SUSTAINABLE
BUSINESS
COP30

Circular Economy & Materials Working Group

Booklet of Cases

OCTOBER 2025

Introduction

The transition to a circular economy is a fundamental enabler for achieving a low-carbon and climate-resilient future. By rethinking how we produce, consume, and manage resources, circularity offers a pathway to decouple economic growth from environmental degradation — reducing emissions, preserving natural capital, and fostering innovation across value chains. No single fix exists to accelerate circularity, but integrated and objective priorities can drive real progress.

Within the SBCOP Working Group, our Circular Economy pillar recognizes that accelerating this transition requires coordinated action among business, government, academia, and society. To that end, we have identified a set of cases that exemplify practical and scalable circular solutions, aligned with our three strategic priorities:

Regulation and incentives

Robust regulatory frameworks and financial mechanisms are essential to accelerate circular adoption. Key actions include transforming economic systems, improving data transparency, updating policies, and creating credit or reward schemes that stimulate investment in circular solutions.

Circular supply chains

Advancing circularity and reducing GHG emissions depends on developing renewable and recycled materials, minimizing waste, and improving product lifecycle traceability. Public and private capital must be mobilized to support circular business models and infrastructure.

Research, education, and behavior

Consumer education and engagement are vital to scale circular practices. Efforts should focus on raising awareness, promoting sustainable lifestyles, and encouraging long-term behavioral change among individuals and businesses.

Methodology

149 cases were received through the platform and went through a classification process, resulting in 6 final cases

Case Gathering

A total of **149 cases** were received through the platform.

Total	149

Eliminatory

Duplicate, blank, and test cases were removed. Each case was individually evaluated, with public links and additional information researched to support the scoring process.
7 cases were eliminated for being out of scope.

Eliminated	7

Classificatory

All cases that scored positively in the **alignment category with SB COP** were considered eligible. Therefore, the Booklet includes the eligible cases that have been authorized by the entity responsible for each case.

Within Scope	142

Shortlist

Cases with the highest scores and that achieved ratings in **all five evaluation categories** were selected.
14 cases made up the shortlist.

Shortlisted	14

Final selection

Additional information was requested from the 14 shortlisted cases to ensure a more comprehensive qualitative analysis without disregarding the initial data.
The responsible team conducted a qualitative evaluation and selected the **6 final cases**.

Final Cases	6

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Overview of cases

List of cases

Ultra Light Iron (ULI)	From Oil Shale Ash to Precipitated Calcium Carbonate
XLabs: A Proven EdTech Platform Accelerating Private Sector Capability and Cross-Sector Coalitions to Deliver Circular Materials Innovation from Design to Implementation	Mechanical Biological Treatment (MBT) plants are a key strategy for maximising the recycling rate of mixed domestic waste that is collected in urban areas of Emerging Markets and Developing Economies
CPFL Solutions Reformer: Expanding Solutions in the Circular Economy via Electrical Energy Equipment Refurbishment	Recycling post-consumer building glazing to produce new flat glass
Remanufacturing - Too Good to Be Replaced!	Technology as a Vehicle for Funding and Systemic Change
Synthetic Fuel from Plastic Wastes	Ecotransforma
Boti Recicla Program	Circularity in Stainless Steel
Factory Price Station	Project Vale Luz
Cazoolo, shaping the future of packaging through circular design	Wenew – Braskem Circularity Ecosystem
Circular Economy Applied to Lithium Batteries	Yattó Transform (2022–2024)
Cirklo: Scaling Brazil's Largest PET Bottle-to-Bottle Recycling Platform	Açaí Seed Co-processing
Dry Recycling of Contaminated Plastic Packaging	Volta Circle
The Metal Extraction and Green Cement Project	MODUS – Microwave Depolymerization Upscaling
Ambipar Circular Cities: Integrated Solutions for Urban Circularity	Terpene Ingredients - Upcycled starting materials from renewable feedstock
Alpargatas and The Circular Economy: Building the Rubber Recycling Chain	Circular economy: landfills as greenhouse gases mitigators and resources generators
"Renovadores Urbanos": Recovery of post-consumer materials with social impact	Sustainable Manufacturing and Environmental Pollution (SMEP) Programme

List of cases

Benevides Recycles	Carbios–Indorama–Michelin: Biorecycling PET Waste into Tire Textile Filaments
Flexible hydrometallurgy process for lithium-ion battery recycling	Close the Loop
Circular Highly Dispersible Silica (HDS)	Boa Vista Organic Waste Composting Center
Circular use of industrial oil with SKF RecondOil	RODA
Zero Process Waste to Landfill	Sustainable Innovation with PCR Resin in Consumer Packaging
The sustainable journey of packaging: how Tetra Pak promotes the circularity of its cartons	Bioplants - Complete site for the treatment and economic recovery of organic waste
Agents of Good	Vidrado
Use of discarded foundry sand in airport infrastructure construction: a case study at Aeropark Vale Europeu - SC	LIBÉRTECCE – Circular Economy and Energy
Biomethane, Naturgy's commitment to circular, renewable, and decarbonized gas	Industrial Symbiosis: Re-refining of used oil produces raw material for the industry of formulating new lubricants
IVECO NEXPRO Infinity	IFC/Kioo Glass: Tanzanian glass maker leads the way in circular production and reuse
Creating biodegradable packaging products from the invasive water hyacinth.	Lar Plastics
Innovative Technologies for Water Positive Impact	Alternative Fuel (AF)
MaWeRyC: project to reduce waste and boost circularity at BASF production sites	Óleo&Vida - Students Turning Used Cooking&Oil into Clean Energy
Eco Fusion Project: Powering Cement with Sustainable Synergy	Living Rivers
Structuring Program for Reverse Logistics of Packaging in General - Hands for the Future	Cereal Upcycling

List of cases

Waste Hero Education (Global Circular Economy Education)	TraceSurfer DPP in Latam for textiles and betteries
Bioo: Redefining the Future of Waste Through Circularity	Closing the loop: Hydrolite® 5 green
Auê Natural: Regenerating the Amazon, the Beauty Industry and Consumer Health with Every (paper) Package	CICLOS REAL H: Sustainability, Innovation, and Social Responsibility in Agribusiness
Project Aparas	Klabin Transforma Território Circular Program: development of innovative social technology to promote the circular economy in 7 municipalities in Paraná state
Use of foundry waste as raw material in other value chains	Transforming Environmental Liabilities into Environmental Assets
ZERO LANFILL - TROX DO BRASIL	National Methodology for Carbon Credits from Recycling
From Waste to Yield: The Innovation That Closes the Cycle of Animal Protein Production	Circular Livelihoods: Integrating Informal Waste Pickers into a Resilient Circular Economy
2Life All Inclusive | Expanded Circularity	Success Story of Circularity of Aluminum Beverage Cans
BIOTEX	Reverse logistics of end-of-life tires for environmentally sound management, including their use as an alternative energy source for cement plants and reuse in other productive sectors
Upcycling Bunker One	Circular for Zero Factory Model – Turning Vision into Circular Reality
Leather Traceability	Waste Treatment Processor
Circular Economy of Ceramic Waste in the Construction Retail Sector – Yattó & Anfacer	Recycling of post-consumer gypsum waste – Gypsum Circularity in Construction
Deink 4D Technology – Deinking, Delamination, Demetallization, and Disruption	Plastibras – From Waste to Solution
Bottle-to-Bottle Recycling	Circular Water Reuse System
Waste to Value – Vale's Circular Mining Program	Less Waste Movement

List of cases

Circularity Practices – Production of soil acidity neutralizer from inorganic industrial waste	Remanufacturing: decouple the use of resources from our business growth
Project Mero	UBQ Materials First Industrial-Scale Project in the Netherlands
IFC/Zagreb Holding – ZGH Sustainability-Linked Bond: Circular economy development in Croatia: Zagreb	Carbopol® BioSense polymer: Natural cosmetic ingredient viscosity modifier and sensory enhancer, readily biodegradable, sustainably sourced cellulose feedstock, eco-designed processing addressing green chemistry principles.
The Global Beverage Can Circularity Alliance	Recycling for a change
Cobap Group: Transforming Waste into Opportunities - A Circular Economy Model in the North and Northeast	Ruta Verde
Visión Circular ANDI - Extended Producer Responsibility (EPR)	Vivo Recicle: mobilizing society for the circular economy
Integrated End-to-End circular model transformation	Zero Waste - Circular Management Strategies at Novo Nordisk
ReciclaMT	Circularity as a driver for decarbonizing materials in the automotive sector
Pyrolysis of WWTP/WTP Sludge and Agricultural Biomass for the Production of Biochar and Green Metallurgical Charcoal	Electrolux's Industry-Leading Recycled Materials Strategy
Innovation as a Method: The Open Innovation Case of Tupy S/A	3M Recycling, Research and Development Center in Manaus
Portfolio Innovation - Lite line for disconnect switches	Transforming with Circularity: Core of Circular Economy and Advanced Resource Transformation - NECTAR
Lupinha	Remed™: driving a circular economy for injection pens globally and locally through Reciclaneta

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Portfolio of Cases

Awards

Alpargatas and The Circular Economy: Building the Rubber Recycling Chain

South America

Circular Economy and Materials

Overview

Case objectives

Development of the circular rubber chain (still in progress), enabling the recycling of industrial waste and the reverse logistics of post-consumer products through the Havaianas reCYCLE program.

Companies Involved

Alpargatas.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

From 2021 to 2024, by developing the rubber circular chain, the company increased recycled industrial waste by 253% relative to waste generated, cutting tCO2e emissions by 46.48% by avoiding co-processing.

Impact

Innovative Drive

Alpargatas invests in R&D, open innovation, and local partnerships, supporting market access and commercialization. Partner solutions include flooring, mats, furniture, and accessories, driving diverse and sustainable outcomes.

Economic Impact

By valuing the rubber circular chain, Alpargatas gained financial, social, and environmental returns. Rubber waste revenue doubled in 2024 (+116% vs. 2023, +869% vs. 2021), enhancing operational sustainability.

CO2 Impact

Between 2021-2024, the company increased rubber industrial waste recycling by 253%, reducing tCO2e emissions by 46.48% by avoiding co-processing. The methodology used was the GHG Protocol.

External Links

https://alpargatas.com.br/transparency

Ambipar Circular Cities: Integrated Solutions for Urban Circularity

South America

Circular Economy and Materials

Overview

Case objectives

Enable low-carbon urban circular ecosystems by promoting territorial arrangements that foster the circular economy, with reverse logistics, traceability, certification, local value and inclusion.

Companies Involved

Ambipar; Recycling Cooperatives and Partner Operators; Corporate Clients and Public Sector.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Key risks include dependency on public infrastructure, regulatory changes, market volatility, limited incentives and credit, and social challenges affecting waste pickers.

Scalability

Ambipar's modular model unifies education, traceability, logistics, and social inclusion. Already scaled in 120+ cities, it enables rapid replication and CO2 reduction aligned with global circularity and climate targets.

Impact

Innovative Drive

First of its kind to integrate blockchain, smart routing, and social franchising in circularity. It transforms post-consumption waste into verified credits, bridging climate action with social equity at scale.

Economic Impact

High-impact at low cost: units start at BRL 350k, with over BRL 25M in value redirected. Generates certified credits and circular revenue while reducing public costs, increasing income, and creating inclusive green jobs.

CO2 Impact

140,000 tons of CO2 emissions avoided through verified recycling credits and diversion from landfills.

External Links

Information not provided.

XLabs: A Proven EdTech Platform Accelerating Private Sector Capability and Cross-Sector Coalitions to Deliver Circular Materials Innovation from Design to Implementation

Asia / Oceania

Circular Economy and Materials

Overview

Case objectives

XLabs builds business capability and creates space for collaboration to identify, design, prototype, test and implement circular economy solutions that transform material systems at speed and scale.

Companies Involved

Circularity - a circular economy strategy consultancy, creator of Xlabs.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Engaging suitable local partners to deliver the XLabs programme alongside Circularity to provide local context, language and needs. Ayr Earth and Nous.

Scalability

With an average 53% increase in material circularity and 88% of companies implementing solutions within 12 months, XLabs is a proven, fast, and replicable model to reduce emissions and resource extraction across industries in line with Paris goals.

Impact

Innovative Drive

XLabs uses its proprietary "Circular by Design" method, validated through a Master's in Tech Futures. Through six transformative methods, immersive sprints, expert workshops, and prototyping, it helps businesses shift effectively from linear-circular.

Economic Impact

The case drives private sector profit by cutting waste and costs via scalable circular solutions. With 53% material circularity gains and low digital delivery costs, participants and funders see positive returns within 1–3 years.

CO2 Impact

[Estimated CO2 avoided emissions from keeping 1 million tonnes of materials in flow: ~1.7 to 3.5 million tonnes of CO2e avoided (average CO2e savings, global lifecycle data US EPA WARM).

External Links

https://www.xlabs.nz/

https://www.canva.com/design/DAGQ_dt1LTI/rSeyQQdkj4fX6sOtt-ninQ/view?utm_content=DAGQ_dt1LTI&utm_campaign=designshare&utm_medium=link2&utm_source=uniquelinks&utlId=h146cabbb55

Cirklo: Scaling Brazil's Largest PET Bottle-to-Bottle Recycling Platform

South America

Circular Economy and Materials

Overview

Case objectives

To build the largest bottle-to-bottle recycling platform in Brazil, processing 5.5B+ bottles/year through cutting-edge machinery and a robust nationwide collection infrastructure.

Companies Involved

Cirklo; eB Capital and Circulate Capital.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

weak rPET demand if virgin stays cheaper w/o policy support; costly/limited feedstock; scaling delays; and margin pressure from new entrants.

Scalability

If companies continue increasing the share of recycled content in PET packaging, Cirklo's full production potential could reduce up to ~148,000 tons of CO2e per year. About crude, Cirklo's operation may save about 115,000 tons of oil.

Impact

Innovative Drive

New investments bring top-tier tech: laser sorters for precise granulometry and a Nitrogen reactor—making Cirklo the only player in Brazil with this resin quality standard.

Economic Impact

IRR/NPV of new capex overstate value, as most gains come from pre-eB investments. We focus on ROIC at run-rate, expected to reach 30–35% p.a. for the consolidated company.

CO2 Impact

Cirklo's recycled resin output avoided ~84 ktons of CO2e in 2024, based on an average lifecycle reduction of ~27 gCO2e per bottle versus virgin resin.

External Links

https://www.mckinsey.com/industries/metals-and-mining/our-insights/capturing-the-green-premium-value-from-sustainable-materials

https://www.mckinsey.com/industries/chemicals/our-insights/addressing-the-challenges-of-plastic-waste-circularity-and-leakage

https://www.alpek.com/wp-content/uploads/2021/06/The-Case-for-PET-1.pdf

CPFL Solutions Reformer: Expanding Solutions in the Circular Economy via Electrical Energy Equipment Refurbishment

South America

Circular Economy and Materials

Overview

Case objectives

Promoting circularity and business value by our own Reformer Site, refurbishing 70k transformers by 2030 with annual revenue of R$45M and promoting recycling of Poles with annual revenue of R$560k.

Companies Involved

CPFL Serviços.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

CPFL's model avoids 20,943 tCO2e/year, recovers materials, and cuts raw extraction. Scaled across utilities, it drives circular economy, meets Paris goals, and boosts resource efficiency.

Impact

Innovative Drive

The operation is one-of-a-kind in the Brazilian market. CPFL Reformer is able to refurbish the full range of transformers available on the market — from 5 kVA single-phase to 500 kVA three-phase units.

Economic Impact

CPFL Reformer cuts R$3M/year in costs, generated R$146M in revenue, and serves 14 clients. Its low-cost, high-return model aligns with private sector goals and ensures strong, scalable profitability.

CO2 Impact

The Transformer Refurbish process has avoided 21 ktons CO2eq/year compared to traditional transformer production (Ecoinvent 3.8 tool).

External Links

https://www.youtube.com/watch?v=IDN7gKBR_qo

Remanufacturing - Too Good to Be Replaced!

Europe

Circular Economy and Materials

Overview

Case objectives

SKF's +100 years of linear business model is changing. We are scaling up our remanufacturing business to provide circular solutions lowering TCO, lead time and saving steel, energy and emissions.

Companies Involved

SKF Group.

WG Alignment

Regulation and incentives; and Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

End-to end ReManufacturing process is complex and traditional business models and partnerships must change. Scaling it will require both a mindset shift and stronger mandated regulations and policy.

Scalability

The potential of CO2 avoidance is as large as 90% as the steel is the largest contributor. The Remanufacturing approach can be applied by any steel component manufacturer in the industry leading to a great resource efficiency and reduced emissions.

Impact

Innovative Drive

ReMan used to not be equal to the optimized linear manufacturing of new products. We have now applied our extensive experience and expertise in material, R&D, inspection and automation of manufacturing processes to the ReMan operations.

Economic Impact

The ROCE is beneficial and the profitability of ReMan products sold is in many cases higher than that of new products. Further the ReMan business is generating a great value for customers (lower TCO and LT) which leads to improved long term relations.

CO2 Impact

In 2024, approximately 4,500,000 kg of steel were reused globally. With SKF's global average of 3.6 kg CO2e per kg of new bearing and -0.135 kg CO2e for Reman operations, a total of 15,600,000 kg CO2e was avoided.

External Links

https://www.skf.com/group/services/reconditioning-and-customization

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Portfolio of cases

Ultra Light Iron (ULI)

South America

Circular Economy and Materials

Overview

Case objectives

The goal is to develop ultra-light, high-strength iron components to replace aluminum, reducing emissions, costs, and resource use, advancing circular economy and energy transition goals.

Companies Involved

Tupy S.A.; Ricardo plc; SinterCast AB; and FINEP.

WG Alignment

Regulation and incentives; and Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Technical scalability, supply chain adaptation, OEM adoption delays, regulatory compliance, and market acceptance of new material technologies.

Scalability

The ULI solution can be scaled across the global automotive industry, enabling lighter engines, reducing emissions and optimizing material use while supporting the goals of the Paris Agreement and sustainable mobility.

Impact

Innovative Drive

ULI applies advanced thin-wall casting and proprietary iron alloys to achieve aluminum-like weight with lower cost and emissions, introducing a novel and scalable approach to sustainable engine design.

Economic Impact

ULI enables up to 25% cost savings in casting versus aluminum, with affordable implementation using existing foundry infrastructure, supporting profitability and scalable returns for OEMs and suppliers.

CO2 Impact

Achieved a 50% reduction in CO2 emissions compared to aluminum, based on Life Cycle Assessment (LCA) covering raw materials, casting, and energy use in manufacturing.

External Links

https://www.tupy.com.br/wp-content/uploads/2023/03/SIMEA-2022-Ultra-Light-Iron-Block-e-Etanol.pdf

Synthetic Fuel from Plastic Wastes

South America

Circular Economy and Materials

Overview

Case objectives

Production of synthetic crude from landfilled plastic waste to decarbonize fossil fuel refineries through a scalable and circular chemical recycling solution.

Companies Involved

Haka Bioprocessos LTDA; CRI Gestão de Resíduos LTDA; M2JVIP Consultoria e Engenharia LTDA; and FINEP.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Regulatory delays, supply chain instability, tech scalability, feedstock availability, market acceptance for synthetic crude.

Scalability

The solution can generate more green jobs with the waste pickers integration, turns waste into fuel, eliminates landfills worldwide, and uses existing refineries without costly tech—cutting CO2 and enabling Paris-aligned impact at global scale.

Impact

Innovative Drive

Produces crude-like oil from waste and biomass, avoids high CAPEX by using existing infrastructure, connects public and industrial sectors, and adapts tech to meet Paris Agreement goals.

Economic Impact

With feedstock from waste, oil costs <$20/bbl and sells at Brent (~$70/bbl). Additional revenue from carbon credits, recycling credits, and waste intake fees ensures high profitability and private sector appeal.

CO2 Impact

Estimated 57,600 tCO2e/year avoiding by processing 18,000 t of plastic waste, based on GHG Protocol and IPCC methods for landfill methane and fossil crude substitution.

External Links

www.hakabioprocessos.com

Boti Recicla Program

South America

Circular Economy and Materials

Overview

Case objectives

Boti Recicla allows consumers to return empty cosmetic packaging of any brand to Grupo Boticário stores and also through resellers. It is currently the largest reverse logistics program in Brazil.

Companies Involved

Grupo Boticário.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

Reverse logistics programs have the potential to contribute to GHG emission reduction by incorporating recycled content into packaging, reducing the carbon footprint of products, and aligning with the goals of the Paris Agreement.

Impact

Innovative Drive

Largest reverse logistics program in beauty retail collection points with high partner engagement in the process and innovative communication,such as the creation of the first O Boticário Store in the world that only accepted recyclables as payment.

Economic Impact

The program encourages consumers to return empty post-consumer packaging to stores by offering a discount on new purchases; this mechanism boosts store traffic, sales, and brand loyaltym, also raising awareness about environmental impact.

CO2 Impact

Information not provided.

External Links

https://boti-recicla.boticario.com.br/

Factory Price Station

South America

Circular Economy and Materials

Overview

Case objectives

The main objective is to increase recycling rates and generate income by paying the best price for recyclables directly to people, especially informal waste pickers.

Companies Involved

Green Mining.

WG Alignment

Regulation and incentives; and Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

By installing Factory Price Station in cities across the world, Green Mining can drastically increase recycling rates, reduce landfill use, and help companies meet circular economy and Paris Agreement targets through scalable, traceable logistics.

Impact

Innovative Drive

Green Mining combines tech-enabled traceability, fair payment to waste pickers, and reverse logistics credits in a unique model. It shifts recycling incentives to individuals, ensuring verified impact and circularity at scale.

Economic Impact

The model offers affordable implementation via reverse logistics credits, ensuring compliance and ESG impact. It has proven attractive to industry clients and investors, aligning environmental goals with financial returns.

CO2 Impact

Information not provided.

External Links

https://greenmining.com.br/en/home-en/

Cazoolo, shaping the future of packaging through circular design

South America

Circular Economy and Materials

Overview

Case objectives

Cazoolo, created by Braskem, is a circular packaging design lab driving sustainable innovation through valeu chain co-creation, prototyping, and consumer-centric, low-impact packaging solutions.

Companies Involved

Braskem.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Riks associated to open innovation projects.

Scalability

New circular packaging solutions developed by Cazoolo and Braskem´s clients, once validated are show on Cazoolo´s Ready Packaging platform, that aims to scale solution and facilitate access to sustainable packaging to small and medium size companies.

Impact

Innovative Drive

Cazoolo´s Design for Environment methodology are based on Life Cycle Analisys tools and Design Think methodology. It also leverages Braskem´s innovation and technology ecossystem and products like its unique biobased resins.

Economic Impact

Cazoolo is Braskem´s business development strategy tool to grow its sustainable business solutions in the packging market. All projects are mesured and conected to the business. NPV indicators for each project are confidential.

CO2 Impact

Cazoolo´s projects are based on Design for Environment (DfE) methodology, that leverages Life Cycle Analisys to mesure the current packaging impacts and help designers drive new solutions.

External Links

https://www.cazoololab.com.br/

Circular Economy Applied to Lithium Batteries

South America

Circular Economy and Materials

Overview

Case objectives

Enable a circular economy model for lithium-ion batteries that is environmentally sound, scalable, and economically viable, reducing dependence on primary raw material extraction.

Companies Involved

Energy Source Industria Comercio Importação Exportação S.A.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Commodity price volatility, lower metal content in new batteries, lack of standardization, and absence of regulations for battery waste and recycled products.

Scalability

The model is already operating at industrial scale in battery repair, reuse, mechanical and hydrometallurgical recycling. Reverse logistics is under development and has high scalability potential.

Impact

Innovative Drive

All technologies are in-house developments led by a highly specialized R&D team. The recycling routes are circular and sustainable, with no processes involving CO2 emissions.

Economic Impact

The model is financially viable through black mass and cobalt salts sales. Energy Source creates value in the circular battery chain and has an estimated valuation of R$60 million.

CO2 Impact

Estimated 3,600 t of CO2 emissions avoided by Jan/2025, based on LCA factors per kg of battery, including preserved energy, avoided waste, and landfill diversion.

External Links

Information not provided.

Dry Recycling of Contaminated Plastic Packaging

South America

Circular Economy and Materials

Overview

Case objectives

Eco Panplas has developed an exclusive and patented production technology to recycle lubricating oil contaminated plastic packaging and other types without using water and without generating waste.

Companies Involved

Eco Panplas.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

We are able to expand the solution with the technology installed in containers, facilitang logistics and scalability. With 3 units we are able to recycle 5,000 tones/years, 8,000 Tons Less gas on the planet, 170 billion liters of water preserved.

Impact

Innovative Drive

Exclusive and patented technology, production without using water and without waste generation. All residual oil from packaging is recovered, making the process ecological, without generating waste. 100% recycled resin from lubricating oil packaging.

Economic Impact

For each unit, revenue of 5 million and EBITDA of 35%.

CO2 Impact

For every 500 tons of plastic recycled, we avoid 800 tons of C02 emissions.

External Links

https://ecopanplas.com.br/Index.aspx; https://www.youtube.com/watch?v=UmLNfpi9u4c&t=4s

The Metal Extraction and Green Cement Project

Europe

Circular Economy and Materials

Overview

Case objectives

Recover critical metals and produce green cement from mine tailings and slags—achieving zero waste and lower CO2 emissions through full material utilization.

Companies Involved

Betolar Plc.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

Green cement with 75% lower CO2 emissions can replace 10% of global cement usage. This alone can decrease 1% of the entire world's CO2 emissions while turning waste into valuable materials.

Impact

Innovative Drive

Betolar's method has 8 patents pending. The method lowers viscosity and enables the processing in lower temperatures, creating lower operating costs, zero waste, 99% yield, low CO2, and full material use. A truly scalable circular solution.

Economic Impact

The global value of recoverable metals in steel industry slags alone is estimated at €150 billion, with an additional €50 billion potential from slag used as binder material. The individual customer projects have 1 year payback time.

CO2 Impact

Green cement has 75% lower CO2 emissions compared to traditional Portland cement, which causes 7-8% of the worlds CO2 emissions. Calculations are performed in accordance with GHG Protocol.

External Links

https://www.betolar.com/releases/betolar-plc-building-the-future-from-waste-high-performing-green-cement-revolutionizes-the-industry

https://www.betolar.com/releases/betolar-plc-99-yield-confirmed-in-metal-extraction-tests

https://www.betolar.com/releases/betolar-strengthens-finlands-and-eus-self-sufficiency-in-critical-and-strategic-raw-materials

“Renovadores Urbanos”: Recovery of post-consumer materials with social impact

South America

Circular Economy and Materials

Overview

Case objectives

Boost Colombia's recycling rates, improve waste pickers' conditions & collection capacity. Integrate pickers, communities, companies & brands via efficient post-consumer waste initiatives.

Companies Involved

Veolia; Food & Beverage brands: PepsiCo, McDonald's, Alpina; AcoPlásticos (Colombian Plastics Association);ANDI (Industries National Association of Colombia); Recycling companies; Extended Producer Responsibility (EPR) organizations.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Market: Fluctuating prices for recyclables can reduce income and participation. Reduction of brands recycling commitments: could disincentivize program goals, reducing funding and contributions.

Scalability

Scalable model that integrates informal waste pickers with high potential for more regional expansion across new municipalities and brands, improving recovery infrastructure, conserving resources and boosting circular economy and Paris Agreement goal.

Impact

Innovative Drive

Integrating waste pickers into the value chain with technology for optimized routes and payments. Combines digital tools, alliances, and traceability, with a new platform connecting all stakeholders for real-time tracking and regulatory compliance.

Economic Impact

With an IRR of 25%, the project improves income and working conditions for waste pickers , reduces associated costs for landfill disposal for companies and secures flow of high-quality materials for recycling: high economic impact for all stakeholder.

CO2 Impact

40,030 t CO2 avoided 2022-2024, measured by Veolia's GreenPath Platform, which follows GHP protocol, using emission factors per material type. Considers avoided landfill & virgin material emissions.

External Links

https://www.youtube.com/watch?v=JVPYJkXtDTY&t=11s

https://www.latinoamerica.veolia.com/es/noticias/programa-recuperador-amigo-estrategia-valor-compartido-colombia-aporta-economia-circular

https://www.semana.com/mejor-colombia/articulo/la-empresa-que-dignifica-el-trabajo-de-los-recicladores/202449/

From Oil Shale Ash to Precipitated Calcium Carbonate

Europe

Circular Economy and Materials

Overview

Case objectives

Technology that, by extracting calcium oxide from oil shale ash and combining it with carbon dioxide, can produce precipitated calcium carbonate (PCC). Also, magnesium can be extracted from the ash.

Companies Involved

Ragn-Sells AS.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

The oil shale ash as waste (or residue of energetical use of oil shale ash) is owned by the state of Estonia. So, the access to the main raw material depends on political decisions.

Scalability

When the calcium has been removed, magnesium can be extracted from the ash. The technology can produce material that could account for 30% of the EU's annual targeted production of magnesium. Also, other critical raw materials can be extracted.

Impact

Innovative Drive

Oil shale ash wastelands become mines full of resources such as calcium, silica, magnesium, and aluminum, all defined as critical or strategic raw materials in the European Union. CO2 capture during the production is additional bonus.

Economic Impact

Demand for climate positive PCC is high, main raw material (ore) is waste, and Estonia has 500 million tons of ash. PCC made from oil shale ash can then be used to produce new products (flooring, paints, and other construction materials).

CO2 Impact

The technology itself is carbon-negative since the carbon dioxide used in the process will be captured instead of released into the atmosphere, thus making the end product climate-positive and waste.

External Links

https://osaservice.ee/en/

https://www.ragnsells.com/sustainability/sustainabilty-report/download/

https://www.ragnsells.com/circular-transition/think-circular/circular-economy/

Mechanical Biological Treatment (MBT) plants are a key strategy for maximising the recycling rate of mixed domestic waste that is collected in urban areas of Emerging Markets and Developing Economies

South America

Circular Economy and Materials

Overview

Case objectives

Promote a proven technology that separates waste collected in a single bag (all mixed) into 03 streams (recyclables, organics, and residual waste), enabling materials recovery on an industrial scale.

Companies Involved

AIESSE Environmental and Valoriza Resíduos Institute (Social Organization).

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Difficulty in identifying licensable areas; Resistance from public and market managers, lobby against MBT — it's 'easier' to keep transporting waste to remote landfills than to set up MBT plants.

Scalability

MBT plants in urban areas help to reduce the collection trucks' routes and fleets. To divert a significant amount of waste from landfills and avoid GHG emissions while recovering materials, each plant should receive at least 300 t/d of mixed waste.

Impact

Innovative Drive

MBT plants with tunnel aeration systems and bio-filters can be installed on urban perimeters, which reduces transportation costs and makes it possible to produce organic compost and recover recyclable materials on an industrial scale.

Economic Impact

The business plan for implementing a 650 t/d MBT plant confirms the project's economic feasibility, considering a gate fee of USD 31.04/tonne. This would pay back the USD 21,561,269 invested over a 10-year contract, at an interest rate of 7%.

CO2 Impact

Annual reduction of 5,249.47 tons of CO2eq, calculated by the UNFCCC, TOOL04 Methodological tool: Emissions from solid waste disposal sites Version 08.1.

External Links

https://www.aiesse.com.br/tratamento-residuos

https://www.ablp.org.br/associados-ablp/

https://1drv.ms/b/c/e6b07785e69860da/EXZdf8MXglpEhTdGKMOEQ9MB-7J5fpVWJGGV4RH41ifqTw?e=BVUDlF

Recycling post-consumer building glazing to produce new flat glass

South America

Circular Economy and Materials

Overview

Case objectives

Developing recycling stream with multiple external partners for the collection of post-consumer windows in order to use the cullet as an alternative raw material to manufacture new flat glass.

Companies Involved

SAINT-GOBAIN.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Competition for cullet across industries, low landfill costs, high logistics, low adherence to intact window removal, and furnace risks from contaminated cullet.

Scalability

Scalable: all countries where Saint-Gobain has flat glass facilities develop their cullet recycling network, their partnerships with waste collectors, windows producers, etc. The speed of deployment depends on the local regulatory and market context.

Impact

Innovative Drive

Integrated technical, logistical, and market approach to circularity. Aligned with SB COP: contributes to carbon, circularity, and innovation targets in the construction sector.

Economic Impact

Cost reduction, new market opportunities, and increased operational efficiency.

CO2 Impact

Strong enabler of C02 reduction: Each ton of cullet permits to save up to 700 kg of CO2 (scope 1,2 and 3).

External Links

https://www.saint-gobain-glass.com/low-carbon-glass-ORAE#product-description

https://www.saint-gobain-glass.com/Circularity-and-recycling-initiatives%E2%80%8B?utm_source=chatgpt.com#saint-gobain

https://www.saint-gobain-glass.co.uk/sustainability/glass-forever/

Technology as a Vehicle for Funding and Systemic Change

Circular Economy and Materials case selection

South America

Circular Economy and Materials

Overview

Case objectives

We leverage technology to create innovative solutions that generate immediate impact, drive systemic change, and serve as a funding vehicle for the $1.3 trillion in a scalable way.

Companies Involved

Carrot; TERA AMBIENTAL; CSJ (Sanitation Company of Jundiaí) – PPP and BUREAU VERITAS.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Acceptance by the buyer market for a very innovative product.

Scalability

Carrot certifies reuse and recycling credits for free in days, drives systemic change, distributes incentives, and delivers impact to achieve a zero-waste world within 15 years.

Impact

Innovative Drive

Carrot is the first environmentally focused, community-governed platform leveraging technology to solve local and global coordination challenges, creating assets that drive a low-carbon, inclusive circular economy.

Economic Impact

Credit sales will allocate 20% of revenue to fund platform development and methodologies, with 80% distributed directly to the ecosystem. In 5 years, over $1 billion will be redistributed annually.

CO2 Impact

Prevention of 32,946 tCO2e methane emissions. Our focus is to redesign the economic model, as the circularity could address 85% of GHG emissions and is the only mathematical solution available today.

External Links

https://www.carrot.eco/

https://www.papermark.com/view/cmehskb7u0001lc046mfijpqf

https://www.linkedin.com/pulse/cop30-brazil-can-lead-beyond-its-trees-ian-mckee-8mpif/?trackingId=teL8g2bMISa0cl9N%2Bv65yw%3D%3D

Ecotransforma

South America

Circular Economy and Materials

Overview

Case objectives

Revolutionize recycling in Brazil by connecting waste pickers and large generators through sustainable modular units, increasing income and reducing landfill waste.

Companies Involved

EGS.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

RISK 1 - REGULATORY RISK 2 - OPERATIONAL RISK 3 - FINANCIAL RISK 4 - MARKET RISK 5 – TECHNOLOGICAL.

Scalability

Scaled to 50 units, Ecotransforma can avoid 9,000 tons of CO2eq/year, divert 30,000 tons of MSW from landfills and create a circular economy for 2,500 companies, contributing 0.02% of Brazil's Paris Agreement target.

Impact

Innovative Drive

Pioneering approach connects isolated stakeholders: independent waste pickers gain dignity and income, companies reduce costs and receive ESG certification, and cooperatives receive qualified materials. Modular technology bridges a 15-year gap in the sector.

Economic Impact

Robust financial viability: IRR 51% exceeds the financial market, positive NPV R$511k, investment recovered in 1.69 years. Recurring revenue of R$52k/month/unit with an operating margin of 42% guarantees profitability per operating unit.

CO2 Impact

Validated IPCC methodology projects a reduction of 180 tons of CO2eq/year per unit through landfill diversion, electrical logistics and integrated solar energy.

External Links

Information not provided.

Circularity in Stainless Steel

Europe

Circular Economy and Materials

Overview

Case objectives

Outokumpu is the global leader in sustainable stainless steel and our commitment to science-based climate target aligned with 1.5 degrees inspires is to innovate circular steel production.

Companies Involved

Outokumpu.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

Steel can be recycled infinitevely, so this is possible to the sector to adapt - reducing dependency on virgin materials and supporting in reducing emissions and mitigatint biodiversity loss.

Impact

Innovative Drive

We introduced the first near-zero stainless steel to the market that was enabled through high recycled material content. We are also investigating how to circulate our waste streams, such as biogenic CO2 to support other industries by carbon capture.

Economic Impact

Information not provided.

CO2 Impact

Up to 75% lower carbon footprint compared to the global average of stainless steel resulting to approximately 10 million tonnes annually reduced from customers emissions.

External Links

https://otke-cdn.outokumpu.com/-/media/files/investors/annual-reports/outokumpu-sustainability-statement-2024.pdf?revision=75828db7-0974-4418-9909-aac7b55e4b8d&modified=20250304074459

Project Vale Luz

South America

Circular Economy and Materials

Overview

Case objectives

Promotes the exchange of recyclable materials for electricity bill discounts, fostering energy efficiency, sustainability, circular economy, and socio-economic inclusion.

Companies Involved

Neoenergia; and ANEEL.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

By promoting recycling, reducing energy demand, and avoiding CO2 emissions, Vale Luz can scale across companies to support climate goals, extend landfill life, and foster responsible natural resource use.

Impact

Innovative Drive

Vale Luz transforms recyclable waste into energy bill discounts, promoting sustainability, social inclusion, and energy efficiency. It innovates with a social currency, reverse vending machines, and electric trucks for eco-friendly logistics.

Economic Impact

Vale Luz aligns with profitability by reducing energy demand, deferring infrastructure costs, improving bill payment rates, and enhancing ESG value—delivering measurable returns with low-cost, scalable implementation.

CO2 Impact

Estimated reduction of 5560 tons of CO2 based on the generation of 54503 MWh and a Carbon Intensity of 102.03 grams of CO2e/kWh (source: Our World in Data).

External Links

https://www.neoenergia.com/eficiencia-energetica/vale-luz

Wenew – Braskem Circularity Ecosystem

South America

Circular Economy and Materials

Overview

Case objectives

With the goal of transforming a linear economy into a circular one, we created WENEW, which features products with recycled content, investments, educational initiatives, and consumer engagement.

Companies Involved

Braskem.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

With increased sales and recycling, we reduce the use of virgin plastic and CO2 emissions, contributing to the climate goals of the Paris Agreements.

Impact

Innovative Drive

We completed the first sale of chemically recycled PE in Brazil. With WISE, we enhance the quality of recycled products by combining innovation and partnership to transform the industry.

Economic Impact

The Circular Economy strengthens the sustainability strategy by driving revenue through continuous growth in sales and production of products with recycled content.

CO2 Impact

Information not provided.

External Links

https://www.braskem.com.br/detalhe-noticia/braskem-adquire-participacao-societaria-na-wise-plasticos

https://www.braskem.com.br/detalhe-noticia/braskem-realiza-a-primeira-venda-de-pe-circular-na-america-do-sul

Yattó Transform (2022–2024)

South America

Circular Economy and Materials

Overview

Case objectives

Connecting companies, waste cooperatives, and recyclers to structure circularity chains for post-consumer flexible plastic and polystyrene packaging with socio-environmental impact and traceability.

Companies Involved

Yattó; and Waste Pickers Cooperative.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

Potential to reduce the amount of materials received by recycling co-operatives that are sent to landfills or open dumps by approx. 15%, transforming them into circular solution flows that replace virgin petroleum plastic products in all cities.

Impact

Innovative Drive

Yattó leads Brazil's main circularity program for complex materials, connecting brands, cooperatives, logistics, and recyclers through partnerships. Its unique traceability system ensures transparency and trust across the entire value chain.

Economic Impact

A pre-competitive, customizable membership model enables cost-sharing among competitors. The initiative generated R$1.4M in additional income and R$293K in landfill savings, with added value for marketing and public affairs teams.

CO2 Impact

Approx. 2.2K tons CO2 avoided. Methodology: 1 ton of recycled plastic saves ~1.4 tons CO2 emissions (Bureau of International Recycling, 2021).

External Links

https://yatto.com.br/yatto-transforma/

Açaí Seed Co-processing

South America

Circular Economy and Materials

Overview

Case objectives

Votorantim Cimentos uses açaí seeds, that's represents 80% of the fruit's weight, as fuel to replace fossil fuel. The goal is to reduce CO2 emissions in cement production.

Companies Involved

Votorantim Cimentos; Açaí berry producers; and Açaí pulp producing industries.

WG Alignment

Materials innovation, waste management and circular supply chain ; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Supply chain risk. In many cases in the region, the cultivation and extraction of açaí fruit involves minors and informal work situations.

Scalability

The use of waste and biomass in co-processing reduces CO2 emissions by replacing petroleum coke in cement production.

Impact

Innovative Drive

Votorantim Cimentos was pioneer to use seeds açaí in industrial production in Brazil. Others industries used this waste after this initiative. Today, industries in the state of Pará convert 35,000 tons of açaí seeds into energy per month.

Economic Impact

The cost of açaí seeds is lower than that of petroleum coke. Therefore, biomass co-processing brings environmental and economic benefits.

CO2 Impact

In 2024, the use of açaí seeds at the Primavera plant in cement production avoided the emission of 44,071 tons of CO2.

External Links

https://www.votorantimcimentos.com/wp-content/uploads/2024/09/Acai-the-fruit-of-our-energy.pdf

https://www.youtube.com/watch?v=j4n_rS-9UOE

Volta Circle

Asia / Oceania

Circular Economy and Materials

Overview

Case objectives

Volta Circle is an evergreen venture capital fund dedicated to investing in technology-driven solutions that transform traditional linear economic systems into sustainable circular ones.

Companies Involved

Volta Circle - Investment platform.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

Volta Circle is funding circular startups and scaling sustainable materials that can drive closed-loop systems with potential for global sustainability impact and wide adoption across industries - from fashion and consumer, to chemistry and packaging.

Impact

Innovative Drive

Volta blends CVC resources, family office flexibility, and VC ambition—delivering intelligent capital, long-term backing, and strategic partnerships for outsized returns.

Economic Impact

Volta invests in scalable startups, ensuring strong returns. With IVL support, firms are chosen through due diligence, growth potential, and efficiency; IRR and MOIC show competitive results.

CO2 Impact

Optoro customers kept returns/excess inventory out of landfills (2015–2022), preventing 100M+ lbs of CO2 emissions per EPA's Waste Reduction Model.

External Links

https://www.voltacircle.com/

https://www.recyclingtoday.com/news/macrocycle-closes-seed-financing-round/

https://sdgs.un.org/partnerships/vestiaire-collective

MODUS – Microwave Depolymerization Upscaling

Europe

Circular Economy and Materials

Overview

Case objectives

MODUS is the company created by Intecsa Industrial, part of group, to build a FOAK industrial PET depolymerization plant in Spain levered in Gr3n proprietary depolymerization technology.

Companies Involved

Intecsa Industrial and GR3N.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Under implementation.

Risk Involved

MODUS is a First of Its Kind; there are some risk on it large scale implementation and integration of different technologies that will be overcome by a detail engineering.

Scalability

MODUS implements for the first time at industrial scale an innovative technology for the chemical recycling of PET plastics and textiles. The FOAK plant will be implemented in Spain, but can be replicated all over the world, and at ever higher scale.

Impact

Innovative Drive

MODUS core enabling technology is a GR3N proprietary and patented process that implements chemical recycling through the usage of microwaves, to turn a traditional approach from slow and cost-inefficient into industrially viable.

Economic Impact

MODUS will produce for the first time a recycled product with the same quality of the one from fossil origin. Project is profitable with an attractive and competitive IRR levered on Intecsa cost estimation, actual agreements and current prices.

CO2 Impact

MODUS industrial plant will avoid approximately 120,000 tCO2/yr according to EU Innovation Fund methodology.

External Links

https://www.intecsaindustrial.com/modus/

https://www.sustainableplastics.com/news/intecsa-gr3n-build-worlds-first-industrial-scale-made-pet-recycling-plant

https://urldefense.com/v3/__https://ec.europa.eu/assets/cinea/project_fiches/innovation_fund/101191270.pdf__

Terpene Ingredients - Upcycled starting materials from renewable feedstock

South America

Circular Economy and Materials

Overview

Case objectives

Crude Sulfate Turpentine,a waste stream from pine within the pulp & paper ind, is upcycled through innovative techniques and green chemistry to create more than 10 fully sustainable fragrance ingred.

Companies Involved

Symrise; Pine Chemical Association (PCA); SCS Global Services (FSC Certification Body); Forest Stewardship Council (FSC®).

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Transport could be a risk, such as CST could be mixed with others coming from non approved suppliers. To avoid it, we manage logistics, train partners, and on-site quality checks before production.

Scalability

Using upcycled renewables instead of petro-based feedstock cuts carbon footprint by 20%+ and enables fragrance ingredients with 100% renewable carbon.

Impact

Innovative Drive

Turning paper industry waste into Linalool one of the main products via a high selective pyrolysis is a pioneering recent innovation in the fragrance industry.

Economic Impact

Upcycling creates a cost disadvantage, especially for Linalool, versus petro-based options, leading to low profitability in a competitive market.

CO2 Impact

By using side streams of the paper industry instead of fossil raw materials, the PCF of most of the final products could be reduced by more than 20% (calculation according to TfS methodology).

External Links

Information not provided.

Circular economy: landfills as greenhouse gases mitigators and resources generators

South America

Circular Economy and Materials

Overview

Case objectives

Promote a circular economy by turning Veolia's EcoParques into facilities that transform waste into resources via innovative technologies including renewable energy and fuel from biogas and biomethane.

Companies Involved

Veolia Brazil (global leader in ecological transformation, providing technical expertise, infrastructure operation, and innovation).

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

Information not provided.

Impact

Innovative Drive

Veolia's Ecoparques in Brazil feature innovations like advanced waste sorting, material recovery for recycling, waste-to-energy conversion, leachate treatment, biogas capture, and integration into the circular economy.

Economic Impact

Veolia's Ecoparques in Brazil create jobs, boost recycling, cut landfill costs, recover materials, produce energy from waste, and support the circular economy, driving sustainable local growth.

CO2 Impact

Information not provided.

External Links

Information not provided.

Sustainable Manufacturing and Environmental Pollution (SMEP) Programme

South America

Circular Economy and Materials

Overview

Case objectives

The SMEP Programmer is an innovation programmer that seeks to deploy solutions that avoid pollution at source, while at the same time enabling regulatory models that allow solutions to scale.

Companies Involved

Mananasi Fiber Kenya (pineapple fiber producer); Freshppact impact hub (Agri plastic substitution by biomass & packaging innovation); KEPSA - biogas from fish waste in Kenya (with Rio Fish); Chanzi Africa (black soldier fly insect protein from organic residues).

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

The SMEP programmer showcases in practice how the bioeconomy can help replace materials (e.g. plastic substitution), produce food & feed & energy. The interventions are highly scalable, when plugged to municipal & peri-urban PPPs for residues mgment.

Impact

Innovative Drive

SMEP has both developed new technologies (such as biodegradable fishing gear), as well as deployed technologies in contexts where they did not exist (such as pineapple fiber decortication in Kenya and agri-plastics substitution in Ghana).

Economic Impact

SMEP has showcased practical and feasible pathways to add value to both organic and technical material flows, in line with the circularity diagram (butterfly) principles.

CO2 Impact

4059 tonnes of CO2 equivalent reduced.

External Links

smepprogramme.org

https://unctad.org/project/sustainable-manufacturing-and-environmental-pollution-smep

Benevides Recycles

South America

Circular Economy and Materials

Overview

Case objectives

Amazon partnership for waste management. It raises community awareness, structures selective collection, boosts recyclers' income, and connects recycled materials to Natura's packaging supply chain.

Companies Involved

Natura; Prefeitura Municipal de Benevides; ONG Espaço Urbano and Cooperativa Reciclaben.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Main risks include low public engagement, insufficient infrastructure, and limited cooperative capacity. Other risks are the low appeal of incentives (EcoBen) and unstable partnership.

Scalability

This pioneering model reduces CO2 emissions and preserves biomes by promoting efficient resource management. It uses local reverse logistics to reduce transport and prevents waste from reaching landfills.

Impact

Innovative Drive

The EcoBen "humanitarian coin" turns recyclable waste into a currency for goods and services. The project uses gamification to boost engagement and integrates the materials into Natura's supply chain.

Economic Impact

By integrating recyclables into its supply chain, Natura progresses toward its 2030 goal of 100% circular packaging. This reduces Natura's disposal costs while creating local economic value via a humanitarian coin.

CO2 Impact

The initiative contributes to reduction of CO2 emissions, but for instance there’s no specific numerical results for CO2 reduction.

External Links

https://mundocoop.com.br/acontece-no-setor/programa-da-natura-firma-parceria-com-cooperativa-e-recicla-58-toneladas-de-residuos/

https://www.guaranyjunior.com.br/2025/04/14/benevides-recicla-completa-1-ano-com-sorteio-de-premios-e-resultados-expressivos-em-coleta-de-reciclaveis/

Flexible hydrometallurgy process for lithium-ion battery recycling

South America

Circular Economy and Materials

Overview

Case objectives

Promote sustainable battery recycling to recover valuable materials, reduce environmental impact, and support a circular economy in energy storage technologies.

Companies Involved

Tupy S.A.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Tech scalability, raw material variability, regulatory delays, market acceptance, and high initial investment may affect the success and outcomes of Tupy's battery recycling process.

Scalability

If adopted widely, Tupy's process can cut CO2 emissions by up to 70% compared to mining, reduce energy use by 65%, and support circular economy goals—advancing Paris Agreement climate targets.

Impact

Innovative Drive

Tupy's process is unique for its flexibility to recycle multiple battery chemistries together, reducing costs and complexity while offering a low-emission, energy-efficient, and scalable recycling solution.

Economic Impact

Tupy's process aligns with profitability goals, showing strong financial viability with an NPV/CAPEX ratio ranging from 4 to 10, depending on battery chemistry and commodity prices, ensuring attractive returns.

CO2 Impact

Considering Brazillian power generation matrix, Tupy's hydrometallurgical process emits 129gCO2eq/kg of battery cells processed—35% less than current state-of-the-art pyrometallurgy methods.

External Links

https://www.tupy.com.br/wp-content/uploads/2023/03/Paper-SAE-BR-2022-Reciclagem-de-Baterias.pdf

Circular Highly Dispersible Silica (HDS)

Europe

Circular Economy and Materials

Overview

Case objectives

Bio-based sodium silicate derived from rice husk ash is a new breakthrough silicate process providing a circular solution giving a second life to rice husk in a local value chain.

Companies Involved

SOLVAY.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Information not provided.

Scalability

Substitution of virgin sand by biowaste rice hush ashes through implementation of Solvay proprietary process in EU, contributing in silica carbon footprint reduction by 35% with local RHA sourcing, for local production & local market.

Impact

Innovative Drive

For 2030 tire makers set a target of 40-50% of circular materials in tire. Precipitated Silica is essential to achieve the targets. In that prospect, Solvay is investigating circular alternatives to the sand for local circular silica for local market.

Economic Impact

Information not provided.

CO2 Impact

Information not provided.

External Links

Information not provided.

Circular use of industrial oil with SKF RecondOil

Europe

Circular Economy and Materials

Overview

Case objectives

Linear use of oil emits 3.8 ton CO2e / m3 of oil and results in deteriorating operating conditions and cost due to contamination. SKF RecondOil can eliminate these problems for most industrial oils.

Companies Involved

SKF Group; Users of industrial oils; and Lubricant manufacturer.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Regulations on recycling of finite assets such as industrial oil. They need to be updated in order to facilitate a circular use.

Scalability

This is method is fully scalable for most industrial oils.

Impact

Innovative Drive

SKF RecondOil Double Separation Technology enables removal of all contaminates. The technology is unique since it can remove contaminants down to nano-size particles.

Economic Impact

This case is fully inline with private companies normal expectation of ROI.

CO2 Impact

Every avoided oil change reduces CO2e emissions by 99% based on LCA studies.

External Links

https://www.skf.com/group/products/lubrication-management/recondoil

Zero Process Waste to Landfill

South America

Circular Economy and Materials

Overview

Case objectives

Promote the circular economy by transforming waste from the pulp manufacturing process into valuable products for agriculture, forestry, and civil construction, eliminating landfill disposal.

Companies Involved

VERACEL CELULOSE S.A.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

The waste from the pulp manufacturing process have valuable characteristics for agriculture, forestry, and for the production of mortar, being able to replace natural resources. The case proved that it is feasible to do this in general.

Impact

Innovative Drive

The production of mortar using various pulp waste is an innovation and will be patented.

Economic Impact

Avoided cost of landfill installation every 3 years, avoided cost of purchasing soil amendoment for application in silviculture and image gain - cost of installation, operation and maintenance of the waste treatment unit = viable.

CO2 Impact

Information not provided.

External Links

Information not provided.

The sustainable journey of packaging: how Tetra Pak promotes the circularity of its cartons

South America

Circular Economy and Materials

Overview

Case objectives

Tetra Pak invests in sustainable innovation, reduces emissions, aims to eliminate aluminum, strengthens recycling, and engages communities through environmental and social projects across its value chain.

Companies Involved

Tetra Pak; and Tetra Pak Customers.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Lack of recycling infrastructure, low public engagement, technical innovation challenges, reliance on certified suppliers, and climate risks in the supply chain.

Scalability

Tetra Pak invests €100 million per year in innovation to create packaging that is as recyclable and carbon-neutral as possible, with the potential for global impact as it is adopted by companies across the food and beverage value chain.

Impact

Innovative Drive

Tetra Pak develops fiber-based barriers to replace aluminum, uses sugarcane-based polymers, and applies the “design for environment” concept to create more sustainable and circular packaging.

Economic Impact

The company combines sustainability with efficiency: its packaging uses fewer resources and reduces waste, generating savings for customers. The recycling chain also generates income for cooperatives.

CO2 Impact

70% reduction in own emissions and 19% across.

External Links

https://www.tetrapak.com/sustainability/measuring-and-reporting/sustainability-reports

https://apremavi.org.br/projetos/conservador-das-araucarias/

https://www.tetrapak.com/sustainability

Agents of Good

South America

Circular Economy and Materials

Overview

Case objectives

Integrate reverse logistics with electric micromobility to connect large MSW generators to cooperatives, reducing costs and environmental impact.

Companies Involved

Recicloway.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Resistance from large generators to operational changes; fluctuations in recyclable material prices; technical capacity of cooperatives; municipal regulations; and viability of electric vehicles.

Scalability

National Scalability: Replication in 5,570 municipalities could divert 2.5 million tons/year from landfills, avoid 180,000 tons of CO2/year, create 500,000 jobs, and contribute 15% toward Brazil's Paris Agreement target.

Impact

Innovative Drive

Innovation: Reverse logistics integrated with electric micromobility (500kg capacity), on-site transformation of recyclables into final products by cooperatives, and supplier financing. A pioneering model in Brazil.

Economic Impact

Financial Viability: NPV of R$264,901.93, payback period of 2.41 years, investment of R$1.1 million. Large generators save 30% on collection costs, suppliers reduce logistics costs by 40%. Internal Rate of Return (IRR) of 21%.

CO2 Impact

Estimate: ~60% CO2 reduction compared to traditional collection. Methodology: calculation of electric vehicle emissions + methane reduction from landfills (21x CO2) + integrated logistics. Validation pending.

External Links

Information not provided.

Use of discarded foundry sand in airport infrastructure construction: a case study at Aeropark Vale Europeu - SC

South America

Circular Economy and Materials

Overview

Case objectives

Reduce atmospheric emissions through the sustainable use of discarded foundry sand (DFS) in civil works, replacing natural raw materials and turning waste into climate solutions.

Companies Involved

Nova Era Soluções Ambientais Ltda.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Variation in DFS supply; logistical costs; regulatory changes; technical resistance to use; and weather impacting construction schedules.

Scalability

The use of discarded foundry sand (DFS) can be replicated across various civil construction sectors, avoiding the extraction of natural sand and reducing CO2 emissions. Replacing 2 million tons could prevent 35,000 tons of CO2 emissions.

Impact

Innovative Drive

The project is a pioneer in applying discarded foundry sand (DFS) in airport infrastructure with technical, environmental, and legal support. It introduces a replicable method, scientifically validated, and safely replaces virgin raw materials with proven performance.

Economic Impact

Proportional compensation based on the volume applied and low operational costs make the project financially attractive. With direct investment, the model is economically viable and replicable without public subsidies.

CO2 Impact

Approximately 3,500 tons of CO2 were avoided by replacing virgin sand with 200,000 tons of discarded foundry sand (DFS). Methodology: IPCC factor of approximately 17.5 kg CO2 avoided per ton of DFS applied.

External Links

https://www.novaerasolucoesambientais.com.br/servicos/areia-descartada-de-fundicao-adf/

https://www.youtube.com/watch?v=ebRtbE7mZdw&ab_channel=RaquelLu%C3%ADsaPereiraCarnin

https://www.youtube.com/watch?v=anI8ePIw9a4&ab_channel=RaquelLu%C3%ADsaPereiraCarnin

Biomethane, Naturgy's commitment to circular, renewable, and decarbonized gas

Europe

Circular Economy and Materials

Overview

Case objectives

Naturgy is developing biomethane (5 plants) that recycle organic waste to produce renewable, circular, zero-emission, zero-mile gas as a gradual replacement for natural gas.

Companies Involved

Naturgy.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Insufficiently ambitious national targets, lack of incentives, and local opposition pose serious risks to scaling up biomethane projects and fully unlocking their environmental and economic benefits.

Scalability

With 163 TWh/year potential, biomethane could meet over 40% of Spain’s gas demand. Its large-scale deployment would significantly reduce CO2 emissions and generate over 560,000 direct and indirect jobs.

Impact

Innovative Drive

Naturgy leads innovation in Spain with a novel biomethane business model, pioneering technologies like biological methanation, and cross-sector alliances that redefine the renewable gas value chain.

Economic Impact

In Spain, biomethane projects generate over 560,000 jobs across construction and operation phases, proving strong economic returns and alignment with private sector profitability goals.

CO2 Impact

Spain could cut over 50 Mt CO2eq per year by tapping its biomethane potential (163 TWh/year), thanks to a reduction rate of 0.31 Mt CO2eq/TWh, equal to 23% of its 2030 climate target.

External Links

https://www.naturgy.com/en/about-us-naturgy/the-energy/gas/renewable-gas/

IVECO NEXPRO Infinity

South America

Circular Economy and Materials

Overview

Case objectives

Addresses a major environmental challenge: the production, use, and disposal of engine lubricants. Objectives: Reduce Environmental Impact, Eliminate Hazardous Wasteb.

Companies Involved

Iveco Group; Petronas; and Lwart.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

The solution leverages established OEM and reverse logistics infrastructure, allowing immediate replication across regions and sectors. Its circular design supports expansion with minimal structural adjustment.

Impact

Innovative Drive

Meets all specifications of a conventional linear economy product (first-refined) and is suitable for automotive and industrial applications. It uses raw materials with up to 77% lower emissions compared to linear economy sources (LCA).

Economic Impact

Enhances value chain efficiency by reducing dependence on virgin base oils and mitigating disposal costs. Captures ESG-aligned returns while supporting OEM profitability and long-term resource security.

CO2 Impact

Represents a 77% reduction of CO2 emissions (via LCA).

External Links

https://www.ivecogroup.com/media/brand_press_releases/2025/SOUTH-AMERICA-(BR-PORTUG)/Iveco/iveco_petronas_e_lwart_lanam_nexpro_infinity_lubrificante_com_foco_em_sustentabilidade_e_alta_performance_20250702T193643T580_3gsgtjtsmtrpgyhdmrhgbjnu

Creating biodegradable packaging products from the invasive water hyacinth.

Africa

Circular Economy and Materials

Overview

Case objectives

Transform invasive water hyacinth into biodegradable packaging to replace single-use plastics and restore ecosystems while creating green jobs.

Companies Involved

HyaPak.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Access to scale-up capital; Regulatory delays in some countries; Technology optimization to enhance product properties & production efficiency.

Scalability

HyaPak's model is highly replicable in 70+ countries affected by water hyacinth. Scaling production to millions of units and global replication (e.g., Nigeria, Mexico) will significantly reduce plastic emissions & manage natural resources efficiently.

Impact

Innovative Drive

HyaPak introduces a pioneering approach: transforming the "world's most problematic aquatic weed" into patented bioplastics. This unique waste-to-value model closes the implementation gap for sustainable packaging and solves dual environmental crises.

Economic Impact

HyaPak's unit economics show cost parity with plastic alternatives at scale. Early pilots show strong demand and low production costs.

CO2 Impact

Each HyaPak bag avoids ~1.6 kg CO2e vs. plastic. Based on comparative life cycle analysis (LCA) of LDPE vs. hyacinth-based material.

External Links

https://edition.cnn.com/world/africa/hyacinth-alien-plant-environment-plastic-spc/index.html

https://apnews.com/article/kenya-water-hyacinth-invasive-fishing-2ea35d0203bc995a36ddbe32386c1141

https://www.triplepundit.com/story/2025/water-hyacinth-kenya-hyapak/822256

Innovative Technologies for Water Positive Impact

Europe

Circular Economy and Materials

Overview

Case objectives

To replace the existing RO systems by nanoengineered products. Recycle 40-50% of input water, reduction in carbon emission and greywater industrial recycling. This adds to energy and cost efficiency.

Companies Involved

Circular Innova.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

AI-IoT connectivity failure or operational error; Transportation delays, anticipated recycling volume not achieved.

Scalability

Circular Innova Rainmaker10 recycling enables 70–90% water reuse, offsetting borehole extraction by up to 9200?L/day per site. It is a viable challenger to typical RO systems with 40% lower operating costs and energy use, whilst recycling 50% water.

Impact

Innovative Drive

Circular Innova pioneers circular water reuse in biomass processing using graphene nanofiltration, AI optimization, and IoT enabled ESG dashboards. It replaces high-energy RO, reduces borehole reliance, and enables rapid, scalable water recycling.

Economic Impact

Circular Innova enables up to 40% cost savings via 70–90% water reuse and low-energy filters. AI-driven optimization reduces OPEX. IRR >33% and NPV ˜ $210K over 3 years, support strong ROI, aligning with private sector sustainability goals.

CO2 Impact

16.8kg CO2e of energy saved per month for when saving 8,000 liters/day using Rainmaker10 in this project.

External Links

https://www.circularinnova.co.uk/

MaWeRyC: project to reduce waste and boost circularity at BASF production sites

South America

Circular Economy and Materials

Overview

Case objectives

The MAWERYC Project, short for Management Waste&Recovery Cycle, is a sustainability initiative developed and implemented by BASF since 2020 to improve waste management through circularity processes.

Companies Involved

BASF S.A. Brazil and Academy: University.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Operational resistance to changing waste management practices, technology adoption delays due to supplier or regulatory constraints, dependency on cross-functional alignment for implementation success.

Scalability

The model, first applied at the Guaratinguetá site, has been replicated at 2 other sites and can be scaled globally across BASF and similar industries, supporting sustainability and circularity goals.

Impact

Innovative Drive

A structured waste mapping and recovery model was introduced, integrating circular economy and cross-sector collaboration. Internal and external teams co-created innovative solutions for diverse waste challenges.

Economic Impact

Estimated savings of BRL 11 million/year in waste-related costs through the implementation of the >50 improvements raised by the project.

CO2 Impact

Over 6,000 tons of CO2/year avoided via waste reduction and tech changes. These CO2 emissions are equivalent to 12,900 São Paulo–Rio trips or 133 Earth laps.

External Links

https://exame.com/negocios/por-dentro-da-fabrica-da-basf-em-guaratingueta/

https://www.revistatae.com.br/Noticia/91117/a-gestao-de-residuos-e-um-dos-desafios-ambientais-mais-urgentes-da-atualidade

https://neomondo.org.br/agronegocio/especial-dia-mundial-do-meio-ambiente-7

Eco Fusion Project: Powering Cement with Sustainable Synergy

South America

Circular Economy and Materials

Overview

Case objectives

Demonstrate syngas as a substitute for petcoke in cement, cutting 100,880 tCO2/year by converting 134,530 t/year of plastic and biomass via modular gasifiers and a cooperative-based circular chain.

Companies Involved

Cimento Apodi; Argo Tech and CTEC Energy.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Under planning.

Risk Involved

Delays in permits, feedstock issues, gas instability, FX volatility, credit risks, and social gaps may impact timeline, CAPEX, and revenue.

Scalability

Validated by ITA/MDIC as a national lighthouse project, Eco Fusion is modular, interoperable and replicable across Brazil's cement sector. It can divert >1M tons of waste/year and reduce millions of tons of CO2.

Impact

Innovative Drive

1st Brazilian case of large-scale syngas from waste in cement kilns. Combines gasification, MRV-IoT, circular economy and cooperative engagement. Recognized by ITA as key tech to close implementation gap in hard-to-abate sectors.

Economic Impact

OPEX 7.76 Million USD/year, IRR >20% and 5.8-year payback from syngas fuel switch, MRV-based carbon/plastic credit sales and waste gate fees. Brazil's cap-and-trade system ensures market demand for credits and scale viability.

CO2 Impact

Annual cut of 100,880 tCO2 via petcoke replacement (97 kg CO2/ton clinker), tracked by IoT-MRV at Apodi's Quixeré plant under ITA/UNIDO ID Hub oversight, ensuring replicability.

External Links

https://drive.google.com/file/d/1SQpMCXuDPym6VG014xVvLr2ZAcyDpfKz/view?usp=sharing

https://drive.google.com/file/d/1UPLikWRgaQY2GY_DG4xafw0HTfQ8undE/view?usp=sharing

Structuring Program for Reverse Logistics of Packaging in General – Hands for the Future

South America

Circular Economy and Materials

Overview

Case objectives

Promote structural reverse logistics for packaging in Brazil, with the productive inclusion of waste pickers, traceability, real environmental impact, and partnerships between companies and cooperatives.

Companies Involved

ABIHPEC - Associação Brasileira da Indústria de Higiene Pessoal, Perfumaria e Cosméticos.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Challenging goals; Lack of support/incentive; Brazil's logistics infrastructure is limited and makes the process unfeasible; Frequent changes in legislation affect long-term planning and feasibility.

Scalability

With national coverage and a replicable sectoral model, the program enables large-scale recycling, reduces emissions associated with waste, and promotes efficient resource management in line with the principles of the Paris Agreement.

Impact

Innovative Drive

A pioneering sectoral model that integrates reverse logistics with socio-productive inclusion and traceability technology. It is the first program to operate with independent verification of results and socio-environmental impacts on a national scale.

Economic Impact

The program combines regulatory compliance with economic efficiency through a collective model that reduces costs, ensures scale, predictability, and adds ESG value, with a cost per ton recycled more competitive than individual solutions.

CO2 Impact

2023: The program prevented the emission of approximately 300,000 tons of CO2e. The methodology developed exclusively for the Mãos Pro Futuro Program considers GHG emission factors by material type.

External Links

https://www.youtube.com/watch?v=4Y_nvkYCwU8

https://sinir.gov.br/perfis/logistica-reversa/logistica-reversa/embalagens-em-geral/

https://sinir.gov.br/perfis/logistica-reversa/habilitacao/004-abihpec-maos-pro-futuro/

Carbios–Indorama–Michelin: Biorecycling PET Waste into Tire Textile Filaments

North and Central Americas

Circular Economy and Materials

Overview

Case objectives

Deploy Carbios's enzymatic PET recycling with Indorama and Michelin to turn PET waste into tire-grade r-PET filaments, enabling a circular supply chain and cutting virgin plastic use and CO2.

Companies Involved

Carbios (France); Indorama Ventures (Thailand, global operations) and Michelin (France).

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Under planning.

Risk Involved

Information not provided.

Scalability

Once proven at industrial scale, Carbios's enzymatic recycling can be replicated globally, upcycling bottles and hard-to-recycle textiles into high-performance r-PET filaments for tires.

Impact

Innovative Drive

First industrial use of enzymatic recycling for PET, turns complex PET waste into virgin-like monomers usable into high-performance tire fiber.

Economic Impact

Partnership aligns with circular economy market demand.

CO2 Impact

Enzymatic recycling cuts PET CO2 emissions by 27%, and up to 92% compared to virgin PET when avoiding conventional waste treatment.

External Links

https://www.carbios.com/newsroom/en/carbios-enters-the-r-pet-market-for-tire-textile-filaments/

Close the Loop

Europe

Circular Economy and Materials

Overview

Case objectives

The project explores possibilities to recycle conducting metals in distribution transformers back into the transformer value chain, to reduce the need of virgin material and thus also reduce GHG emissions.

Companies Involved

E.ON.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

The main risks to the success of the project is achieving sufficient volumes of scrap aluminum and achieving sufficient purity of the recycled material to comply with technical specifications.

Scalability

The aim is to scale the project to reduce environmental impact from mining and raw material refining.

Impact

Innovative Drive

Delivering a recycled aluminum that meet technical requirements for transformers, purity and conductivity.

Economic Impact

While cost-benefit analysis has not been performed yet, the expectation is that additional cost caused by CBAM could rise up to 1 500 kEuro by 2030. These costs could be avoided by sourcing recycled aluminum.

CO2 Impact

Only theoretical estimations so far, the potential CO2 reduction is up to 90% for aluminum, which would contribute to up to 35% reduction of cradle-to-gate emissions of the distribution transformer.

External Links

Information not provided.

Boa Vista Organic Waste Composting Center

South America

Circular Economy and Materials

Overview

Case objectives

CETRO-BV promotes circular bioeconomy by composting organic waste, reducing emissions, enriching soil, and supporting sustainable farming in the Amazon.

Companies Involved

AVSI Brasil.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Inaccurate waste data, poor sorting, equipment issues, and training gaps. Compliance with environmental rules was crucial to avoid legal problems.

Scalability

The model can be scaled to other cities, significantly cutting GHG emissions by diverting organic waste from landfills, replacing chemical fertilizers, and promoting circular economy and resource efficiency.

Impact

Innovative Drive

First large-scale composting center in the Legal Amazon, combining advanced waste sorting, community training, and social inclusion. It pioneers urban organic waste management with strong environmental and circular economy impact.

Economic Impact

Revenue from compost sales and reduced waste disposal costs support profitability. The project creates jobs and promotes economic inclusion. Low costs and growing market potential show strong financial viability despite no detailed NPV or IRR data.

CO2 Impact

Recycling 1,369 tons of waste at CETRO -BV (Dec 2023–Oct 2024) prevented an estimated 479 tons of CO2 emissions by diverting organic waste from landfills.

External Links

https://www.avsibrasil.org.br/wp-content/uploads/2024/11/Cetro-BV_26_11_24.pdf

RODA

South America

Circular Economy and Materials

Overview

Case objectives

Pilot program for door-to-door selective collection in Salvador and Fortaleza, connecting people to recycling through accessible services, low-carbon logistics, and social impact partnerships.

Companies Involved

iFood; Prefeitura de Fortaleza; Prefeitura de Salvador; and Resilients Cities Network.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Investment by the public sector to continue the project, user engagement drop-off, waste market price volatility and formalization challenges with recycling cooperatives.

Scalability

By expanding Re-ciclo to other cities and companies, the model can scale circular economy logistics, reduce transport emissions with electric micromobility aligned with Paris Agreement goals and SDGs ODS 11, 12 and 13.

Impact

Innovative Drive

Re-ciclo combines electric micromobility with digital logistics, formalizes informal waste pickers, integrates reverse logistics credits, and creates an inclusive, scalable model for urban recycling.

Economic Impact

The project ensures regulatory compliance, avoids fines, improves ESG positioning, and allows companies to convert taxes when investing in projects, generating direct reputational returns and aligning with stock exchange market guidelines.

CO2 Impact

884,000 kg of CO2 avoided using electric tricycles instead of fossil fuel vehicles. Estimate based on km traveled and standard vehicle emissions factors (GHG Protocol method).

External Links

https://youtu.be/_sDzIvm2p3k?si=nUQTrFBHhocjbNda

Sustainable Innovation with PCR Resin in Consumer Packaging

South America

Circular Economy and Materials

Overview

Case objectives

Develop a solution with WENEW PCR resin in partnership between Braskem, Rhotoplas and Kimberly-Clark for diaper packaging, with a technical and sustainable focus, promoting circular economy.

Companies Involved

Braskem; Kimberly Clark; and Rhotoplas.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

With this sale, we reduce the use of virgin plastic and CO2 emissions, aligning with the Paris Agreement as three companies collaborate across the entire supply chain.

Impact

Innovative Drive

Reduces the use of virgin plastic in hygiene packaging with 30% Wenew PCR, promoting circularity and a lower carbon footprint.

Economic Impact

The Circular Economy strengthens the sustainability strategy by driving revenue through continuous growth in sales and production of products with recycled content.

CO2 Impact

Information not provided.

External Links

https://www.braskem.com.br/wenew/noticia/braskem-e-reconhecida-pela-embanews-por-solucoes-de-filmes-flexiveis-fabricados-com-resinas-recicladas

Bioplants - Complete site for the treatment and economic recovery of organic waste

South America

Circular Economy and Materials

Overview

Case objectives

Complete solution integrating: organic waste, biogas, biomethane, organomineral fertilizers and green CO2. Promoting decarbonization and efficient use of resources.

Companies Involved

MWM Tupy do Brasil.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

Units in operation with replication potential. Very low exploration potential in Brazil, with great expectations for expansion.

Impact

Innovative Drive

Complete solution integrating: waste, biogas, fertilizers and green CO2.

Economic Impact

The generation of energy, renewable fuel, and fertilizers are aligned with the reduction in the use of fossil resources. The rational use of waste (environmental liabilities) generates economic value of great use in the market (assets).

CO2 Impact

The implemented project has the potential to reduce CO2 equivalent by more than 25,000 tons of CO2/year.

External Links

Information not provided.

Vidrado

South America

Circular Economy and Materials

Overview

Case objectives

Promote the proper disposal of glass through community engagement in tourist destinations, especially during summer when waste generation increases.

Companies Involved

SOLOS; and Heineken.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Logistical challenges in remote areas; regulatory risks like quadricycle restrictions; community engagement due to diverse economic and political interests.

Scalability

Vidrado offers a replicable model for circular waste management in tourist areas, reducing landfill use, reintroducing glass into the production chain, cutting emissions, and promoting local income generation in line with SGDs 11, 13 and 15.

Impact

Innovative Drive

Vidrado pioneers circular glass management in remote tourist areas by combining data-driven logistics, georeferenced mapping, behavior change, community impact actions, and public-private cooperation for lasting systemic change.

Economic Impact

The project ensures regulatory compliance, avoids fines, improves ESG positioning, and allows companies to convert taxes when investing in projects, generating direct reputational returns and aligning with stock exchange market guidelines.

CO2 Impact

Average CO2 emissions were reduced by 52.8% per year, calculated through logistics optimization, avoided landfill transport, and recycling in the glass industry.

External Links

https://youtu.be/BqOVSw7Yczo?si=Jt9uk1ssfxulba-W

LIBÉRTECCE – Circular Economy and Energy

South America

Circular Economy and Materials

Overview

Case objectives

We transform synthetic textile waste into new products/raw materials: wood plastic; plastic for injection, rotomolding, thermoforming of parts/filament extrusion; electricity.

Companies Involved

LIBÉRTECCE - TR & JC INDÚSTRIA E COMÉRCIO DE POLÍMEROS LTDA.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

We have established waste recycling technology. What we lack is capital to invest in equipment, make improvements and adjustments to the gasifier, and also to reduce the company's financial leverage.

Scalability

We impact the apparel production chain. We contribute to the Sustainable Development Goals (UN-SDGs): 9. Industry/Innovation/Infrastructure; 12. Responsible Consumption and Production; 13. Action against Global Climate Change.

Impact

Innovative Drive

These are innovative products. Currently, a small portion of the waste is reused (20%). The remainder is sent to landfills and improperly disposed of in the environment; and all developed technologies have been granted a patent by the INPI.

Economic Impact

Our factory is operational and generating revenue. The Contribution Margin ranges from 50% to 100%. Our average payback period is 8 years. NVP and IRR values will be disclosed if our project is selected and with due confidentiality formalization

CO2 Impact

Waste-positive:More than 20 tons/polyester textile waste were recycled, resulting in a waste-positive reduction of 192,000 kg of CO2 emissions and 1,658,000 liters of water consumed. See attached file.

External Links

https://www.abcmais.com/brasil/rio-grande-do-sul/vale-do-rio-dos-sinos/novo-hamburgo/premio-lancamentos-fimec-tem-vencedores-confira

https://www.instagram.com/p/C-sWCUtOCHu/?igsh=eGl1bnNsNDZ0cWhs

https://abpi.org.br/newsletter/premio-patente-do-ano/

Industrial Symbiosis: Re-refining of used oil produces raw material for the industry of formulating new lubricants

South America

Circular Economy and Materials

Overview

Case objectives

Promote a circular economy by removing hazardous waste from circulation and reinserting it into the production chain as base oil, the main raw material of lubricant industry.

Companies Involved

Lwart Soluções Ambientais.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

Re-refining by hydrotreatment allows the return to the market of high-quality base oils, used in the manufacture of high-performance lubricants. This is a successful circular economy example that reduces the need for fossil-based raw material extract.

Impact

Innovative Drive

Lwart is celebrating 50 years, and to this day remains the only company in Latin America capable of producing Group II base oils, accounting for nearly half of all such oil circulating in the national market.

Economic Impact

This case demonstrates how technological innovation and sustainability can go hand in hand with solid economic returns. Its efficient operations and unique market position demonstrate that sustainable practices can also be highly profitable.

CO2 Impact

The base oil produced by Lwart has a 77% lower carbon footprint compared to first-refined base oil. This represents a reduction of 3,632 kg COe per cubic meter of base oil.

External Links

https://relatorios.lwart.com.br/relatorio-de-sustentabilidade-de-2024.pdf

https://static.portaldaindustria.com.br/portaldaindustria/noticias/media/filer_public/99/59/9959c2df-c068-486c-af99-dda4f664b171/economia_circular_na_industria.pdf

https://www.lwart.com.br/projeto-h/

IFC/Kioo Glass: Tanzanian glass maker leads the way in circular production and reuse

North / Central America

Circular Economy and Materials

Overview

Case objectives

IFC's loan to help Kioo expand manufacturing capacity for reusable glass bottles, increase recycled glass content in production process, meet demand in regional markets & generate thousands of jobs.

Companies Involved

IFC; Kioo Limited and Multinational beverage companies (offtakers).

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Delays in construction and Changes in competitive landscape.

Scalability

Demand for refillable glass bottles expected to grow in east and southern Africa. Durable bottles can be collected, cleaned and sterilized for multiple reuse. Reuse of bottles extends lifetime and reduces lifecycle emissions of containers.

Impact

Innovative Drive

Kioo's production shapes the market by supplying bottles to MNCs with higher reuse capability than market average. Project will help Kioo meet growing demand for refillable glass containers in its regional markets where there is a supply gap.

Economic Impact

Refillable glass bottles have collection incentives and a cost advantage in East and Southern Africa compared to other containers. By substituting for imports, Kioo can supply a higher volume of cost-efficient locally manufactured products.

CO2 Impact

Bottles with high reuse cycles can reduce CO2 emissions through lifetime extension & import reduction. Kioo also estimates 4090 tons reduced CO2 emissions annually by reaching recycling targets.

External Links

https://www.ifc.org/en/pressroom/2024/ifc-and-kioo-tanzania-partner-to-produce-locally-made-sustainably-manufactured-glass

https://www.ifc.org/en/stories/2024/no-glass-ceilings; https://disclosures.ifc.org/project-detail/SII/48438/kioo-glass-k3

Lar Plastics

South America

Circular Economy and Materials

Overview

Case objectives

Processing and production of recycled plastic products.

Companies Involved

Lar Plastics.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

By vertically integrating post-consumer and post-industrial plastic recycling into product manufacturing, its model can be replicated across industrial supply chains in diverse geographies.

Impact

Innovative Drive

Lar combines recycling, production, and social impact in one chain. Its model supports waste pickers, uses real-time GHG data, and sets a new standard for circular industry.

Economic Impact

Lar's model enhances profitability through vertical integration, long-term contracts, and operational efficiency. Its structure aligns with private sector goals, offering scalable, cost-effective impact with strong potential for return.

CO2 Impact

Using recycled plastics reduces energy consumption by up to 80% compared to virgin materials, significantly lowering associated CO2 emissions (source: https://repositorio.ufrn.br/items/6951808d-3b1e-4).

External Links

https://gefcapital.com/impact-esg

Alternative Fuel (AF)

Africa

Circular Economy and Materials

Overview

Case objectives

Minimize dependency on fossil fuel, reduce CO2 emissions, conserve natural resources, reduce costs, manage waste and enable sustainable production through waste combustion in the cement kilns.

Companies Involved

Dangote Cement Plc (DCP).

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

New entrants into biomass space, increase in prices driven by competition and inflation, supply chain reliability, loss of trained team members, weather, AF type, quality&quality selection, policies.

Scalability

Integrating more technology and AF feeding systems will further reduce emissions. This aligns with GCCA net-zero and Paris Agreement goals. Increased AF use as fuel and supplementary cementitious materials will conserve natural resources.

Impact

Innovative Drive

Phased in-house modification of feeding systems upgraded redundant equipment by reducing natural resource extraction and GHG emissions. This saved time, costs and encouraged innovation. Back hauling also reduced costs and emissions.

Economic Impact

The cement industry's energy cost (thermal & electrical) is 35-40% of production. Substituting thermal energy with alternative fuel (AF) reduces costs. ROI is evaluated for all project's, ensuring payback does not exceed 2.5 years before approval.

CO2 Impact

A CO2 emission intensity reduction of 6% was recorded between 2021 and 2024. Methodology included CO2 accounting using the GHG Protocol and The Cement CO2 and Energy Protocol.

External Links

https://dangotecement.com/wp-content/uploads/2025/05/Dangote-Cement-FY-2024-Annual-Report.pdf

Óleo&Vida – Students Turning Used Cooking&Oil into Clean Energy

South America

Circular Economy and Materials

Overview

Case objectives

Educate K-12 students on circular economy while creating a community network that collects household used cooking oil, channels it to Binatural for biodiesel production, and rewards participating class.

Companies Involved

Binatural and School - Irmã Dulce.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Parental consent delays; low student engagement; improper oil storage/contamination; logistic collection failures; fluctuation of UCO market value.

Scalability

Any school can replicate the model with minimal investment, creating a nationwide network that feeds thousands of liters of UCO into biodiesel supply, cuts sewer pollution, and supports Brazil's Paris-aligned bioenergy targets.

Impact

Innovative Drive

First Brazilian school programmer that gamifies household UCO recovery, links real-time collection data to class leaderboards, and closes a full circular loop from kitchen to classroom to clean fuel.

Economic Impact

Each 1000L of UCO yields ˜USD1000 in biodiesel value while avoiding sewer maintenance costs. Low capex and community labor ensure payback <1year, supporting Binatural's feedstock strategy at marginal cost.

CO2 Impact

1.1tCO2e avoided, calculated with RenovaCalc life-cycle model comparing B100 to fossil diesel, using default emission factors (EPA/ANP).

External Links

Information not provided.

Living Rivers

South America

Circular Economy and Materials

Overview

Case objectives

The project boosts plastic collection, empowers Amazonian cooperatives, and fosters innovation to turn riverine plastic pollution into local economic development and environmental sustainability.

Companies Involved

Natura; Belém and Benevides Municipal Governments; Seixos de Plástico; Diego Saldanha - Company Ecobarreiras; eciclaben; Cootpa; CAIC+MMIB; ESPAÇOURBANO; Sitawi; Riverside Communities; SPROC; NósPodemos cooperative; Guesthouses (Pousadas) in Cotijuba.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Key risks include inadequate recycling infrastructure, insufficient funding, and a lack of external engagement. Supplier non-compliance, missed collection targets, and regulatory changes.

Scalability

The Rios Vivos project can significantly reduce CO2 emissions and scale plastic recycling with low-cost, simple technologies. This pioneering model promotes a circular economy and preserves biomes.

Impact

Innovative Drive

Rios Vivos pioneers' community-led riverside plastic collection, turning waste into local commerce credits and new income streams. The project creates recycled plastic chains, using waste for new products and packaging, and explores making construction.

Economic Impact

The Rios Vivos project boosts waste pickers' income by selling recyclables for Natura's supply chain and new products. The business model is economically feasible without subsidies, and it reduces government waste management costs.

CO2 Impact

Rios Vivos aids CO2 reduction via recycled plastic. 18.2% of Natura LatAm's plastic packaging was recycled in 2024, aiding SBTi Net Zero goals. Impact measured by LCA.

External Links

https://g1.globo.com/am/amazonas/noticia/2023/12/24/embalagem-de-hidratante-corporal-de-castanha-e-produzida-com-plastico-retirados-dos-rios-da-amazonia.ghtml

https://docs.google.com/presentation/d/1k_ae0gH1RWT1wpj0d8rRvQkzI5P_g0KXFXmCBh3jwmk/edit?usp=sharing

Cereal Upcycling

South America

Circular Economy and Materials

Overview

Case objectives

The initiative aims to reduce the company's scope 3 emissions by approx. 7% and reduce food waste by applying circular economy concepts and using a by-product as an ingredient.

Companies Involved

Nude.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

The risks involved in the development are intrinsically related to the process of developing and launching a new product in the portfolio, including development and market risks.

Scalability

The upcycling cereal has half of the environmental impact of a traditional option. If adopted by other companies, this solution can support the food industry in aligning the portfolio to the emissions reductions necessary to address Paris Agreement.

Impact

Innovative Drive

The initiative addresses two of the main challenges of the food systems: reduces the environmental impact of raw ingredients, by using a by-product as an ingredient, and reduces food waste, as the biomass (by-product) used to be discarded.

Economic Impact

The upcycled cereal, developed based on concepts of circular economy and food waste reduction, is sold at a price close to traditional options, which demonstrates the potential of innovative products.

CO2 Impact

The cereal uses as an ingredient a byproduct of the oat milk production process, reducing the company's scope 3 emissions by approx. 7%. The Oat milk base is grown in a regenerative system.

External Links

https://heynude.com.br/categoria/para-comer

Waste Hero Education (Global Circular Economy Education)

Asia / Oceania

Circular Economy and Materials

Overview

Case objectives

Waste Hero aims to educate and empower youth and communities to manage waste responsibly, promote recycling and circular economy principles, and support environmental sustainability for a low-carbon.

Companies Involved

Yunus Thailand; Southeast Asian Ministers of Education for Sufficiency Philosophy Economy for Sustainability and National Education Association and American Federation of Teachers.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Key risks include limited long-term behavior change among students, potential misalignment of materials with local culture, dependency on partners for resources, and challenges in tracking impact.

Scalability

Aligned with the Paris Agreement, Waste Hero educates future generations on circular economy and recycling, promoting responsible consumption, diverting waste from landfills, avoiding CO2 emissions, and driving systemic consumer behavior change.

Impact

Innovative Drive

With a unique open-access platform, Waste Hero connects schools, youth, and associations, advancing circular change through school pilots, an accredited Master's course, global digital learning, and innovative gamified education tools.

Economic Impact

In 2023, Waste Hero achieved a Social Return on Investment (SROI) of 4.49x per $1 spent in Indonesia and the Philippines, demonstrating measurable social value and tangible impact from the program's cost-effective implementation.

CO2 Impact

Waste Hero reduces CO2 emissions by diverting PET bottles from landfills, avoiding emissions and promoting circularity, using NAPCOR's PET packaging Life Cycle Analysis methodology.

External Links

https://www.wasteheroeducation.com

Bioo: Redefining the Future of Waste Through Circularity

South America

Circular Economy and Materials

Overview

Case objectives

To transform residual biomass and waste into bioproducts like biomethane, bioCO2 and biofertilizers, enabling decarbonization and promoting circularity within various value chains.

Companies Involved

Bioo; Invest RS; EB Capital and Sebigas Cótica.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Regulatory uncertainty; availability of biomass.

Scalability

The expansion of anaerobic biodigestion on an industrial scale is strategic for reducing global emissions. Waste biodigestion is a process that can be scaled up through the installation of modular plants designed to be placed in different locations.

Impact

Innovative Drive

Bioo's project is representing a pioneering advancement in the sector for treating agro-industrial waste with virtually net-zero greenhouse gas emissions, converting it into bioproducts that directly replace derivatives of fossil fuels.

Economic Impact

All projects are cost-efficiency oriented with strong fundamentals and a well-balanced risk-return scenario. This results in a competitive cost structure, the bioproducts have high added value and returns adequate to the risk level of the project..

CO2 Impact

The emissions of CO2 in Bioo's plant is much lower in comparison to the solutions presently implemented in Brazil, namely landfills and composting. The operation is considered carbon neutral.

External Links

https://bioosolucoes.com.br/

Auê Natural: Regenerating the Amazon, the Beauty Industry and Consumer Health with Every (paper) Package

Europe

Circular Economy and Materials

Overview

Case objectives

Building a next-gen beauty brand that is healthy, plastic-free and powers a regenerative rainforest bioeconomy - co-created for and with conscious youth consumers.

Companies Involved

Aue Natural Ltd; 100% Amazônia; University of Warwick; and EGP Packaging.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Supply Chain (over reliance on seasonal Amazon harvests); Mitigation: Diverse sourcing strategy. Regulatory (market delays due to EU/UK cosmetics regulation and Nagoya Protocol compliance); Mitigation: ongoing monitoring.

Scalability

Auê's waterless formulations and plastic-free, compostable packaging offer a blueprint for circular innovation in the beauty industry. When replicated, this model can drastically reduce individual consumer's footprint, CO2, plastic production and water usage, aligned with Paris goals and circularity, as well as improve consumer health outcomes through avoidance of microplastics and synthetic formulations.

Impact

Innovative Drive

In July 2025, we were named Innovator of the Year by Climb UK, proving our leadership in scalable green innovation. Auê disrupts beauty with safe ancient knowledge and science-backed formulas done by UK/EU/BR experts, plastic-free, waterless products co-created with Gen Z.

Economic Impact

Auê is projected to reach £43M in revenue and £190M in enterprise value by 2030. Based on its growth plan, the estimated IRR exceeds 35%, demonstrating strong return potential, scalability and low implementation cost per unit.

CO2 Impact

By Year 5: 751 tCO2e avoided via PET-free packaging and waterless formulas, measured using cradle-to-gate LCA against conventional beauty packaging, transport and processing methods.

External Links

www.auenatural.com

Instagram and TikTok: @auenaturalUK

Project Aparas

South America

Circular Economy and Materials

Overview

Case objectives

Transform waste into circular inputs through local industrialization, productive inclusion, digital traceability, and generation of environmental, social, and economic value.

Companies Involved

ULTRAKRAFT LTDA.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Low engagement of cooperative members; operational issues with machinery; resistance to digitalization; fluctuations in demand for recycled materials; and labor risks (technical cooperation).

Scalability

A modular model with standardized processes and suppliers enables rapid expansion and replication across different regions, amplifying environmental and social impacts in a traceable and measurable way.

Impact

Innovative Drive

Integration of AI, TOTVS, and QR code technology into local production transforms cooperatives into industrial hubs, providing traceability, inclusion, and participatory governance, resulting in rapid and transparent impact.

Economic Impact

Industrialization increases the value of recyclables by up to 13 times (plastic waste worth R$0.80 transformed into trash bags worth R$11.00), reduces costs, diversifies revenue streams, and meets ESG criteria. The model is accessible, with a quick economic return and tangible gains already seen within 4 months.

CO2 Impact

In 4 months, 425 tons of waste were recycled — avoiding 805 tons of CO2 (approximately equivalent to 20 football fields of growing trees). Methodology: GHG Protocol.

External Links

www.projetoaparas.com.br

Use of foundry waste as raw material in other value chains

South America

Circular Economy and Materials

Overview

Case objectives

Promote environmental benefits by not disposing waste in landfills, reducing the consumption of natural resources, and carbon footprint..

Companies Involved

Tupy.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Environmental criteria; compliance assessment; and short standing partenership..

Scalability

Great potential since we still have an annual generation of about 500 thousand tons without promoting a circular economy.

Impact

Innovative Drive

Tupy uses Research and Development (R&D) as a competitive edge in the market, by improving production capacity; prioritizing the efficiency of products and services; and launching technological solutions.

Economic Impact

Resource and waste management and circular economy is considered a material topic for Tupys sustainability strategy. All statutory directors have a portion of their individual targets linked to ESG factors, including reducing GHG emissons.

CO2 Impact

Reduces the need to extract new mineral resources from nature, reduces GHG emissions into the atmosphere in other production chains, such as the cement, chemical, steel and automotive industries.

External Links

https://www.tupy.com.br/wp-content/uploads/2025/04/RelatorioSustentabilidade2024_ENG.pdf

ZERO LANFILL – TROX DO BRASIL

South America

Circular Economy and Materials

Overview

Case objectives

The objective of Landfill Zero was to completely eliminate the sending of waste to landfill, ensuring environmentally correct disposal through recycling, co-processing and reuse.

Companies Involved

TROX DO BRASIL.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Failures in segregation, logistical problems, and variation in waste quality.

Scalability

TROX's Zero Landfill model is highly scalable and replicable across various industrial sectors. By prioritizing proper waste disposal, it significantly reduces CO2 emissions, directly contributing to the goals of the Paris Agreement.

Impact

Innovative Drive

A pioneering approach that integrates the circular economy into the factory floor with traceability and waste treated as an asset. A practical, accessible, and culturally transformative solution.

Economic Impact

The project generated savings by eliminating landfill costs and enabling waste valorization. Implementation was low-cost, with financial returns achieved through operational efficiency.

CO2 Impact

Since 2023, TROX has properly disposed of approximately 1,636 tons of waste, achieving the zero landfill goal.

External Links

https://www.troxbrasil.com.br

https://www.kapersul.com.br

From Waste to Yield: The Innovation That Closes the Cycle of Animal Protein Production

South America

Circular Economy and Materials

Overview

Case objectives

Transforming environmental liabilities into a source of nutrients for the soil, impacting the animal protein chain (pork) and agriculture.

Companies Involved

SERVARE AMBIENTAL.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Initial resistance from producers to changing handling practices; climate risk affecting waste drying; and limited access to credit lines for expansion.

Scalability

The Servare model is replicable across all swine-producing regions, reduces emissions, and reuses waste as an agricultural input, promoting efficient management of natural resources and soil fertility.

Impact

Innovative Drive

It transforms swine farming liabilities into biofertilizers applied in general agriculture, closing the production chain loop with circular innovation and low logistical and environmental costs.

Economic Impact

The model creates scalable impact in the swine protein production chain and replaces imported fertilizers. The operation is financially viable with attractive and scalable returns, promoting profitability and cost reduction on the farm.

CO2 Impact

Estimated reduction of 1,250 tCO2e/year by avoiding methane emissions from lagoons and substituting mineral fertilizers. Methodology: IPCC 2006 Tier 1 for organic waste.

External Links

www.servare.eng.br

2Life All Inclusive | Expanded Circularity

South America

Circular Economy and Materials

Overview

Case objectives

2Life All Inclusive integrates reconditioning and waste recovery, converting liabilities into inputs and accelerating the transition to a sustainable industry.

Companies Involved

Pieralisi do Brasil Ltda.

WG Alignment

Regulation and incentives; and Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Limited customer adoption, uncertain market acceptance of products derived from sludge, increasing operational costs, resistance to new models, and gaps in tax incentives.

Scalability

The strategy expands Pieralisi's portfolio of circular solutions, with high adoption potential among its installed customer base in Brazil and Latin America, enabling sustainable growth and revenue diversification.

Impact

Innovative Drive

It integrates machine refurbishment with solutions for industrial waste within a circular ecosystem. The proposal is unprecedented in connecting technology, industrial services, and the circular economy on a scalable platform.

Economic Impact

The solution lowers operational costs and increases profit margins for customers. Refurbished equipment holds competitive market value, and waste reuse reduces disposal and input costs.

CO2 Impact

Information not provided.

External Links

https://pieralisidobrasil.com.br/novidade-pieralisi-tratamento-de-lodo-all-inclusive/

https://pieralisidobrasil.com.br/second-life-pieralisi-maquinas-revitalizadas-com-qualidade-de-produto-novo/

BIOTEX

South America

Circular Economy and Materials

Overview

Case objectives

Production of low-cost products from solid waste generated in the production process, reducing discards, optimizing resources and strengthening sustainability and operational efficiency.

Companies Involved

Ibratin - Tintas e Texturas.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

When replicated, the model reduces waste, emissions, and raw material usage, contributing to climate goals and promoting efficient natural resource management in the industry.

Impact

Innovative Drive

Use of segregation and reuse technologies within the production process itself, employing a circular and innovative approach that transforms waste into input, reducing waste and costs.

Economic Impact

Low implementation cost, reduction of expenses related to disposal and input purchases, with a positive NPV and attractive IRR, aligning with the profitability goals of the private industrial sector.

CO2 Impact

Information not provided.

External Links

Information not provided.

Upcycling Bunker One

South America

Circular Economy and Materials

Overview

Case objectives

To fight textile waste, all boiler suits used in Bunker One's own operations in Brazil since May 2023 are being sanitized and transformed into new products, like tote bags and pencil cases.

Companies Involved

Bunker One; and Women from the Global South.

WG Alignment

Materials innovation, waste management and circular supply chain ; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

The textile sector represents up to 8% of global carbon emissions, and upcycling addresses a significative part of that, considering both the product's end-of-life emissions and the offsetting of virgin textile production through reusing materials.

Impact

Innovative Drive

Using the upcycling technique in a maritime environment is a creative approach to resource management; the project's setup, in which the used uniforms are not only donated, but purchased back by the company after transformation, is a pioneering aspect.

Economic Impact

The baseline materials for production are already property of the company. The funds employed in the uniforms' transformation and environmental awareness workshops are ultimately reverted into local community impact and employee motivation.

CO2 Impact

Emissions savings related to the otherwise discarded textile materials - Not specified in this project.

External Links

https://upcyclingbunkerone.com/en/

Leather Traceability

South America

Circular Economy and Materials

Overview

Case objectives

Traceability of leather in footwear, bags and accessories free of deforestation through blockchain, with a goal of 100% on all products by breeding farms by 2030.

Companies Involved

Azzas 2154.

WG Alignment

Materials innovation, waste management and circular supply chain ; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Resistance from suppliers to formalization and audits; system integration failures; high technology costs; and lack of engagement from the production chain.

Scalability

The project reduces CO2 by avoiding leather sourced from deforested areas, supports the Paris Agreement through more responsible supply chains, encourages sustainable livestock farming and efficient land use, and inspires the sector by demonstrating the viability of blockchain and AI.

Impact

Innovative Drive

AZZAS 2154 uses blockchain and AI, aiming to provide customers with QR Code access to track 100% of leather by 2030, combating deforestation and ensuring transparency. It is the only Brazilian signatory from the sector in the Call to Action for Deforestation-Free commitment.

Economic Impact

Access to demanding markets such as Europe and the US, brand value enhancement, operational efficiency, regulatory anticipation, and affordable costs—achieved through long-term cost dilution, economies of scale, and integration with existing IT infrastructure.

CO2 Impact

It prevents illegal deforestation, the main source of emissions in Brazilian livestock farming, promotes conscious choices in the production chain, and models data for future emissions accounting.

External Links

https://ri.azzas2154.com.br/a-companhia/sustentabilidade/

https://epocanegocios.globo.com/Empresa/noticia/2022/08/de-olho-no-mercado-externo-arezzoco-implanta-o-rastreamento-do-couro-em-calcados.html

Circular Economy of Ceramic Waste in the Construction Retail Sector – Yattó & Anfacer

South America

Circular Economy and Materials

Overview

Case objectives

To reduce ceramic waste in retail by preventing product breakage and transforming unavoidable waste into sand for reuse in construction.

Companies Involved

Yattó; and ANFACER.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Low retailer adoption, scaling challenges, regulatory delays, market resistance, and inconsistent ceramic waste supply.

Scalability

The solution can be adopted by ceramic producers and retailers across regions, reducing waste sent to landfills and replacing virgin sand, thus lowering emissions and improving resource efficiency at scale.

Impact

Innovative Drive

The project transforms ceramic waste into a new construction input, combining waste prevention, product innovation, and retail integration—bridging the gap between circularity and market adoption in construction.

Economic Impact

The solution created a marketable product with low production cost and high demand. Retail sales generate new revenue from waste. Affordable implementation ensures economic viability for companies with minimal investment.

CO2 Impact

Estimated CO2 reduction from avoided landfill disposal and replacement of virgin sand; based on life-cycle emissions of ceramic waste and sand extraction processes.

External Links

https://www.anfacer.org.br/noticias/anfacer-inova-com-projeto-de-gestao-de-residuos

https://www.instagram.com/p/C_0b6yQOtrB/?locale=ar-EG&hl=ar

Deink 4D Technology – Deinking, Delamination, Demetallization, and Disruption

South America

Circular Economy and Materials

Overview

Case objectives

The Deink project aims to enable the recycling of flexible plastic packaging by removing inks, adhesives, and metallic layers, making previously non-recyclable materials viable for circular reuse.

Companies Involved

Valgroup.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Key risks include limited post-consumer material, high investment costs, market resistance to recycled content, operational challenges, and regulatory changes affecting recycled material use.

Scalability

Deink enables up to 83% CO2e reduction vs. virgin resin (LCA-based), recycling complex flexible packaging without solvents. Scalable across industries, it promotes circularity and supports Paris Agreement and resource efficiency goals.

Impact

Innovative Drive

Deink is a pioneering, solvent-free technology that enables the recycling of complex flexible packaging by removing inks, adhesives, and metal layers, materials previously considered non-recyclable, closing a major gap in circularity.

Economic Impact

Deink adds value by transforming hard-to-recycle waste into high-quality resin. Its solvent-free, cost-efficient process ensures a positive NPV and IRR , aligning with profitability and circular economy goals.

CO2 Impact

An LCA shows that the Deink technology produces recycled resin with an 83% lower carbon footprint than virgin resin. Since 2023, this has avoided an estimated 4,000 tCO2eq.

External Links

https://www.deinkbrasil.com.br/

Bottle-to-Bottle Recycling

South America

Circular Economy and Materials

Overview

Case objectives

The Bottle-to-Bottle project recycles post-consumer PET into food-grade resin, reducing emissions, promoting circularity, and generating jobs, aligning with climate and resource efficiency goals.

Companies Involved

Valgroup.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Key risks include limited access to post-consumer PET, market volatility, quality variability of collected material, competition for feedstock, and regulatory barriers affecting recycled content use.

Scalability

The Bottle-to-Bottle model cuts emissions by 53% vs. virgin PET, promotes resource efficiency, and strengthens recycling chains. Scalable across industries, it supports Paris Agreement goals and circular economy transitions.

Impact

Innovative Drive

Valgroup pioneered Bottle-to-Bottle PET recycling in the early 2000s and is today the largest PET recycler in Latin America. The project boosts PET's value as raw material, ensuring profitability and circularity.

Economic Impact

The project boosts PET's value as a raw material, not waste, reducing costs and ensuring profitability. With positive IRR and NPV, it meets market demand and supports the circular economy.

CO2 Impact

Using LCA methodology, the project shows that recycled PET has a 53% lower carbon footprint than virgin resin, avoiding significant CO2 emissions by recycling 162,000 tons annually.

External Links

https://www.valgroupco.com/

Waste to Value – Vale's Circular Mining Program

South America

Circular Economy and Materials

Overview

Case objectives

Reusing mining waste and turning it into value through innovation and circular economy practices, creating sustainable products and co-products, optimizing resources, and reducing environmental impact.

Companies Involved

VALE S.A.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

In 2024, Vale avoided 23 kt of CO2 through Waste to Value. As the program scales, benefits will grow. Since it reuses tailings and waste, the model is replicable by other iron ore companies with similar liabilities

Impact

Innovative Drive

W2V drives innovation by turning tailings into products via new processing routes and R&D. A key differentiator is how we engage employees—many initiatives arise from their creative ideas to reuse waste in circular ways.

Economic Impact

All W2V initiatives have positive NPV, ensuring profitability. We seek socio-environmental impact with financial returns, evaluating each case for revenue potential and sustainability—attracting investors through solid, circular value.

CO2 Impact

Key risks include obtaining environmental licenses for tailings reuse, ensuring market acceptance, and completing the necessary infrastructure in time to enable circular production.

External Links

https://vale.com/pt/esg/mineracao-circular

TraceSurfer DPP in Latam for textiles and betteries

South America

Circular Economy and Materials

Overview

Case objectives

Implement digital product passports in the fashion and textile industry in Colombia. To comply with regulations such as de EcoDesign for Sustainable Productos (ESPR) in Europe and circular economy.

Companies Involved

TraceSurfer.

WG Alignment

Regulation and incentives; and Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Information not provided.

Scalability

We have developed a software as a service where brands can create their own DPP. The system is able to implement DPP at scale and the subscription business model allows SME´s and enterprises to operate the same software at different levels.

Impact

Innovative Drive

We are using existing technology to solve a big problem, supply chain transparency, interoperability and DPP compliance at scale with affordable prices adapted to the latam market.

Economic Impact

Our business model is by subcritption depending on the volume of DPP created per year. This allows SME´s which are 95% of companies in Latam to operate regardless of their budget and size.

CO2 Impact

Information not provided.

External Links

Information not provided.

Closing the loop: Hydrolite® 5 green

South America

Circular Economy and Materials

Overview

Case objectives

Symrise developed Hydrolite® 5 green to replace synthetic pentylene glycol with 100% plant-based and upcycled ingredients, driven by a commitment to the circular economy and nature-based solutions.

Companies Involved

Symrise.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

Potential for significant emission reductions at scale is indicated by high and growing demand for more circular, sustainable cosmetic products. Hydrolite® 5 green can also replace multiple other ingredients, improving efficient resource management.

Impact

Innovative Drive

Unlike other pentylene glycol, Hydrolite® 5 green uses renewable, traceable raw materials upcycled from the food production and wood pulp industries. The patented, low-carbon, solvent-free process also adheres to the 12 green chemistry principles.

Economic Impact

The ingredient's proven efficacy and multifunctionality make it highly cost effective, with strong demand supporting profitability. Two substances used in production can be either repurposed, reducing costs, or sold on, creating revenue opportunities.

CO2 Impact

Symrise's process design reduces direct CO2 emissions by 67 kg/ton of Hydrolite® 5 green from cradle to gate, following ISO 14040-14044 using product-specific data and public ecoinvent data.

External Links

Information not provided.

CICLOS REAL H: Sustainability, Innovation, and Social Responsibility in Agribusiness

South America

Circular Economy and Materials

Overview

Case objectives

Present the Ciclos Program, Real H's circular economy initiative that expanded waste collection and disposal, engaged stakeholders, and generated positive economic, social, and environmental impacts.

Companies Involved

REAL H.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Initial lack of infrastructure, lack of employee support, risk of low attractiveness, and price volatility of recyclables.

Scalability

Ciclos is a replicable model that combines waste management, environmental education, and social impact. Its adoption by other companies can accelerate emission reductions, generate ESG value, and promote a sustainable culture with low cost and high effectiveness.

Impact

Innovative Drive

Ciclos is a pioneer in integrating waste management, internal and external engagement, and measurable social impact. With sector-specific goals, traceability, and reinvestment in communities, it turns sustainability into practice with low cost and high effectiveness.

Economic Impact

Ciclos generates revenue from recyclables, reduces operational costs, and has low implementation costs. It reinvests in social initiatives, improves internal climate, and creates value for the business, especially in terms of brand image.

CO2 Impact

1,355.41 tons of CO2e were avoided based on the GHG Protocol (Scope 3) and the factors from the GHG Emissions Calculation Manual for Waste (GIEGRICH et al., 2021).

External Links

https://programaesg.fiems.com.br/ciclos-real-h-sustentabilidade-inovacao-e-responsabilidade-social-na-agroindustria/

https://programaesg.fiems.com.br/iniciativas-esg/ciclos-real-h-sustentabilidade-inovacao-e-responsabilidade-social-no-agronegocio/

https://programaesg.fiems.com.br/empresas/realh/

Klabin Transforma Território Circular Program: development of innovative social technology to promote the circular economy in 7 municipalities in Paraná state

South America

Circular Economy and Materials

Overview

Case objectives

Klabin Transforma – Circular Territory program supports waste management, boosting recycling, reverse logistics, and inclusion. From 2014–present, it impacted 168,000 people and diverted 14,000 tons.

Companies Involved

Klabin S.A.; Ambipar; Cooperative ReciclaTB; Cooperative CoopaTB; Cooperative of Pickers Acamarango; Cooperative of Pickers Acamari; Cooperative Ascores; Cooperative ReciclaRBI; Cooperative of Ortiguera.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

This project is a national benchmark for cooperative structuring, selective collection, and education, helping avoid landfill waste and methane emissions—critical in Brazil, which has 3,000 methane-emitting landfills.

Impact

Innovative Drive

The circular territory approach is a social innovation that has brought new ways to build a humanized circular economy, with waste picker cooperatives as its main pillar.

Economic Impact

The greatest economic impact was on the income of cooperative members, which increased by an average of 86% over the last four years.

CO2 Impact

Information not provided.

External Links

Information not provided.

Transforming Environmental Liabilities into Environmental Assets

South America

Circular Economy and Materials

Overview

Case objectives

Present a replicable technological solution using the LETE System, reducing emissions, transforming organic waste into safe fertilizer, and promoting bioremediation and economic benefits.

Companies Involved

ORGANOESTE; and FUNDECT.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Unstable regulation, inadequate local infrastructure, resistance to decentralization, risk of operational failures, high demands for environmental compliance, and accountability requirements.

Scalability

Organic waste composting reduces municipal costs, prevents methane emissions, extends landfill lifespan, and can be replicated within 28 months.

Impact

Innovative Drive

The LETE System is a pioneering technology that enables composting of organic waste mixed with conventional collection rejects, integrating cooperatives and producing high-quality compost. It is an accessible, scalable innovation with positive environmental impact.

Economic Impact

Composting using the LETE System has low operational costs, eliminates transshipment, generates revenue from compost sales, and avoids landfill fees. The model offers financial returns with potential positive NPV and IRR depending on scale.

CO2 Impact

An average estimate of 0.06 tCO2eq avoided per ton treated, based on the IPCC factor; however, the ideal parameterization for calculating the CO2 emission factor for composting is still uncertain.

External Links

https://programaesg.fiems.com.br/transformando-passivos-ambientais-em-ativos-sustentaveis-o-caso-da-organoeste-com-o-sistema-lete/

https://programaesg.fiems.com.br/iniciativas-esg/organoeste-transformando-passivos-ambientais-em-ativos-ambientais/

https://www.youtube.com/watch?v=wL8o4A9RhfI

National Methodology for Carbon Credits from Recycling

South America

Circular Economy and Materials

Overview

Case objectives

To certify avoided emissions from recycling in Brazil through a traceable, auditable methodology for issuing carbon credits linked to material recovery and circular economy.

Companies Involved

Central de Custódia LTDA and ASSOCIACAO NACIONAL DOS CATADORES E CATADORAS DE MATERIAIS RECICLAVEIS – ANCAT.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Under planning.

Risk Involved

Regulatory uncertainty, early-stage national carbon market, limited incentives for recyclers, and need for institutional support to validate and integrate methodologies into climate policy.

Scalability

The methodology enables traceable, verifiable carbon credits from recycling, applicable nationwide. It can be scaled across sectors and states, reducing emissions and supporting Brazil's climate goals under the Paris Agreement and SBCE.

Impact

Innovative Drive

First carbon credit methodology for recycling in Brazil with verified traceability, social inclusion, and impact-based allocation. Links reverse logistics to the national carbon market under SBCE and includes cooperatives as key actors.

Economic Impact

Recycling-based carbon credits offer a cost-effective path to emissions reduction, attracting private buyers. The system enables revenue for cooperatives and recyclers, aligning profitability with circular economy goals.

CO2 Impact

901,000 tons of recycled packaging avoided ~836 kt CO2 eq, calculated using the IPCC 2013 method versus virgin materials. Avoided emissions: ~0.93 kg CO2 eq per kg recycled.

External Links

https://www.centraldecustodia.com.br

https://recirculabrasil.org.br

https://www.unep.org/resources/report/global-waste-management-outlook-2024

Circular Livelihoods: Integrating Informal Waste Pickers into a Resilient Circular Economy

Asia / Oceania

Circular Economy and Materials

Overview

Case objectives

To empower Informal waste pickers in Tamil Nadu, India by creating sustainable livelihoods through proper waste management, reducing environmental impact, and enhancing marine ecosystems.

Companies Involved

Hand In Hand India.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Scattered and mobile ragpicker locations; Seasonal migration disrupting engagement and Evictions from informal settlements.

Scalability

This model's scalability in India, with high plastic waste, offers substantial potential for emissions reduction. Empowerment of informal waste pickers is crucial for circular economy to align with the Paris Agreement & SDGs.

Impact

Innovative Drive

New nomenclature for Informal waste pickers as "Recycle Guardians"; Developed a first of its kind guide named "A Guide to Empower Informal Waste Pickers"; Provision of specially designed PPE kits; Created WhatsApp Digital Clubs for peer support.

Economic Impact

Income increased after intervention USD 23.21 per month, per person, Intervention cost: USD 0.52 per person.

CO2 Impact

By diverting 12,600 tones of recyclable from landfills & burning, the project reduced CO2 emissions significantly. Estimations done based on IPCC factors for the emissions avoided through this project.

External Links

https://docs.google.com/document/d/17M6N73nWretFcobb_XgVO9biPRHUygw8/edit?usp=drive_link&ouid=111220615215130166005&rtpof=true&sd=true

Success Story of Circularity of Aluminum Beverage Cans

South America

Circular Economy and Materials

Overview

Case objectives

Making the circular economy of aluminum beverage cans in Brazil a global success story, generating a positive impact for the planet and society.

Companies Involved

Novelis and Cooperativas de reciclagem e catadores/as.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

Aluminum recycling has the potential to avoid GHG emissions, as it consumes around 95% less energy compared to production from bauxite.

Impact

Innovative Drive

In Brazil, Novelis stands out for returning beverage cans to its production chain. The Collection Centers' operating model is considered a pioneering one in the country. Novelis operates the largest Integrated Aluminum Rolling and Recycling Complex in the world.

Economic Impact

Sustainable and low-carbon aluminum solutions have been increasingly demanded by customers across different sectors in order to achieve their respective sustainability goals.

CO2 Impact

In 2024, Novelis avoided the emission of approximately 6 million tons of CO2, including the recycling of approximately 50,000 tons of other types of metal scrap.

External Links

Information not provided.

Reverse logistics of end-of-life tires for environmentally sound management, including their use as an alternative energy source for cement plants and reuse in other productive sectors

South America

Circular Economy and Materials

Overview

Case objectives

Collection and recovery of end-of-life tires for alternative applications. Processed through shredding and converted into rubber products, rubberized asphalt and alternative fuel in cement kilns.

Companies Involved

Reciclanip - Project leader, coordination, and management of reverse logistics; Partner shredding companies - Tire processing/shredding; Cement plants; IBAMA and State and Municipal environmental agencies – environmental.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Logistical challenges in remote regions, Environmental regulatory changes and High transportation costs.

Scalability

Model already operates on a national scale and can be replicated by industrial sector with high thermal consumption (cement plants and steel mills). Largest reverse logistics program in the sector in Latin America and the third largest in the world.

Impact

Innovative Drive

Integration of reverse logistics, energy recovery, and environmental traceability, with potential for carbon credit generation.

Economic Impact

Reduces fuel costs for cement plants, lowers disposal expenses for manufacturers, and drives activity in the transportation and shredding sectors.

CO2 Impact

Cumulative reduction of 5.165.666 tCO2e, based on IPCC methodology (emission factor of TDF vs. petroleum coke).

External Links

www.reciclanip.org.br;

https://www.anip.org.br/releases/anip-destaca-acoes-da-industria-de-pneus-instalada-no-brasil-para-um-futuro-mais-sustentavel/

https://conama.mma.gov.br/?id=597&option=com_sisconama&task=arquivo.download

Circular for Zero Factory Model – Turning Vision into Circular Reality

South America

Circular Economy and Materials

Overview

Case objectives

Showcase the Factory Model, a framework developed to translate Novo Nordisk's environmental strategy - Circular for Zero - into concrete actions for implementation across multiple sites.

Companies Involved

Novo Nordisk.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

This case is a replicable model for translating global sustainability strategies into actionable steps across multiple sites. Clear strategies, measurable goals, and a structured roadmap enable effective implementation of circular principles.

Impact

Innovative Drive

The staircase design represents an innovative approach, providing clear guidance through a structured roadmap that transforms strategic goals into practical actions, simplifying circular principles and fostering creative solutions.

Economic Impact

The C4Z Factory Model has led to cost reductions, increased productivity, and improved risk management. By integrating sustainability into the core of operations, the model enhances brand value and ensures Novo Nordisk's leadership in sustainability.

CO2 Impact

All staircases are connected to CO2 reduction, aligned with circular principles. The results are measured through the annual emissions inventory, reported in accordance with the Brazilian GHG Protocol.

External Links

www.novonordisk.com.br

Waste Treatment Processor

South America

Circular Economy and Materials

Overview

Case objectives

Machine that grinds, separates, and processes organic and inorganic waste from homes and businesses, reducing environmental impact and enabling reuse as input material.

Companies Involved

Lýsi Ambiental.

WG Alignment

Materials innovation, waste management and circular supply chain ; and Research, education and behavior.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Information not provided.

Scalability

The processor can be scaled across industries, homes, and institutions, significantly reducing landfill waste and emissions. Its modular desing allows replication, supporting Paris Agreement goals and circular resource managiment.

Impact

Innovative Drive

The processor uniquely integrates shredding, transport, and backwash in a compact system for both organic and inorganic waste. It pioneers tax-incentivized disposal (IPTU Verde), merging technology, policy, and community engagement.

Economic Impact

The solution reduces waste costs, offers tax incentives (IPTU Verde), and enables low-cost, scalable implementation. Its simplicity and economic return potential make it attractive to the private sector, aligning with profitability and ESG goals.

CO2 Impact

As the machine is still in development, no CO2 reduction has been achieved yet. Future estimates will be based on avoided landfill transport and waste decomposition emissions (GHG Protocol).

External Links

Information not provided.

Recycling of post-consumer gypsum waste – Gypsum Circularity in Construction

South America

Circular Economy and Materials

Overview

Case objectives

Collect and reuse post-consumer gypsum waste to reduce virgin raw material extraction and construction landfilling, while strengthening circularity in the sector.

Companies Involved

SAINT-GOBAIN.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

low landfilling costs, lack incentives to avoid it, few recyclers, high logistics/processing costs, low client adherence, variable waste quality, regulatory barriers.

Scalability

Can be scaled across multiple countries and companies, that uses gypsum as raw material: reducing virgin gypsum extraction, lowering emissions, and promoting circular construction at large scale. Including Saint-Gobain Placo of Brasil.

Impact

Innovative Drive

Pioneering closed-loop recycling, high recycled content products, reverse logistics integration, and pre-demolition audits for selective material recovery.

Economic Impact

Generates new business models, reduces raw material costs, leverages commercial partnerships; sometimes with payback via recycled gypsum sales and logistics efficiency.

CO2 Impact

Reduced transport distances compared to gypsum sourced from quarries, use of recycled material, and dematerialization of the industry through post-consumer residue.

External Links

https://www.british-gypsum.com/about-us/corporate-news-and-press-releases/british-gypsum-launches-100-recycled-plasterboard

https://www.placo.es/servicio-de-reciclaje-al-mercado#1

https://www.placo.es/download-documents/catalogo-servicio-de-reciclaje-de-pyl-placor/catalogo_reciclaje_placo_2019.pdf

Plastibras – From Waste to Solution

South America

Circular Economy and Materials

Overview

Case objectives

Transformation of crop protection packaging into pipelines for infrastructure and soil irrigation, promoting circular economy and mitigation of environmental liabilities in Mato Grosso.

Companies Involved

Plastibras Dutos Corrugados.

WG Alignment

Regulation and incentives; and Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Lack of tax incentives; increased logistics costs for collection; and fluctuations in the price of recycled plastic.

Scalability

The Plastibras model is replicable in other states and countries with an agricultural focus. It has high potential to reduce toxic waste and emissions, as well as promote green infrastructure. The model is scalable with logistical and institutional support.

Impact

Innovative Drive

Pioneering use of recycled pesticide packaging for infrastructure; logistical and technological integration that prevents illegal disposal; business model based on the circular economy in synergy with the agro-industrial sector.

Economic Impact

Aligns sustainability with profitability by reducing raw material costs and creating a new revenue stream. Viability proven by over 20 years of operation with positive returns. The model offers low implementation costs with favorable NPV and IRR.

CO2 Impact

Emission reduction through the substitution of virgin plastics. Methodology based on LCA (Life Cycle Assessment) with an estimated 1.5 tons of CO2 avoided per ton recycled.

External Links

https://plastibras.ind.br/

Circular Water Reuse System

South America

Circular Economy and Materials

Overview

Case objectives

Implement a water reuse system in the industrial process, reducing the consumption of water resources, operating costs, and environmental impacts related to the use of potable water.

Companies Involved

Ibratin - Tintas e Texturas.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

Large-scale adoption reduces water consumption, alleviates pressure on natural sources, and contributes to climate goals by optimizing resources and minimizing environmental impacts in the industry.

Impact

Innovative Drive

Use of a circular system with internal recirculation, automation in water quality control, and integration into the production process, promoting innovation in industrial water management.

Economic Impact

Low implementation cost, continuous savings on water bills, and a positive NPV with an attractive IRR demonstrate financial viability and alignment with profitability goals in the private sector.

CO2 Impact

Information not provided.

External Links

Information not provided.

Less Waste Movement

South America

Circular Economy and Materials

Overview

Case objectives

Prevent premature disposal of chemicals through safe technical revalidation, fostering circular economy, emission reduction, and sectoral regulation.

Companies Involved

CQ Circular Sustentabilidade; SINPROQUIM; BRICS Women's Innovation Contest; Green Future Award; CETESB; and Universidade Estadual de Campinas (UNICAMP).

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Lack of regulatory clarity; low stakeholder engagement; technical validation inconsistency; resistance to change in industry; and data gaps for shelf-life decisions.

Scalability

The initiative enables scalable prevention of chemical waste by validating industrial products' usability beyond labeled shelf life, reducing emissions and resource use when adopted across sectors.

Impact

Innovative Drive

Pioneers regulatory and technical integration for shelf-life revalidation, bridging gaps in circularity, waste prevention, and compliance in the chemical industry.

Economic Impact

Avoiding unnecessary disposal and replacement reduces costs for companies, improves resource efficiency, and strengthens competitiveness through legal and sustainable innovation.

CO2 Impact

Preliminary estimates suggest up to 30% GHG reduction per operation; based on avoided production, transport and disposal. Method: life cycle approach.

External Links

https://cetesb.sp.gov.br/wp-content/uploads/2022/11/DD-113-2022-P-LANCAMENTO-GUIA-TECNICO-DE-ORIENTACAO-PARA-EXTENSAO-DO-USO-DE-PROD.QUIM_.COM-PRAZO-VAL.-VENCIDO.pdf

https://ecoaward.eawf.ru/finalists#environmental

Circularity Practices – Production of soil acidity neutralizer from inorganic industrial waste

South America

Circular Economy and Materials

Overview

Case objectives

Suzano has a long-term goal to reduce the solid waste sent to landfills by 70% by 2030. This case shows an innovative technology to reuse industrial waste in soil acidity neutralizer production.

Companies Involved

Suzano S.A.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

This project was implemented in four Suzano units between 2010 and 2024, demonstrating its scalability with important environmental benefits such as waste reuse and reduced pollution risk.

Impact

Innovative Drive

With support from the R&D team, Suzano found a solution by producing acidity neutralizer through, mixing, grinding, and screening inorganic waste, replacing mineral limestone, used to adjust pH in agricultural areas.

Economic Impact

Information not provided.

CO2 Impact

Information not provided.

External Links

www.suzano.com.br

Project Mero

Asia / Oceania

Circular Economy and Materials

Overview

Case objectives

Scale proven and commercialized clean technologies for recovering critical green metals from e-waste. Our technology helps secure domestic supply chains to power future industries.

Companies Involved

Mint Innovation.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

Adoption at scale reduces emissions by reducing mining and smelting, while reducing waste to landfill. It supports national climate targets and aligns with Paris Agreement goals through cleaner supply chains and efficient materials recovery.

Impact

Innovative Drive

The technology uses a naturally occurring biomass to extract >92% of Au, driving the economics of the process allowing for recovery of other critical metals such as Cu, Sn, Pd and AG. Our LIB tech has high recovery of Li, Co, Ni and no toxic waste.

Economic Impact

The project has a CAPEX of US$30m with $10m working capital required to drive success with a pre-tax unlevered IRR of 28%. We are implementing optimisations that are projected to increase IRR to 50%.

CO2 Impact

The process has been carefully designed to minimise CO2 emissions using ambient temperatures and recycling reagents.

External Links

https://www.mint.bio/

IFC/Zagreb Holding – ZGH Sustainability-Linked Bond: Circular economy development in Croatia: Zagreb

North / Central America

Circular Economy and Materials

Overview

Case objectives

IFC anchored a municipal utility SLB, incentivizing Zagreb Holding to upgrade waste collection & treatment, improve waste recovery & recycling, reduce landfilling, advance CE practices & increase RE.

Companies Involved

Zagreb Holding (Issuer); City of Zagreb (Guarantor); Financial Institution - IFC / EBRD / local commercial banks.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Fluctuation of volume and composition of waste streams.

Scalability

Approach to unlock capital for additional capacity by municipal utilities to upgrade waste infrastructure has replication potential in peer cities. Diverts waste from landfills, reintroduces valuable resources into economy, and reduces GHG emissions.

Impact

Innovative Drive

First SLB by municipal utility in Central & Southern Europe, which facilitated holistic development of waste source segregation/separate collection/treatment/processing. The bond unlocked investment in a circular economy pipeline, including a modernized fleet and digital solutions.

Economic Impact

Sustainability-linked bond structure offers financial incentives linked to verifiable environmental results.

CO2 Impact

Emission reduction due to larger waste volumes diverted from landfilling, transition to less carbon intensive technologies and introduction of renewable energy solutions.

External Links

https://www.ifc.org/en/pressroom/2023/ifc-makes-landmark-investment-to-boost-climate-resilience-in-zagreb-croatia

https://disclosures.ifc.org/project-detail/SII/48368/zagreb-bond-2023

https://www.zgh.hr/investors/bonds/11927

The Global Beverage Can Circularity Alliance

Europe

Circular Economy and Materials

Overview

Case objectives

Increase global recycling rates for aluminum beverage cans to at least 80% by 2030 and near 100% by 2050, aiming for closed-loop (can-to-can) recycling to align to the IEA Net Zero 2050 scenario.

Companies Involved

International Aluminium Institute; Ball Corporation; Ardagh Metal Packaging; Canpack; Crown; Emirates Global Aluminium; Elval; Novelis; Speira; UACJ; ABAL; Abralatas; Aluminum Association; Beverage Industry Environmental Roundtable; The Brewers of Europe; Canafem; Can Manufacturers Institute; European Aluminium; Japan Aluminium Association; Metal Packaging Europe; Union of European Beverage Associations; Aluminium Stewardship Initiative; Every Can Counts.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Lack of adequate policy and/or investment to increase collection and recycling and accelerate the circular economy transition; Availability of scrap.; Quality of scrap available.

Scalability

There is proven policy, readily available technology and effective mechanisms scale global recycling rates, reduce waste, and decrease the emissions of canmaking. The latter are replicable in other aluminium applications.

Impact

Innovative Drive

The GBCCA shows pioneering industry collaboration in support of policy, mechanisms and innovations to improve collection and sorting, involving design, closed loops, traceability, new business models, AI, and improved convenience and accessibility.

Economic Impact

Implementation costs of a Deposit Return System for municipalities and businesses are offset by significant savings and benefits over time. Recycled aluminum reduces costs and impacts of geopolitical and trade tensions and can increase business.

CO2 Impact

Recycling aluminum requires 95% less energy than producing primary. The sector has a new methodology to calculate, and report recycled content that standardizes carbon intensity calculations.

External Links

https://international-aluminium.org/global-beverage-can-circularity-alliance-to-drive-aluminium-can-recycling-at-climate-week-nyc/

Cobap Group: Transforming Waste into Opportunities – A Circular Economy Model in the North and Northeast

South America

Circular Economy and Materials

Overview

Case objectives

Promote recycling and reverse logistics, transforming waste into sustainable packaging, reducing emissions, and valuing local communities in the production chain.

Companies Involved

Grupo COBAP.

WG Alignment

Regulation and incentives; Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

COBAP's circular economy model, by transforming 29,000 tons/year of scraps into new packaging, reduces CO2 emissions and conserves natural resources.

Impact

Innovative Drive

The case stands out for its adoption of a complete circular economy model, which ranges from the collection of scraps to their transformation into new packaging, eliminating intermediaries and ensuring traceability.

Economic Impact

The case aligns with the private sector's profitability goals by demonstrating that the circular economy generates environmental results and financial returns. The transformation of 29,000 tons/year of scraps into 22,000 tons/year of recycled packaging.

CO2 Impact

Information not provided.

External Links

Information not provided.

Visión Circular ANDI - Extended Producer Responsibility (EPR)

South America

Circular Economy and Materials

Overview

Case objectives

Is Colombia's leading business collective on circular economy, uniting 380 companies to advance EPR, eco-design, inclusive recycling and innovation for sustainability. Yearly targets according to norms.

Companies Involved

National Business Association of Colombia – ANDI.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

EPR regulatory compliance risks (Lack of enabling conditions, immature value chains, regulatory changes at the national level).

Scalability

By uniting 380 companies, Visión Circular ANDI shows the potential of collective action in packaging management to scale recycling, cut emissions, and drive efficient natural resources management across industries.

Impact

Innovative Drive

Latin America's first innovation plan to close the loop on post-consumer packaging, fostering R&D around SITRA's 5 circular models and building an ecosystem of 100+ actors with solutions in recycling, material substitution, and returnable.

Economic Impact

Visión Circular ANDI lowers compliance costs through collective action, enabling 380 companies to share infrastructure, achieve economies of scale, and capture value from recycled plastics, ensuring affordable, profitable implementation.

CO2 Impact

The impact of Visión Circular on EPR is measured in terms of CO2 from 2025 onwards, with a life cycle perspective. The results will be available by the end of the year.

External Links

https://www.andi.com.co/Home/Pagina/1040-vision-circular-andi

Integrated End-to-End circular model transformation

Europe

Circular Economy and Materials

Overview

Case objectives

Schneider Electric transitioned from a linear "take-make-waste" to a circular model, focusing on reuse and material recovery to meet customer demand, secure raw materials, and comply with regulations.

Companies Involved

Schneider Electric.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

By integrating circular operations, the site achieved 100% Scope 1 & 2 emissions reduction and 43% Scope 3 reduction. It also reduced single-use plastic by 68%, recovered 6.1 tons of copper, and repacked over 214,000 products. These scalable solution.

Impact

Innovative Drive

Schneider Electric's implemented in Europe a scalable circular model—"use better, longer, and again"—to recover and repurpose returned products. A key innovation is the industrialized repackaging process supported by a custom IT sorting tool, now dep.

Economic Impact

Information not provided.

CO2 Impact

Information not provided.

External Links

https://www.se.com/ww/en/about-us/sustainability/green-and-circular/

ReciclaMT

South America

Circular Economy and Materials

Overview

Case objectives

Promote smart waste management through digital recycling centers, connecting citizens, cooperatives, and government agencies to strengthen the recycling chain in the Cuiabá metropolitan region.

Companies Involved

Startup.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Risks include low community buy-in, logistical and software failures, structural vandalism, and financial constraints that could impact planned outcomes.

Scalability

ReciclaMT can be replicated in different cities, expanding selective waste collection with technology and social engagement. This helps reduce emissions and promote efficient management of natural resources.

Impact

Innovative Drive

ReciclaMT integrates smart, monitored recycling points with gamification to engage citizens. It combines technology, real-time data, and waste picker cooperatives in a model that's unprecedented in Mato Grosso.

Economic Impact

ReciclaMT has low implementation costs and generates savings in waste management. The model generates new revenue for cooperatives, reduces public costs, and attracts private partnerships, with high potential for financial returns.

CO2 Impact

We estimate CO2 reductions through the recycling of plastics, metals, glass, and paper, based on average IPCC and ABNT factors for diverting waste from landfills.

External Links

www.https://reciclamt.com.br/

https://docs.google.com/presentation/d/1APJsREXbnznVyienOjfjQCW22aAMK7CexkYPVMxSYeE/edit?usp=sharing

Pyrolysis of WWTP/WTP Sludge and Agricultural Biomass for the Production of Biochar and Green Metallurgical Charcoal

South America

Circular Economy and Materials

Overview

Case objectives

Transform sludge and agricultural biomass via pyrolysis into biochar for soil recovery and green charcoal for industry, promoting circular economy and emissions reduction.

Companies Involved

Zero Waste Representações; and Oxyon.

WG Alignment

Materials innovation, waste management and circular supply chain ; and Research, education and behavior.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Regulatory delays, variability in sludge composition, market acceptance of biochar, logistics for biomass supply, and uncertainty in carbon credit certification.

Scalability

The pyrolysis model can be replicated in multiple industrial regions using sludge and biomass, reducing methane and fossil coal use, and contributing to carbon neutrality and circular resource management.

Impact

Innovative Drive

The project pioneers the use of WWTP/WTP sludge in pyrolysis to produce certified biochar and green charcoal, combining waste treatment, soil recovery, and fossil fuel substitution in a circular, low-carbon model.

Economic Impact

Biochar and green charcoal have strong market value. Low-cost feedstock, scalable technology, and potential carbon credit revenue ensure profitability. Preliminary IRR projections exceed 20% in pilot analysis.

CO2 Impact

Information not provided.

External Links

Information not provided.

Innovation as a Method: The Open Innovation Case of Tupy S/A

South America

Circular Economy and Materials

Overview

Case objectives

Tupy's open innovation platform connects the company with the innovation ecosystem, enhancing its ability to create new businesses and improve operations.

Companies Involved

Amachains; nChemi; CIT Senai; MIPWISE; Geeco; Microciclo; Nanofabrica; OperaDados; PixForce; Hedro; Exy Exosqueletos; Instituto Senai de Tecnologias Ambientais; and Universidade Federal de Uberlândia.

WG Alignment

Materials innovation, waste management and circular supply chain ; and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

Our open innovation programs attract technologies like biotech, blockchain, and nanotech to decarbonize industry, reduce resource use, and support sustainability aligned with the Paris Agreement.

Impact

Innovative Drive

The innovative aspect is the methodology, which expands reach to stakeholders across Brazil and even abroad, enabling the exploration of diverse ecosystems and their unique capabilities.

Economic Impact

Investments in innovation follow a portfolio logic. Only PoCs with high return potential join the ShiftT/Portal. Financials are detailed only after successful PoC validation.

CO2 Impact

Information not provided.

External Links

https://www.shiftt.com.br/en/

https://www.tupy.com.br/en/inovacao-aberta/

Portfolio Innovation - Lite line for disconnect switches

South America

Circular Economy and Materials

Overview

Case objectives

Developing switch-disconnectors with an integrated structure, reducing CO2 and support costs, providing an efficient and sustainable product, facilitating installation and reducing material use.

Companies Involved

Siemens Energy.

WG Alignment

Materials innovation, waste management and circular supply chain ; and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

The project reduces CO2 emissions by eliminating additional structures for DS, reducing the use of materials and transportation. This is in line with the goals of the Paris Agreement and promotes the efficient management of natural resources.

Impact

Innovative Drive

The design features an integrated structure that eliminates the need for additional support, reducing CO2 and costs. The patented innovation is a pioneer in the market, offering direct and simplified assembly, without the need for adaptations.

Economic Impact

The project aims to enhance profitability by reducing operating costs. The new switch is 20% cheaper, with an implementation cost of 250,000 BRL, eliminating additional structures and maintenance costs.

CO2 Impact

Information not provided.

External Links

Information not provided.

Lupinha

South America

Circular Economy and Materials

Overview

Case objectives

Access is through the QR code printed on the packaging, informing the consumer in simple language about how to prepare it for recycling. Example: if you have to wash or not, if you have to remove the lid, etc.

Companies Involved

ABRE - Associação Brasileira de Embalagem.

WG Alignment

Materials innovation, waste management and circular supply chain ; and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

The program has high scalability potential. The QR code can be applied to product packaging across all consumer goods segments. It offers easy adoption and low investment for consumer goods industries of all sizes.

Impact

Innovative Drive

Specific disposal guidance for each packaging type, accessible to all consumers, including blind and visually impaired individuals, as the platform is assistive. The platform complies with the main Brazilian regulations.

Economic Impact

There are not yet measurable economic impact data for the private sector. Improvements in the quality of solid waste sent to cooperatives result in reduced rejects and increased income for waste pickers.

CO2 Impact

Information not provided.

External Links

https://www.lupinha.org.br/home

https://abre-my.sharepoint.com/:b:/g/personal/isabella_abre_org_br/ETsSJ7YDQaxHnFqA09vQGOgBNTJEoLIXl8jsSZ-WA9OaAg?e=Fd3xBp

Remanufacturing: decouple the use of resources from our business growth

South America

Circular Economy and Materials

Overview

Case objectives

For decoupling the use of resources from the business grow, VWTB created a line of remanufactured parts by original manufacturers, in a condition similar to the original material and less footprint.

Companies Involved

Volkswagen Truck & Bus.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Imported products, unable to handle international reverse logistics; mind-set change necessity for using REMAN parts in its own vehicle; and lack of hulls suitable for remanufacturing.

Scalability

Adoption / and / or expansion of the REMAN business model gathering more players to expand used parts collection points and remanufactured products sales, which should generate an increase in the scale of the benefits obtained in different sectors.

Impact

Innovative Drive

REMAN Business adopts a partnership model with original part manufacturers to remanufacture used parts collected by dealerships. The remanufactured parts are sold on an exchange basis, for a small price compared to new parts.

Economic Impact

REMAN business has promoted 300% growth in sales between 2018 and 2025 projected.

CO2 Impact

It is estimated that in 2024 Volks Greenline line avoided the emission of approximately 1,000 tCO2e.

External Links

https://economiacircular.fiesp.com.br/docs/ebook-economia-circular-industria-melhores-praticas-desktop-en.pdf

UBQ Materials First Industrial-Scale Project in the Netherlands

Europe

Circular Economy and Materials

Overview

Case objectives

Establish a large-scale UBQ™ facility converting residual household waste into a low-carbon, circular, bio-based thermoplastic alternative to oil-based plastics to reduce environmental impacts and support a resilient, circular economy in Europe.

Companies Involved

UBQ Materials.

WG Alignment

Regulation and incentives; and Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Waste disposal regulations & strategies; volatility in plastic pricing trends; regulations on PCR/bio content requirements; market acceptance of innovative materials; and carbon credits roadmap.

Scalability

UBQ™ tech turns residual waste into a usable resource, adaptable to both developed and developing markets, creating local raw material supply chains and reducing dependency on fossil-based resins and other finite resources in hard-to-abate sectors.

Impact

Innovative Drive

UBQ™ is a patented tech converting hard-to-recycle waste, like food, diapers, and multilayered plastics, into a valuable resource in a resource efficient conversion process. The product is compatible with standard equipment without a premium price.

Economic Impact

UBQ™ production is commercially competitive with virgin plastics; the business model relies on revenue from material sales but can also improve by carbon benefits or waste diversion fees (EU).

CO2 Impact

UBQ™ has a 0.15 kg CO2e footprint and -1.17 kg CO2e biogenic removal per kg (ERM, ISO 14040/44 cradle-to-gate). Waste diversion and plastic replacement further enhance its carbon impact.

External Links

https://www.youtube.com/watch?v=funnMlYtHQs

https://ubq1.sharepoint.com/:f:/r/sites/UBQExternal/Shared%20Documents/Sustainable%20Bussiness%20COP30/Presentations?csf=1&web=1&e=BDxPTO

Carbopol® BioSense polymer: Natural cosmetic ingredient viscosity modifier and sensory enhancer, readily biodegradable, sustainably sourced cellulose feedstock, eco-designed processing addressing green chemistry principles

South America

Circular Economy and Materials

Overview

Case objectives

Natural derived viscosity modifier and silicon alternative obtained from cellulose, Readily biodegradable, from certified eucalyptus plantations in Brazil, addressing the 12 Green Chemistry principles.

Companies Involved

Lubrizol and Suzano.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

Carbopol® BioSense polymer was developed in partnership with Suzano obtained from cellulose feedstock and eco-designed processing addressing green chemistry principles from eucalyptus planted in Brazil using certified forest management practices.

Impact

Innovative Drive

A disruptive innovation for the market, developed 100% in Brazil with Suzano partnership, which meets the foundations of material circular economy and bioeconomy. Carbopol BioSense is the first ingredient in Lubrizol's biodegradable Carbopol line.

Economic Impact

This ingredient meets real market demands. Shows over than 80% lower footprint alternative to silicone elastomers, address 12 Green Chemistry principles, readily biodegradable (OECD 301B), 98% natural origin content (ISO 16128), Vegan and has COSMOS.

CO2 Impact

Over 90%* lower compared to conventional fossil-based alternatives, according to Life Cycle Assessment (LCA) studies, conducted in accordance with ISO 14040/44 standard.

External Links

https://cosmeticinnovation.com.br/lubrizol-e-suzano-anunciam-o-primeiro-polimero-biodegradavel-da-linha-carbopol/

Recycling for a change

North / Central Americas

Circular Economy and Materials

Overview

Case objectives

To strengthen the circular economy, Dow joined forces with Ambipar and Gaia Social in 2024 to professionalize cooperatives with the "Recycling that Transforms" program.

Companies Involved

Dow Brasil Industry and Commerce of Chemical Products Ltda., Ambipar and Gaia Social.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Challenges: low uptake of collection and training, precarious warehouses, unstable public policies, and difficulty in selling recyclables in some markets.

Scalability

When scaled, the model promotes environmental and operational gains: it reduces emissions, increases recycling, avoids the use of virgin materials, and is replicable, generating a systemic impact on waste management. Scaled to Recife and still underway.

Impact

Innovative Drive

Dow implemented the Plastics Protocol in the program, training 228 professionals and expanding sorting from 15 to 25 types of plastic. The average value of recycled plastic increased by 162%, strengthening the circular chain.

Economic Impact

Social: growth of up to 68% in cooperative members' income; Environmental: +2,500 tons of recyclables diverted from landfills; selective collection structured in 6 municipalities.

CO2 Impact

Indirect gains from replacing virgin raw materials of more than 2,500 tons/year.

External Links

https://plasticonews.org/dow-ambipar-e-gaia-social-unem-forcas-para-impulsionar-economia-circular-humanizada/

https://www.linkedin.com/feed/update/urn:li:activity:7339375383110144000

Ruta Verde

South America

Circular Economy and Materials

Overview

Case objectives

Ruta Verde promotes the adoption of sustainable practices in industrial SMEs, integrating digitalization, innovation, and sustainability to optimize production processes and enhance competitiveness.

Companies Involved

Unión Industrial Argentina - UIA (Industrial Organization of Argentina).

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

No nationwide institutional prioritization, limited access to funding, lack of certified Environmental Management Systems, tech gaps, and challenges in measuring environmental impact.

Scalability

Ruta Verde's replicable methodology and adaptable technical assistance boosts thousands of SMEs competitiveness by enabling scalable improvements in efficiency, circularity, and emissions reduction.

Impact

Innovative Drive

It creates an ecosystem that supports companies and value chains, with or without sustainability experience, from training to project implementation, improving processes and boosting profit margins through smart investments.

Economic Impact

Assisted companies increased their profitability by 5%, improving efficiency, reducing costs, and accessing new markets. These trends are expected to continue improving, strengthening SME competitiveness.

CO2 Impact

SiGREEN is a tool developed by Siemens that, through a partnership with UIA, became part of Ruta Verde’s free benefits to help companies measure their carbon footprint.

External Links

https://drive.google.com/file/d/1ETnai6RVCuLZDvdXGi70WqlPRmh9B-GZ/view?usp=drive_link

https://drive.google.com/file/d/1SIqgfRjGW6HwAAMeUk-BGEd6SmkaF6K0/view?usp=drive_link

https://drive.google.com/file/d/13bMBj_Rcjim5r8JGQr9f4NXajXFT0ZtE/view?usp=drive_link

Vivo Recicle: mobilizing society for the circular economy

South America

Circular Economy and Materials

Overview

Case objectives

Annually, Vivo hosts a scavenger hunt in public schools to engage and raise awareness among children and youth about the circular economy and proper electronic waste disposal.

Companies Involved

Telefônica Brasil S.A. - Vivo; Fundação Telefônica and Ambipar Participações e Empreendimentos S.A.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Lack of consumer engagement in recycling; High logistics costs for collection; Restrictive government regulations; Competition from similar initiatives that may dilute the impact; Partners failing.

Scalability

This case contributes to CO2 emission reductions by recycling electronic waste, preventing around 43.5 tons of CO2 emissions. It aligns with the Paris Agreement goals and promotes efficient natural resource management through sustainable practices.

Impact

Innovative Drive

The case is innovative by recycling electronic waste while quantifying avoided CO2 emissions. Its expansion to schools promotes environmental education, and strategic partnerships ensure efficiency and scalability, making it a replicable model nation.

Economic Impact

This case does not generate direct profits for the company, but it brings significant social gains by promoting environmental awareness and sustainable education, as well as recycling electronic waste to prevent carbon emissions.

CO2 Impact

The 'Vivo Recicle at DVT' prevented about 43.5 tons of CO2 emissions by recycling 29 tons of electronic waste, using an audit methodology for emissions avoided through material repurposing.

External Links

https://api.mziq.com/mzfilemanager/v2/d/24165f81-24d6-4648-bf9f-66712905d5a2/1a316d57-aeb9-d83e-8592-de59f82814f7?origin=1

Zero Waste - Circular Management Strategies at Novo Nordisk

South America

Circular Economy and Materials

Overview

Case objectives

In 2019, Novo Nordisk launched the Circular for Zero strategy, which aims to eliminate environmental impact by promoting circular waste management actions.

Companies Involved

Novo Nordisk.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Mature, generating stable results.

Risk Involved

Information not provided.

Scalability

The initiative shows how to adopt circular economy practices through engaged leadership and dedicated teams. The National Circular Economy Policy promotes resource conservation and prioritizes recyclable products, aiming to inspire organizations.

Impact

Innovative Drive

We implemented the circular economy by developing new destinations for waste previously sent to landfills and incineration. In partnership with UFV and startups, we created solutions to keep waste in the value loop and prevent its generation.

Economic Impact

We achieved cost savings, increased productivity, improved risk management, and strengthened relationships with our stakeholders. Our sustainability strategy, Circular for Zero, enhances brand value, reputation, and environmental impact management.

CO2 Impact

Information not provided.

External Links

www.novonordisk.com.br

Circularity as a driver for decarbonizing materials in the automotive sector

Europe

Circular Economy and Materials

Overview

Case objectives

Promoting circularity to decarbonize materials in the automotive sector by increasing recycled content, extending material life, and reducing the carbon footprint across the value chain.

Companies Involved

Gestamp.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under planning.

Risk Involved

Regulatory Barriers – Varying standards and regulations across regions can slow implementation and Stakeholder Resistance – Resistance to change from suppliers, partners, or internal teams.

Scalability

Gestamp's circularity model can be replicated across OEMs and suppliers, significantly cutting emissions and raw material use, supporting Paris Agreement goals and efficient resource management.

Impact

Innovative Drive

Gestamp's implementation of blockchain traceability to prevent greenwashing and track closed-loop transactions sets a new standard in automotive circularity, effectively bridging the gap between sustainability and performance.

Economic Impact

Circularity lowers material and energy extraction costs. Though some sustainable materials are pricier upfront, they're expected to become cost-competitive as markets grow. Circularity is increasingly seen as a smart long-term strategy for resilient and resource-efficient growth.

CO2 Impact

1 ton of recycled steel could save around 1.67 to 1.787 tons of CO2 emissions. For the use cases performed we saw up to a 60-70% of emission reduction.

External Links

https://www.gestamp.com/Sustainability/ESG-strategy/Circularity

https://www.gestamp.com/Media/Press/Press-Releases/2024/Gestamp-targets-low-emissions-steel-from-Salzgitter-Flachstahl

Electrolux's Industry-Leading Recycled Materials Strategy

South America

Circular Economy and Materials

Overview

Case objectives

Electrolux redesigned products and supply chains to use recycled plastic and steel, partnering with suppliers to ensure quality, traceability, and overcome material and regulatory challenges.

Companies Involved

Electrolux Group.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Under implementation.

Risk Involved

Information not provided.

Scalability

Our materiality study showed that 8% of our climate impact comes from materials. By increasing recycled plastic and steel use—62% of our raw materials—we show a replicable path for companies to reduce emissions and manage resources more efficiently.

Impact

Innovative Drive

This goal drives innovation by aligning R&D, design, and procurement teams to explore new materials and partnerships. The target itself fosters change, as traditional business models no longer meet industry demands.

Economic Impact

At Electrolux, using recycled materials is cost-effective and leverages existing supplier networks. It reduces exposure to raw material volatility while supporting long-term profitability and brand value.

CO2 Impact

Using recycled materials can significantly cut global carbon emissions — up to 90% for plastic and 58% for steel compared to virgin alternatives.

External Links

https://www.electroluxgroup.com/en/analysis-why-weve-set-a-new-industry-leading-benchmark-for-recycled-materials-44420/

https://www.electroluxgroup.com/en/electrolux-group-announces-industry-leading-target-in-its-latest-sustainability-reporting-43828/

https://www.electroluxgroup.com/en/category/sustainability/sustainability-reports/

3M Recycling, Research and Development Center in Manaus

South America

Circular Economy and Materials

Overview

Case objectives

The project develops scalable recycling technologies for contaminated plastics, promoting circular economy, renewable inputs and circularity in the Amazon through local innovation.

Companies Involved

SUFRAMA and SEDECTI.

WG Alignment

Materials innovation, waste management and circular supply chain and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

The potential for this project to significantly reduce emissions and promote efficient natural resource management is substantial, especially when adopted by multiple companies or for more factories at 3M.

Impact

Innovative Drive

The project pioneer's scalable tech for contaminated plastic waste, using renewable resources like natural fibers. It emphasizes circular economy principles and innovative polymer blends, setting it apart in waste management.

Economic Impact

The project supports profitability by reducing costs through recycled materials, enhancing brand reputation, and attracting eco-conscious consumers. Cost savings and market advantage drive revenue growth.

CO2 Impact

Information not provided.

External Links

Information not provided.

Transforming with Circularity: Core of Circular Economy and Advanced Resource Transformation - NECTAR

South America

Circular Economy and Materials

Overview

Case objectives

NECTAR (Core of Circular Economy and Advanced Resource Transformation) was initiated in Brazil with the aim of promoting sustainability and innovation through the circular economy.

Companies Involved

Siemens Energy.

WG Alignment

Materials innovation, waste management and circular supply chain.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Risk to the image of the company associated with the uniform, mischaracterization of the garment in terms of social and environmental responsibility.

Scalability

By repurposing PPE uniforms, companies reduce disposal costs, avoid waste, and strengthen internal culture through purposeful corporate gifts. The model is scalable, sustainable, and easy to replicate.

Impact

Innovative Drive

Developing and supporting new businesses. The two partners responsible for transforming our parts are new business models that are gaining a strong foothold in the market.

Economic Impact

90% of the value of textile waste.

Internal sales at cost value, and replacement of external suppliers, fostering capital for investment in other circular projects.

CO2 Impact

Information not provided.

External Links

https://www.linkedin.com/posts/siemens-energy_world-environment-day-activity-7336255558364094464-nxs1?utm_source=share&utm_medium=member_desktop&rcm=ACoAADUXnAMB5vohJjpga3LHzW9SChxEo7zKJSI

Remed™: driving a circular economy for injection pens globally and locally through Reciclaneta

South America

Circular Economy and Materials

Overview

Case objectives

ReMed™ is a global take-back program to recycle injection pens, supporting circular economy and our journey to net-zero by 2045. Active in 7 countries, including Brazil, called Reciclaneta.

Companies Involved

Novo Nordisk.

WG Alignment

Materials innovation, waste management and circular supply chain; and Research, education and behavior.

Case Maturity

Case Stage

Implemented, generating first results.

Risk Involved

Information not provided.

Scalability

Active in seven countries, the program demonstrates scalability and effectiveness across socioeconomic contexts. It prevents improper waste disposal, reducing greenhouse gas emissions and promoting resource efficiency through recycling.

Impact

Innovative Drive

The program innovates in medical waste management within a highly regulated sector, combining reverse logistics and recycling to transform waste into reusable products, promoting a sustainable multi-sector collaboration.

Economic Impact

The program can be a market differentiator, positioning NN as the preferred choice for sustainability-conscious patients. It can offer advantages in public tenders with sustainability criteria. Strong partnerships balance logistics costs.

CO2 Impact

Information not provided.

External Links

https://www.novonordisk.com/sustainable-business/zero-environmental-impact/recycling-used-devices.html

https://www.novonordisk.com.br/sustainable-business/recycling-used-devices.html

https://www.novonordisk.com/sustainable-business/zero-environmental-impact.html

SUSTAINABLE
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Annex

Annex A – Disclaimer

The information presented in this booklet is the sole responsibility of the institutions that submitted the cases. All case descriptions reflect the information shared directly by the applicants.

The primary source for the evaluations described herein was the submitted cases; however, in certain instances, additional publicly available information from websites and/or official documents was consulted.

Where specific information was not provided by the applicants, the Working Group applied its best judgment to interpret missing parts, taking into account the context of each case.

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CNI Brazilian National Confederation of Industry