

BUSINESS MODEL PROFILES: ENERGY

SUMMARIZED FROM THE FORTHCOMING PUBLICATION
RESOURCE RECOVERY FROM WASTE



RESEARCH PROGRAM ON
Water, Land and
Ecosystems



Producing Briquettes from Municipal Solid Waste

Business characteristics

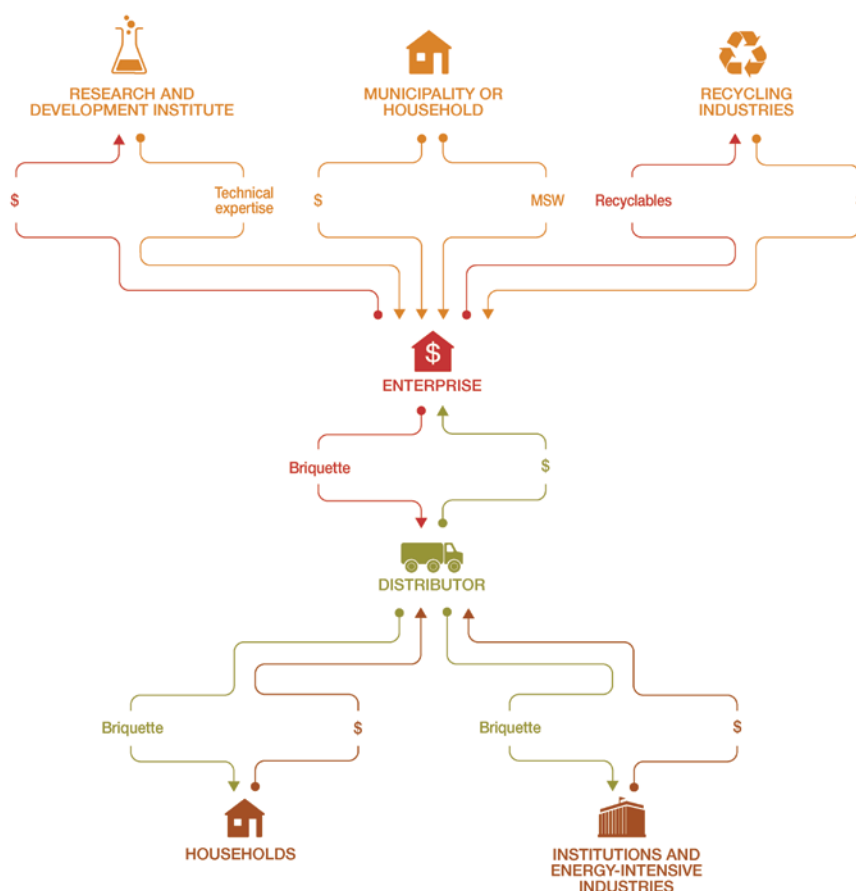
Geography	Regions where there is a lack of availability of fuelwood
Scale of production	Small scale (less than 200 tons of briquettes per year) and medium scale (200-1,500 tons)
Type of organization	Private or cooperative public-private partnership
Investment cost range	About USD 30,000-450,000
Key costs	Investment cost (land, building and machinery) and operational costs (transportation, labor, disposal, utilities, maintenance, marketing and packaging, training of distributors/micro-franchisees)
Revenue stream	Briquette sales, waste collection and management fees, and potential sale of recyclables and carbon credits

Business model

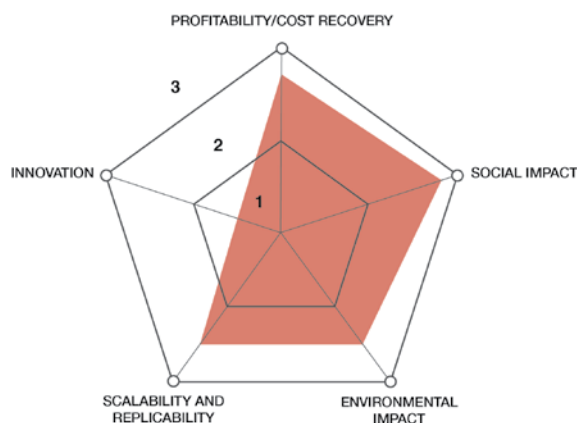
The business model converts municipal solid waste (MSW) into briquettes to be sold as clean fuel for cooking and heating. Briquettes can be produced with limited skill and can replace natural firewood and raw biomass, providing customers with a low-cost fuel that emits less smoke and offers higher calorific (energy) value. The business also provides municipalities with a waste collection and management service.

In the model, a private enterprise, or a cooperative under a public-private partnership (PPP) collects MSW from municipalities or households to process this into briquettes. The organic waste is then separated and compressed at high temperature with a binding agent to produce briquettes. These are then sold to households and businesses through direct sales, distributors or micro-franchising. The company can also invest in research and development (R&D) in order to improve product quality.

BUSINESS MODEL VALUE CHAIN



Business performance



The business model scores highest on profitability and social impact, with two strong revenue sources (sale of briquettes and waste management fees) and the provision of a high number of jobs, especially in waste collection. It ranks low in innovation as it does not require any sophisticated technology or financing.

Main risks

Market risks: Risks are high for households using firewood as the willingness to pay is significantly lower.

Competition risks: Briquettes have to compete with alternative products such as charcoal, wood and kerosene, which can be more easily available and cheaper.

Political and regulatory risks: In most developing countries, cooking is a social issue, with governments providing subsidies for fuels such as kerosene. This results in these products being priced lower than briquettes, thereby posing a significant risk to the business model.

Safety, environmental and health risks: Processing MSW poses a high risk for environmental pollution and human health, if appropriate measures are not taken. These include the contamination of groundwater or other natural water sources, and health and safety risk for workers.

Case study: Kigali, Rwanda

Established in 2002, Coopérative Pour La Conservation De L'Environnement (COOCEN) is a women's cooperative which produces briquettes from MSW collected in the Rwandan capital, Kigali. Through a strategic PPP with the Kigali City Council, the cooperative collects waste from 4,000 households for a fee, and then produces briquettes from the organic components of this waste. This is done at a production plant in the low-income Nyamirambo District of Kigali, where the council has provided 7 hectares of land.

With government support, COOCEN has been able to create the market for its products and services,

making revenue from waste collection fees and sale of briquettes (major revenue streams), and selling compost and improved cooking stoves (minor revenue streams). It has also managed to change people's attitudes towards paying for waste collection through extensive awareness campaigns on waste, sanitation and the environment. This has resulted in the cooperative selling around 1,500 tons of briquettes per year to schools, prisons and factories, and thereby preventing wood burning and reducing carbon dioxide (CO₂) emissions. It has also brought social benefits from the employment of over 100 workers, of which 90% are women (mainly widows and former sex workers).

Key performance indicators (as of 2012)

Capital investment:	USD 162,075	
Labor:	110 employees (90% women)	
Operation and maintenance cost:	USD 94,875	
Output:	1,500 tons of briquettes per year (retailed at USD 0.122/kg)	
Social and environmental impact:	Job creation and income generation (women members earn USD 50/month), improved sanitary and health conditions for households, 1,200 tons of firewood per year not burned, and CO ₂ emission savings of 297 tons/year	
Financial viability:	Payback period: 3 years	Gross margin: 42%

For more information on the business model and related cases, see Chapter 3 of **Otoo, M.; Drechsel, P. (Eds.). 2017. Resource recovery from waste: Business models for energy, nutrient and water reuse in low- and middle-income countries. London: Earthscan/Routledge. In press.** The book has been produced by the Resource Recovery and Reuse subprogram of the International Water Management Institute (IWMI), under the CGIAR Research Program on Water, Land and Ecosystems (WLE) and its Rural-Urban Linkages Research Theme. The support of the Swiss Agency for Development and Cooperation (SDC), the International Fund for Agricultural Development (IFAD), and CGIAR Fund Donors (www.cgiar.org/about-us/our-funders/) is gratefully acknowledged.