



Business model

RENEWABILITY

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Source: Sitra





NESTE

Currently nearly 80% of the raw materials in Neste's renewable diesel are made up of waste and residues. The life-cycle carbon dioxide (CO₂) emissions of renewable diesel are considerably lower compared to fossil diesel.



Problem

Fossil fuels for transport generate vast amounts of carbon dioxide emissions. The earth's resources are limited and competition for raw materials is increasing. Many waste and residue streams are currently underused.

Solution: Neste MY Renewable Diesel made from renewable raw materials

The majority, nearly 80%, of the raw materials used in the product are waste and residue fat and vegetable oils from the food manufacturing industry. The products offer considerably lower carbon dioxide emissions over a life cycle compared with fossil diesel. The product has been enabled by Neste's investments in research and development in areas such as renewable raw materials and products and the NEXBTL technology. The company has more than tripled its investment commitment in this area in the last 10 years.

Revenue logic and benefits to Neste

More and more of the net sales and operating profit comes from renewable products, while only ten years ago the figures were close to zero. Neste is the world's largest manufacturer of renewable products made with waste and residue.

Benefits to customers and end users

For consumers, transport businesses, city authorities and distributors, Neste MY is a cost-effective alternative to the increased use of renewable energy and the reduction of carbon dioxide emissions without investing in new vehicles. It also releases fewer impurities into the atmosphere. The fuel is of high quality and odourless, it burns efficiently, is suitable for sub-zero conditions and doesn't require any additional vehicle maintenance. It can be used, distributed and stored in the same way as regular diesel.

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HOISKO CLT

The cross-laminated solid wood elements made by CLT Finland enable modern and sustainable solid wood construction. Wooden block buildings bind carbon, and sustainable forest management takes care of a renewable source of raw material.



Problem

The traditional concrete construction process produces plenty of carbon dioxide emissions and consumes a lot of energy and resources due to mining and transportation of raw materials. Concrete is made of non-renewable raw materials and it has limited possibilities for secondary use because of its low cost of production and construction quality requirements.

Solution: sustainable and comfortable wooden construction with CLT elements

HOISKO's cross-laminated timber (CLT) elements are manufactured from Finnish solid wood that can replace load-bearing frame materials that are typically made of concrete and steel. CLT elements are non-toxic and lightweight, thus allowing wooden apartment buildings to be built higher. The products can be used in building wooden apartment blocks and detached houses, and in the wooden components of buildings, such as balconies. Wooden construction commits carbon to buildings and reduces atmospheric emissions. The CLT elements have also been designed to fit a variety of uses throughout their lifecycle.

Revenue model and benefits to CLT Finland

CLT Finland's revenue model is based on selling CLT panels to builders and manufacturers that equip the panels for specific uses. The company's current revenue model is based on manufacturing and refining CLT panels and providing builders and construction companies with advice and cost-efficient construction. The production's side streams are also utilised, such as waste timber.

Benefits to customers and end users

For the builder, constructing the frame of a building with CLT elements is considerably faster than using traditional, beam-based frames. Highly prefabricated CLT elements also help reduce risks related to weather changes during the construction period. CLT panels are a cost-efficient and durable material. In addition, wood is much easier to work with as a material and serves also as a marketing factor because of its environmental sustainability. Studies show that residents in wooden apartment blocks find their homes more comfortable than those in concrete buildings.

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SULAPAC

Sulapac creates fully biodegradable and organic cosmetics packaging to replace plastic. The existing production facilities and infrastructure can be used for manufacturing the packaging. The solution has vast potential to reduce the amount of plastic waste that ends up in the sea.



Problem

Approximately 80 million tonnes of plastic packaging is produced worldwide every year. Up to 30% of plastic packaging ends up in nature, untreated. Microplastics that are released into the oceans harm the ecosystem and ultimately find their way into our food chain. Oil, which is used to make plastic, is also a non-renewable natural resource.

Solution: biodegradable packaging design

Sulapac manufactures luxury biodegradable packaging, which can be used for products such as cosmetics. Packaging material is produced using wood chips from certified forests and natural binding agents, which are used to mould the packaging to meet customer needs. The barrier coating material developed for the packaging ensures that the products will be preserved for their intended life cycle.

Revenue logic and benefits to Sulapac

Sulapac offers its customers a ready packaging concept, which includes the design of the packaging according to the customer's needs. The comprehensive solution provides a competitive advantage over the competition, as traditionally the packaging design and finishing is the customer's responsibility. Sulapac packaging can also be sold through licenced manufacturers.

Benefits to customers and end users

The biodegradable packaging made of renewable raw materials reduces the environmental footprint of Sulapac's customers. Ready-to-use packaging also helps its customers, who do not have to design the end product's finishing or company markings.

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GASUM

Gasum offers renewable domestic biogas as an alternative to import-dependent non-renewable natural gas. Gasum produces biogas from partners' waste streams and returns it into their product manufacturing processes to be used as supplementary energy.



Problem

The planet has limited resources of farmland nutrients and fossil energy. Traffic emissions will have to be reduced significantly in the coming years to help abate climate change. Industry, agriculture and households produce high volumes of organic waste, which will have to be utilised in new innovative ways, since the landfill disposal of biowaste will soon be banned in many countries.

Solution: Renewable energy and organic nutrients from biodegradable secondary streams

Gasum receives community biowaste and slurry, organic secondary streams from various manufacturing industries and commercial operators, and secondary streams from agriculture. The waste products undergo a biological digestion process, which produces biogas and nutrient residue. The biogas is refined into a transportable form appropriate for the intended application, and nutrients are used as they are or processed for application on fields, in landscaping projects or as a replacement for inorganic nutrients for the manufacturing industry. Biogas is used as vehicle fuel, in households, in heating systems and as industrial energy.

Revenue logic and benefits to Gasum

Gasum sells its energy and nutrient products and waste-processing services to customers. By bringing together different markets and identifying node points, the company is able to form partnerships and create new business.

Benefits to customers and end users

Biogas can significantly reduce emissions from vehicles and energy production while giving biowaste a purpose, thus contributing to circular economy targets. Both corporate customers and consumers can reduce their carbon footprint and act in a more sustainable manner, whether as raw material suppliers or product users. In addition, biogas is considerably cheaper than petrol, which consumers will be able to see in their wallets.

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KEKKILÄ GARDEN

Kekkilä manufactures compost fertiliser from organic waste. Its products replace fertilisers made from virgin raw materials, giving long-lasting fertilisation and supporting microbial activity in the soil.



Problem

There is an acute need for solutions to process organic waste produced by local communities and industrial operators. For example, wastewater treatment plants produce high volumes of nutrient-rich sewage sludge from which nutrients could be captured for reuse.

Solution: fertiliser from organic waste

Kekkilä produces compost fertilisers from organic waste sourced from factory sites. For example, Kekkilä's soil-improving compost, which is made from a combination of biowaste, sewage sludge and grass clippings, is used in its ready-made landscaping substrates. The recycled nutrients are used in growing media in parks and other green spaces. The solution helps to create a closed nutrient cycle and reduces the need for additional nutrients from non-renewable sources.

Revenue logic and benefits to Kekkilä

Kekkilä sells growing media made from organic waste for various landscaping applications. The company is able to use recycled materials by offering a responsible processing method for problematic organic waste.

Benefits to customers and end users

By using Kekkilä's products, customers are helping to convert waste into new growth in parks and other green spaces. The company's compost products offer long-term fertilisation. They improve water retention and microbial activity in soil, which means happy plants. Microbial activity helps to release nutrients from the growing media at slow rates to better sustain the plants.

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AQUAZONE AND EKOLANNOITE

Aquazone and Ekolannoite have developed a solution that cleanses waste water and makes an adequate fertiliser, thus allowing the field to benefit from the nutrients and sparing the water system from additional chemical and nutrient load.



Problem

The global water situation is constantly deteriorating as a result of pollution, climate change, population growth and industrial growth, among others. It has been estimated that by 2025, two thirds of the world's population will suffer from an acute lack of clean water. In addition, releasing poorly treated waste water into the environment leads to local problems in food production and in the ability to obtain drinking water.

Solution: turning waste water into soil-treatment materials and drinking water

Aquazone produces technology and expertise, which can be used for remodelling waste water treatment plants into water purification facilities. Waste water is primarily treated biochemically, where water, solid materials and nutrients are separated. The treated water can either be used for irrigation in agriculture or used as drinking water.

The treatment of the sludge consisting of the solid materials and nutrients is handled by Aquazone's partner, Ekolannoite, which specializes in the manufacture of organic fertilizers and soil-treatment materials. The sludge is treated with two chemicals, after which the material is free of any harmful bacteria and is ready for use in farming.

Revenue logic and benefits to Aquazone and Ekolannoite

The total solution is still under development. The revenue logic will be based on building or remodeling plants in cooperation with their owners. The goal is to develop through joint operations where cooperation is developed with reliable local partners in developing countries. In addition, Aquazone aims to develop a model where full responsibility for the plant will be assumed for a 3 to 10-year period, which allows time to teach the local partner to use the plant effectively.

Benefits to customers and end users

Aquazone's waste water treatment technology and the soil-treatment material produced from sludge by Ekolannoite can increase the availability of clean water and farming possibilities in developing countries. Cleaning waste water and the soil-treatment material obtained from it allows self-sufficient farming and also improves the ability to live in difficult conditions.

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ARCTIC BIOMATERIALS

Arctic Biomaterials manufactures bio-based plastics and composites that provide opportunities for new innovative solutions. The materials can help reduce the product's carbon footprint by up to 80% and cut dependency on non-renewable raw materials.



Problem

The manufacture of plastics and composites requires non-renewable, fossil-based raw materials. At the end of their life cycle, pure plastics can be recycled, but nevertheless plastics and composites are usually destined for incinerators. Plastics and composites are durable, multipurpose materials. For example, they can be used to make vehicles and machines lighter, which reduces fuel consumption. The replacement of plastics and composites with bio-based materials is a challenging task, since biomaterials do not generally tolerate high processing temperatures.

Solution: biomaterial to replace oil-based plastics and composites

Arctic Biomaterials has developed an environmentally friendly alternative for demanding technical applications. The company manufactures bio-based plastic from lactic acid polymers and additives as well as a bio-composite, which is available in granular form. The formula varies slightly depending on the intended application and can tolerate processing temperatures of up to 165 °C. The bio-composite is compostable or can be broken down into lactic acids and reused as raw material.

Revenue logic and benefits to Arctic Biomaterials

The company's revenue comes from the sale of bio-plastics intended for technical and medical applications. The sale of material instead of finished products is the best alternative for the company, as applications vary.

Benefits to customers and end users

Many companies are aiming to reduce their dependency on fossil-based raw materials and cut down the carbon footprint of their products, and Arctic Biomaterials provides a solution for this aim. Customers can also capitalise on the responsibility aspect in their marketing activities.

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INFINITED FIBER

Difficult waste streams, such as rejected textiles and recycled fibres, can produce higher added value as new products. Infinited Fibre recycles fibres to produce virgin raw material for textile products.



Problem

The textile industry is one of the world's most polluting industries. For example, enormous amounts of water, land and chemicals are needed for producing cotton, which results in uncertainty about the future availability of cotton fibre. Oil-based textiles, in turn, release microfibres into waterways when washed. At the same time, the useful life of clothes has become shorter and 85% of textile waste ends up at landfills.

Solution: textile fibre from waste

Textile, paper and cardboard waste can be used to produce a cotton-like, soft textile fibre using Infinited Fiber's technology. The cellulose in the raw materials is processed into a 100% cellulose solution and reshaped into ready fibre using nozzle technology. The fibre can be used to solve the environmental problems caused by textile production and textile waste disposal.

Revenue logic and benefits to Infinited Fiber

The company sells technology licences for producing fibre. The usefulness of the fibre has been demonstrated in laboratories and the next step is to start operations in a pilot plant in Espoo. The technology licence will be ready for the global markets by 2020. Due to the licencing sales model, the company does not need to invest capital in all of the production facilities that make use of the technology.

Benefits to customers and end users

There is a demand for a cotton-like fibre that is produced ecologically in the global textile and consumer markets. Infinited Fiber offers considerable brand benefits to customers who are seeking more sustainable alternatives for textile fibre – customers will also be able to use the solution to ensure the supply of affordable recyclable textile in the future.

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