimantan where medium scale biogas digesters were introduced in communities where there is communal stabling of cattle.

Benefiting from renewable energy

The adoption of waste-to-energy technologies improves the livelihoods of small and home-based agricultural producers in a number of ways:

- Reduced spending and labour to procure fuel
- Improved health due to the reduced inhalation of smoke from the burning of wood fuel
- Production of organic fertiliser from bio-slurry for reuse on crops
- Reduced deforestation
- Cleaner surroundings
- Reduced greenhouse gas emissions through improved waste management and reduced wood fuel use
- Electricity for off-grid communities



Project Components



The project consists of two key components:

- 1. Developing and demonstrating innovative waste-to-energy technologies:** Initially we will develop and field-test innovative waste-to-energy technologies in targeted small and home-based enterprises in the tofu, cassava, coconut and palm oil sectors. Initial project locations are where SNV is already working so that that we can benefit from increased synergies, tap into established networks and partners and access local knowledge.
- 2. Upscaling waste-to-energy technologies in new markets:** After proving technical feasibility and appropriateness for the business enterprise, SNV will scale up the new technologies to users elsewhere in Indonesia. SNV will identify and demonstrate business models for upscaling and

disseminate learning both within Indonesia and globally through our office network and regional learning events.

New Waste-to-Energy Technologies

The project will target small and home-based enterprises in the tofu, cassava, and palm oil sectors in Indonesia with the following new technologies:

- **Tofu waste bio-digester:** Targeted to small and home-based tofu enterprises in Nusa Tenggara Barat due to its large home-based tofu industry. The gas produced from tofu waste will be used for producing tofu and replacing wood fuels.
Up-scale potential: The innovation can also be applied to other tofu producing provinces of Indonesia based on the market demand. There are around 48,000 home businesses in Indonesia producing tofu.
- **Cassava solid waste bio-digester:** Targeted at small and home-based cassava enterprises in East Java, one of the largest cassava production centres in Indonesia. The gas produced from the digester will be used for producing electricity or

distributing gas to multiple households for cooking and lighting.

Up-scale potential: Indonesia is the third largest cassava producer in the world.

- **Biogas from palm oil mill effluent:** We will work with palm oil mills to provide energy to nearby communities in Muaro Jambi, one of the centres of palm oil production in Indonesia.

Up-scale potential: Indonesia is one of the largest palm oil producing countries in the world generating a large amount of palm oil waste.

- **Efficient biomass cook stove for coconut sugar enterprises:** Primarily targeted at coconut sugar producers in East Java. SNV has existing projects in the sector with local partners that can support the proposed intervention.

Up-scale potential: There are estimated to be 100,000 coconut sugar producers in Indonesia.

- **Bio-pallet from agri-waste:** Primarily targeted at farmers

in Jambi, as well as Manggarai and Ngada districts in Flores, which have access to large amounts of farm waste and other biomass such as palm fronds, coffee husks and coconut waste.

Up-scale potential: Indonesia is one of the largest palm oil, coconut and coffee producing countries. A large amount of waste is generated and is not effectively exploited.

Goals

SNV has high aspirations for the waste to energy technologies we are developing which have the potential to be significantly upscaled. The immediate goals of this project are:

- Over 1000 households in Indonesia benefit from improved livelihoods through up-scaling of the new technologies and reduction of greenhouse gas emissions
- Six new technologies developed and user tested: 21 biogas and bio-pallet projects completed and 1800 cook stoves built and used
- At minimum of 80% of targeted small and home-based

enterprise users satisfied with the new technologies

- Four local partners trained and supported to disseminate the new technologies
- SNV global advisers and partner organisations have access to technical and user documentation and technical assistance to support replication in other areas

Monitoring and Evaluation

Good oversight of project outcomes and impact is essential for long-term success and potential up-scaling.

SNV will monitor progress and keep track of lessons learnt, continuously improving our business model as we move forward. Our aim is to constantly share our experiences with other actors.



Partnering for success

Local implementation partners will support the construction, testing, and dissemination of the promoted technologies, while SNV will carry out the feasibility studies, identify construction locations, develop appropriate biogas and stove designs, provide technical training on operation and maintenance, and supervise and monitor activities. The national and local governments will play a crucial role in co-ordination and the direct provision of support for up-scaling.

SNV is **now seeking partners** interested in helping bring the project into fruition.

SNV Indonesia

SNV is an international not-for-profit development organisation. Founded in the Netherlands nearly 50 years ago, we have built a long-term, local presence in 39 of the poorest countries in Asia, Africa and Latin America. Our global team of local and international advisors work with local partners to equip communities, businesses and organisations with the tools, knowledge and connections they need to increase their incomes and gain access to basic services – empowering them to break the cycle of poverty and guide their own development.

SNV officially opened its office doors in Indonesia in 2013. We work in close partnership with the Ministry of Home Affairs across three main sectors in Indonesia, water and sanitation, renewable energy and agriculture as well as the crosscutting issue of climate change. Our philosophy is to partner with local organisations and employ local people, believing that lasting change to the lives of the poor has to start with the people who live and work here.



Our projects





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