Business Model Case Study 2: Municipal Solid Waste

Wilson Bio-Chemical in Yorkshire, UK

Introduction

This SME develops technology for the waste management sector, converting municipal solid waste (MSW) into products by using steam in large rotating autoclaves. The technology can process mixed waste streams, separating the biodegradable fraction from recyclable resources. The biomass is processed into a fibre product, sold as a renewable energy source for combustion (generating power), gasification (syngas), pyrolysis (hydrogen and methane), and anaerobic digestion (methane and fertiliser) and, in the future, as raw material input for biobutanol-, acetone- and ethanol-production in the chemicals industry. After years of development with a pilot- and demonstration plant, the technology has reached full commercial scale with a plant processing 150,000 tonnes of MSW per annum.

Circular business model canvas

The business model on the next page shows how a company can exploit technology developed through extensive R&D. WBC has developed a truly "multi-dimensional" value proposition, integrating economic, technical, social and environmental values appealing to multiple interdependent customer segments. Both in terms of customer relations and key partnerships, this business model is characterised by strong, dedicated relationships. Supply chain relations are expanding with the exploration of higher value applications of recovered resources, contributing to the regeneration of the wider socio-economic and environmental context.

Drivers and barriers

This business model is driven by environmental and socio-economic challenges, offering a technological solution that can be seen as regenerative – especially in the context of developing countries. The model does depend on continued waste generation which in the long-term may not be sustainable. However, within any reasonable timescale availability of new and already landfilled MSW can be guaranteed. This prevents dissipation- and enables the recovery of multiple types of value as explained in the circular business model on the next page.

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Circular business model canvas: Wilson Bio-Chemical (WBC), Municipal Solid Waste (MSW)

Key partnerships

Joint ventures with technology adopters.

Investors.

Government bodies funding R&D projects.

Academia and research institutes.

Activities to create, distribute, sell and recover values

Technology development; R&D projects; Waste resource testing; Product development.

Secure regulatory permits to use technology and products, such as the end-of-waste application for Biocoal.

Prepare investment opportunities.

Physical, financial, human and/or intellectual assets needed to create, distribute, sell and recover values

Trademarks in Europe and USA.
Intellectual property.
Pilot- and demonstrator plants.
Human resources – know-how and know-how-not-to.
Professional indemnity guarantee protecting the customers' financial capital.

Value added proposition, e.g. economic, technical, social and /or environmental value of product or service

Technology to convert MSW into valuable chemicals; Separate organic fibres from recovered technical materials.

Solve MSW problem with convenient, scalable solution avoiding separation challenges.

Renewable energy supply.

System meets own power and heat requirements, and has low water costs.

Environmental value by reducing and emptying landfills, freeing up land for other purposes, with positive effects on public support.

Social value in taking people off landfills and creating jobs.

Price of waste management competitive compared to incineration.

Types of customer relationships

For each development, technology is transferred by setting up a project team consisting of contract- and project-manager from WBC and customer-engineer "Engineering Procurement Contractor" who carries the commercial risk for the development.

Communication, distribution, sales and other channels used to reach customers

Direct contact - customers and WBC mostly communicate via the telephone for sales and during development. After plant commissioning communication shifts more towards online media.

Customer segments

Interdependent segments, including:

Problem owners:

1. Municipalities providing the waste and sites.
2. National governments of developing countries with large landfill sites creating social and environmental issues.

And solution providers:

3. Private project developers, e.g. waste management companies and landfill operators.

Types of costs to create, distribute, sell, and recover value (e.g., financial, social and environmental costs)

Staff costs and all the usual costs to operate an SME such as office costs, electricity, insurance, etc.

Above average R&D costs.

Social capital: training and knowledge transfer to new employees.

Types of benefits for *your* business and the mechanisms required to capture them

Current: License fee to use the intellectual property, either as annual fee or proportionate to weight MSW processed.

Future: Lease facility after WBC makes capital investment in partnership with investor; possibly in relatively small systems for the shipping sector.

Costs and benefits created and shared in the wider circular supply chain

The supply chain within which WBC's technology will be used starts from waste producers such as households and commercial facilities to the waste management and landfill operators handling the waste using the WBC system, and the downstream reprocessing of recyclables, use of Wilson Fibres and Biocoal or chemicals and manufacturing of new products. Partnerships are increasingly strengthened through R&D into higher value applications, anticipating delivering more economic, technical, environmental and social benefits whilst controlling for negative impacts.

Context: Wider costs of- and benefits to the economy, society and/or environment

The WBC system is marketed in developed and developing countries, offering solutions when wastes are already generated. While waste prevention and reduction should always be prioritised, the reality is that large volumes of mixed waste are produced around the world. Within that context, the WBC system offers a regenerative solution dealing with environmental issues including climate change and pollution caused by waste landfill and incineration as well as growing energy demands. Wastes, especially the biodegradable fraction, are diverted from landfill, reducing greenhouse gas emissions and freeing up land for other purposes whilst producing feedstock for renewable energy, reducing demand for primary materials by offering secondary resources to the market, and creating new knowledge, skills and jobs.