



A CIRCULAR ECONOMY IN BRAZIL:

Case Study Appendix

A product of the collective
expertise of members of the
CE100 Brasil Network

January 2017



INTRODUCTION

This document is an appendix to the paper *A Circular Economy in Brazil: An Initial Exploration*, written with the collective expertise of members of the *CE100 Brasil* network and the supporting team from the Ellen MacArthur Foundation. The paper was launched with the 2nd Acceleration Workshop of the *CE100 Brasil* network in São Paulo on 25th October 2016.

The paper is intended as an introductory piece that provides an initial overview of existing circular economy activities in Brazil and identifies potential opportunities in bringing such activity to scale. It covers three focus areas significant to the Brazilian economy: agriculture and biodiversity assets, buildings and the construction sector, and electrical and electronics equipment.

This case study appendix has been coordinated by the Ellen MacArthur Foundation team. Profiled companies and *CE100 Brasil* members have led the development of their individual case studies. Contributors are listed in the acknowledgements. Individual participation does not necessarily equate to endorsement of the paper's full contents and conclusions.

ABOUT THE *CE100 BRASIL* NETWORK

The *CE100 Brasil* is a pre-competitive collaboration and innovation programme, bringing together key stakeholders from businesses, governments, academia and affiliate organisations to work as a living lab for the transition to the circular economy in Brazil. It was the first localised network of the global *CE100* programme, and its aim is to help organisations on their circular economy journeys by providing four pillars of support: Learning, Capacity Building, Networking and Collaboration.

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AGRICULTURE & BIODIVERSITY ASSETS

NATIVE (THE BALBO GROUP)

Regenerative agriculture at scale in sugar cane production

The Balbo Group has pioneered large-scale regenerative sugar cane production in Brazil. Under the name Native it created a strong organic sugar brand that is now the world's leading producer and retailer of organic sugar. In 2015 Native grew organic sugar cane on 22,000 hectares of land and made profits of US \$10 million.

The Approach

Inspired by the 'interconnectedness and sophisticated communication network¹ seen in living systems, the Balbo Group developed the Green Cane Project in 1986. This Project enshrined a new approach to the production of sugar cane – one that applies the principles of regenerative agriculture. The approach includes:

- Eliminating the practice of burning unused parts of the sugar cane plant prior to harvesting
- Automating practices that previously required strenuous manual labour to allow workers to be redeployed to higher skilled tasks
- Using zero tillage² to re-incorporate the significant volumes of organic matter that sugar cane produces back into the soil's physical structure
- Adopting biological pest control and eliminating pesticide use
- Applying detailed landscape planning to analyse the land use and identify where biodiversity 'islands' or 'corridors' should be preserved (this can be based on where natural vegetation is required to preserve soil, or where there is a particular concentration of biodiversity that needs preserving)
- Using liquid waste from nearby agribusinesses (such as sugar mills) as fertiliser
- Adopting practices to support green manure and crop rotation.

1 Leontino Balbo Jr, Executive Vice-President, interview, 'Is this the future of Global Food Systems?', a film by the Ellen MacArthur Foundation, 2015.

2 Zero Tillage is the practice of leaving crop residue in the soil whilst no mechanised tools are used to turn the soil. The practice results in reduced mechanised tool costs and reduced soil erosion.

The Impact

Since Native's launch in March 2000, it has quickly become a leading brand in the organic food market worldwide. Selling products in over 60 countries on all continents, the company can meet demand from both domestic and international markets. Its success is seen as a paradigm for regenerative agriculture, setting the benchmark for others to follow.

Their Green Cane Project approach has resulted in:

- Increased crop yields and productivity
- Improved soil fertility
- Increased biodiversity with over 340 different species of mammals, birds, reptiles and amphibians co-existing on the sugar cane farms
- Improved water quality and reduced water use
- Reduced incidence of pests
- Reduced production costs due to organic production methods eliminating the need for synthetic chemical inputs
- Improved working conditions for workers through reduced exposure to non-biodegradable and toxic pesticides, and the provision of professional training that takes into account the Green Cane approach.

At its core, the Balbo Group's Native sugar cane plantations have moved from a traditional linear model to one that is organic, highly productive and profitable. The approach also generates numerous positive externalities that strengthen natural systems and has come to be highly regarded. The Green Cane approach has and continues to strongly influence the entire sugar cane supply chain across Brazil.

Looking forward, the Balbo Group is now seeking to apply this biointelligence and regenerative methodology to other crops in their production systems, as well as influencing other agricultural producers across the globe.

NATURA

Creating a regenerative economy working with the Amazon

Natura is widely recognised as one of the most innovative and sustainable cosmetics companies in the world with a consolidated net annual revenue of R\$7.9 billion in 2015. Headquartered in Brazil, Natura employs over 7,000 employees and is a leader in the direct sales sector with 1.9 million consultants around the world. In December 2014, Natura became the first publicly-traded company to become B Corp¹ certified, supporting its transparent and sustainable approach to social, environmental and economic performance.

The Approach

In July 2011, Natura launched its 'Amazon Program' to put in place an inclusive, regenerative business model in the Amazon region of Natura's operations. The model is built on the concept of 'floresta em pé' (literally translated as "standing forest" or "living forest") and is designed to echo the regenerative cycles of the forest.

The Amazon Program reinforces Natura's strategic choice to transform social and environmental challenges into business opportunities, with Amazonian biodiversity one of the company's main sources of innovation. By incorporating biodiversity assets in Natura's products, the company combines traditional community knowledge with scientific research and in doing so generates long-term employment for more than 2000 families.

The Amazon Program aims to source 30% of all Natura's raw materials from the Amazon region by 2020, in turn enlarging the "standing forest" economy. It also seeks to generate R\$1 billion of revenue in the region by 2020.

The Impact

The Amazon Program has led Natura to:

- Develop Sustainable Production Chains in partnership with traditional Amazonian communities. Working with 30 supplier communities, this has led to more than 25 natural ingredients being developed to date
- Develop new processes and systems to provide traceability in supply chains and fair trade terms for communities
- Support social projects in communities, such as the installation of micro-mills to increase the added value of community production
- Invest in sustainable production and stewardship systems, such as organic agriculture, agroforestry systems and stewardship of populations of native flora and fauna to guarantee their viability
- Drive innovation in the customer product offer.

¹ B Corporations are certified by B Lab for creating businesses aiming to solve social and environmental issues (find out more at <https://www.bcorporation.net>)

The project has also led Natura to try to support and inform customers about their product choices, providing insight into their regenerative and biointelligent approach. For example, in 2015 Natura launched Ekos Ucuuba products, made from the fruit of the Ucuuba tree that has been threatened with extinction following extensive felling for timber. Following the Amazon Program's discovery of the Ucuuba fruit's potential for use in cosmetics production, local communities have begun maintaining the Ucuuba trees to harvest their fruit. This has led to local communities earning three times more than they would from selling the Ucuuba timber, benefiting 15 communities to date comprising some 600 families in total. It has also raised consumer awareness of the Ucuuba tree's properties above and beyond timber, and in so doing has changed consumer mindsets and behavior.

During 2016, Natura sourced 15% of its raw materials from the Amazon region and 83% of product ingredients have come from plants. In Natura's perfumes 100% of the alcohol used is organic and comes from regenerative agriculture systems. The Amazon Program has also led Natura to make more than R\$900 million of investments. Overall the Amazon Program business model has contributed to the protection, recovery and sustainable use of the Amazon ecosystem, the expansion of sustainable forest management, and the reversal of land degradation and species extinction.

BUILDINGS & THE CONSTRUCTION SECTOR

PRECON ENGENHARIA

Reducing structural waste in construction through circular innovation

Precon Engenharia is a Brazilian precast concrete company, which in 2010 launched the 'Solução Habitacional Precon'. This was the first residential housing development in Brazil constructed using industrialised modular processes inspired by the automotive industry. The patented construction method has proven very successful in reducing waste, improving working conditions, and reducing costs for the Precon Group.

The Approach

Research and Development lies at the core of Precon Engenharia and has led to their development of many innovative precast products using a lean and fast construction process. In the case of the Solução Habitacional Precon, buildings are produced in sections at an industrial plant and assembled at the construction site. The approach has been met with approval by the Ministry of Cities for use across Brazil.

The Impact

By switching to and optimising a modular construction technique, the construction of Solução Habitacional Precon has led to:

- A reduction in waste of 85% compared with average waste production in the Brazilian construction sector
- A halving of construction time
- A halving of costs.

By applying a modular construction and logistics operation, Precon has also been able to reduce its use and stocks of materials.

Alongside these developments, Precon has also invested in production processes and staff development. Applying ergonomic considerations to the production floor has led to reduced faults and losses in the production cycle and supported higher quality construction and materials. These improvements have simultaneously led to safer working conditions, increased productivity, and fewer business risks.

Investment in the production processes has also enabled greater flexibility with regard to the residential units by increasing the ability to change building plans and adapt them to users' needs, and by extending the building's lifespan.

TARKETT

Driving circularity from the core of a global strategy

Tarkett is a global leader in innovative flooring solutions and sports surfaces. It is also a company that seeks to demonstrate positive ways with which to respond to the major long-term challenges facing the world today, from an aging and increasingly urban population to resource scarcity and climate change. The company aims to choose materials that are safe for people and the environment and which can be reused in technical and biological cycles so that post-use products can re-enter the system and waste can be eliminated. Circularity has been placed at the core of the company's global strategy.

The Approach

Tarkett develops new products focused on closed-loop circular designs that promote 'good materials', resource stewardship, people-friendly spaces, and reuse – an approach that requires thinking about end of use pathways right from the start. Tarkett aims to reuse and recycle everything it produces, either directly or via partnerships. The company has teams dedicated to recovering and cleaning the infill from used artificial turf and fibres from used carpet for reincorporation in new products.

It is also willing to use recycled materials from other industries. Where Tarkett uses such by-products, this reduces or eliminates the use of virgin materials within Tarkett's operations.

The Impact

Tarkett's factory in Brazil is located in Jacareí, São Paulo. Using the circular approach, this factory manufactures vinyl floors. Specific positive impacts have included:

- 65% of total polyvinyl chloride (PVC) used is recycled PVC (post-consumption and post-industrial), representing approximately 100 tonnes per year
- All phthalates, extensively used in the plastics industry as plasticisers, have been replaced by bio-plasticisers based on vegetable oils and alcohols
- All scrap generated in the manufacturing process is internally recycled
- A take-back programme of post-installation or post-consumer flooring commences at the end of 2016. It will first focus on large clients in the southeast of Brazil, with Tarkett assuming responsibility for the transportation costs.

This Brazilian example demonstrates how applying circular economy principles is simultaneously reducing Tarkett's costs, generating more value, and contributing positively to the environment.

Looking at the application of the strategy at the global level, Tarkett's incorporation of the circular approach has also had a significant impact across its global operations. Global results include:

- 80% of raw materials have been assessed according to the Cradle to Cradle® principles
- 67% of materials used do not contribute to resource scarcity
- 92% of flooring products (in m²) have low volatile organic compound emissions
- 9,900 tonnes of post-installation and post-consumer flooring have been collected
- 57% of manufacturing sites have implemented closed-loop water circuits (or do not use water in their processes).

ELECTRICAL & ELECTRONIC EQUIPMENT

RECICLADORA URBANA

Creating systemic benefits with repair and refurbishment

Recicladora Urbana offers companies and organisations a certified end-of-life telecommunications and IT product service, in compliance with Brazil's National Policy for Waste Disposal. Established in 2012, Recicladora Urbana is a small company focused on managing waste electrical and electronic equipment in the B2B market. It does so in a socially and environmentally sensitive manner using a circular economy business model. With increasing experience, the company has progressed from the resale of parts to their remanufacture and to the refurbishment of products.

The Approach

Recicladora Urbana works in the B2B market helping NGOs, small businesses and individuals dispose of unwanted electronic equipment. The company aims at all times to maximise the value extracted from all items it collects.

Recicladora Urbana offers a recovery and repair service, and sells used and remanufactured parts and refurbished equipment to customers through third party websites. It also offers a certified service for safe and secure electronic asset retirement and disassembly for recycling, offering clients full compliance with relevant regulations on repairs, data protection and environmental compliance.

The company establishes contracts with clients to collect their unwanted IT equipment. After collection, it removes data from the equipment in accordance with Brazilian law and disassembles items for refurbishment or recycling. Recicladora Urbana prepares some items for donation to social inclusion projects through a partnership with the Centre for Digital Inclusion (CDI).

The Impact

Between 2013 and 2015, the company collected more than 400 tons of equipment. The greatest contribution comes from the remanufacturing of IT equipment. In 2015, 70% of Recicladora Urbana's revenue came from the sale of refurbished or remanufactured equipment, despite saleable equipment accounting for just 30% of the items collected.

In the same period, more than 250 items of equipment supported social impact projects, reaching more than 2,200 vulnerable people. This was possible because Recicladora Urbana found a balanced business model that is both profitable and helps maintain social inclusion, while enabling the business to develop and grow.

HP BRAZIL

Recovering value from materials beyond manufacturing sites

HP, one of the world's leading technology companies, started operations in Brazil in 1967. To enhance and improve HP global initiatives, in 2008 HP Brazil began to drive an ambitious initiative implement circularity in the EEE sector. HP Brazil's circular economy approach is centred on innovation, technology, and supply chain integration to recover value from materials beyond the manufacturing sites.

The Approach

Under their drive to create circularity, HP Brazil has launched three key initiatives:

- **Take Back & Recycling**

In 2008, HP Brazil and Flextronics became manufacturing partners to identify opportunities to recover materials from end-of-life products. Coordination of distribution, local suppliers, and an internal network of professionals was a key part of the collaboration. The partnership led to the creation of the Innovation and Recycling Technology Centre, now operated by Sinctronics. All end-of-life HP brand products are eligible to be brought to this centre and over 400 collection points have been established, complementing collection facilities already available in post offices.

- **Smart Waste**

In 2011, HP Brazil launched Smart Waste, a project that tracks end-of-life products via radio frequency identification devices (RFID). The tracking system enables HP Brazil to capture key information (model, year of manufacture and material components) through internet-based software. This information supports recycling efficiency at the Innovation and Recycling Technology Centre. It also provides insights to the HP environmental business strategy team, which can assess the amount of material recovered from e-waste sources and ensure the proper reinsertion of these materials into new HP products, or their redirection to other industries.

- **Zero Waste**

In 2013, the Zero Waste programme was launched to deliver on HP Brazil's commitment to eliminate non-electrical and EEE waste to landfill from across the entire supply chain. Example materials include cardboard boxes, plastic packaging and wooden pallets. The Zero Waste programme creates solutions to reuse these products or recycle the materials from which they are made.

THE IMPACT

The circular economy strategy now sees HP products manufactured in Brazil typically containing 8% recycled material. The aim for 2017 is to increase this to 20%. The strategy has also led to significant cost reductions across the value chain, and to environmental benefits such as reductions in GHG emissions.

SINCTRONICS

Leveraging technology and innovation to generate post-consumption value

Sintronics is a company born from the Flextronics' 2010 initiative to drive circularity in the EEE sector, which led to the first Recycling and Technology Center in the country being established. Since 2012, this centre has been run by Sinctronics as an independent business unit of Flextronics (the global electronics manufacturer).

The Approach

Sinctronics is the first integrated ecosystem solution to apply the concept of a circular economy to the electronics market in Brazil. An IT innovation centre combining innovation and R&D in the development of infrastructure and technology, Sinctronics collects post-consumption electronic waste and transforms it into raw materials and components for new products.

Sinctronics first emerged as a system enabler for a client's Take Back & Recycling initiative. It has since expanded to a cross-value chain solution operating over 400 Take Back locations in all 27 states in Brazil. Sinctronics address the reverse cycle and remanufacturing needs of various electronics companies in Brazil, including HP, Toshiba, Lenovo and Receita Federal.

Cross-sector collaboration with universities, industries, retailers, social organisations and logistics operators is a further key part of the model.

The Impact

The in-house R&D laboratory guarantees rigorous transformation processes, resulting in the production of industry standard materials and components that satisfy diverse client requirements. These are able to substitute for virgin materials in electronics supply chains in Brazil without compromising performance. Its closed loop solution for plastics for instance has achieved standards equalling those of virgin materials, positioning the company as a strong competitor to virgin plastic suppliers.

Sinctronics' reverse logistics system can reduce client costs by up to 30% and speed up collection times by 50%.

EMBRACO/NAT.GENIUS

Pioneering circularity in durable consumer goods

Nat.Genius is the innovation business unit of Embraco, a B2B multinational in the sector of hermetic compressors for refrigeration. Nat.Genius offers a closed loop solution to meet the reverse cycle needs of the white goods and commercial refrigeration industries. By engaging manufacturers and informal scrap pickers, Nat.Genius collects, refurbishes and repurposes end-of-life electrical and electronic equipment, especially white goods. The process helps Embraco's commercial partners comply with their environmental commitments under the National Policy for Waste Disposal and reduce their costs associated with reverse logistics and waste disposal in land.

The Approach

Nat.Genius is accelerating the shift to the circular economy through the smarter use and recovery of white goods and refrigeration products, which in turn generates a source of materials and components for new production lines.

Nat.Genius works directly with producers to collect compressors and white goods. Two separate facilities then disassemble the products and prepare them to re-enter the supply chain. Sub-assemblies such as motors are remanufactured and sold on, either within Embraco, or for use in other industries (such as fans). Nat.Genius is constantly developing projects to explore recovery systems that will retain the maximum value from components.

The Impact

Nat.Genius broadens Embraco's scope. Beyond selling compressors, its work adds value to Embraco's customers, offering services and support to help them comply with regulations. It also reduces costs for its customers by reducing their need to pay land fill charges and replacing new parts with lower cost recovered ones. In so doing it assists their shift towards the circular economy.

In 2015 Nat.Genius returned approximately 10 thousand tons of ferrous recycled materials to the Brazilian industry and provided reverse logistics to approximately 20 thousand tons of appliances and its parts. Currently, the operation has capacity of 2 million tons per year. This is the foundation on which it plans to create the conditions for the business to rapidly expand.

In 2015, Nat.Genius was able to produce:

- Steel sufficient to produce a fleet of 4,200 cars
- Aluminium sufficient to manufacture 5 million cans
- Plastic sufficient to produce 70 million pens
- Copper sufficient to make a thread long enough to go around the Earth
- Refrigerators sufficient to reach outer space if stacked one on top of the other.



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