

The Role of LP Gas in Food Production



Tofu and Tempeh Production in Indonesia - A WLPGA Case Study

Tofu and tempeh (a traditional soy product originally from Indonesia) are fundamental to the Indonesian diet where they are a staple source of affordable protein. Tofu and tempeh are traditionally produced using firewood to heat soybeans. A lack of government regulation has led to poor sanitation, safety and health conditions, and high environmental impacts.

This case study looks at a project that scales up efforts to replace firewood with LP Gas and to enable small and medium sized tofu and tempeh producers to produce nutritious, hygienic and environmentally friendly produce.

World LP Gas Association
182 avenue Charles de Gaulle
92200 Neuilly-sur-Seine - France
www.worldlpgas.com
www.exceptionalenergy.com

1. The Story/Background

In urban Jakarta and the surrounding cities in Java, Indonesia, tofu and tempeh are fundamental staples of the Indonesian diet and an important source of protein and other critical nutrients, especially for low-income households.

Demand for these products is served by an industry of small and medium sized enterprises (SMEs) employing 285,000 workers in some 85,000 businesses. This generates some 57 million EURO per year. However production practices are extremely energy inefficient and environmentally damaging. Businesses use firewood which results in a per-factory emissions average of 450 tons CO₂/year and sector-wide emissions of 30 million tons.

Java represents a significant fraction of total production with approximately 68,000 small factories, 9,000 of which are located in the Jakarta metropolitan area. A single factory can produce anywhere from less than 50 kg soybeans per day to more than 1,000 kg.



Tofu and tempeh are traditionally produced using firewood to heat soybeans. Soybeans can be cooked using direct heat or a steam boiler which is hand-made in house or by a nearby producer or cooperative. The lack of government regulation has led to poor sanitation, safety and health conditions, and high environmental impacts. For example soybeans are often boiled in repurposed oil drums, which contain harmful chemical residues, and producers may add other harmful chemicals, including formaldehyde, to extend shelf-life. At the same time, producers are experiencing economic and political pressure with rising fuel and soybean costs and expanding urban development.

The tofu and tempeh sector is in need of suitable, scalable, and sustainable production technologies. At the same time the sector - with its vast conglomeration of Micro, Small and Medium Enterprises (MSMEs), inefficient processes, environmentally damaging production practices, inadequate waste disposal, lack of hygiene, insufficient access to credit, low awareness of new technologies, and low-paid employees - offers an opportunity to have a significant impact on mitigating environmental damage in Indonesia while reducing urban poverty.

Tofu and tempeh are sold by producers in local markets throughout the city, or fried and sold as snacks in roadside snack stalls.

2. The Project

Mercy Corps is a leading global humanitarian agency dedicated to saving and improving lives in the world's toughest places.

Mercy Corps has leveraged its links to producer associations, ministries and the National Standards agency to build a successful programme which has supported some 1,000 producers to switch from firewood to LP Gas since 2009.

The project developed a lease-to-own financing scheme where equipment also serves as a guarantee. This enables small producers to purchase clean technologies.

The SEEP network provided the initial funding to pilot the project to verify the approach/methodology. In January 2012 the programme received REEEP and EU funding and as such was able to expand the project. In their ninth funding cycle REEEP was looking for innovative projects that harness the benefits of clean energy in both food production and in reliable water supply – recognising the importance of the food-energy-water nexus.

“As REEEP’s core mission is to provide clean energy solutions to entrepreneurs and SMEs to improve their daily business, Mercy Corps’ approach was exactly the kind of project that we were looking for. We are very excited about their achievements”, says Claudia Florowski, Programme Officer at REEEP.



3. The Scope

The very specific nature of production, with its vast network of SMEs, environmentally damaging production practices and low-paid employees offers an opportunity to have a significant impact on mitigating environmental damage in Indonesia and reducing urban poverty. Key problems in the current production methods are inadequate processes, inadequate waste disposal, lack of hygiene, insufficient access to credit and low awareness of technologies.

In January 2012 the programme received EU funding and was able to expand.

4. Project Activities

- Mobilise and engage producer associations and co-operatives for the switch.
- Establish model factories.
- Hold workshops in cost-benefit analysis.
- Develop partnerships with Ministry of the Environment (MoE), banks and small producers to increase access to develop lease-to-own schemes and other innovative financing options.
- Support consumer demand through media campaigns.
- Demonstrate the long term benefits and better link the SMEs with financing options.
- Disseminate and promote uptake of successful solutions.



Top 5 reasons for using LP Gas over Firewood in Tofu & Tempeh production

- As quoted by one tofu and tempeh producer (source Mercy Corps)

1. Cleanliness of the factory
2. More hygienic
3. Less labour intensive than firewood
4. Less storage space needed than firewood
5. Time efficiency

5. Immediate Benefits

- Time savings of one and a half to two hours per day. This could have potential value because the producer makes very long days seven days a week producing and selling tempeh. Any price difference is seen as an acceptable price to pay for the time gained. Producers may choose to use this opportunity
- time to rest or engage in other activities that may be important to the family.
- Reputational benefits based on the cleaner kitchen and end-products. Hygienic production also allows producers to obtain a government certification, which opens markets to new clients, such as restaurants, hotels, supermarkets, etc.
- Avoided risk of firewood scarcity: cheap wood is becoming scarcer in the study area. Tempeh producers mostly use cheap recycled wood from destroyed buildings or used boxes at the market but there are fewer buildings made of wood and more market boxes made of plastic these days. Tempeh producers are spending more time on trying to find cheap wood. They foresee this will become a much bigger problem in the future.



Increased health conditions in producer's kitchen: no more smoke from wood burning stove.

6. Expected Impact of Adoption of LP Gas practices



- 100 enterprises to switch to energy efficient production practices.
- Achieve a 75% reduction in emissions equivalent to 25,000 tons CO2 per year.
- Achieve a 15% reduction in water waste.
- Achieve a drastic reduction in smoke and related illnesses in the workplace.
- Significantly decrease/remove the associated production costs of using firewood (cost of workers, power to fuel exhaust blowers, cost of maintaining tools).
- Increase profitability of 'clean' producers by an average of 500 EURO per year.
- Improve access between food producing SMEs and government programmes and financial institutions.
- Improve overall capacity of Indonesian business intermediaries to promote sustainable production practices.
- Reduce deforestation.
- Overall increase in awareness of the importance of sustainable food production and healthy consumption among consumers, which will in turn increase demand for clean green tofu and tempeh products.

7. Acknowledgements

REEEP (www.reeep.org)



Mercy Corps (www.mercycorps.org)

