SUSTAINIA 100

2014

→ A Guide to
100 sustainable
solutions

SUSTAINIA

a part of
MONDAY MORNING
Global Institute

10
SECTORS

100
SOLUTIONS

142
COUNTRIES
OF DEPLOYMENT

→ A Guide to
100 sustainable
solutions

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Disclaimer: The members of the Sustainia100 Advisory Board have contributed their knowledge in vetting solutions within sectors of expertise. However, the selection of solutions to be featured in the Sustainia100 is the sole responsibility of Sustainia. Moreover, the opinions expressed by the Advisory Board members do not necessarily represent the official opinion of the Advisory Board members' organizations.

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A special thank you goes out to our community who have been a great source of inspiration and have helped us identify great solutions around the world.

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SUSTAINIA

BUILDING THE WORLD OF TOMORROW

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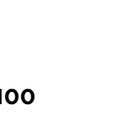

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SUSTAINIA100

Rajendra K. Pachauri speaks about the urgent need for new solutions at the Sustainia Award Ceremony 2013.

The solutions are yours

The recently completed reports of the Intergovernmental Panel on Climate Change (IPCC) which form part of its Fifth Assessment Report have brought out with a high level of confidence the dominant role of human activities in climate change. However, these reports also provide a blueprint for action which is urgent and certainly feasible. The scientific knowledge provided by the IPCC needs to be converted into a set of options which the non-specialist public should be able to understand easily and implement. That is what this volume has done very well. There are reasons for optimism which are detailed in the book that you are about to read.

While we don't have the luxury of time to fix the problems, we do have the luxury of readily available solutions. And with Sustainia100, we now know where to find the most inspiring of them. Reading about how new projects and technologies are innovating transportation, advancing our food production, slowing down fashion and speeding up resource efficiency, you cannot help but be amazed by the opportunities present to start creating sustainable industries, communities and cities. **Sustainia100 is a guide to a green and desirable future within our reach** and it is a guide away from threats and insecurities.

At the same time, the Sustainia100 guide is a reminder that if we want to limit the effects of climate change, the answer is you. **These are the years in which we have a window of opportunity to activate solutions and create a future we all want to be part of**. I hope the 100 carefully researched cases you are about to read will inspire you to act and invite you to share the solutions, so we together can meet one of the greatest challenges we have faced.

Sustainia100 is providing the solutions, but they are powered by you.

Dr. Rajendra K. Pachauri
Chairman Intergovernmental Panel for Climate Change

About Sustainia100

The **Sustainia100** is our annual guide to 100 innovative solutions from around the world. It presents tangible projects, initiatives, and technologies at the forefront of sustainable transformation. All solutions are readily available and introduce state-of-the-art practices with a positive impact on communities and industries worldwide.

By identifying leading solutions in 10 key sectors, Sustainia100 gives investors, business leaders, politicians, and consumers in-depth insights into the projects and technologies within their field.

The solutions in the Sustainia100 are readily available, have the potential to scale up across markets, and impact society on the triple bottom line of sustainability: environmental, social, and economic.

The Sustainia100 2014 is based on a comprehensive **review of more than 900 projects** by Sustainia's research team. The solutions have been vetted by the Sustainia100 **Advisory Board of 21 sector experts from 11 international research organizations.**

This year's guide is the third edition of the Sustainia100. Over the last three years, **Sustainia has built a comprehensive database of 1700+ sustainability solutions** from every corner of the globe. Reviewing this data, we can confidently say that sustainability innovation is happening on a yearly basis and within a range of sectors.

You are about to see 100 solutions that prove to us that sustainable transformation is possible. Not in 10 years' time, but today!

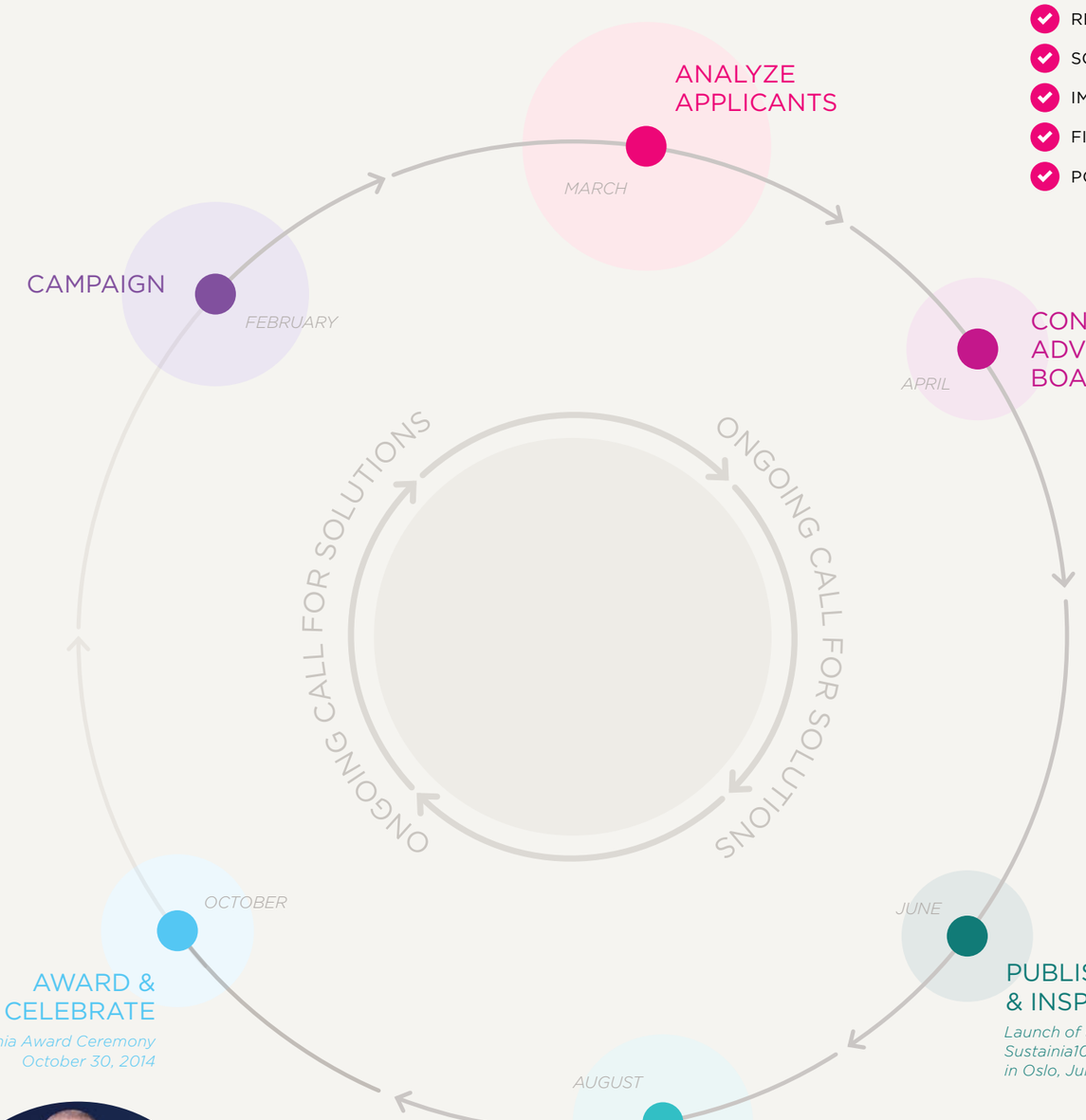
A Global Call for Solutions

Sustainia has adopted a systematic approach to finding solutions in concert with a global sustainability community. This year, sustainability entrepreneurs from 70 countries submitted their projects to Sustainia. These submissions are supplemented by extensive research carried out to ensure geographic and sector diversity. Finally, the solutions are carefully vetted and selected using five evaluation criteria, in consultation with the Sustainia100 Advisory Board.

Awarding the Best Solutions

Sustainia's efforts to identify state-of-the art solutions are ongoing. Every year, 10 finalists are selected among the Sustainia100 solutions and honored at the Sustainia Award Ceremony, which this year takes place on October 30th 2014 in Copenhagen.

The Sustainia Award winner is picked for its significant ability to build a greener and more prosperous future, and the Sustainia Community Award is given to the solution that wins the hearts and minds of Sustainia's global community.



Sustainia Award Winner 2013, ***TaKaDu***

Sustainia Community Award Winner 2013, ***Liter of Light***

Sustainia100 Evaluation Criteria

- READILY AVAILABLE
- SCALABLE
- IMPROVE QUALITY OF LIFE
- FINANCIALLY VIABLE
- POSITIVE ENVIRONMENTAL IMPACT

The Sustainia100 Advisory Board

Our Advisory Board consists of 21 experts from 11 international research organizations:

Ellen MacArthur Foundation
EPEA Internationale
European Environment Agency
International Federation for Housing and Planning
Natural Resources Defense Council
Nordic Fashion Association
Norwegian University of Life Sciences
United Nations World Food Programme
University of California, Berkeley
World Resources Institute
World Wildlife Foundation

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The 10 Sustainia100 Sectors:

Buildings · Food · Fashion · Transportation · IT · Education · Energy · Health · Cities · Resources

Sustainia100 Trends

In this year's Sustainia100, six overall trends can be identified. They represent solutions that are tackling some of world's most pressing issues and tapping into markets of great potential.

TOP TREND:
NEW SOLUTIONS FOR THE RISE OF THE CIRCULAR ECONOMY

With **25 solutions** embodying this phenomenon, **the circular economy is the top trend in this year's Sustainia100**. It involves creating products for closed-loop systems, with most of the relevant solutions designed and produced for **reuse, recycling, upcycling or even biodegradation** without harming the environment.[1] Solutions for the circular economy are particularly apparent in the fashion and resources sectors.

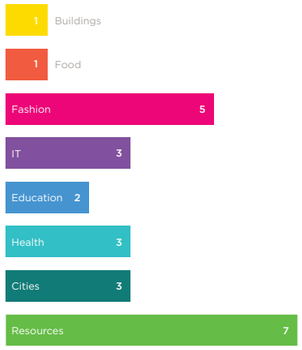
The solutions representing this trend provide alternatives to existing ways of producing materials that are harmful to the environment by, for example, substituting petroleum-based plastics with ones made from agricultural waste. Several technologies are featured whereby products such as construction materials **are both created out of waste and ultimately recycled**. This Sustainia100 trend even incorporates solutions that actively benefit nature by turning pollutants into resources, for example, producing a material based on CO2 extracted from the atmosphere.

A circular economy also requires **effective return systems to secure the materials for recycling**. They appear in many forms among this year's solutions, with relevance spanning from sectors such as cities, education, food and IT. Examples range from simple waste collection mechanisms in rural areas to advanced technological solutions but have a common goal of minimizing waste and turning it into a valuable resource.

The Potential

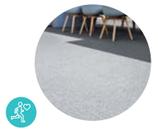
A circular economy could generate around $700 billion in materials savings each year,[2] with a potential of creating 400.000 jobs in the European Union alone.[3] The savings potential is especially prominent in the fast consumer goods industries, where circularity could yield material savings of 21.9% annually. With commodity prices growing by almost 150% between 2002 and 2010,[4] new solutions for a circular economy are essential to change the current linear production paradigm.

Solutions representing this trend:



Most relevant solutions:

Carbon-Negative Plastic
PG 153



Carpets that Clean the Air for Better Indoor Climates
PG 125

Leasing Jeans for a Circular Fashion Industry
PG 49

Biodegradable Plastic from Waste Materials
PG 155

Automated e-Waste Recycling Kiosk
PG 79

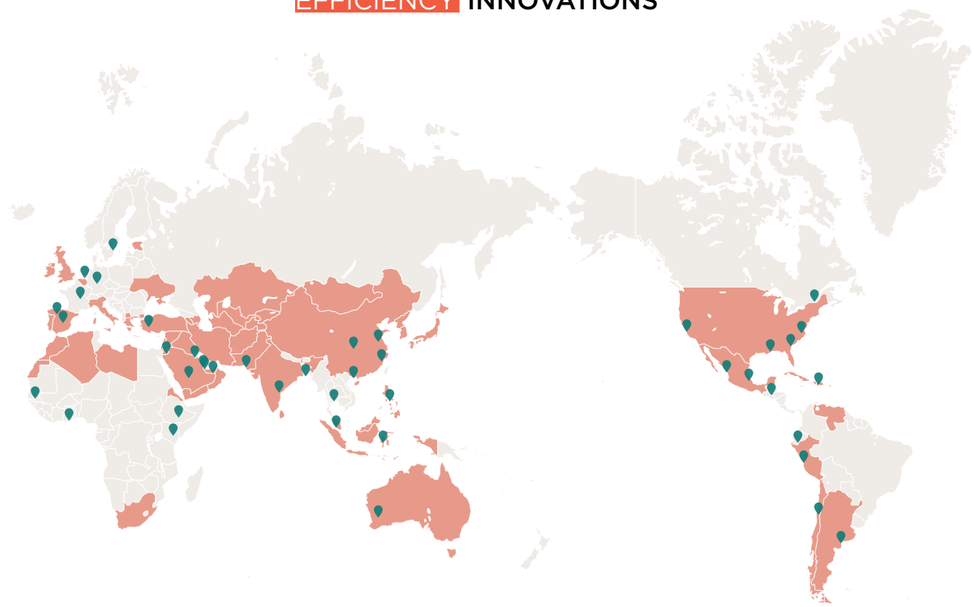
[1] World Economic Forum (WEF). "Circular Economy." Online: http://www.weforum.org/issues/circular-economy.

[2] WEF. "Towards the Circular Economy: Accelerating the Scale-up Across Global Supply Chains." January, 2014. Report.

[3] Members of European Parliament. "Plastic Waste: Parliament Sounds the Alarm"" January 2014. Press release.

[4] WEF. "Towards the Circular Economy: Accelerating the Scale-up Across Global Supply Chains." January, 2014. Report.

TREND:
A WAVE OF WATER EFFICIENCY INNOVATIONS



MAP: Countries with medium to extremely high water stress, according to World Resources Institute and Aqueduct

Most relevant solutions:

- Smart Water Leak Detection for Agriculture PG 77
- Drip Irrigation Maximizes Crop Yields for Smallholder Farmers PG 32
- Shower System Recycles and Cleans Water PG 150
- Growing Trees in Deserts with Minimal Water Use PG 39
- Replacing Cotton with Low-Impact Flax Fiber PG 47

Solutions for more efficient **use of the world's scarce water resources is a global trend in this year's Sustainia100, with 16 solutions** addressing the issue. The solutions are prevalent in developed and developing countries alike, however, most of the solutions address problems in water-stressed regions of the world.

This year's Sustainia100 is also a testament to how **manufacturing companies are shifting production in a more water efficient direction** by optimizing production or making products with entirely new, less water-intensive materials. Reducing water consumption in production processes is particularly apparent within the fashion and food sectors, where several solutions showcase new ways of recycling water and managing water loss.

Moreover, new water infrastructure monitoring technologies present a whole host of new opportunities, particularly in arid regions of the world, with **smart technology providing real-time alerts in the event of water leaks and sensors monitoring water use and providing valuable data for analysis**. This builds on a trend seen in last year's Sustainia100, when the Sustainia Award Winner, TaKaDu, was honored for its unique solution making use of data on water consumption and infrastructure weaknesses to reduce water losses.

The Potential

Global water loss costs water utilities more than $14 billion each year.[5] In the future, water savings opportunities will become increasingly valuable as global demand is expected to increase by 55% between 2000 and 2050.[6] Companies are already looking to find new solutions as water demand for manufacturing is estimated to increase by as much as 400% by 2050.[7]
Potential for savings exists in a range of sectors, with agriculture as the largest consumer, using up to 70% of accessible freshwater while industry consumes 19%.[8]

[5] World Bank. "The Challenge of Reducing Non-Revenue Water (NRW) in Developing Countries." 2006.

[6] Organization for Economic Co-operation and Development. "The OECD Environmental Outlook to 2050." 2012.

[7] United Nations World Water Assessment Programme. "Water and Energy." 2012.

[8] United Nations Food and Agriculture Organization. Aquastat. Online: www.fao.org/nr/water/aquastat/water_use/index.stm.

TREND:

MOVING TOWARDS RESPONSIBLE SUPPLY CHAINS

The trend of responsible supply chains is marked by international collaboration between developed and developing countries, and is represented this year by **14 Sustainia100 solutions.** In several cases, **solutions represent companies taking concrete measures to improve their performance**. These exist in many forms, such as producing mobile phones free from conflict minerals, collaborating with suppliers for better resource management, supply chain transparency, integrating the needs of local communities, and partnering with fair trade organizations to ensure proper working conditions.

This trend also sees several Sustainia100 solutions **providing the materials, methods, and technologies necessary to catalyze the integration of responsible supply chain techniques**. In fashion, this involves the use of mobile technology to monitor working conditions and environmental management, or methods for increasing traceability and ecologically friendly techniques. Elsewhere, solutions are making it possible to reduce the carbon footprint of transportation, design products with software that helps keep sustainability goals in mind, or create buildings and products from low-impact materials.

The Potential

The development of responsible supply chains is becoming an increasingly strategic and commercial priority for businesses, with 76% of operations professionals surveyed in 2013 stating that their efforts to bolster supply chain sustainability will increase over the next three years.[9] *Studies show that many socially and economically responsible practices are also business opportunities, exhibiting a positive correlation with lower operating costs.*[10]

Most relevant solutions:

- The Ethical Smartphone **PG 78**
- Water Recycling in Denim Production **PG 53**
- Construction Products Made From Natural Waste **PG 144**
- Refrigerated Shipping Cuts Energy Consumption and Food Waste **PG 62**
- Transparency and Real-Time Data for Buyers **PG 52**

[9] PwC and APICS Foundation. "Sustainable Supply Chains: Making Value the Opportunity." Report. 2013.

[10] Stanford Graduate School of Business. "The Relationship Between Responsible Supply Chain Practices and Performance: Research Insights." Report. November, 2013.

TREND:

SHAPING NEW MARKETS BY RETHINKING CONSUMPTION PATTERNS

Many solutions in the Sustainia100 represent a range of new choices for consumers willing to rethink the old consumption model of ownership followed by disposal of products. **This trend is embodied in 13 solutions this year, with several depicting innovative business models** that offer services instead of ownership through leasing or renting. Moreover, **business models based on sharing** are – similar to what was seen in last year's Sustainia100 – providing consumers with new options within personal transportation as well as domestic goods.

Several Sustainia100 solutions in this year's collection are also evidence of consumers' willingness to redefine the concepts of value and waste. As more people begin to perceive waste as an asset, solutions are stepping in to reward behaviour changes. Whether it be incentivized recycling schemes, taking the hassle out of donating used goods, or selling previously disposable products innovatively redesigned to be reused, **solutions are leaning on consumers' enthusiasm to participate in a sustainable economy**.

The Potential

As projections claim that by 2030 almost 60% of the world's population will belong to the middle income bracket,[11] *new innovations are crucial to reverse the current paradigm of consumption, accounting for $2.56 trillion worth of waste annually in the consumer goods sector alone.*[12] *Moreover, the sharing economy is gaining ground, with 40% of consumers in the United States participating in the sharing of goods and services online.*[13]

Most relevant solutions:

- Ridesharing for People-Powered Transportation **PG 63**
- Mobilizing Behaviour Change for a Zero Waste City **PG 132**
- Global Take-Back System for Textiles **PG 46**
- Biodegradable Diapers Reducing Waste **PG 148**
- Providing Incentives for Recycling in Low-Income Communities **PG 130**

[11] WEF. "Sustainable Consumption". Online: www.weforum.org/issues/sustainable-consumption

[12] WEF. "Circular Economy." Online: www.weforum.org/issues/circular-economy

[13] Crowd Companies and Vision Critical. "Sharing Is the New Buying: How to Win in the Collaborative Economy." 2014.

TREND:

DATA ANALYTICS OPEN BOOMING MARKETS FOR SUSTAINABILITY

Building on a trend seen in last year's Sustainia100, at least **13 solutions demonstrate how the increased availability of data is fueling advanced analytics** that open up new possibilities for improving sustainable practices. Numerous solutions provide examples of how analyzing data on a large scale, also known as **Big Data**, is creating new business models in the energy sector. Collectively they are improving the performance of utilities and the way we operate our buildings while also **helping users to change their behaviour in order to save energy**. In the transportation sector, new sets of data are being utilized for optimized use of infrastructure such as roads and railways and to design planes.

In the cities and buildings sectors, we see solutions that are connected online and thereby collecting data in real time through smartphones, sensors, and other devices – also known as **"The Internet of Things."** Ranging from smart parking to online connected street lighting and citywide smart meter deployments, data is continuously generated, analyzed, and used to optimize behaviour, infrastructure, and energy production.

The Potential

Data storage worldwide will double every two years until 2020, and this growth will be accompanied by a 40% increase in investments in digital infrastructure.[14] *One study shows that integrating big data efficiently could save the American health care sector $300 billion annually.*[15] *The Internet of Things is also taking off with 1.9 billion devices connected online today, and an estimated 9 billion by 2018.*[16]

Most relevant solutions:

- Saving Energy through Data and Cloud Software **PG 108**
- Citywide Parking Sensors for Lowering Congestion **PG 139**
- Software Combatting Energy Inefficiency in Buldings **PG 76**
- IT System for Fuel-Efficient Railways **PG 65**
- Communication Platform for Integrating Renewable Energy **PG 138**

[14] DC iView. "Big Data, Bigger Digital Shadows, and Biggest Growth in the Far East." December, 2012.

[15] Business Insider Intelligence. "Here's Why 'The Internet Of Things' Will Be Huge, And Drive Tremendous Value For People And Businesses." December, 2013.

[16] McKinsey. "Big Data: The Next Frontier for Innovation, Competition, and Productivity." May, 2011.

TREND:

SMART SOLUTIONS MAKE BUILDINGS MORE EFFICIENT

Twelve solutions featured this year represent a wide array of smart technologies that increase the efficiency of buildings in terms of key functions such as heating, cooling, lighting, and water use. Compared to previous editions of the Sustainia100, these smart building solutions are more focused on **optimizing existing technologies, like LED lighting, solar panels, and smart meters, and connecting them in ways that are better integrated** with how the building is used.

Moreover, these Sustainia100 solutions find new ways to take better advantage of natural resources such as daylight and renewable energy. Some solutions also focus on behaviour by gathering data that can engage users to reduce their energy and resource consumption as well as provide precise analytics on resource use and resulting costs.

In these ways, the 12 solutions representing this trend **maximize indoor comfort and productivity within buildings while saving valuable resources and reducing costs**. The trend is most apparent in Europe, North America, and leading Asian economies, which underlines the fact that smart technologies are still largely a developed country phenomenon.

The Potential

Buildings consume more than 40% of the world's available energy.[17] *Scaling of energy efficiency retrofits for buildings in the United States alone constitutes a $279 billion investment opportunity, while the energy savings over 10 years could amount to more than $1 trillion.*[18] *Moreover, multiple studies document the health and productivity benefits of improved indoor climates in buildings.*[19]

Most relevant solutions:

- Mirror-Enhanced Skylight with No Upfront Costs **PG 18**
- Designing Hospitals to Maximize Daylight **PG 123**
- Dynamic Windows Dim Glass and Save Energy **PG 22**
- Energy Savings Finance the Switch to LED Lighting **PG 133**
- Refurbishing to Create Energy-Positive Buildings **PG 25**

[17] World Business Council for Sustainable Development. "Energy Efficiency in Buildings - Transforming the Market." 2009.

[18] The Rockefeller Foundation. "United States Building Energy Efficiency Retrofits - Market Sizing and Financing Models." March, 2012.

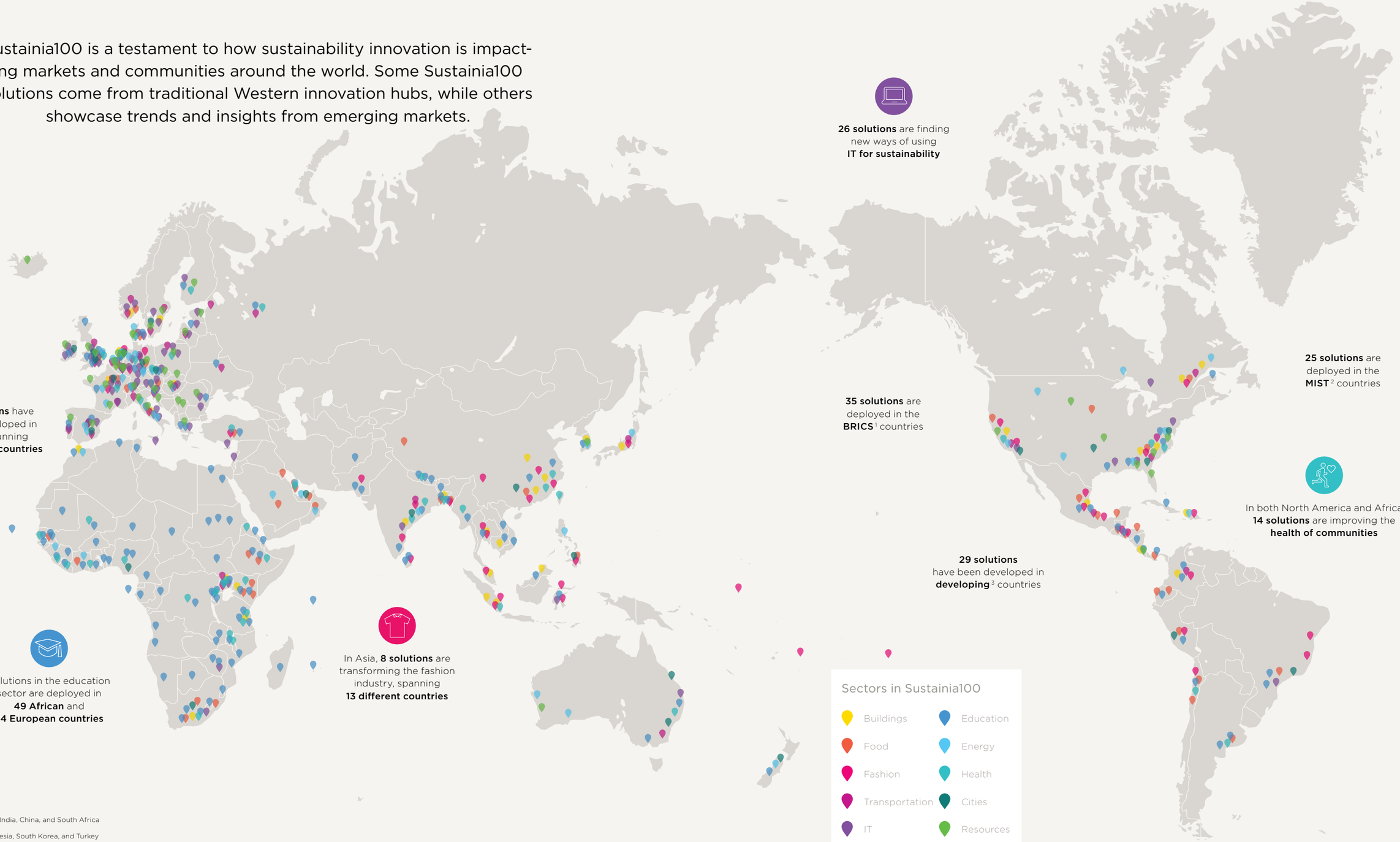
[19] Sustainia. "Sustainia Guide to Co-Creating Health." 2014.

A World of Solutions

Sustainia100 is a testament to how sustainability innovation is impacting markets and communities around the world. Some Sustainia100 solutions come from traditional Western innovation hubs, while others showcase trends and insights from emerging markets.

Solutions deployed in

142 different countries



26 solutions are finding new ways of using **IT for sustainability**

25 solutions are deployed in the **MIST**[2] countries

35 solutions are deployed in the **BRICS**[1] countries

In both North America and Africa **14 solutions** are improving the **health of communities**

29 solutions have been developed in **developing**[3] countries

17 solutions have been developed in **Asia,** spanning **7 different countries**

Solutions in the education sector are deployed in **49 African** and **24 European countries**

In Asia, **8 solutions** are transforming the fashion industry, spanning **13 different countries**

Sectors in Sustainia100

- Buildings
- Education
- Food
- Energy
- Fashion
- Health
- Transportation
- Cities
- IT
- Resources

[1] Brazil, Russia, India, China, and South Africa

[2] Mexico, Indonesia, South Korea, and Turkey

[3] Nations with either a Low or Medium Human Development Index ranking are termed Developing Countries by the United Nations Development Programme.

Buildings Sector

Mirror-Enhanced Skylight with No Upfront Costs
EcoNation

Salt Water Air-Conditioners Save Energy in Humid Climates
Advantix Systems

Alternative Soil Blocks for Affordable Construction
Haileybury Youth Trust (HYT)

Dynamic Windows Dim Light and Save Energy
View

Daylight and Natural Ventilation in High-Rise Construction
Skidmore, Owings & Merrill

Refurbishing to Create Energy-Positive Buildings
Snøhetta, Skanska, ZERO, Sapa, Hydro, Asplan Viak, and Entra Eiendom

Insulating Building Blocks from Recyclable Materials
Xella Baustoffe

Solar Hospital Safeguarding Against Power Outage
Hôpital Universitaire de Mirebalais and Partners in Health

Flood-Resistant Housing in Areas Impacted by Climate Change
Practical Action

Stadium Built to Win onSustainability
Skanska and MetLife Stadium Company

Solutions deployed

Mirror-Enhanced Skylight with No Upfront Costs

Solution by: **EcoNation**

→ EcoNation combines mirror-based daylight technology with a customized financial model, combining electricity savings, comfort, health, and environmental benefits into one package.

The Triple Bottom Line

ENVIRONMENTAL

Per 1,000 m² of industrial floor surface, EcoNation's technology can save up to 50,000 kWh and reduce up to 40 tons of CO2 per year, according to the company.

SOCIAL

EcoNation switches off artificial light and replaces it with filtered daylight, resulting in a 100% color spectrum, less eye fatigue, and all the health benefits of daylight.

ECONOMIC

Verified by light experts of the independent research institute VITO, EcoNation's technology is up to eight times more efficient than "traditional" daylight solutions, providing utility bill savings up to 50%.

Developed: Belgium

Deployed: 15 countries in Europe, Asia, and Africa

The LightCatcher is a solar-powered sensor system that tracks the brightest point in the sky. Through a mirror-based technology that optimizes the amount of daylight coming in, the LightCatcher automatically **turns off lights for an average of 10 hours a day**. The solution also diffuses light and reflects heat, avoiding high temperatures and blinding light on sunny days.

EcoNation funds the installation on the customer's premises and is repaid via monthly payments that are guaranteed to be lower than the customer's previous electricity bills. Customers face no upfront cost and start saving immediately. According to the company, the package deal **decreases electricity consumption by 20%-50%**, reducing yearly CO2 emissions by 40 tons per 1,000 m² while improving working conditions.

Why a Sustainia100 solution?

Daylight technology creates better working conditions while reducing electricity consumption. LightCatchers have been installed in factories, airports, nuclear sites, and even in chicken farms.

LightCatcher brings filtered daylight without temperature fluctuations or blinding spots. It switches off artificial light and thus provides real electricity savings.

Salt Water Air-Conditioners Save Energy in Humid Climates

Solution by: **Advantix Systems**

→ New air-conditioning technology based on a non-toxic "salt water" solution dehumidifies and cleans the air while saving energy and improving the indoor climate.

The Triple Bottom Line

ENVIRONMENTAL

As dry air feels cooler than humid air, the system produces a cooling effect at a higher temperature, saving energy.

SOCIAL

The salt water solution captures bacteria and stops them from spreading, which improves air quality and reduces sick days.

ECONOMIC

The system's upfront costs are comparable to conventional systems, and, in humid climates, saves 30% to 50% on running costs, according to Advantix.

Developed: USA, Israel

Deployed: USA, Canada, India, China, Singapore, Thailand, Mexico, Costa Rica, and Colombia

"ADVANTIX SYSTEMS IS COMMITTED TO OVERCOME BARRIERS TO ENERGY EFFICIENCY AND CUT THE GROWTH RATE OF GLOBAL ENERGY CONSUMPTION."

Hannah Granade, CEO, Advantix Systems

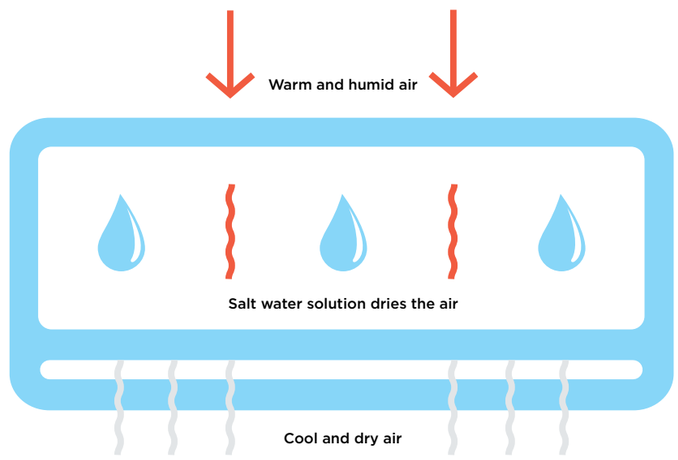
Conventional air-conditioning systems chill the air to its dew point to remove unwanted humidity and then reheat it to a comfortable temperature, an energy-intensive process. Advantix's air-conditioning system **passes the air through a non-toxic fluid "salt water" solution** called a liquid desiccant. This process dehumidifies the air without need for re-heating and **reduces energy consumption by up to 40%**. When heated, the liquid desiccant releases the collected moisture into the external environment.

The technology also **naturally disinfects and improves air quality** by scrubbing the air clean of microorganisms and eliminating the use of drip pans that produce mold or bacteria build-up.

Why a Sustainia100 solution?

The International Energy Agency has found that basic efficiency standards for appliances, motors, and air-conditioning units in developing countries could account for half the carbon emissions reductions needed to stabilize global temperature rise at 2°C. Advantix is targeting commercial and industrial settings in humid climates, which cover 75% of the world, including emerging markets such as China and India, where demand for air-conditioning is growing quickly.

The Advantix system naturally cleanses the air of particulates, producing cleaner and healthier air than conventional air-conditioning systems.



Alternative Soil Blocks for Affordable Construction

Solution by: **Haileybury Youth Trust (HYT)**

→ This durable, compressed, interlocking soil block provides a sustainable alternative to conventional fired bricks in developing countries.

The manually pressed Interlocking Stabilized Soil Block (ISSB) is a **low-cost, low-carbon alternative** to the conventional and environmentally damaging fired brick. Mixed with a small amount of cement and **cured rather than fired**, the soil block is proven to be strong, cost-effective, and environmentally sustainable.

The ISSB has a wide range of construction applications, including rainwater harvesting. In meeting increasing needs for housing, schools, and water provision, the ISSB technology is proving not only a carbon-saving alternative to fired bricks, it is also economically viable. The ISSB has already **transformed lives and employment opportunities through training programs** across East Africa, while preserving the region's fragile environment. The technology can be readily adopted throughout Africa.

Why a Sustainia100 solution?

Vast numbers of trees are cut down and used as fuel to produce traditional fired bricks in Africa. Such deforestation is already an environmental concern in countries, such as Uganda, with rapidly growing populations. Since the ISSB is not fired, no trees are chopped down to fuel brick kilns, which reduces CO2 emissions.

The Triple Bottom Line

ENVIRONMENTAL

Several reports have found that the ISSB technology provides significant reductions in CO2 emissions as well as biodiversity preservation.[1,2]

SOCIAL

The simplicity and low cost of the technology means it can be readily adopted among the poorest communities in developing countries.

ECONOMIC

Savings of up to 30% are possible when using the ISSB technology as opposed to conventional fired bricks, according to HYT.

Developed: Kenya and Uganda

Deployed: Uganda, Kenya, and Tanzania

"THIS SIMPLE CONSTRUCTION TECHNOLOGY IS TRANSFORMING UGANDAN COMMUNITIES, MEETING BASIC HUMANITARIAN NEEDS SUSTAINABLY."

Russell Matcham,
Director, Haileybury Youth Trust

The Interlocking Stabilized Soil Block provides a sustainable and appropriate solution to Africa's need for viable, environmentally friendly construction technologies.

[1] RICS. "The Viability of ISSB." 2010.

[2] Arup. "Structural Guidance Note." 2013.

Dynamic Windows Dim Light and Save Energy

Solution by: **View**

→ View Dynamic Glass intelligently changes its tint, enabling control over the amount of light and heat that enters a building. The result is reduced energy consumption.

The Triple Bottom Line

ENVIRONMENTAL

Buildings account for 70% of the electricity load in the United States and emit more carbon dioxide than automobiles or the industrial sector, according to the U.S. Green Building Council.

SOCIAL

Benefits include user controllability, improved thermal comfort, and daylighting.

ECONOMIC

View Dynamic Glass can reduce energy consumption by up to 20%, according to the company.

Developed: USA

Deployed: USA and Canada

"VIEW IS WHERE SILICON VALLEY TECHNOLOGY MEETS WORLD-CLASS GLASS MANUFACTURING."

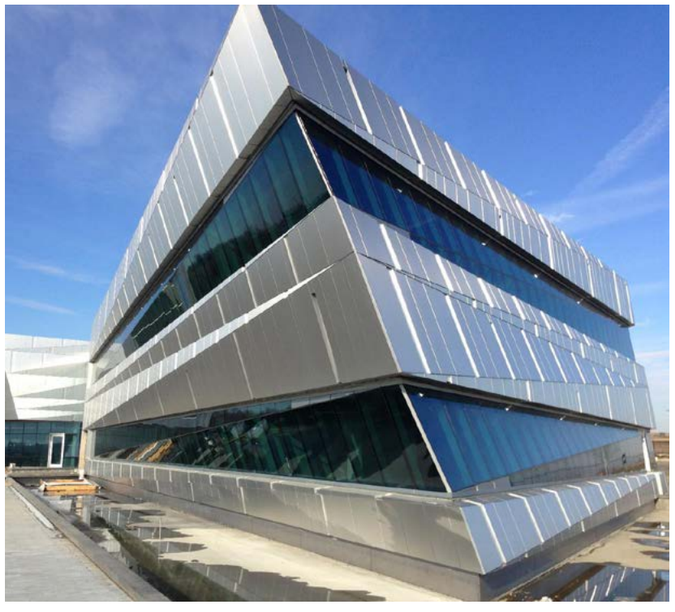
Dr. Rao Mulpuri, CEO, View

View Dynamic Glass is **intelligent glass** designed for commercial buildings that eliminates the need for blinds or shades. Two layers of glass surround an electrochromic coating, allowing a seamless transition through four variable tints to **provide continuous unobstructed views** without heat or glare. The system can automatically adapt to changing external conditions, or be controlled to meet specific preferences.

View states that in a typical dynamic glass commercial installation, annual heating, ventilation, air conditioning, and lighting **energy consumption is reduced by up to 20%**.

Why a Sustainia100 solution?

About 25 billion square feet of glass are used for architectural purposes each year, and windows are responsible for up to 40% of the heating, cooling, and lighting energy consumption, according to View. Natural light and expansive views are known to enhance both creativity and productivity. View empowers occupants to enjoy continuously unobstructed views and improved thermal comfort.



Daylight and Natural Ventilation in High-Rise Construction

Solution by: **Skidmore, Owings & Merrill**

→ The Zhengzhou Greenland Plaza tower utilizes a shading screen and an atrium to optimize use of daylight, reduce heat gain, and create natural ventilation.

The Triple Bottom Line

ENVIRONMENTAL

Energy consumption is 20% below ASHRAE 2007 standards.

SOCIAL

Access to daylight reduces stress and increases productivity within the building.

ECONOMIC

Water and energy efficiency drives the tower's long-term commercial success.

Developed: USA and China

Deployed: China

"AT ZHENGZHOU GREENLAND PLAZA, PASSIVE STRATEGIES ENHANCE COMFORT AND QUALITY OF LIFE WITH NATURAL VENTILATION, ADVANCED SHADING, AND INNOVATIVE DAYLIGHTING."

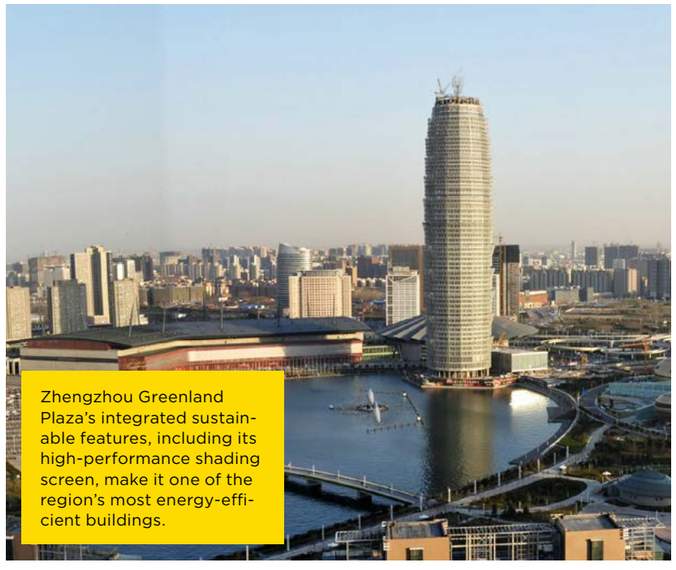
Luke Leung, PE, LEED Fellow, Director, Sustainable Engineering Studio, Skidmore, Owings & Merrill

The tower is designed to prioritize sustainability and optimize performance within Zhengzhou's humid subtropical climate. The building's shading screen — made from white aluminium panels — protects the tower's exterior glass curtain wall from solar heat gain. Its precise cant also **reduces the need for artificial lighting by enhancing daylighting via reflections**.

The integrated suite of sustainable features include a low-E glass curtain wall, a 20-meter heliostat that **reflects sunlight down into the tower's atrium**, control systems that allow the building to be naturally ventilated, and low-flow plumbing fixtures that improve water efficiency by 30%. The 280-meter Zhengzhou Greenland Plaza tower is the tallest building in central China.

Why a Sustainia100 solution?

The tower outperforms the stringent ASHRAE 2007 energy efficiency baseline by 20%. The profile created by its shading screen also nods to the region's cultural context, appearing reminiscent of the shape of traditional pagoda structures when viewed from a distance.



Zhengzhou Greenland Plaza's integrated sustainable features, including its high-performance shading screen, make it one of the region's most energy-efficient buildings.

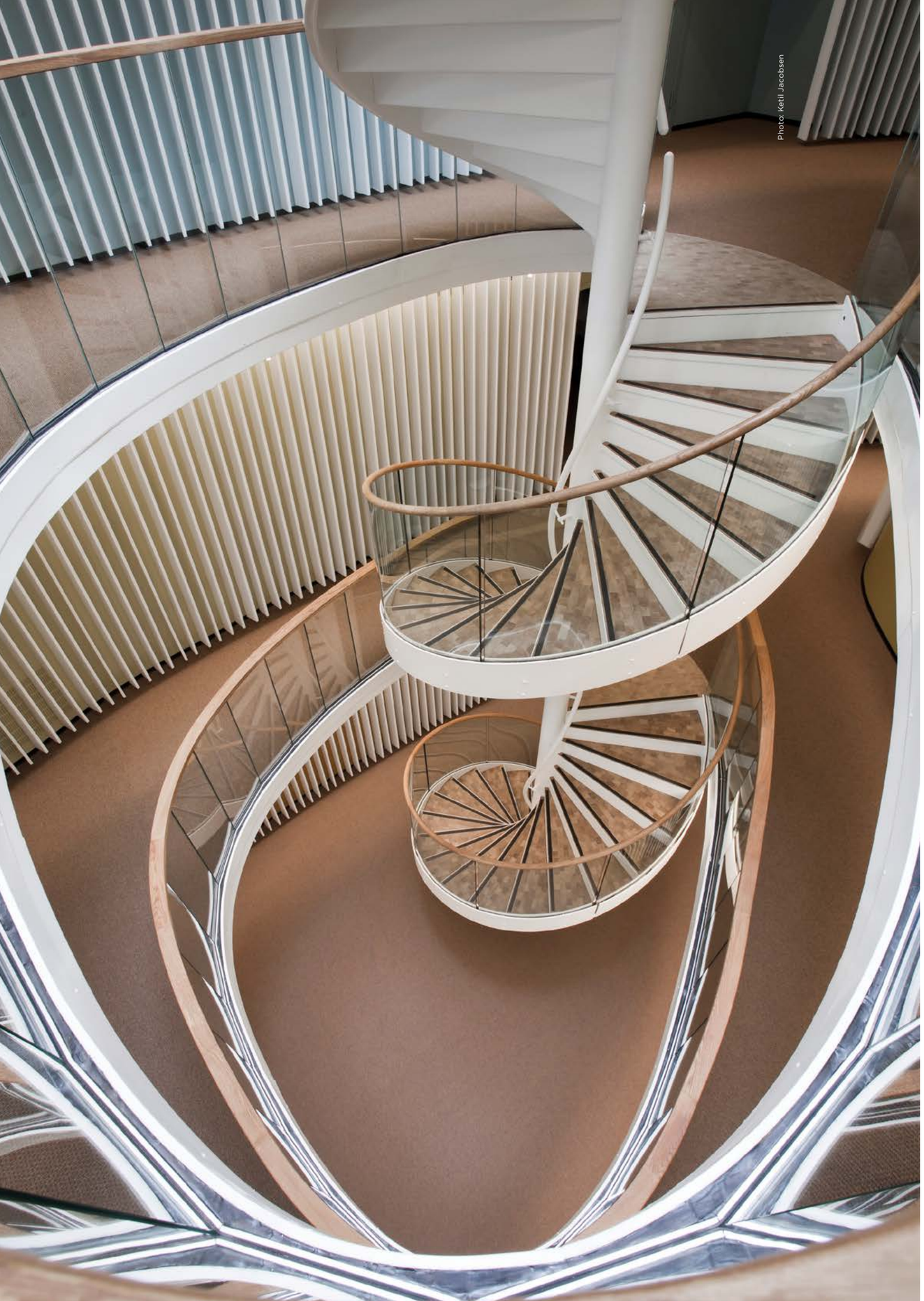


Photo: Ketil Jacobsen

Refurbishing to Create Energy-Positive Buildings

Solution by: **Snøhetta, Skanska, ZERO, Sapa, Hydro, Asplan Viak, and Entra Eiendom**

→ Powerhouse Kjørbo is the first office building to become energy-positive after refurbishment, producing more energy than it consumes over its lifetime.

By optimizing and combining existing technologies in new ways, the project partners behind Powerhouse Kjørbo have created a building that **produces more energy than it consumes**. The concept focuses on energy efficiency as well as energy self-sufficiency through local energy production. This is done by focusing on ventilation concepts, lightning technology, choice of materials, and energy supply.

The solar panels on the building can produce electricity for use on site, or for delivery to the power grid, with **capacity of over 200,000 kWh, or 41 kWh/m2 each year**. As a result of these efforts, the Powerhouse Kjørbo was awarded BREEAM's "Outstanding" certificate.

Why a Sustainia100 solution?

Buildings account for 40% of the world's energy consumption.[1] The project partners behind Powerhouse Kjørbo are collaborating to design and construct buildings that produce more energy than they consume. These energy-positive buildings reduce energy consumption and operating costs, while surplus electricity generated by rooftop solar panels can be used for other purposes.

The Triple Bottom Line

ENVIRONMENTAL

The building uses less energy while also producing clean and renewable energy for the electricity grid.

SOCIAL

Improved lightning and ventilation contribute to a better indoor climate and working environment for building occupants.

ECONOMIC

Higher upfront construction costs will be repaid over the building's lifetime due to lower energy costs, making the building financially viable.

Developed: Norway

Deployed: Norway

"WE ARE SHOWING THAT THE PRIVATE SECTOR CAN WORK TOGETHER IN A UNIQUE COLLABORATION, USING EXISTING TECHNOLOGY IN NEW WAYS."

Klaus-Anders Nysteen, CEO, Entra Eiendom

The stairs go through all floors of the building and work as a ventilation shaft, ensuring good ventilation and circulation of air in the building.

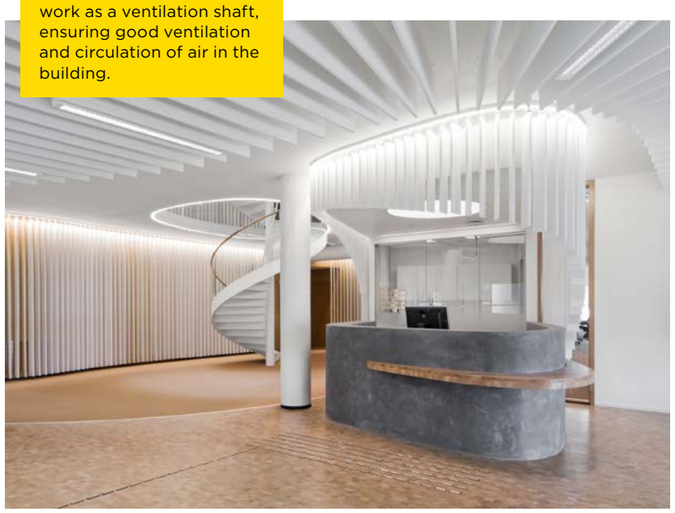


Photo: Ketil Jacobsen

[1] World Business Council for Sustainable Development. "Energy Efficiency in Buildings - Transforming the Market." 2009.

Insulating Building Blocks from Recyclable Materials

Solution by: **Xella Baustoffe**

→ With its thermal insulation properties and 100% recyclable materials, the Ytong Energy+ building block reduces CO2 emissions throughout its life-cycle.

Ytong Energy+ is made for solid, load-bearing walls. The building block consists of aerated concrete with two different densities in a sandwich-like construction, combining a compressive, bearing layer with effective insulation. While ordinary building materials allow precious heat produced inside the building to escape through the walls, **Ytong blocks have a powerful insulating effect** – thanks to the trapped air pockets in the concrete – that helps save energy.

From production to shipment and disposal, Ytong Energy+ is part of a **closed cycle where all materials can be reused or recycled** if separated properly. Part of the rock flour from the demolished aerated concrete will be conveyed into the production process of new Ytong Energy+ blocks.

Why a Sustainia100 solution?

With concrete being the second most consumed substance on Earth after water, there is an urgent need to improve efficiency in production and increase reuse and recycling at the end of the life-cycle.[1] Ytong Energy+ is Cradle to Cradle certified and the blocks are manufactured using raw materials in a process where waste products, such as dust and condensation, are circulated back into the production process.

The Triple Bottom Line

ENVIRONMENTAL

The blocks have minimal environmental impact during production, shipping, and disposal thanks to closed-cycle production.

SOCIAL

The Ytong Energy+ block removes the need to seal bare masonry with artificial insulation by using mineral materials that actively improve the indoor climate.

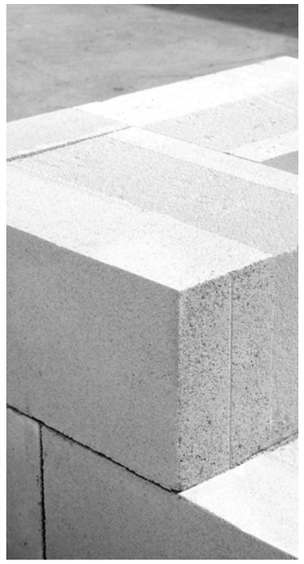
ECONOMIC

The block fulfils passive house standards without any additional insulation expenses, according to Xella.

Developed: Germany

Deployed: Denmark

Similar to a sandwich, the Ytong Energy+ building block contains a core between two layers of aerated concrete, resulting in effective insulation properties.



[1] IEA and WBCSD. "Cement Technology Roadmap 2009." 2009.

Solar Hospital Safeguarding Against Power Outage

Solution by: **Hôpital Universitaire de Mirebalais and Partners in Health**

→ This hospital in Haiti is designed with an uncomplicated array of solar panels, generating significant savings and eliminating the risk of local power outages.

The world's largest solar hospital, the Hôpital Universitaire de Mirebalais offers care to 185,000 people. A **rooftop array of 1,800 solar photovoltaic panels** enables the hospital to avoid the high price and unreliability of grid power in the region. In the first seven months of operation, the hospital attended to 60,029 patients and safely delivered more than 800 babies.

The solar panels provide more than enough energy for the hospital's daily electricity needs, with diesel generators for backup. The hospital **sells surplus electricity back to the grid**, which reduces operating expenses by $379,000 annually.

Why a Sustainia100 solution?

Electricity costs six-and-a-half times as much in Haiti as it does in the state of Maine, and random power outages average at three hours daily. With sporadic electricity impairing the uninterrupted operation of surgical wards, delivery wards, and essential hospital equipment, solar energy provides an off-grid guarantee of power for life-saving hospital equipment.

The Triple Bottom Line

ENVIRONMENTAL

With most electricity in Haiti produced by diesel generators,[1] shifting to solar energy significantly reduces CO2 emissions.

SOCIAL

Decentralized solutions offer people in off-grid regions reliable access to electricity, benefitting social development.

ECONOMIC

The savings attained are proportionally greater than in other types of commercial buildings. The hospital estimates that the rooftop solar panels cut about $379,000 in annual operating costs.

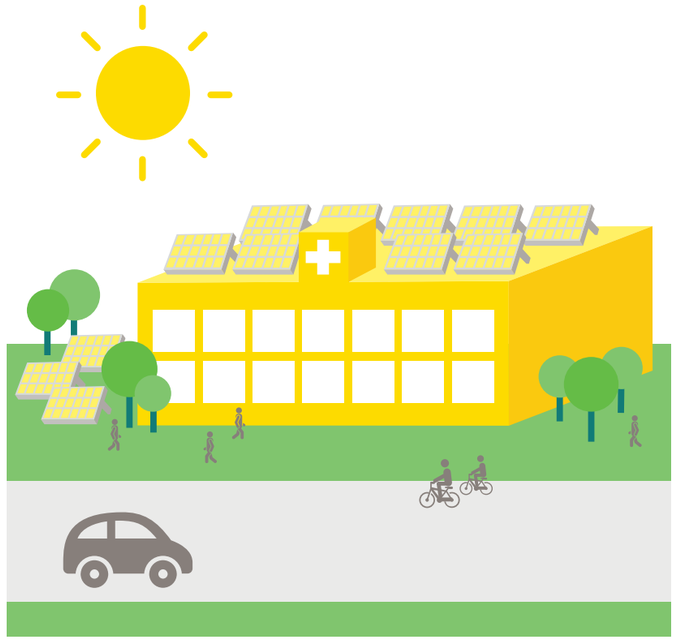
Developed: Haiti

Deployed: Haiti

"THIS HOSPITAL UNDERLINES OUR COMMITMENT TO THE COUNTRY AND PEOPLE OF HAITI, WHICH IS STRONGER THAN EVER AFTER THE EARTHQUAKE."

Paul Farmer, Co-founder, Partners In Health

[1] The World Bank. "Caribbean - Regional Electricity Supply Options." 2011.



Flood-Resistant Housing in Areas Impacted by Climate Change

Solution by: **Practical Action**

→ With training and materials supplied by Practical Action, people impacted by climate change in Bangladesh have built flood-resistant houses to protect families and businesses against annual floods.

The Triple Bottom Line

ENVIRONMENTAL

According to a World Bank study, Bangladesh will be among the countries in South Asia most effected by climate change, with extreme river floods threatening the population even more in the future.[1]

SOCIAL

Practical Action has elevated 100 wells, and 60 new ones have been built, saving an estimated 30,000 people from waterborne diseases which kill 110,000 annually in Bangladesh alone.

ECONOMIC

Practical Action estimates that every $1 spent on flood-resistant housing saves $3 in avoided damage.

Developed:
UK and Bangladesh

Deployed: Bangladesh

"OUR FLOOD-RESISTANT HOUSES ARE TRANSFORMING PEOPLE'S LIVES, HELPING THEM PROTECT THEIR FAMILIES, BUSINESSES, AND LIVELIHOODS."

Simon Trace, Chief Executive, Practical Action

In Bangladesh, Practical Action is empowering families to build houses on a plinth of sandy soil, brick, and concrete, making them **strong and high enough to endure repeated floods**. Treated bamboo poles on concrete bases are strengthened with metal tie rods to keep the walls firm and safe. Fastenings bind the walls firmly to the house's skeleton through a network of holes and notches. This means the houses can remain standing through the strongest of winds and rain.

Water-thirsty plants are set around the house to "drink up" flood water and hold onto the soil, helping the whole structure stay intact.

Why a Sustainia100 solution?

Every year, flooding in Bangladesh kills over 700 people, damages 4 million homes, and wipes out over 1 million hectares of crops. Climate change is likely to increase these numbers if adaptation measures are not taken. Most of the deaths are not due to drowning, but disease spread by the shallow stagnant water. With homes intact, families can protect their crops, send their children to school, and keep their businesses running.

Flood-resistant housing helps families in Bangladesh protect their livelihoods from the effects of climate change and annual floods.

[1] The World Bank. "Turn Down the Heat: Climate Extremes, Regional Impacts and the Case for Resilience." 2013.

Stadium Built to Win on Sustainability

Solution by: **Skanska and MetLife Stadium Company**

→ The MetLife Stadium features solar panels, energy-efficient windows, water-saving toilets and construction with recycled steel and plastic.

The Triple Bottom Line

ENVIRONMENTAL

Skanska's collaboration with the EPA has resulted in 25% water savings compared to the old stadium.

SOCIAL

When building MetLife Stadium, Skanska agreed to contracts worth $260 million with small minority and women-owned businesses.

ECONOMIC

The MetLife Stadium has saved an estimated $19.9 million in operating expenses over the past 3.5 years, showing green construction is less expensive when including life-cycle costs.

Developed:
USA

Deployed: USA

With 82,500 seats and TV audiences in the millions every week, the MetLife Stadium creates awareness on building green. The construction of the MetLife Stadium saw **83% of construction waste recycled**, 40,000 tons of recycled steel used, and construction vehicles using cleaner fuels. Skanska also established a partnership with the U.S. Environmental Protection Agency (EPA), resulting in low water and solid waste production.

The MetLife Stadium is twice as big as the stadium it replaced in 2010 but uses 30% less energy for operations while also **producing its own electricity with a rooftop solar ring**. The stadium is well connected to public transportation, resulting in more than 5 million avoided vehicle miles traveled from 2009 to 2013.

Why a Sustainia100 solution?

Buildings are responsible for around 40% of all energy use in the United States, according to the EPA. By hosting the 2014 Super Bowl, and welcoming millions of guests and TV viewers every week, the MetLife Stadium showcases to the general public that technologies exist to affordably and sustainably construct green buildings. Skanska's efforts at MetLife Stadium reduced its carbon footprint equivalent to the emissions from 48,924 vehicles per year.

Food Sector

Drip Irrigation Maximizes Crop Yields for Smallholder Farmers
Netafim

Harvesting Larvae from Waste for Animal Feed
AgriProtein Technologies

Clay Refrigerator Cools Through Evaporation
Mitticool

Reusing Food Waste as Energy and Fertilizer
BioTrans Nordic

Monitoring Water Levels for Smarter Rice Irrigation
International Rice Research Institute and Syngenta

Growing Trees in Deserts with Minimal Water Use
Groasis

Cricket Flour for High-Protein Bars
Exo

Bio-Based Products for Pest Management and Plant Health
Marrone Bio Innovations

Green Fish Farming Fosters Local Growth
West African Fish

Smaller Plates at Buffets Reduce Food Waste
Hotel Union Geiranger

Solutions deployed

Drip Irrigation Maximizes Crop Yields for Smallholder Farmers

Solution by: **Netafim**

→ Netafim is integrating drip technology with a low-tech gravity-based system that enables smallholder farmers in developing countries to cost-effectively increase yields and quality, while maximizing water efficiency.

Netafim has developed an irrigation system that drips precise quantities of water and nutrients right at the root zone of crops. An **elevated tank distributes the water** using gravity, which results in a minimized need for electricity and no need for further investments in infrastructure. Thus, the system is helping **reduce water usage significantly, improve crop quality, and increase crop yields**.

Netafim is offering smallholder farmers affordable irrigation methods while ensuring the **optimal use of the solution by educating** them about using the technology most effectively.

Why a Sustainia100 solution?

UNEP has estimated that 500 million smallholder farmers provide over 80% of the food consumed in the developing world. Drip irrigation positively impacts the environment by addressing issues such as water scarcity, arable land reduction, soil erosion and climate change. According to Netafim, the solution is commercially viable and the investment has a payback time of about a year, thus making it fit for microfinance projects.

Water and nutrients flow by gravitational force from the elevated tank to dripperlines, and irrigate the plants.

The Triple Bottom Line

ENVIRONMENTAL

According to Netafim, the move to drip irrigation led to water savings of 60% in growing sugarcane in Peru.

SOCIAL

Women in a Kenyan village who installed the Netafim drip irrigation system reported an increase in vegetable-growing capacity, free time, and improved agro-knowledge through training.

ECONOMIC

A project in the Indian state of Jharkhand led to a significant increase in net profit among farmers. The pay-back period for a loan received for the purchase of the system was 5 months, according to Netafim.

Developed: Israel

Deployed: 11 countries, including Kenya, China, and Mexico

"THE TIME HAS COME TO PROVIDE DRIP IRRIGATION TECHNOLOGY TO MILLIONS OF SMALLHOLDERS IN DEVELOPING COUNTRIES."

Naty Barak, Chief Sustainability Officer, Netafim

Harvesting Larvae from Waste for Animal Feed

Solution by: **AgriProtein Technologies**

→ Using fly larvae for animal feed generates compost from waste and provides a natural alternative to soy and fishmeal, which reduces pressure on ocean fish supplies.

To satisfy the global demand for meat, fishmeal and soy are often produced and shipped thousands of kilometres to where animals are farmed. AgriProtein's animal feed product, MagMeal, **replaces fishmeal with locally-produced larvae for feeding common livestock** such as chickens and pigs. MagMeal's nutritional composition is comparable to that of fishmeal and better than soy, according to AgriProtein.

Every day, AgriProtein adds fly eggs to 110 tons of waste. The eggs hatch into larvae that digest the waste and grow to about 20 tons worth of maggots for producing Magmeal. The only two by-products of this process are **40 tons of fertilizer and 50 tons of water** that evaporate into the atmosphere.

Why a Sustainia100 solution?

Generating agricultural protein requires vast amounts of land and water, while the sea-caught alternative has severe consequences for marine life. For every ton of MagMeal, almost 5 tons of fish are left in the ocean to reproduce, according to AgriProtein.

The Triple Bottom Line

ENVIRONMENTAL

An estimated 10 tons of CO2 are generated per ton of fishmeal produced. In comparison, MagMeal only generates two tons of CO2 per ton.

SOCIAL

MagMeal addresses the needs of a growing population and reduces pressure on scarce water and land resources.

ECONOMIC

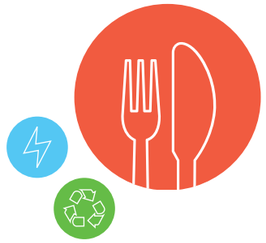
A single female fly will lay 750 eggs in under a week, which hatch into larvae and grow over 400 times in weight within just a few days.

Developed:
South Africa

Deployed: South Africa

Clay Refrigerator Cools Through Evaporation

Solution by: **Mitticool**



→ The Mitticool refrigerator is made of natural clay and runs without electricity, serving as an affordable cooling alternative for rural communities in developing countries.

This solution works on the principle of evaporation. Water from the upper chamber drips down the side and evaporates, removing heat from the inside and leaving the chambers cool. **Using only water, it is possible to keep food, vegetables, and milk naturally fresh** for days.

The refrigerator is made of white clay and has a simple design that eliminates the need for maintenance. In areas with electricity shortages and frequent blackouts, the Mitticool refrigerator offers **a reliable cooling storage option**.

Why a Sustainia100 solution?

According to the UN Food and Agriculture Organization, much of the post-harvest loss of fruits and vegetables in developing countries is due to the lack of proper storage facilities. Most refrigerated cooling options are expensive to buy and run. Furthermore, according to consumer reports, the refrigerator is the most power-consuming device in a typical household.[1] Mitticool addresses these challenges by offering a low-cost alternative that is simple and does not require any external power supply. This makes the solution viable in rural areas with poor electricity infrastructure.

The upper chamber of the Mitticool refrigerator is used for storing water that drips down the side and evaporates, drawing energy from its surroundings to produce a considerable cooling effect.

The Triple Bottom Line

ENVIRONMENTAL

This refrigerator, made from a natural material, is an alternative to highly energy consuming cooling devices.

SOCIAL

The solution offers a reliable cooling option for people living in rural areas, making it possible to secure a healthy and nutritional food supply.

ECONOMIC

The Mitticool refrigerator has no maintenance costs and a significantly lower fixed cost in comparison with its electrified competitors.

Developed:
India

Deployed: India, Kenya, United Arab Emirates, and UK

[1] Energy Saving Trust. "Powering the nation". Report 2012.

Reusing Food Waste as Energy and Fertilizer

Solution by: **BioTrans Nordic**

→ This solution converts food waste from restaurants and cantinas into renewable energy and natural fertilizer for food production through a biogas plant.

In restaurants and cantinas, the BioTrans System grinds food waste and peelings into a homogeneous biomass. The food waste is then pumped into a **closed, odour-free system** to a tank where it is collected and stored for several weeks at ambient temperature. From there, the biomass is periodically hauled to large plants where it is recycled into biogas and used as **renewable energy for heating and electricity**.

The low content of contaminants makes biomass from the BioTrans System easy to handle for biogas plants. Also, the leftover waste product from the process is utilized as **fertilizer for new food production**.

Why a Sustainia100 solution?

The closed-loop system enables non-avoidable food waste from restaurants and cantinas to be reused for energy and fertilizer, while also improving hygiene and removing bad odours from the kitchen. According to the company, the road haulage of food waste is also reduced by up to 90% because fewer collection runs are needed when compared with conventional logistics.

The Triple Bottom Line

ENVIRONMENTAL

The system reduces carbon footprints by converting food waste into optimal feedstock for production of renewable bioenergy and fertilizer.

SOCIAL

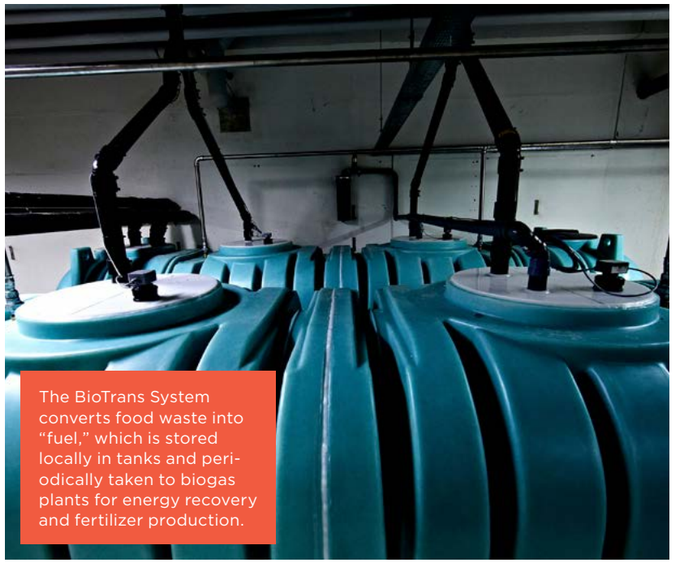
The food waste grinder improves hygiene and removes bad odors, while also being easy to handle and clean.

ECONOMIC

According to the company, the BioTrans System typically enables restaurants and cantinas to reduce internal handling and external food waste disposal costs.

Developed:
Switzerland and Denmark

Deployed: Denmark, Switzerland, Germany, and Austria



The BioTrans System converts food waste into "fuel," which is stored locally in tanks and periodically taken to biogas plants for energy recovery and fertilizer production.

"THE BIOTRANS SYSTEM CREATES A BETTER WORKING ENVIRONMENT AND HYGIENE IN THE KITCHENS."

Søren Jeberg, CEO, BioTrans Nordic

Monitoring Water Levels for Smarter Rice Irrigation

Solution by: **International Rice Research Institute and Syngenta**

→ The PaniPipe allows farmers to monitor water levels below ground, thereby decreasing the need to flood rice fields, saving fuel and improving crop protection.

When inserted into the ground, the PaniPipe allows farmers to see **the depth to which the soil is saturated** by simply measuring the amount of water in the pipe. The farming technique is based on the understanding that differing depths of water are optimal for growth at different stages of the plant's life. This reduces the need to flood rice fields, **saving irrigation costs and fuel used to pump water** onto the fields.

The management system allows farmers to make sure rice fields are allowed to dry intermittently during the rice-growing stage, promoting air circulation in the root zone. Producing rice under drier conditions also **provides better crop protection to secure and enhance yield**.

Why a Sustainia100 solution?

Distributed free of charge, the PaniPipe allows farmers to save up to 30% of the nearly 5,000 liters of water used traditionally to produce one kilogram of rough rice, according to Syngenta. The savings in water, combined with an increased yield, allows farmers to increase their return on investment by more than 30% – in many cases taking them from a net loss to a net profit.

The Triple Bottom Line

ENVIRONMENTAL

The technology conserves groundwater and reduces diesel fuel used to pump water.

SOCIAL

The technique addresses water scarcity and enhances crop protection for food security.

ECONOMIC

The estimated increased yield raises the incremental benefit per acre from $22.50 to $37.50, according to Syngenta.

Developed:
The Philippines and Switzerland

Deployed: The Philippines and Bangladesh

Farmers in rice fields are being educated on how to use the PaniPipe.

Photo: Courtesy of Syngenta

Growing Trees in Deserts with Minimal Water Use

Solution by: **Groasis**

→ The Groasis Waterboxx grows plants and trees in desert areas using limited water resources with no continuous need for energy or irrigation.

The Groasis Waterboxx is a **planting technology for eroded, rocky, dry, and desert areas**. It is filled with a one-time dose of 15 liters of water, which the design of the box prevents from evaporating. Instead, water is slowly released into the soil surrounding the seeds. Rain and condensation from surroundings are also collected in the box. In this way, a heavy rain shower of just 10 minutes once a year can be **stored and apportioned to the plant until the following season**.

The box releases only 50 ml of water per day. With such a limited amount of water the plants are forced to search deeper into the ground, and over time the roots – even in the driest areas – typically find water within just a few feet.

Why a Sustainia100 solution?

According to the company, the average survival rate for the trees is over 90%, no matter how difficult the circumstances. Likewise, water savings are more than 90% compared to any other planting method during the first year. From the second year onwards, water savings become 100% as no artificially added water is used.

The Triple Bottom Line

ENVIRONMENTAL

Research has shown that a large-scale plantation could capture 17 – 25 tons of CO2 per hectare per year from the atmosphere in hot and dry areas around the world.[1]

SOCIAL

Productive trees and plants produce accessible food for the local community.

ECONOMIC

According to the company, productive trees create one job per hectare.

Developed:
The Netherlands

Deployed: **18 countries, including Argentina, Kenya, and Kuwait**

"IF THE 2 BILLION HECTARES OF MAN-MADE DESERTS WAS SMALL ENOUGH TO CUT, IT IS CERTAINLY SMALL ENOUGH TO REPLANT."

Pieter Hoff, Founder, Groasis

[1] Earth Systems Dynamics. "Carbon farming in hot dry coastal areas". 2012

Beechwood plant two months after planting in Ecuador with temperatures of up to +40.5°C and only 211 mm rain per year.

Cricket Flour for High-Protein Bars

Solution by: **Exo**

The Triple Bottom Line

ENVIRONMENTAL

Crickets produce almost no methane compared to conventional livestock.

SOCIAL

Exo offers an appealing and healthy alternative to conventional protein bars.

ECONOMIC

Crickets reproduce quickly and require minimal feed, water, and space, which makes them a low cost alternative when produced at scale.

Developed: USA

Deployed: USA

"SUSTAINABLE, HEALTHFUL AND DELICIOUS—EATING INSECTS SIMPLY MAKES SENSE. CONVINCING PEOPLE TO ACT ON THAT LOGIC, AND OVERCOME THE PSYCHOLOGICAL HURDLE, IS THE REAL CHALLENGE THOUGH."

Gabi Lewis, CEO, Exo

→ Cricket flour is high in protein and micronutrients like iron and calcium, while requiring 20 times fewer resources than cattle per gram of protein created.

Exo makes energy bars with cricket flour, developed by a three Michelin-starred chef. The bars are high in protein, low in sugar and nutritionally dense. Insects are **easy to farm, reproduce quickly and require very little feed, water, and space** when compared to conventional livestock.

The insects are 69% protein by dry weight as compared with 31% for chicken breast and 29% for sirloin steak, according to Exo. Moreover, **crickets only produce one eightieth the amount of methane that cattle do**, and consume a sixth of their feed without requiring acres of grassland to graze on.

Why a Sustainia100 solution?

The fifth assessment report from the Intergovernmental Panel on Climate Change concludes that global warming could reduce agricultural production by as much as two percent each decade for the rest of this century. During that period, food demand is expected to rise as much as 14% each decade.[1] With this in mind, insect protein represents an efficient alternative to current practices.

The protein bars made of cricket flour is flavored with cacao nut, cashew ginger or peanut butter and jelly.

[1] Intergovernmental Panel on Climate Change (IPCC). "Climate Change 2014: Impacts, Adaptation, and Vulnerability. Summary For Policymakers". 2014

Bio-Based Products for Pest Management and Plant Health

Solution by: **Marrone Bio Innovations**

The Triple Bottom Line

ENVIRONMENTAL

While not disturbing bio-diversity, the bio-based products provide selective control of harmful pests and diseases.

SOCIAL

Marrone Bio Innovations empowers farmers to maximize food quality and increase yields. In addition, the products are safer for workers and carry no harmful residues.

ECONOMIC

Farmers can increase their incomes by achieving greater production together with higher quality products, for which they can receive premium prices. Bio-based products can also be used in organic production.

Developed: USA

Deployed: 10 countries, including Guatemala, Mexico, South Africa, and Turkey

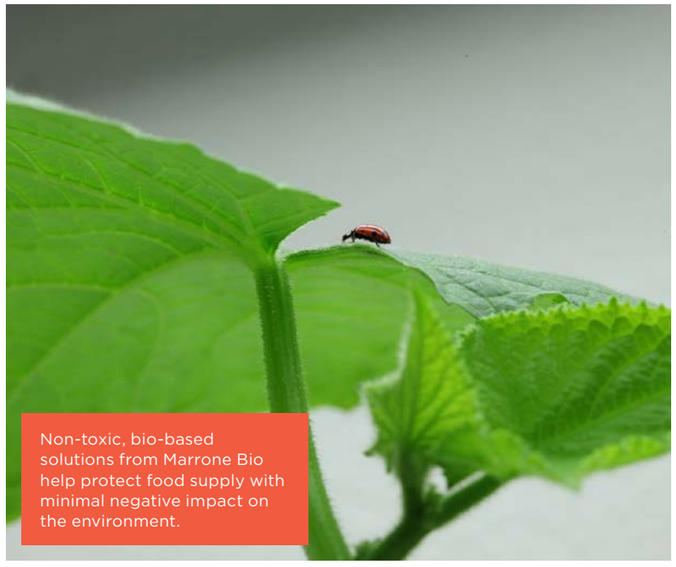
→ Non-toxic bio-based products can control pests and improve plant health without using chemicals that are harmful to both people and beneficial insects.

Marrone Bio Innovations provides **bio-based pest management** and plant health products for the agricultural, turf, and water treatment markets. The biopesticides used are naturally-occurring substances, such as microbes, bacteria, and plant extracts. While controlling pests, improving plant health, and increasing crop yields, the pesticides are **non-toxic and reduce the use of agrochemicals** that are harmful to the environment, people, and beneficial insects such as honey bees.

Biopesticides **only affect the targeted pest** and closely related species, while posing little or no risk to most non-target organisms. They can be used up to the day of harvest, as biopesticides do not leave behind any harmful residue.

Why a Sustainia100 solution?

The Intergovernmental Panel on Climate Change has argued that models of agriculture that use chemical fertilisers and pesticides together with requiring large amounts of water weaken soil health and reduce its ability to store water in the face of droughts or floods. Using bio-based products promotes plant health and manages weeds, pests, and plant diseases in a broad range of fruit, vegetable, grain, and nut crops as well as for turfs and ornamentals.



Non-toxic, bio-based solutions from Marrone Bio help protect food supply with minimal negative impact on the environment.

Green Fish Farming Fosters Local Growth

Solution by: **West African Fish**

→ West African Fish produces environmentally friendly aquaculture farms in Ghana that create jobs and a supply of protein-rich food for the local community.

West African Fish produces fish by aquaculture in eastern Ghana. The aquaculture involves cultivating the tilapia fish under controlled conditions, as opposed to commercial fishing, which relies on harvesting wild fish. The main technology employed in the process involves **recirculating and recycling water and using floating fish feed** to minimize waste and pollution.

The fish are sold in the local market, **creating 100 jobs** in a region with a high unemployment rate. At the same time, West African Fish meets the heavy demand for **protein-rich quality food** in a country where most food is imported.

Why a Sustainia100 solution?

Aquafarming has become a critically important additional means of seafood production at a time when many natural populations are declining in the wild.[1] West African Fish has doubled capacity every year, from 38 tons of production in 2008 to 4,000 tons in 2014. According to the company, 400 families get their income through spin-offs by reselling the fish.

The Triple Bottom Line

ENVIRONMENTAL

Sustainable aquafarming improves ecosystems by limiting the need to catch wild fish.

SOCIAL

West African Fish creates local jobs and is supplying the region with a healthy source of food. Moreover the company has had a zero-tolerance policy on corruption and facilitation payments.

ECONOMIC

West African Fish's focus on creating an efficient food supply chain has improved livelihoods in Ghana and created growth in the region.

Developed: Denmark and Ghana

Deployed: Ghana

The aquaculture production site consists of several fishing ponds.

[1] FAO. "Technical Guidelines for Responsible Fisheries." Report 2011.

Smaller Plates at Buffets Reduce Food Waste

Solution by: **Hotel Union Geiranger**

→ The Hotel Union Geiranger has introduced smaller plates and decreased the height of drinking glasses at its buffets, resulting in substantial reductions in food waste.

Hotel Union Geiranger in Norway has saved around **$16,000 in food costs over one year simply by introducing smaller plates** at its buffet meals. Switching from plates of 28 to 23 centimeters in diameter prompted guests to be more selective about how much they pile onto their plates, resulting in major waste reductions.

Similarly, decreasing **the height of the drinking glass** by half a centimeter has created a substantial saving in liquids. These simple measures towards reducing food waste have resulted in **market advantages by improving publicity**, which has attracted more visitors to the hotel, according the company.

Why a Sustainia100 solution?

According to UNEP, simple actions by consumers and food retailers can dramatically cut the 1.3 billion tons of food lost or wasted each year, representing around one third of all food produced in the world. Environmentally, food loss and waste generate a host of impacts, including unnecessary greenhouse gas emissions and inefficiently used water and land, which in turn can lead to diminished natural ecosystems.[1]

The Triple Bottom Line

ENVIRONMENTAL

Decreasing food waste results in significant reductions in methane emissions from landfills and saves resources associated with food production.

SOCIAL

According to UNEP, there is enough food in the world to feed everyone - even without further scientific breakthroughs. It is therefore critical to find simple measures to divert food away from landfills.

ECONOMIC

By preventing food waste, businesses purchase less food and reduce costs.

Developed: Norway

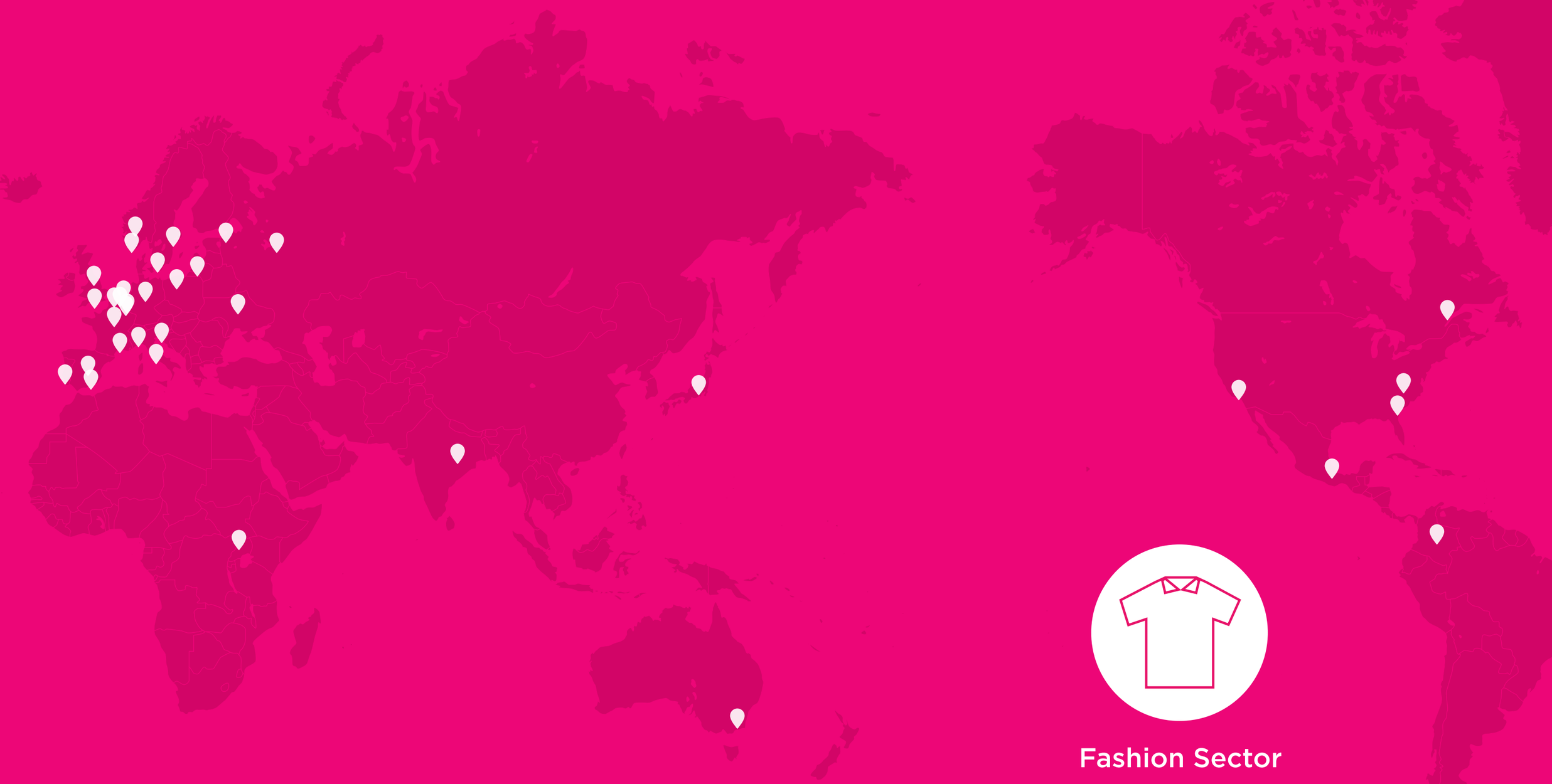
Deployed: Norway and Austria

"REDUCING FOOD WASTE AND SAVING MONEY AT THE SAME TIME IS PLAIN LOGIC."

Finn Nustad, Hotel Manager, Hotel Union Geiranger

[1] World Resources Institute. "Reducing Food Loss and Waste." Working Paper 2013.

90% of the Hotel Union Geirangers' guests serve themselves at buffets.



Fashion Sector

Global Take-Back System for Textiles
I:Collect (I:CO)

Replacing Cotton with Low-Impact Flax Fiber
CRAiLAR Technologies

Transparency and Real-Time Data for Buyers
Good World Solutions

Perpetual Recycling Makes Used Polyester New Again
Teijin

Recycled Plastic Bottles Reinvent Sustainable Fashion
Bionic Yarn

Leasing Jeans for a Circular Fashion Industry
Mud Jeans

Turning Food Waste into Exotic Leather
Atlantic Leather

Water Recycling in Denim Production
Levi Strauss & Co.

Used Clothing as a Currency for Development
GOONJ

Pearl Farms Fostering Marine Conservation and Social Enterprise
Sustainable Pearls

Solutions deployed

Global Take-Back System for Textiles

Solution by: **I:Collect (I:CO)**

→ I:CO has created an innovative take-back system for collecting used apparel, footwear, and other textiles for reuse and recycling.

Through its simple consumer and business take-back system, along with its worldwide infrastructure, I:CO aims to keep used clothing and shoes in **a continuous closed-loop product cycle**. As a result, I:CO increases product lifespan and encourages manufacturers to be mindful of resource use in their designs.

Through cooperation with large retail partners, used shoes and clothing are collected in stores and other retail outlets. As an incentive to participate, **customers are financially rewarded for depositing their used items**. Once collected, the textiles are sorted according to more than 350 criteria for designation. Used clothes can be labeled suitable for second-hand sale, recycling into fibers and paddings, or upcycling into products of equal or higher quality.

Why a Sustainia100 solution?

Used textiles and footwear are made from valuable resources such as cotton and polyester. Currently, however, after a product's first or second life cycle, these resources are discarded. The only real way to effectively handle textiles and footwear that can no longer be reused is to utilize them as raw materials for creating new products. To meet this challenge, the I:CO system closes the recycling loop, providing the basis for a profitable "circular economy."

The Triple Bottom Line

ENVIRONMENTAL

I:CO claims to recieve around 700 tons of used clothing daily, reducing waste sent to landfills.

SOCIAL

I:CO also collects in developing countries like Kenya, aiming to establish a local recycling economy.

ECONOMIC

All players, including customers and retailers, benefit economically from the recycling process.

Developed:
Switzerland

Deployed: 54 countries, including Singapore, Chile, and Hungary

"THERE IS NO ALTERNATIVE TO CLOSED LOOP PRODUCT CYCLES."

Stephan Wiegand,
CEO, I:Collect AG

After collection, I:CO puts used textiles and footwear to their most ecologically and economically viable use.

Replacing Cotton with Low-Impact Flax Fiber

Solution by: **CRAiLAR Technologies**

→ CRAiLAR's Flax Fiber drastically reduces chemical and water usage, creating fabrics that are indistinguishable from cotton.

Due to its scratchy texture, flax has traditionally been synonymous with discomfort. Its **application as a fiber has been limited by its structure**, which allowed it to be woven into linen, but not knitted like cotton. Developed in collaboration with the National Research Council Canada, **the all-natural, enzymatic process** used to create CRAiLAR unlocks the potential of flax as a high-performing, eco-friendly natural fiber.

Based on ongoing testing, garments made of or blended with CRAiLAR Flax Fiber outperform pure cotton, according to the company. The fiber is strong, dries quickly, and shrinks less. It wicks in a similar manner to synthetics, while offering **the breathability and comfort of cotton**.

Why a Sustainia100 solution?

Cotton represents almost half of the fiber produced globally. Simultaneously, producing cotton garments is a water- and chemical-intensive process resulting in substantial damage to ecosystems.[1] CRAiLAR is focusing on integrating its low-impact substitute fiber into the apparel and textile industries, partnering with large brands with the goal of making sustainably produced clothing and textile goods accessible to all.

The Triple Bottom Line

ENVIRONMENTAL

CRAiLAR reports that it requires fewer herbicides, pesticides, and 99% less water to produce the same amount of finished fiber as cotton.

SOCIAL

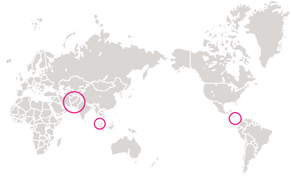
The company claims that its fiber produces more than three times the yield per acre compared to cotton, alleviating pressure on local food production.

ECONOMIC

Through a seamless integration into the current supply chain, deployment requires no additional equipment or starting costs.

Developed:
Canada, UK, Belgium, and USA

Deployed: 10 countries, including El Salvador, Malaysia, and Pakistan.



"WE IMAGINE A WORLD WHERE CORPORATIONS CAN PURSUE PROFIT AND ENVIRONMENTAL STEWARDSHIP WITH EQUAL EFFORT."

Ken Barker, CEO, CRAiLAR Technologies

[1] WWF Global. "Cotton: A Water Wasting Crop." Online: wwf.panda.org

Perpetual Recycling Makes Used Polyester New Again

Solution by: **Teijin**

→ This technology makes it possible to recycle polyester products multiple times without compromising on quality, significantly reducing waste, CO2 emissions, and energy consumption.

The Triple Bottom Line

ENVIRONMENTAL

According to Teijin, the process reduces CO2 emissions by 77% and energy use by 84% compared to new polyester made from petroleum.

SOCIAL

The recycling process alleviates pressure on precious resources.

ECONOMIC

The ability to create new polyester from used products insulates manufacturers from fluctuations in resource prices.

Teijin's Eco Circle recycling process is **a closed-loop system geared towards polyester**. Used items are broken down to the molecular level by means of a chemical process, which removes impurities and **produces material of quality equal to that of polyester derived from petroleum**. Teijin's Plantfiber, the first commercially produced bio-derived PET fiber helping to reduce consumption of fossil fuels, is also recycled using this process.

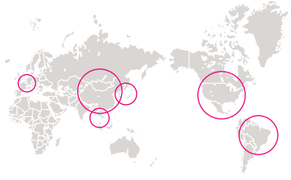
With a global network of over 150 corporations, including Patagonia and Quicksilver, the process is being used to **recycle everything from office wear, sportswear, bags, and uniforms**.

Why a Sustainia100 solution?

Teijin reports that 78 million tons of the most common fibers are produced annually, a figure that has increased fivefold in the last decade. Polyester accounts for 80% of the 45 million tons of synthetic fibers produced.[1] This volume is associated with high levels of CO2 emissions during production and disposal. By means of 100% recycling, lower levels of fuel consumption, energy use, and CO2 output can be achieved.

Developed: Japan

Deployed: 10 countries, including Mexico, Thailand, and Singapore.



[1] Teijin. "Evolutionary Step in Recycling." Online: www.teijin.com/solutions/ecocircle/

Leasing Jeans for a Circular Fashion Industry

Solution by: **Mud Jeans**

→ Mud Jeans promotes usage over ownership, facilitating the transition to a circular economy in the fashion industry by leasing jeans and recycling or upcycling materials.

The Triple Bottom Line

ENVIRONMENTAL

As a pair of jeans requires up to 11,000 liters of water,[1] the company reports significant savings due to its recycling of all materials.

SOCIAL

Partnerships with the Max Havelaar Foundation and BSCI ensure that production respects workers' well-being.

ECONOMIC

Raw material prices will likely rise tremendously in coming years, adding to producers' incentive to preserve ownership of materials.

By **retaining ownership of the raw materials**, Mud Jeans makes the process of recycling a given. After a year of leasing a pair of jeans or a hoody, customers have the option of keeping it, switching it for a new model, or sending it back for reuse or recycling.

Once recovered, Mud Jeans **sells the used clothing as vintage or recycles them into new products**. The manufacturing process itself is socially responsible, respecting workers' rights. The ultimate aim is to demonstrate that even the traditional clothing industry can make the transformation to a **circular economy**.

Why a Sustainia100 solution?

Jeans are very water-intensive to produce with up to 11,000 liters required for just one pair. According to Mud Jeans, 135 million kilos of cotton are thrown out as waste and burned annually in the Netherlands alone. This company's process creates clothing with far less water and without the use of substances that are harmful to the environment and people.

Developed: The Netherlands

Deployed: The Netherlands, and Germany

"WE WANT TO MAKE GOOD QUALITY, ETHICAL JEANS AVAILABLE TO MORE PEOPLE."

Bert van Son, CEO, Mud Jeans

[1] WWF. "The Hidden Cost of Water." Online: www.wwf.org.uk

Turning Food Waste into Exotic Leather

Solution by: **Atlantic Leather**

→ Atlantic Leather puts the fish skin waste produced by the food industry to use in fashion, using only renewable energy in the process.

This solution demonstrates that demand for the exotic and stylish can be met without compromising biodiversity. None of the fish used to make this leather are farmed for their hides. Instead, the skins used are **byproducts of food processing**. This also means that the leather does not negatively impact ocean biodiversity.

Further minimizing its impact, Atlantic Leather **takes advantage of local resources**. The environmental harm associated with transportation is limited by sourcing the majority of raw materials from the local fishery industry. It also makes use of the **abundant geothermal energy** available in the area to power the process.

Why a Sustainia100 solution?

Snakes, alligators, crocodiles, and other reptiles are sought after for their hides, putting pressure on endangered species and biodiversity.[1] Although the use of cold-blooded species requires a different process compared to traditional warm-blooded ones, this solution has managed to reach the market for belts, handbags, accessories, and other apparel items. Finally, the European Chemicals Agency found that the leather performs well in terms of reducing harmful chemical content to below regulation standards.[2]

The Triple Bottom Line

ENVIRONMENTAL

This solution caters to the demand in exotic skins without threatening endangered species and ecosystems.

SOCIAL

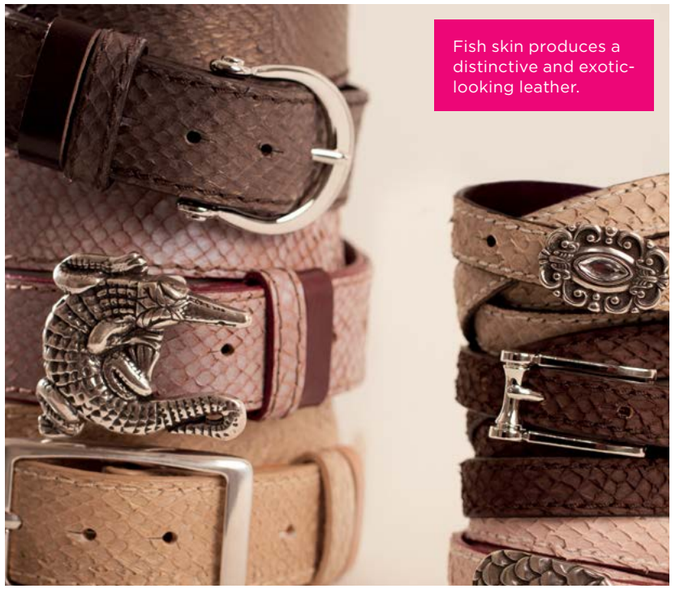
Atlantic Leather contributes to the reconciliation between the fashionably exotic and sustainability.

ECONOMIC

Atlantic Leather's upcycling process results in value being generated from waste.

Developed: Iceland

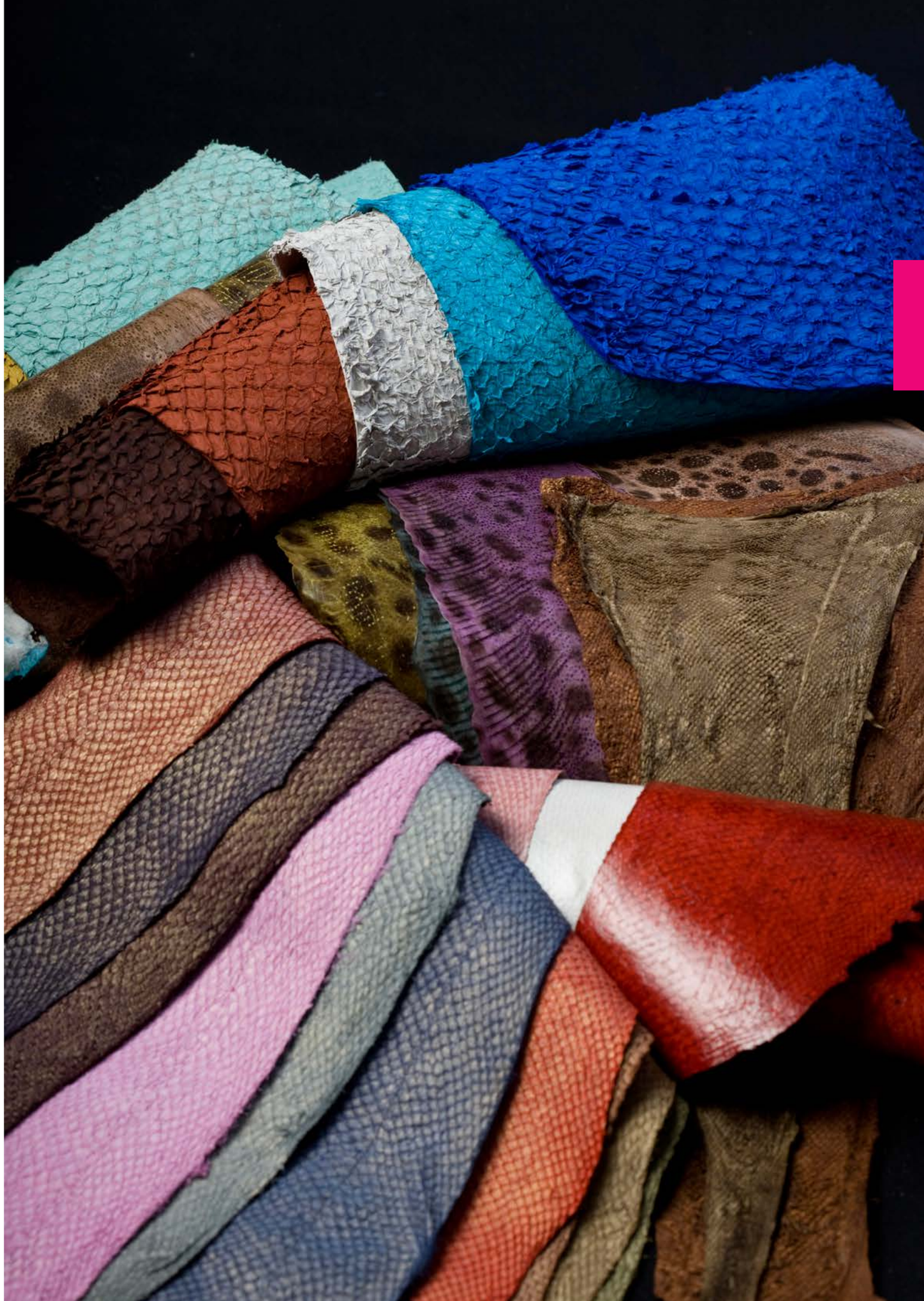
Deployed: Sold globally, with main buyers in Europe and USA



Fish skin produces a distinctive and exotic-looking leather.

[1] PETA. 'Exotic Skins: The Animals.' Online.

[2] The Sustainable Angle. 'Future Fabrics Virtual Expo.' Online.



Transparency and Real-Time Data for Buyers

Solution by: **Good World Solutions**

→ Labor Link leverages the power of mobile phones to give a voice to the global workforce and deliver real-time data to apparel companies, aligning sourcing practices with worker rights.

Labor Link gives textile industry workers a **free and anonymous channel** – their own mobile phones – to report on working conditions and needs in real time. Workers answer short, multiple-choice surveys and receive **educational messages about their rights and local services**. The voice-based system does not require literacy and operates in any language.

Surveys cover every aspect of working conditions and sustainability. For example, the system enables workers to report directly on **environmental conditions in their workplace**, including use of toxic chemicals, water, energy, and waste production. Real-time data has been used to educate and enhance worker-management communication.

Why a Sustainia100 solution?

The lack of transparency in the fashion industry has become an increasingly pressing issue, aggravating social and ecological problems. Labor Link has already given voice to over 80,000 workers and artisans in 10 countries, aiming to reach 1 million in the next five years. Furthermore, Labor Link is cited as a model for a new type of mobile-enabled worker engagement.[1]

The Triple Bottom Line

ENVIRONMENTAL

Transparency is a powerful weapon against pollution and other forms of environmental damage in the supply chain.

SOCIAL

Labor Link reports that its data has helped address sexual harassment, workers being denied legally mandated health benefits, and child labor violations.

ECONOMIC

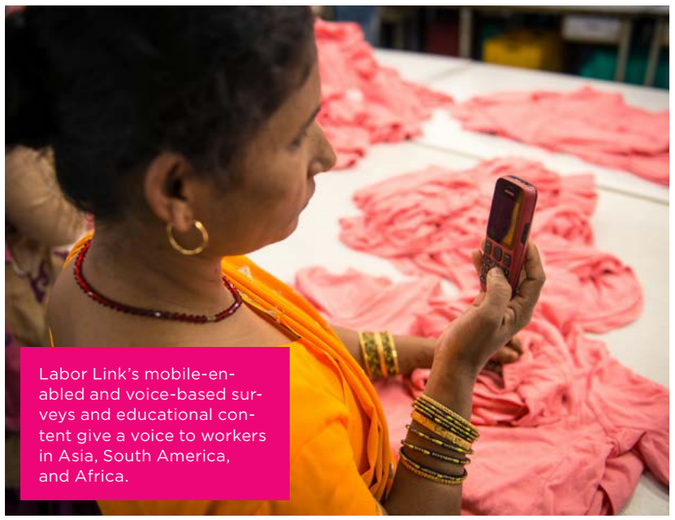
Vodafone estimates that by 2020 Labor Link has the potential to benefit 18 million workers globally.

Developed: USA

Deployed: 10 countries, including Bangladesh, Peru, and Uganda

"OUR VISION IS THAT ONE DAY ANY WORKER GLOBALLY CAN ANONYMOUSLY REPORT ON THEIR ENVIRONMENT AND WORKING CONDITIONS."

Heather Franzese, Executive Director, Good World Solutions



Labor Link's mobile-enabled and voice-based surveys and educational content give a voice to workers in Asia, South America, and Africa.

[1] Vodafone Group Plc. "Connected Worker: How mobile technology can improve working life in emerging economies." Report. April 2013.

Water Recycling in Denim Production

Solution by: **Levi Strauss & Co.**

→ In collaboration with suppliers, Levi's water recycling system has saved millions of liters by reducing the amount of fresh water used in the finishing process.

As part of the company's water conservation efforts, including its "Water<Less" collection which has saved some 770 million liters, Levi's has started **collaborating with its suppliers to implement wastewater recycling strategies**. The new system, which has already achieved 12 million liters of savings, allows water to be recycled repeatedly.

In order to facilitate participation, it has also produced new industry standards for its partner factories operating globally, geared towards **the reuse of effluent water during finishing**. Following the success of this program at a key partnering Chinese factory, others in Nicaragua and South Asia are due to follow suit by retrofitting existing facilities.

Why a Sustainia100 solution?

The denim finishing process is a water-intensive one, with an average pair of jeans consuming 42 liters.[1] This solution aims to lessen the impact of this process, having already produced 100,000 pairs of jeans using recycled water, and is making efforts to scale adoption industry-wide.

The Triple Bottom Line

ENVIRONMENTAL

This method of water recycling has already led to some 12 million liters of water savings, according to Levi's.

SOCIAL

Water scarcity is a global concern with significant social and political implications, particularly in regions producing clothing for the fashion industry.

ECONOMIC

According to Levi's, water recycling significantly reduces costs for the manufacturer.

Developed: USA

Deployed: China

[1] UNFCCC. 'Private Sector Initiative actions on adaptation: Levi's Water<Less'. Online: www.unfccc.int

Used Clothing as a Currency for Development

Solution by: **GOONJ**

→ This solution turns the textile waste generated by affluent urban households into a resource with which to finance sustainable development activities in rural India.

Operating in over 20 Indian states by means of a robust and far-reaching network of partner organizations and volunteers, GOONJ collects, processes, and redistributes used shoes and clothing. As a result, this solution has built **a parallel currency in the search for alternative resources for development**.

Once collected, clothes are either upcycled, transported to areas struck by natural and man-made disasters, turned into sanitary pads, or donated through a "cloth-for-work" program. Communities work together to, for example, repair roads and schools, clean ponds, or construct bridges in exchange for clothing. In the last three years, GOONJ has overseen **more than 1,500 development activities through this model**.

The Triple Bottom Line

ENVIRONMENTAL

According to GOONJ, it diverts over 1,000 tons of textile waste from landfill annually, often serving as funding for work involving water conservation, agriculture, and similar issues.

SOCIAL

While supplying the basic human right of clothing to underserved individuals, the solution also orchestrates valuable projects and fosters cooperation within communities.

ECONOMIC

GOONJ has built an economic bridge between urban and rural areas by generating value from textile waste..

Developed: India

Deployed: India

"CLOTHING IS A SYNONYM OF DIGNITY."

Anshu Gupta, Founder, GOONJ

Why a Sustainia100 solution?

Despite its importance as a basic human right, clothing is not prioritized in the global development agenda. By treating discarded textiles as a valuable resource for development, GOONJ diverts a significant volume of waste from landfills while improving quality of life for those impacted. To further scale, it has also made its model open for replication in organizations anywhere.

School bags made from upcycled jeans for students in low-income communities.

Recycled Plastic Bottles Reinvent Sustainable Fashion

Solution by: **Bionic Yarn**

→ Using recycled plastic bottles, this solution creates adaptable and high-performance fabrics that are being integrated seamlessly with fashionable designs.

Efforts to scale sustainable textiles in fashion are often foiled by their common association with the niche or alternative. Bionic Yarn, through its **partnerships with global brands** like Timberland, Moncler, and Burton, has been making significant strides in altering this perception.

With **a 40% to 45% recycled plastic content**, Bionic Yarn also offers up to 400% more strength along with greater abrasion resistance than conventional alternatives, widening its applications considerably.

In a more recent development, **plastic debris collected from the oceans** by marine organizations and recycling companies will be specifically utilized in the creation of Bionic Yarn, as part of The Vortex Project initiative.

The Triple Bottom Line

ENVIRONMENTAL

According to the company, it managed to recycle 2 million plastic bottles in 2012 alone.

SOCIAL

The solution brings sustainable fashion to a far greater audience, while working to reduce plastic pollution that threatens biodiversity and food chains.

ECONOMIC

Bionic Yarn generates economic value from waste products that would have otherwise polluted our oceans for years to come.

Developed: USA

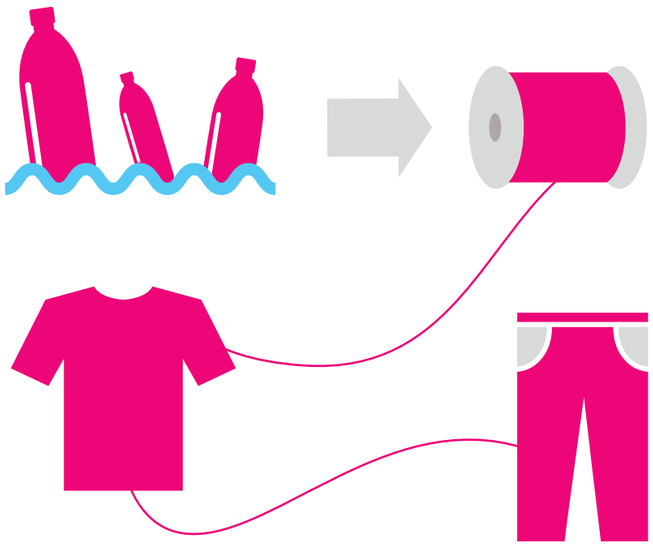
Deployed: USA

"WHEN SOMEONE TELLS YOU SOMETHING IS SUSTAINABLE, YOU THINK IT'S GONNA FEEL LIKE CARDBOARD, AND THE ONLY WAY TO DISPEL THAT IS TO EXPRESS THE COOL."

Pharrell Williams, Creative Director, Bionic Yarn

Why a Sustainia100 solution?

According to The Vortex Project, around 18 million kilos of plastic has accumulated in the North Pacific Ocean alone.[1] The benefits of targeting this problem through the fashion industry, uniting economic success with debris collection, are wide-ranging. The appeal of the designs, along with the reach of brands involved, simultaneously serves to expand scalability.



[1] The Vortex Project. "Facing Ocean Plastic Pollution." Online: www.parley.tv/thevortexproject/#vortex5

Pearl Farms Fostering Marine Conservation and Social Enterprise

Solution by: **Sustainable Pearls**

The Triple Bottom Line

ENVIRONMENTAL

This solution helps pearl farmers develop ecologically sound techniques to farm their pearl oysters, increasing the abundance of reef fish and acting as marine protected areas.

SOCIAL

Pearl farming offers unique development opportunities for remote coastal communities.

ECONOMIC

Pearls are a viable economic activity in vulnerable Pacific environments, and sustainable pearls are not significantly more expensive than regular pearls for consumers.

Developed:
9 countries, including Australia and USA.

Deployed: 7 countries, including Fiji, French Polynesia, and Indonesia

“A THRIVING ENVIRONMENT WILL PRODUCE FINER PEARLS, INEXTRICABLY LINKING ENVIRONMENTAL STEWARDSHIP AND ECONOMIC PROFITABILITY.”

Laurent Cartier,
Co-founder, Sustainable Pearls

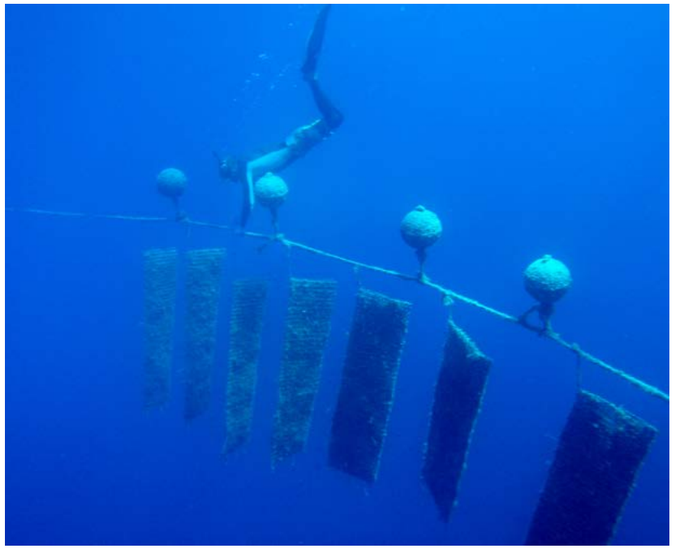
→ This solution brings traceable, sustainable marine pearls to the jewellery market while directly fostering marine conservation and social enterprise throughout the Pacific.

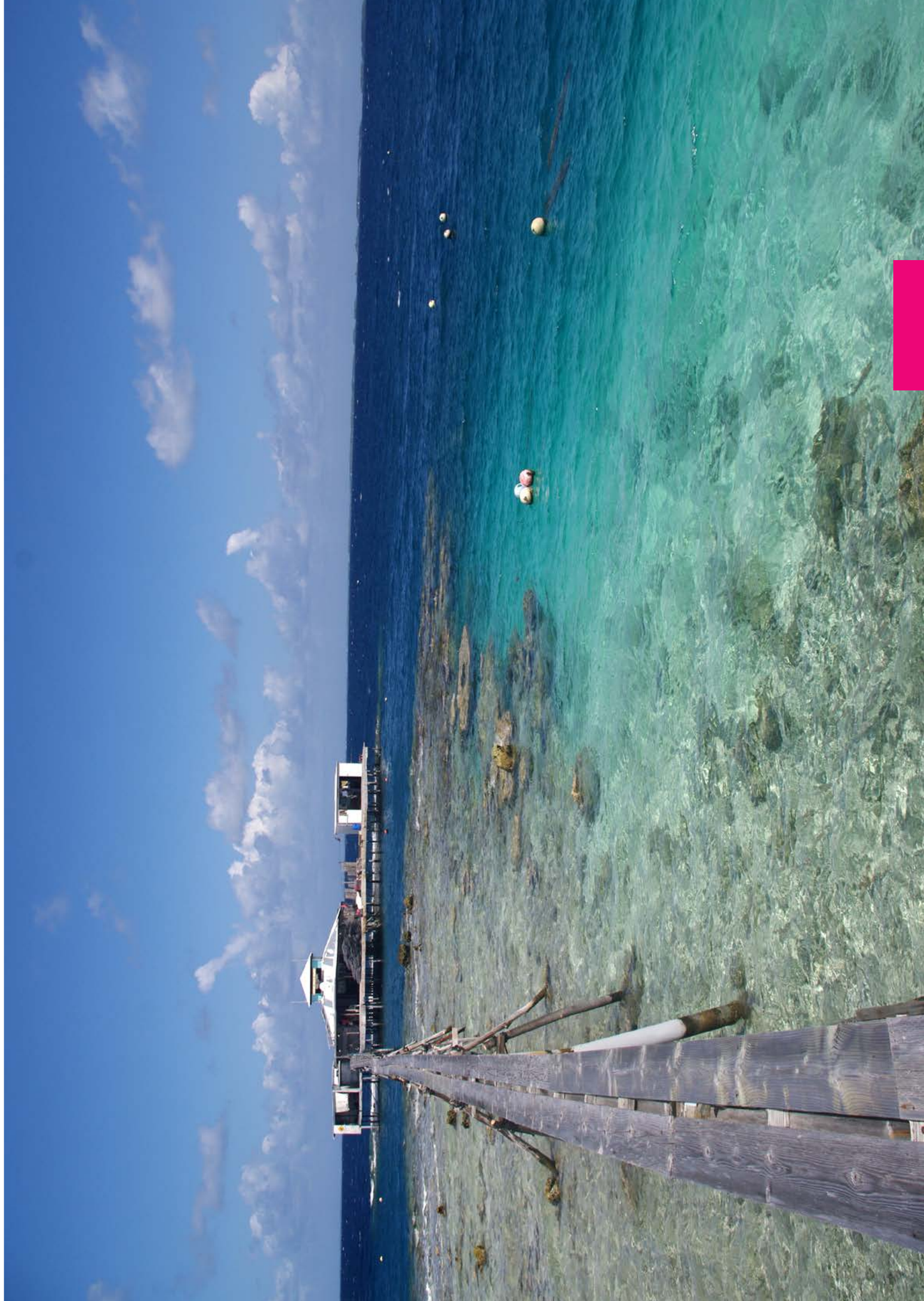
Producing beautiful marine cultured pearls **requires exceptional environmental conditions**. This solution is working to bring traceable, sustainable pearls to the market. As a result, marine conservation and social enterprise in the Pacific can be directly supported and funded through active consumption of marine cultured pearls from selected farms, which are introduced to **more sustainable techniques that can actually increase the abundance of reef fish**.

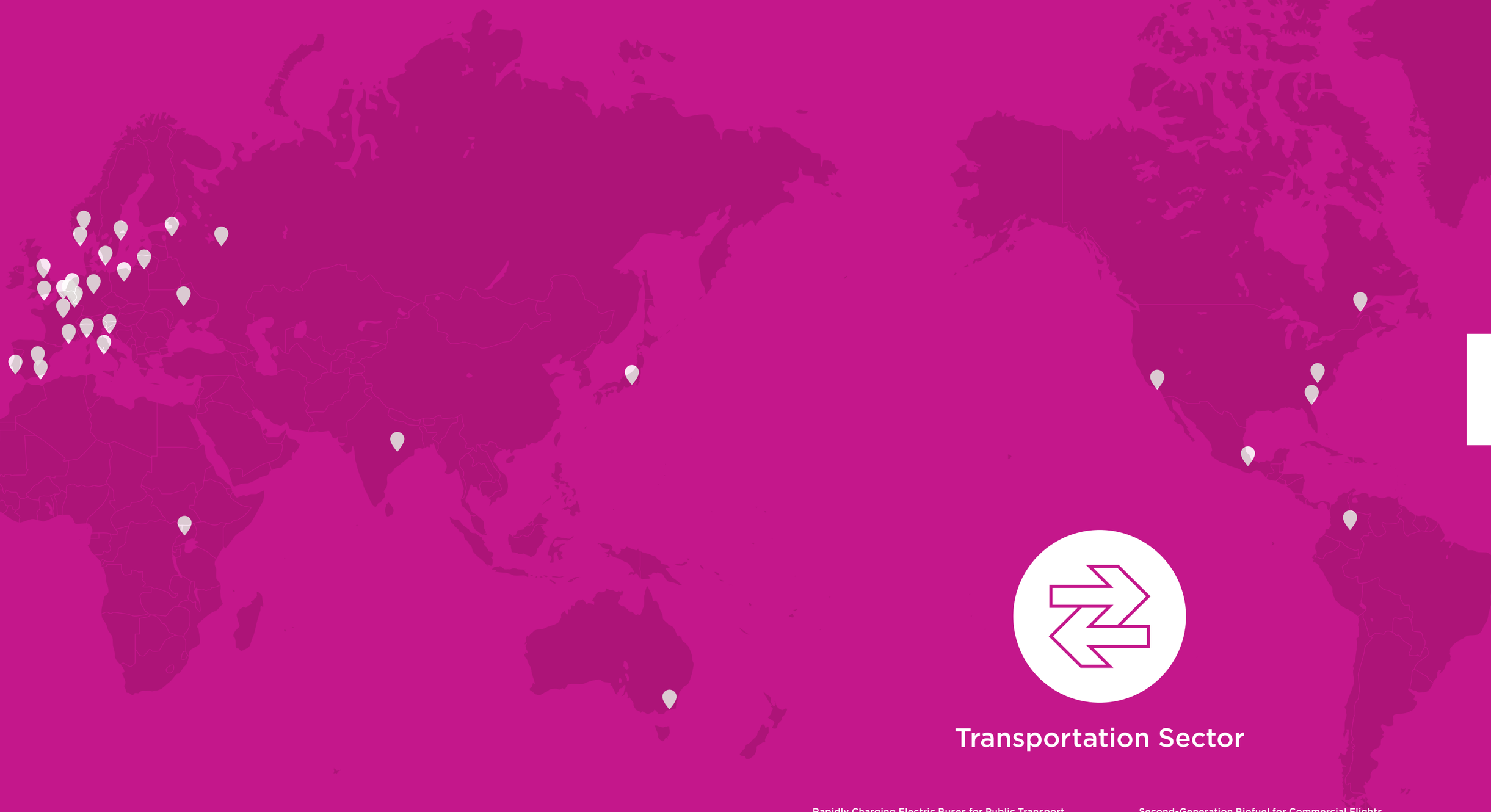
By connecting pearl producers with consumers using a dedicated platform, pearl farmers in the Pacific can capture more value for their pearl products. Sustainable pearls are not significantly more expensive than regular pearls, creating **real potential to change the pearl market**.

Why a Sustainia100 solution?

In marine pearls two goals – environmental and economic – are inherently merged. It is possible to create added value for pearl farmers, increasing ecological and socio-economic benefits through a market-based approach. This model can be feasibly scaled up and invested in, as it is already partnering with some of the world’s major pearl producers.







Transportation Sector

Rapidly Charging Electric Buses for Public Transport
Proterra

Bike-Sharing App Connects Users Worldwide
8D Technologies

Refrigerated Shipping Cuts Energy Consumption
Maersk Container Industry

Ridesharing for People-Powered Transportation
BlaBlaCar

IT System for Fuel-Efficient Railways
Transrail Sweden and Trafikverket

Second-Generation Biofuel for Commercial Flights
LATAM Airlines Group and Honeywell

Large-Scale EV Charging with Real-Time Availability
ChargePoint

Less Congestion with Bus Rapid Transit System
Bhopal Municipal Corporation

Electric Taxiing System for Planes
Honeywell and Safran

Bicycling for Better Health in Low-Income Communities
FABIO

Solutions deployed

Rapidly Charging Electric Buses for Public Transport

Solution by: **Proterra**

→ With fast-charging technology, the EcoRide bus can stay on the road longer than other electric buses while offering safe and energy-efficient transit.

Proterra's EcoRide bus is the first full-size, zero-emissions electric vehicle (EV) transit bus in revenue service in the United States. The bus features a **fast-charge system** that keeps it on the road with no overnight charging requirements. With on-route fast-charging, the bus can **charge in as few as 5 minutes**, keeping it in passenger service for as long as required. Proterra states that the bus can cover 480+ kilometers per day.

The composite body of the bus provides **a 20% to 40% weight reduction without jeopardizing safety**. The body of the bus is stronger and more resistant to crashes, leading to a 40% longer lifespan, according to Proterra.

The Triple Bottom Line

ENVIRONMENTAL

EcoRide buses are helping cities across the United States reduce their carbon footprints.

SOCIAL

Electric buses operate without the noise and smoke of normal transit buses.

ECONOMIC

The EcoRide bus promises $750,000 in fuel savings, and $130,000 in maintenance savings, compared to a diesel-powered bus over a 16-year life-cycle.

Developed: USA

Deployed: USA

Why a Sustainia100 solution?

By offering a quiet, fuel-efficient, and environmentally friendly bus to the market today, Proterra has helped cities across the United States reduce their carbon footprints and improve the quality of life for residents. Proterra has recorded that the EcoRide bus has a fuel economy per kilometer (when translated into conventional fuels) that is nearly six times that of a diesel bus.

"PROTERRA HAS DEMONSTRATED THAT EV BUSSES NOT ONLY WORK, BUT OFFERS THE LOWEST TOTAL COST OF OWNERSHIP AND MOST ENVIRONMENTALLY FRIENDLY OPTION FOR COMMUNITIES SMART ENOUGH TO EMBRACE IT."

Garrett Mikita, President and CEO, Proterra

Proterra's EcoRide bus helps cities decrease their carbon footprints, save money, and improve the quality of life of their citizens.

Bike-Sharing App Connects Users Worldwide

Solution by: **8D Technologies**

→ Spotcycle is a free bike-share app that locates nearby bike stations for availability, maps out bike paths, and helps users navigate in cities.

Spotcycle has developed **a smartphone application** that assists bike-share users in getting the most out of their experience by locating bike stations, mapping out routes and displaying biking directions.

Spotcycle's scalability, adaptability, and comprehensive **support of worldwide bike-share schemes** helps cyclists take advantage of a sustainable and ecologically sound solution for urban transportation.

With Spotcycle, every city does not have to invent its own bike-sharing technology. Spotcycle is already available in cities in North America, Australia, and Europe.

The Triple Bottom Line

ENVIRONMENTAL

Spotcycle supports bike-share systems worldwide, enabling users to reduce greenhouse gas emissions globally.

SOCIAL

In facilitating the use of bike-share systems, Spotcycle fights obesity and other negative effects of sedentary lifestyles.

ECONOMIC

8D states that Paris' bike-share system resulted in 5% less vehicle traffic, translating into infrastructural savings for the city.

Developed: Canada

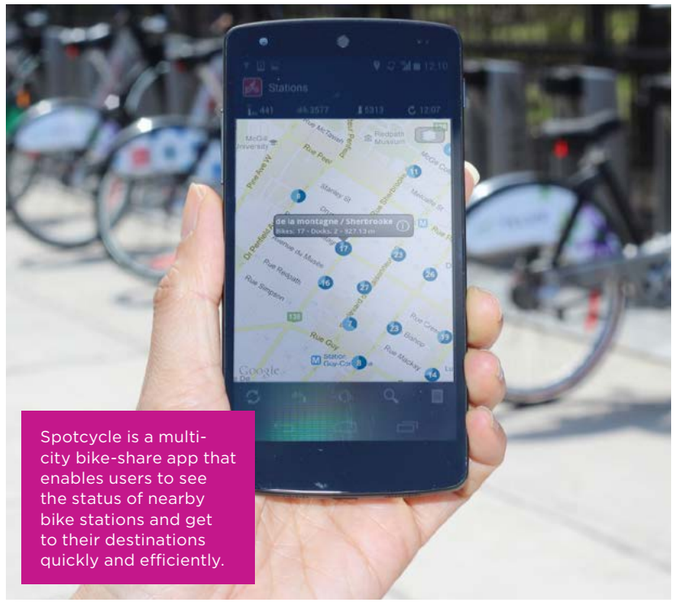
Deployed: 16 countries in North America, Australia, and Europe

"SPOTCYCLE MAXIMIZE BIKE-SHARE EXPERIENCES ALL OVER THE WORLD, WHILE SUPPORTING A HEALTHY AND LOW-CARBON TRANSPORT SYSTEM."

Isabelle Bettez,
President and CEO, 8D Technologies

Why a Sustainia100 solution?

Bike-share systems help take cars off the road while extending and complementing existing modes of public transportation. The success of bike-share schemes largely rests on making them easy to use. Spotcycle provides data to help facilitate commutes, which in turn encourages repeated use of bike-share systems. This makes Spotcycle a practical solution for reducing greenhouse gas emissions, gridlock, and smog in cities around the world.



Spotcycle is a multi-city bike-share app that enables users to see the status of nearby bike stations and get to their destinations quickly and efficiently.

Refrigerated Shipping Cuts Energy Consumption and Food Waste

Solution by: **Maersk Container Industry**

The Triple Bottom Line

ENVIRONMENTAL

Maersk states that the Star Cool technology has the lowest energy consumption on the market and is produced without the harmful HCFC greenhouse gas.

SOCIAL

This solution is especially suited for small-scale farmers, as the container can be placed directly on the field during harvest.

ECONOMIC

Independent tests have shown that Star Cool container is at least 20% more energy efficient than all other similar products on the market, according to Maersk Container Industry.

Developed: **Denmark, China, and Chile**

Deployed: Global

"FOOD SHOULD ALWAYS MOVE FROM FARM TO FORK, BUT TOO OFTEN IT DOESN'T. WE BELIEVE OUR TECHNOLOGIES CAN HELP IMPROVE THE FOOD LOGISTICS CHAIN."

Peter Nymand,
CEO, Maersk Container Industry

→ The Star Cool refrigeration technology makes it possible to transport food over longer distances using less energy.

Using a combination of technologies to control **temperature, humidity, air flow, and air composition**, this refrigeration technology for container shipping makes it possible to transport fruits and vegetables over much greater distances than previously possible. Goods can **be transported for up to 45 days before arriving in shops**.

Not only does this limit food waste, but it also opens up **new trade routes without using airfreight**. Its affordability means that small-scale farmers from Kenya can now export avocados to the European and Russian markets, while bananas from Ecuador can be exported to Azerbaijan.

Why a Sustainia100 solution?

Global food waste is worth an estimated $750 billion annually.[1] It is the cause of approximately four percent of global energy consumption and one-fifth of total fresh water consumption.[2] In the past 30 years, 95% of funding has gone towards pre-harvest efforts while less than five percent has gone towards post-harvest improvements.[3] The Star Cool refrigeration technology is addressing the need for post-harvest efforts in the global food supply chain.

Combining cooling and atmospheric control, fresh cargo is hibernated and can be transported for up to 45 days before starting shelf life.

[1,2] World Economic Forum. "Enabling Trade: From Farm to Fork." 2014.

[3] FAO Agriculture Services Bulletin. "The Role of Post-Harvest Management in Assuring the Quality and Safety Horticultural Crops." 2004.

Ridesharing for People-Powered Transportation

Solution by: **BlaBlaCar**

The Triple Bottom Line

ENVIRONMENTAL

The BlaBlaCar community has avoided solo car use amounting to an estimated 700,000 tons of CO2 savings to date.

SOCIAL

The BlaBlaCar community's average car occupancy is 2.8 compared to an average of 1.7 in Europe, significantly reducing congestion and infrastructure strain.

ECONOMIC

An estimated $364 million has been saved by BlaBlaCar drivers in total.

Developed: **France**

Deployed: 12 countries in Europe

"RIDESHARING REDUCES THE NEED FOR CAR OWNERSHIP IN THE POPULATION AND MAKES IT LESS BURDENSOME AND GREENER FOR THOSE WHO CAN'T LIVE WITHOUT A CAR. THAT'S THE POWER OF SHARING."

Frédéric Mazzella, CEO, BlaBlaCar

→ The world's largest ridesharing community, BlaBlaCar, connects drivers with people who need to travel so they can share the journey and the cost.

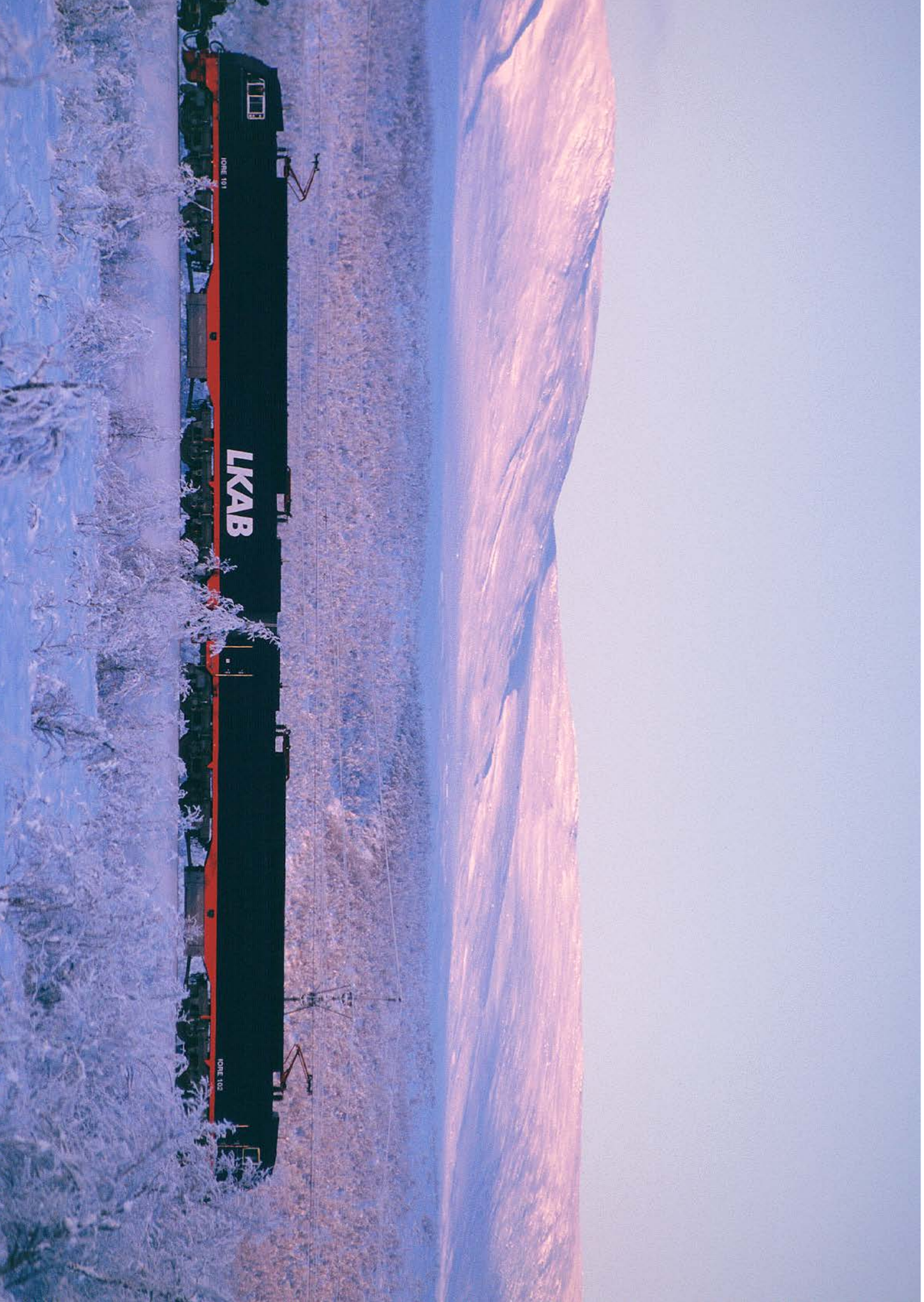
The BlaBlaCar website and mobile app allows drivers to publish a planned journey. Just like other travel sites, people can then search and book their journey. With over **7 million members in 12 countries across Europe**, and a community doubling in size yearly, BlaBlaCar is scaling fast. It is financially viable with a proven commission model and is having a positive social and environmental impact by reducing dependency on single-occupancy vehicles and ownership.

BlaBlaCar provides a range of features to create a **trust-based community**, for example, a 24/7 member relations team, verified contact details, and community ratings.

Why a Sustainia100 solution?

By enabling over one million people a month to share long journeys, and with over three billion kilometers shared by members to date, BlaBlaCar is increasing the efficiency of road transport and creating an affordable and social transport network. This helps utilizing a valuable but often wasted asset: the empty seats in our cars.

BlaBlaCar is the world's largest ridesharing community. In part this is thanks to its strong emphasis on trust, resulting in 96% positive ratings.



Transportation

IT System for Fuel-Efficient Railways

Solution by: **Transrail Sweden and Trafikverket**

→ The CATO IT system makes use of advanced algorithms to manage railway traffic and to operate trains as efficiently as possible.

CATO (Computer-Aided Train Operation) is an advanced IT system that **assists dispatchers in planning and managing train traffic**, informing drivers on the current plans, and advising them on the **driving profile with the highest possible energy savings**.

With the CATO system, trains can run on a "green wave" with significantly reduced fuel consumption increased **punctuality and higher infrastructure capacity**. CATO has already been successively deployed in heavy-haul iron ore transports and the high-speed airport shuttle in Stockholm.

Why a Sustainia100 solution?

Railways are an environmentally friendly mode of transport, but their energy consumption for train operations is still substantial. The CATO system brings savings on the order of 10% to 25% with low implementation costs and a payback time of less than one year for most routes. The CATO system also improves quality of life for passengers by increasing traffic capacity and punctuality. The CATO algorithms can easily be implemented in any rail application around the world.

The Triple Bottom Line

ENVIRONMENTAL

Globally the CATO system can reduce rail energy consumption by more than 250 TWh per year, according to Transrail Sweden.

SOCIAL

The CATO system reduces noise and local particle pollution due to better use of mechanical brakes.

ECONOMIC

Transrail Sweden states that the CATO system provides energy savings for railway operations of up to 25%.

Developed: **Sweden**

Deployed: **Sweden and Norway**

"WE ARE PROUD TO OFFER CATO TO THE GLOBAL RAILWAY MARKET."

Per Leander, CEO, Transrail Sweden AB

Second-Generation Biofuel for Commercial Flights

Solution by: **LATAM Airlines Group and Honeywell**

→ Colombia is the latest country to host a commercial flight using second-generation biofuel made from natural oils mixed with conventional jet fuel.

In Colombia, a commercial Airbus A320 has flown between Bogota and Santiago de Cali fueled by a 30/70 blend of Honeywell's Green Jet Fuel and conventional jet kerosene. The renewable fuel is made with **natural oils derived from camelina, an inedible plant** that grows in conditions where food crops cannot flourish.

Each gallon of the camelina-based biofuel burned instead of petroleum **reduces CO2 emissions by 68%**, according to Honeywell. For airline companies, the use of biofuels **diminishes exposure to market risks** associated with the volatility of oil prices and improves engine performance.

Why a Sustainia100 solution?

Aviation is responsible for 12% of CO2 emissions from all transportation sources.[1] This solution contributes to the development of a climate-friendly biofuel industry through a multi-stakeholder engagement approach that aims to achieve a competitive price for biofuels. With second-generation biofuels, competition with the production of crops destined for human consumption is resolved.

The Triple Bottom Line

ENVIRONMENTAL
Green Jet Fuel can offer a 65% to 85% reduction in greenhouse gas emissions, according to Honeywell.

SOCIAL
Using second-generation biofuels avoids competition with food crops for human food production.

ECONOMIC
Sustainable alternatives to jet fuel are less vulnerable to the volatility of oil prices.

Developed: **Colombia**

Deployed: Colombia

"WE AIM FOR THE DEVELOPMENT OF SUSTAINABLE BIOFUELS FOR COMMERCIAL AVIATION THAT HAVE HIGH PRODUCTION POTENTIAL IN THE REGION."

Ignacio Cueto,
CEO, LAN, LATAM Airlines Group

[1] The Air Transportation Action Group. "Facts and Figures." 2014. Online: www.atag.org

Large-Scale EV Charging with Real-Time Availability

Solution by: **ChargePoint**

→ ChargePoint is the world's largest network of electric vehicle (EV) charging stations with integrated smartphone technology, allowing customers to easily access updates on availability and directions.

ChargePoint has built the largest and most open EV charging network in the world with **over 16,500 available charging locations**. It provides a reliable, accessible, and easy-to-use EV charging network that all EVs can connect to, regardless of hardware. If charging stations are not yet available in a neighborhood, ChargePoint can **set up an EV charger based on a single request**.

The advanced network system lets drivers see station availability in real-time with turn-by-turn directions. The information can be accessed through a mobile app and the car's 3G network.

Why a Sustainia100 solution?

ChargePoint provides drivers with the ability to plug in regardless of where they live, work, shop, and play. Statistics show that a driver plugs into a ChargePoint station every nine seconds. So far ChargePoint drivers have saved over 15 million liters of gasoline and avoided more than 13,000 tons of CO2 emissions.

The Triple Bottom Line

ENVIRONMENTAL
ChargePoint users have driven over 160 million gas-free kilometers, avoiding 13,000 tons of CO2 emissions.

SOCIAL
One of the biggest obstacles to widespread EV adoption is the lack of charging locations.

ECONOMIC
By offering EV charging, companies can provide employees with the equivalent of a 5% raise through gas and time saved through the use of "High-Occupancy Vehicle" lanes in USA.

Developed: **USA**

Deployed: USA

"THE FUTURE DEMANDS A ROBUST CHARGING NETWORK ON EVERY CONTINENT, GIVING DRIVERS CONFIDENCE TO PURCHASE ELECTRIC VEHICLES."

Pasquale Romano,
CEO, ChargePoint

Less Congestion with Bus Rapid Transit System

Solution by: **Bhopal Municipal Corporation**

The Triple Bottom Line

ENVIRONMENTAL

After implementation of the BRTS the number of vehicles on the road has decreased, lowering the pollution and carbon emissions in Bhopal.

SOCIAL

The number of road accidents has decreased drastically since the introduction of the BRTS, according to Bhopal Municipal Corporation.

ECONOMIC

The BRTS is an economically sound approach to increasing the mobility of citizens in Bhopal, resulting in more people being able to afford to commute.

Developed: **India**

Deployed: India

→ With the introduction of a Bus Rapid Transit System, the city of Bhopal in India has managed to take cars off the road and reduce congestion and pollution in the city.

As the city of Bhopal, with its almost two million inhabitants, continues to grow, one of the biggest challenges it faces is traffic congestion. Implementation of a Bus Rapid Transit System (BRTS) project passing through the city's central business district has given **preferential treatment to buses** on urban roads and improved the transport infrastructure in the city.

The BRTS has encouraged more people to use **reliable public transportation**, decreased the number of road accidents by better organizing traffic, and decreased the levels of pollution from congestion.

Why a Sustainia100 solution?

The BRTS services have quickly become very popular amongst commuters in Bhopal due to reliability, punctuality, and cleanliness. Around 50,000 people are travelling in the BRTS corridor each day. One of the major benefits of the system is its contribution to lowering the amount of carbon emissions by reducing the usage of private motorized vehicles.

"WE ARE PROVIDING A BEST-IN-CLASS PUBLIC TRANSPORTATION SERVICE FOR THE BETTERMENT OF SOCIETY."

Mr. Chandramauli Shukla Addl, Commissioner, BMC and Chief Executive Officer, BCLL

Electric Taxiing System for Planes

Solution by: **Honeywell and Safran**

→ This solution offers an electric aircraft taxi system that reduces fuel consumption and slashes CO2 and other pollutants emitted when planes are on the ground.

Honeywell and Safran's EGTS taxiing system **equips the main wheels of aircrafts with an electric motor**. This allows planes to taxi autonomously from the gate to the runway and back without using the engines.

As well as saving fuel, the EGTS system **reduces NOX emissions by 47% in the airport environment**. Tests by Safran have found that utilizing the EGTS system on **one A320 aircraft yields CO2 savings equivalent to planting 835 trees**.

Why a Sustainia100 solution?

Reducing aviation-related fuel emissions is a concern for both local air quality and global climate change. Taxi operations represent four percent of short-haul airline fuel costs, according to Safran. Targeted specifically at single aisle aircrafts, the EGTS system can bring environmental benefits to both developed and developing nations, with economic benefits from the reduced fuel consumption.

The Triple Bottom Line

ENVIRONMENTAL

Installing the EGTS system on one aircraft reduces NOX emissions equivalent to eliminating 717 automobiles, according to Safran.

SOCIAL

By reducing emissions, the EGTS system will improve air quality in and around airports.

ECONOMIC

The EGTS system can save an airline up to 4% of fuel equating to savings of $250,000 to $400,000 per aircraft annually, according to Safran.

Developed:
USA, France, and UK

Deployed: Global

"EGTS IS A PRIME EXAMPLE OF THE SHARED COMMITMENT OF SAFRAN AND HONEYWELL TO MINIMIZE THE IMPACT OF AVIATION ON THE ENVIRONMENT."

Brian Wenig and Olivier Savin, Vice Presidents, EGTS Programme, EGTS International

The EGTS system enables planes to taxi without use of their main engines. This reduces fuel burn and slashes emissions of CO2 and other pollutants created during taxi operations.

Bicycling for Better Health in Low-Income Communities

Solution by: **FABIO**

→ FABIO builds capacity for using bicycles as ambulances in rural Uganda, increasing access to health care in marginalized communities.

FABIO distributes bicycle ambulances in poor Ugandan communities and **sets up local expertise to repair and use the ambulances properly**. FABIO's bicycle model increases access to health care by facilitating bicycle-related programs that make this **cheap, non-motorized form of transportation** more readily available to marginalized communities.

FABIO also **promotes the general use of bicycles** by setting up local repair shops and employing young people. By establishing bicycle rental programs for tourists, FABIO is both making a profit and broadening the profile of cycling.

Why a Sustainia100 solution?

Over 80% of people in Uganda cannot afford motorized transport, limiting mobilty in rural areas. This affects everyone from the farmer who cannot take large loads of crops to the market for sale to the family who cannot transport their sick mother to a hospital. A bicycle is one of the most affordable, effective and environmentally-friendly means of transport.

The Triple Bottom Line

ENVIRONMENTAL

The increased motorization in Ugandan urban areas has led to increased congestion and carbon emissions, which makes the bicycle a useful alternative.

SOCIAL

Bicycles promote good health through physical exercise and increase accessibility to public and social services.

ECONOMIC

The price of 200 bicycle ambulances equals the price of one car ambulance, according to the European Institute for Sustainable Transport.

Developed:
Uganda

Deployed: Uganda

"CYCLING IS THE INTELLIGENT SOLUTION FOR PEOPLE ALL OVER THE WORLD TO BE MOBILE IN A WAY THAT IS BOTH IN HARMONY WITH THE ENVIRONMENT AND LESS STRESSFUL."

Kayemba Patrick, Executive director, FABIO

IT Sector

Recyclable Computers Slash Use of Energy and Materials
MicroPro Computers

Software for Combatting Energy Inefficiency in Buildings
Retroficiency

Smart Water Leak Detection for Agriculture
PowWow Energy

The Ethical Smartphone
Fairphone

Automated e-Waste Recycling Kiosk
Outerwall

Wireless Surveillance for Crop Protection
Webstech

Mobile-Enabled Farmer Information on Food and Finance
Mercy Corps

Cloud Solutions Powered by Renewable Energy
GreenQloud

Life-Cycle Assessment Software for Designing Aircraft
Fraunhofer IBP

Sustainable Liquid IT Cooling
Iceotope

Solutions deployed

Recyclable Computers Slash Use of Energy and Materials

Solution by: **MicroPro Computers**

→ Computers pose a major environmental threat due to their intensive use of materials, short lifespans, and limited recycling options. Iameco computers are designed to reduce energy consumption, carbon emissions, and waste.

Iameco computers are manufactured using renewable and recycled materials such as wood and metals. The design allows for easy disassembly and upgrading, creating a lifetime of up to 10 years, according to the company. Iameco's V3 touch screen computer has **a carbon footprint that is 70% less than the average PC**. It is the first integrated desktop computer to secure the EU Eco Flower label.

The computers are produced using eco design principles at every stage of the life-cycle, with ease of system disassembly facilitating reuse and recycling of materials by means of a take-back system. This approach **extends the lifetime of the computer, minimizes production waste, and avoids the use of toxic substances**. The production of the computers is also transparent, with full information offered to consumers in an effort to achieve an integrated sustainable supply chain.

Why a Sustainia100 solution?

Iameco computers make sustainable consumption a reality by providing a high-quality, readily available computer at an affordable price, with a smaller environmental footprint than typical computers. This is achieved through eco design and a new business model based on ongoing local services.

The Triple Bottom Line

ENVIRONMENTAL

The computers have 45% lower electricity consumption and material savings of up to 50% due to the extended lifetime, according to MicroPro computers.

SOCIAL

Reducing the informal disposal of IT parts avoids social problems arising from uncontrolled e-waste.

ECONOMIC

The design makes iameco v3 more energy efficient than comparable devices at an affordable price.

Developed:
Ireland, Austria, and Germany

Deployed: Ireland, UK, France, Spain, Germany, and Austria

Software for Combatting Energy Inefficiency in Buildings

Solution by: **Retroficiency**

The Triple Bottom Line

ENVIRONMENTAL

Energy efficiency retrofits for buildings have the potential to yield as much as $1 trillion in energy savings over the coming decade, according to Retroficiency.

SOCIAL

The BEI platform dynamically re-engages customers as technologies, incentives, and building conditions evolve over time.

ECONOMIC

Energy efficiency is the cheapest energy resource available and helps reduce building operating costs.[2]

Developed: USA

Deployed: USA

→ Retroficiency has developed a virtual energy assessment model that provides a fast and cost-effective approach to turning energy savings potential into real projects.

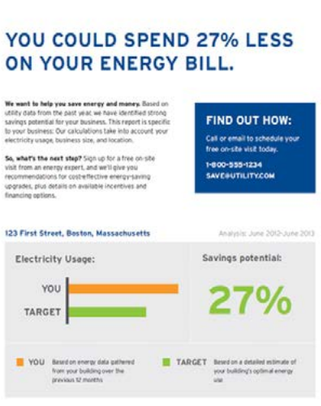
Retroficiency's Building Efficiency Intelligence (BEI) platform **combines sophisticated energy analytics and rapid building modelling** with data from thousands of previously conducted energy audits to deliver insights within minutes, driving savings across utility programs at minimized costs.

The BEI platform creates **an energy model of each building analyzed**. With these models, utilities and energy service providers can use data to rapidly and accurately evaluate and rank all buildings within a portfolio by total energy savings or end-use savings to target those with the highest savings potential. The platform then helps **convert energy assessments into real projects**.

Why a Sustainia100 solution?

Buildings consume over 40% of the world's available energy[1] and 30%–50% of that energy is routinely wasted, according to the company. Thus, buildings are a leading cause of harmful carbon emissions, which energy efficiency can help mitigate. Utilities and energy service providers in the United States use the BEI platform to scale building efficiency.

Retroficiency's platform ranks buildings by total energy savings or end-use savings to target those with the highest savings potential.



"BUILDINGS OFFER A HUGE OPPORTUNITY FOR ENERGY SAVINGS THAT HASN'T BEEN FULLY REALIZED."

Bennett Fisher, CEO and Co-Founder, Retroficiency

[1] World Business Council for Sustainable Development. "Energy Efficiency in Buildings - Transforming the Market". 2009.

[2] American Council for an Energy-Efficient Economy. "New Report Finds Energy Efficiency is America's Cheapest Energy Resource." 2014. Online.

Smart Water Leak Detection for Agriculture

Solution by: **PowWow Energy**

The Triple Bottom Line

ENVIRONMENTAL

PowWow Energy, a start-up, estimates that the first leak it detected in a pilot trial would have wasted about 12,000 gallons of water and 800 kWh of energy.

SOCIAL

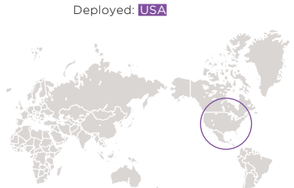
The solution provides farmers with access to their energy data anywhere and delivers an alarm whenever there is a leak.

ECONOMIC

Using the data from already installed smart meters makes investments in expensive water meters unnecessary.

Developed: USA

Deployed: USA



→ PowWow Energy helps farmers detect and prevent expensive and crop-damaging water leaks without installing sensors.

PowWow Energy **collects energy data from smart meters to detect water leaks**, which are common in drip and spray irrigation systems. Using sophisticated algorithms, the software detects electric signatures that are characteristic of a leak and **alerts the farmers and ranchers by sending them a text message**, helping them to instantly identify and fix the leak.

Eight percent of all energy use in California, USA, where the solution is currently deployed, is consumed by agriculture, and around 70% of this is energy is used for water pumping.[1] Using the pumps more effectively can help reduce energy consumption significantly. This solution helps farmers **save money on utility bills and reduce repair costs while avoiding crop losses**.

Why a Sustainia100 solution?

The solution helps to minimize unnecessary water loss in the agricultural sector, which accounts for about 70% of all water consumed globally.[2] Furthermore, it is a cheaper alternative to installing expensive water meters, as a smart electricity meter can deliver the information needed to detect and alleviate water losses.

[1] The California Agricultural Water Stewardship Initiative. "Water & Energy". Online.

[2] United Nations Food and Agriculture Organization. "Aquastat." Online.

The Ethical Smartphone

Solution by: **Fairphone**

→ Fairphone produces socially responsible mobile phones. They constantly strive to develop, design, and produce mobile devices that cause minimal harm to people and the planet.

Taking steps to create a fairer economy, the people behind Fairphone started by designing a phone **made from conflict-free minerals**, providing fair wages to workers and offering supply chain transparency.

But Fairphone is not only about the product. The social enterprise makes production systems transparent in order to address problems and interacts with suppliers to provide **sustainability throughout the supply chain**.

By establishing a market for ethical products, Fairphone wants to motivate the entire industry to act more responsibly and eventually create a fairer economy. Fairphone **sold all 25,000 of its initial production run** in November 2013 via pre-orders in Europe. A second production run is planned for 2014.

Why a Sustainia100 solution?

Driving sustainability through the supply chain – on a social and environmental level – is at the core of what Fairphone does as a social enterprise. The company aims for systemic change and a holistic approach to sustainability, focusing on the full lifespan of a smartphone – from responsible mining to reuse and recycling.

The Triple Bottom Line

ENVIRONMENTAL

Fairphone reserves $3 from every sold phone to set up new business models for safer e-waste recycling.

SOCIAL

Fairphone ensures that workers at production facilities earn fair wages, and that the minerals used are conflict-free.

ECONOMIC

The Fairphone costs $490, with each dollar accounted for in a cost breakdown. The transparent pricing helps to show the true value of a phone.

Developed:
The Netherlands, Portugal, and China

Deployed: 30 countries, including Estonia, Malta, and Poland

"THE POSSIBILITIES SMARTPHONES GIVE US TO SHARE INFORMATION, SOLVE PROBLEMS TOGETHER, AND CREATE SHARED VALUE CAN ACTUALLY BE A DRIVER TO MAKE PEOPLE RELATE TO THE GEOLOGY OF OUR DIGITAL SYSTEMS."

Bas van Abel, Founder and CEO, Fairphone

Automated e-Waste Recycling Kiosk

Solution by: **Outerwall**

→ EcoATM is the first automated e-waste recycling station that dispenses instant cash in exchange for old phones, tablets, and MP3 players.

EcoATM is a network of automated electronics recycling kiosks, currently deployed nationwide in the United States. Through simple steps, customers can **easily recycle their devices while putting a little cash in their pockets**. When a device is deposited into an EcoATM kiosk, it is scanned for type, serial number, and condition. The EcoATM will then **search for the highest price among a network of buyers**, and ask if you agree to sell your device. If so, money is exchanged on the spot after proof of identity is provided.

Live monitored cameras match sellers to their I.D. before cash is dispensed, and all transactions and personal information are **reported daily to local police to help identify possible theft**.

Why a Sustainia100 solution?

Through nationwide deployment in the United States, mainly in shopping malls, EcoATM provides an easily accessible recycling solution where people get paid instantly for recycling their goods. EcoATM makes sure that the phones are reused and recycled, keeping tons of potentially toxic waste out of landfills. EcoATM has found a second life for 75% of the more than 2 million collected devices, and has recycled the rest.

The Triple Bottom Line

ENVIRONMENTAL

EcoATM has kept 31,800 kilograms of copper out of landfills – enough to create a second Statue of Liberty.

SOCIAL

The 900 recycling kiosks around the United States make recycling old phones, MP3 players, and tablets easily accessible where people do their shopping.

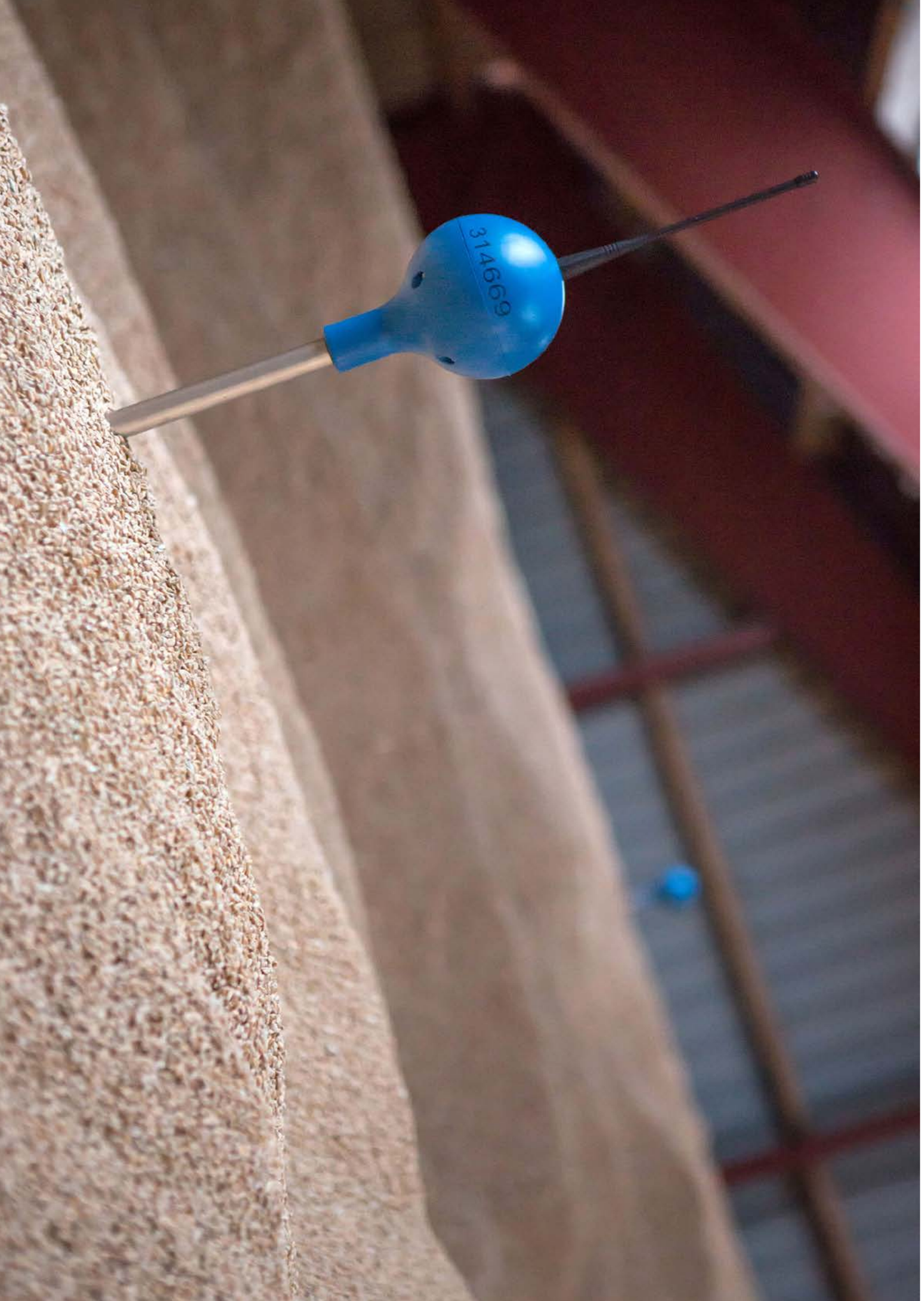
ECONOMIC

EcoATM automatically locates the buyer willing to pay the highest price for the recycled device.

Developed:
USA

Deployed: USA

EcoATM takes the hassle out of recycling electronics by instantly exchanging cash for used devices.



Wireless Surveillance for Crop Protection

Solution by: **Webstech**

→ Webstech's simple, smart, and robust technology monitors temperature and relative humidity in biomass, alerting farmers when food is at risk.

Webstech's technology is **minimizing food losses** through wireless surveillance of crops, measuring temperature and relative humidity. The technology provides infomation that reduces loss of crops, improving food and feed quality while increasing profits for farmers.

The system works via **intelligent sensors installed in the stored food** and a base station. If the temperature gets too high in a stock, the farmer will be **alerted via email or SMS**, preventing a larger food loss. Webstech helps farmers to look after their assets, whether it is stored corn, grass on a golf course, or stored potatoes.

Why a Sustainia100 solution?

According to the World Resources Institute, 24% of global food loss and waste occurs during handling and storage. Webstech has developed a well-proven technology for farmers to keep an eye on their assets after they have been put into storage. The solution is a minor investment compared to a single loss in a grain stock while looking after valuable food stocks.

The Triple Bottom Line

ENVIRONMENTAL

The technology can help farmers save up to 40% of energy costs associated with drying, according to Webstech.

SOCIAL

With 24% of all food loss occurring during handling and storage,[1] this solution has the potential to address future global food shortages.

ECONOMIC

Webstech's customers report that the solution costs only a fraction of the potential costs of lost food stocks.

Developed: **Denmark**

Deployed: 10 countries, including Poland, Canada, and South Africa

"WEBSTECH IS ALL ABOUT KNOWLEDGE, DATA, AND INFORMATION."

Sten Andersen, CEO, Webstech

[1] World Resources Institute. "Reducing Food Loss and Waste" Working Paper. 2013.

Webstech provides wireless data from the grain stock. The system monitors the grain and sends alarms and information to the farmer via PC, tablet, or cell phone.

Mobile-Enabled Farmer Information on Food and Finance

Solution by: **Mercy Corps**

The Triple Bottom Line

ENVIRONMENTAL

Rice farmers in Indonesia have learned to make more efficient use of their land by participating in the Agri-Fin Mobile program.

SOCIAL

Participating farmers are able to ask questions as well as share their knowledge with the broader farming community.

ECONOMIC

Participating rice farmers in Indonesia have seen an increase in productivity of approximately 30% above normal production levels.

Developed:
Indonesia, Uganda, and Zimbabwe

Deployed: Indonesia, Uganda, and Zimbabwe

→ Mercy Corps' Agri-Fin Mobile program directly connects farmers to relevant agricultural information and financial services via their mobile phones.

Mercy Corps works with public and private partners to help **smallholder farmers harness mobile technology** to grow and earn more. The Agri-Fin Mobile program provides farmers access to information about crops and weather, so they can achieve the **highest yield with the lowest risk**.

Farmers can use their phones to send questions and communicate directly with experts, as well as receive daily agricultural tips, buy supplies remotely, and access real-time market prices so they are well-positioned to secure fair deals. After the harvest, farmers can use their phones as **a safe, convenient way to receive payments and save money**.

Why a Sustainia100 solution?

Mercy Corps is leveraging the power and convenience of mobile phones to help smallholder farmers boost their harvests and incomes for the second year running. The increased production will also help to address the increasing demand of food globally. The aim is to increase the incomes of 180,000 farmers in Indonesia, Uganda, and Zimbabwe by 30% by 2015, and then expand to five additional countries.

"OUR AIM IS TO GIVE SMALL-SCALE, LOW-INCOME FARMERS ACCESS TO THE FINANCIAL SERVICES AND AGRICULTURAL EXPERTISE THAT HAVE TRADITIONALLY BEEN BEYOND THEIR REACH, USING SIMPLE AND AFFORDABLE TECHNOLOGY."

Sean Granville-Ross,
Country Director, Uganda Mercy Corps

Agri-Fin Mobile enables farmers to access need-to-know info on market prices, weather, and crop cycles, as well as connect to mobile financial services.

Cloud Solutions Powered by Renewable Energy

Solution by: **GreenQloud**

The Triple Bottom Line

ENVIRONMENTAL

CO2 emissions from the IT industry are growing. GreenQloud is battling this rise with renewable energy cloud solutions.

SOCIAL

GreenQloud's live energy usage and carbon savings metrics can be incorporated into a company's sustainability strategy or CSR program.

ECONOMIC

Powering GreenQloud on renewable energy in cool climates cuts costs because cooling servers can account for 30% to 40% of data center costs.

Developed:
Iceland

Deployed: Global, mostly North America, Europe, and Brazil

→ GreenQloud offers a cost-effective, renewable energy powered cloud and data storage solution for private users and large companies.

GreenQloud is actively **reducing the CO2 footprint of the IT industry** by enabling it to power its services on clean energy. GreenQloud taps into the world's only 100% renewable electricity grid in Iceland as well as other regions where renewable energy is readily available, such as Seattle. Powering GreenQloud on renewable energy cuts costs for customers and enables businesses to **easily manage and monitor data** in the cloud without damaging the climate.

GreenQloud provides transparency about energy usage and reduction in CO2 emissions, **displaying live metrics on an online dashboard**. It has built sustainability into the core of its business, while providing a platform from which other companies can do the same.

Why a Sustainia100 solution?

GreenQloud eliminates barriers to cleaner cloud practices because there is no premium pricing for GreenQloud's renewable energy powered cloud service. The solution has a significant scalability potential with its service in Iceland fuelled by abundant clean energy.

"GREENQLOUD'S SERVICES ARE DESIGNED TO DECREASE COSTS, INCREASE EFFICIENCY, AND REDUCE THE CO2 FOOTPRINT OF DATA."

Jón Þorgrímur Stefansson, CEO of European Operations, GreenQloud

Life-Cycle Assessment Software for Designing Aircraft

Solution by: **Fraunhofer IBP**

The Triple Bottom Line

ENVIRONMENTAL

With more than 35,000 new aircraft being built by 2032, there is a need to substantially reduce environmental impacts through eco design of new aircraft fleets.[1]

SOCIAL

Reducing the impacts of air travel can make its benefits accessible to more people without substantially damaging the environment.

ECONOMIC

Environmentally improved air travel saves costs through reduced resource consumption and optimized processes.

Developed:
Germany

Deployed: France, Germany, Italy, UK, and Israel

"WITH ECO-DESIGN TOOLS, LIKE ENDAMI, FRAUNHOFER CONTRIBUTES TO A SOCIETY RICH IN PRODUCTS WHILE MINIMIZING ENVIRONMENTAL IMPACTS."

Prof. Reimund Neugebauer,
President, Fraunhofer-Gesellschaft

→ This eco design software tool, offers quick and detailed life-cycle analysis of complex aircraft by simple means.

ENDAMI supports aircraft developers with information about the environmental impacts of their design choices at any time throughout the entire design process. Tapping into readily available information at aircraft companies, the software can automatically create **environmental models of complex aircraft** using a database of 25 years of environmental research.

The **easy-to-use interface** and the high degree of automation guarantee a smooth integration of environmental considerations into existing structures. ENDAMI also ensures compliance with the latest European and international standards.

The software is ready to use and **has been tested on full-scale** by the major players of the European aviation industry – from producers of large passenger aircraft to business jets and helicopters, as well as material and component suppliers. Market entry is targeted for 2014.

Why a Sustainia100 solution?

ENDAMI addresses the environmental impacts of building new aircraft. Implementation will add virtually no costs to traditional design processes. The modular and flexible structure of ENDAMI is readily adaptable to other products and sectors.

ENDAMI helps to visualize the environmental improvements and trouble spots of particular design choices within seconds.

[1] Boeing: Current Market Outlook 2013-2032. www.boeing.com. 2013.

Sustainable Liquid IT Cooling

Solution by: **Iceotope**

The Triple Bottom Line

ENVIRONMENTAL

Widespread adoption of the Iceotope solution in the industry could ultimately prevent the release of millions of tons of CO2 into the atmosphere.

SOCIAL

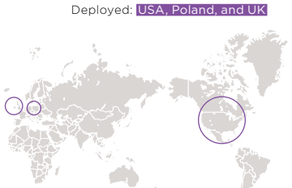
Icotope's cooling technology can be applied anywhere in the world, regardless of humidity and temperature.

ECONOMIC

As well as lowering energy bills, this technology also cuts IT infrastructure costs by 50%, and is a viable economic solution for even the largest IT providers, according to the company.

Developed:
UK

Deployed: USA, Poland, and UK



"MOST PEOPLE DON'T REALIZE THAT TODAY'S 'ALWAYS-ON, ALWAYS CONNECTED' CULTURE IS DAMAGING IN TERMS OF ITS ENVIRONMENTAL IMPACT."

Peter Hopton, CEO, Iceotope

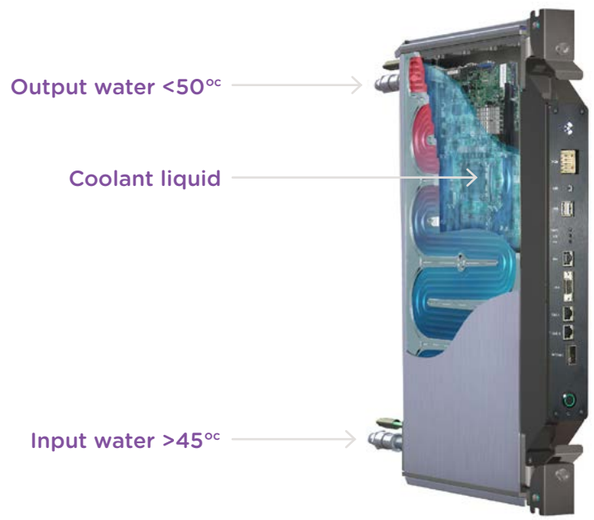
→ Iceotope has developed a liquid cooling system for IT equipment that eliminates the need for inefficient air conditioning units and fans.

Instead of cooling electronics with inefficient fans, which are used in almost every data center on the planet, Iceotope submerges IT equipment in an inert coolant liquid, which **cuts cooling energy costs up to 97%**, according to the company. The solution also provides opportunities for the **surplus heat to be recycled** in the form of hot water, which can be fed into domestic radiators to reduce heating bills.

As testament to the system's environmental performance, it can enable high-density **IT facilities in desert regions** to operate as efficiently as those based in the Arctic Circle. Unlike most data centers, Iceotope's system does not rely on clean water.

Why a Sustainia100 solution?

The digital economy is estimated to account for a massive 10% of global electricity use, according to a report by the Digital Power Group. Given today's spiraling data consumption levels and growing reliance on IT, this technology addresses one of the biggest global energy challenges.



Solutions deployed

Education Sector

Weathering Climate Change with Resilient Classrooms
Shidhulai Swanirvar Sangstha

Recycling Books for Literacy Worldwide
Better World Books

Personalized Data for Teaching Resource Savings
August and the Victorian State Government

Collaborative Innovation for an Open Source Economy
Open Source Ecology

Information that Empowers Consumer Choices
GoodGuide

Innovative Learning Spaces Bridging the Digital Divide
Red de Innovación y Aprendizaje (RIA) by Fundación Proacceso

e-Learning Breaks Down Barriers to Education
Khan Academy

Open Source Software Making Old Computers Act New
Linux Terminal Server Project

Solar and Wind-Up Power Delivers Education to Remote Areas
Lifeline Technologies and Lifeline Energy

Customized Teaching Accelerates Private Sector Growth
Educat

Photo: Abir Abdullah/Shidhulai Swanirvar Sangstha

Education

Weathering Climate Change with Resilient Classrooms

Solution by: **Shidhulai Swanirvar Sangstha**

→ These solar-powered floating classrooms ensure access to year-round quality primary education in flood-prone regions of Bangladesh while also providing training for climate change adaptation.

The Triple Bottom Line

ENVIRONMENTAL

The project recycles used traditional kerosene lanterns, creating new solar lantern casings while old boats are turned into new classrooms.

SOCIAL

Girls and young women are taking full advantage of the education being delivered to their doorsteps, which has allayed the concerns of their parents and guardians. [3]

ECONOMIC

According to a study, the solution has helped landless people to increase their income and escape poverty. [4]

Developed: Bangladesh

Deployed: Bangladesh

"IF THE CHILDREN CANNOT COME TO THE SCHOOL FOR LACK OF PROPER TRANSPORTATION, THEN THE SCHOOL SHOULD GO TO THEM."

Mohammed Rezwan, Founder and Executive Director

Each floating school collects students from different riverside villages, ultimately docking at the last destination where classes begin on-board. Boats are **equipped with a classroom along with Internet access and a library**. Additionally, students take home solar lanterns as rewards for good performance, while **parents and other adults receive training** through the same model.

Solar lighting makes the schedule flexible, meaning boats can arrange educational programs in the evening. After training and switching to flood-resistant crops, farmers are more likely to achieve **year-round food supply and income**. The solution has also introduced a business model whereby solar lanterns can be rented for a fee.

Why a Sustainia100 solution?

Climate change has increased flooding, affecting over 1.2 billion people between 1992 and 2001. [1] One consequence of floods is that children are prevented from attending classes, making it harder for them to escape poverty. Shidhulai's "floating school" model has been replicated in Nigeria, Cambodia, Philippines, Vietnam, and Zambia, [2] creating a transformative impact upon education and communities in flood-prone regions.

Photo: Abir Abdullah/Shidhulai Swanirvar Sangstha

[1] National Centre for Epidemiology and Population Health. "Climate Change and Human Health: Present and Future Risks." 2006.

[2] Bangladesh Development Research Center (BDRC). "Bangladesh's Solar Powered Floating Schools." 2012.

[3] The New York Times. "Floating Schools Bring Classrooms to Stranded Students." 2013.

[4] Shidhulai Swanirvar Sangstha. "Study on Integrated Floating Farming." Report. 2014.

Recycling Books for Literacy Worldwide

Solution by: **Better World Books**

→ Better World Books is a global bookstore that harnesses the value of used books to protect the environment while helping to bring literacy and opportunity to people around the world.

Better World Books **collects and sells books online**, matching each purchase with a donation, while generating funds for literacy initiatives run by its **non-profit partners around the world**.

With a network of more than 4,000 libraries and a presence at around 1,000 college campuses at any given time, Better World Books routinely supports used book drives across the United States. By **turning its non-profit partners into shareholders** through stock options, the company's contribution to global literacy efforts is an integral part of its business model.

Why a Sustainia100 solution?

Over 774 million illiterate adults worldwide miss out on the opportunities afforded by formal education.[1] At the same time, the United States generated 860,000 tons worth of book waste in 2012 alone.[2] In response, this solution seeks out unwanted books and diverts them from landfills, finding a market online while funding literacy projects.

Better World Books stages book drives across the USA in collaboration with colleges and libraries.

[1] UNESCO Institute for Statistics. 2014.

[2] United States Environmental Protection Agency. "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Tables and Figures for 2012." Feb. 2014.

The Triple Bottom Line

ENVIRONMENTAL

Better World Books reports that it has re-used or recycled over 128 million books, the equivalent of saving 2.25 million trees.

SOCIAL

The company states that it has donated over 12 million books and raised $16 million for global literacy efforts thus far.

ECONOMIC

While improving the economic prospects of beneficiaries through literacy, Better World Books also employs over 300 people full time.

Developed: USA and UK

Deployed: 68 countries including Morocco, Vietnam, and Peru

"BETTER WORLD BOOKS AND OTHER SOCIAL ENTERPRISES ARE LEADING THE CHARGE TO REDEFINE BUSINESS."

Mike Miller,
CEO, Better World Books

Personalized Data for Teaching Resource Savings

Solution by: **August and the Victorian State Government**

→ By means of data loggers that monitor schools' water and electricity consumption, this solution introduces students to the importance of resource conservation during their mathematics and science lessons.

This technology enables Australian schools to easily access and monitor their water and electricity usage. The platform promotes sustainability in future generations by empowering students with real and personalized data. After a simple data logger installation process, **an interactive online portal provides students with visually appealing and easily interpreted graphs** depicting their school's water and electricity consumption.

Complementing the national mathematics and science curricula, **students can test behaviour and infrastructural changes** to map their school's improvement in water and electricity usage. This access to personal data also helps schools to detect leaks, resulting in **large savings of water, electricity, and money**.

Why a Sustainia100 solution?

The need to improve water and energy efficiency is a mounting global concern. This solution introduces students to the discussion, as well as supplementing their mathematics and science curricula. In addition to its positive environmental impact, it also helps schools save money and kindles behavior change among students and their families.

The Triple Bottom Line

ENVIRONMENTAL

Since the program's inception in March 2012, participating schools have saved over 400 million liters of water.

SOCIAL

The solution teaches children to become more resource conscious and encourages them to be sustainability advocates through the use of data and technology.

ECONOMIC

Schools have identified over $300,000 worth of water leakage using this technology – leaks that would otherwise have increased in volume and cost.

Developed: Australia

Deployed: Australia

"A SCALABLE SOLUTION PROMOTING UNDERSTANDING OF WATER CONSERVATION."

Zoë Warne, Co-Founder and Director of Creative Services, August

Collaborative Innovation for an Open Source Economy

Solution by: **Open Source Ecology**

→ This distributive enterprise aims to accelerate innovation towards a sustainable and regenerative economy by publishing blueprints for the machines behind modern comforts.

The Triple Bottom Line

ENVIRONMENTAL

Open Source Ecology makes possible the use of local resources, leading to a deeper understanding of nature.

SOCIAL

This solution has identified the machines behind modern comforts, making their blueprints freely available to all.

ECONOMIC

With lowered barriers to entry, each community can increase the range of products and services provided.

Developed: USA

Deployed: More than 10 countries, including Slovenia, Italy, and Guatemala

"THE OPEN SOURCE MOVEMENT IS NOW EXTENDING INTO OPEN SOURCE HARDWARE, OPEN PRODUCT DEVELOPMENT, AND OPEN ENTERPRISE."

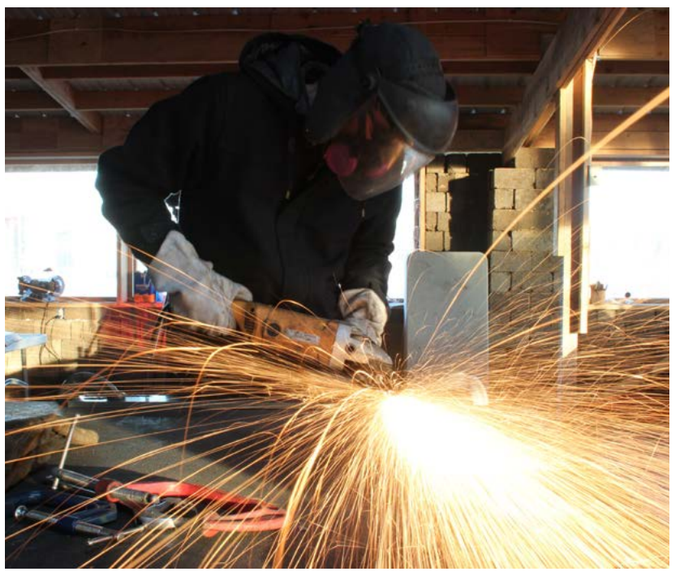
Marcin Jakubowski, Ph.D., Founder, Open Source Ecology

The machines included in Open Source Ecology's Global Village Construction Set constitute **the main building blocks necessary for a small, sustainable civilization**. They can be created for a fraction of commercial costs, and come with free instructional videos, 3D models, and fabrication manuals of, for instance, an earth brick press for housing and a wind turbine. The **modular and interchangeable components** allow for rapid assembly and streamlined repairs.

With work in sectors including transportation, agriculture, energy, manufacturing, and housing, Open Source Ecology is founded upon the principles of **technological literacy, local production, knowledge sharing, and collaboration**.

Why a Sustainia100 solution?

Centralized production leads to low levels of transparency and prohibitively high entry costs, preventing communities from taking advantage of local resources. This solution steers away from this issue by creating resource feedback loops and promoting a sustainable synergy between environmental, societal, and technological systems. Meanwhile, its open and inclusive nature makes its scalability limitless.



Information that Empowers Consumer Choices

Solution by: **GoodGuide**

→ As an authoritative source for information about the sustainability performance of products and companies, GoodGuide educates consumers about the impacts of their purchases.

The Triple Bottom Line

ENVIRONMENTAL

This solution communicates the potential environmental impacts associated with the manufacture, sale, use, and disposal of products.

SOCIAL

GoodGuide's Social Score measures the social impacts associated with manufacture and sale, including customer health, safety and labor practices.

ECONOMIC

This solution allows for measures beyond price to help differentiate products on the market.

Developed: USA

Deployed: USA

"INFORMED DECISIONS ABOUT THE HEALTH, ENVIRONMENTAL, AND SOCIAL IMPACTS OF PRODUCTS SEND A STRONG SIGNAL TO MANUFACTURERS AND RETAILERS."

Dara O'Rourke, Co-Founder and Chief Sustainability Officer, GoodGuide

GoodGuide uses a scientifically based scale to rate consumer products and companies, making the information easily accessible online. Scores are based on evaluations of **a comprehensive set of health, environmental, and social issues**, with a higher score signifying better performance. Whether it pertains to individual indicators like energy consumption, specific issues such as resource use, or main categories of concern, the scoring system used is easy to understand and consistent throughout.

With over one million downloads of the GoodGuide app and 600,000 monthly visitors to the website, this solution provides **instant access to sustainability information for over 200,000 everyday products**, enabling consumers to match their buying habits with personal preferences and values.

Why a Sustainia100 solution?

Consumers have limited access to information about the products they buy every day. Information is either unavailable, too complex to understand, or biased. This solution was founded on the premise that better information can transform the marketplace. As more consumers buy better products, retailers and manufacturers face compelling incentives to make products that are safe and sustainable.

The GoodGuide mobile app provides scientific ratings on the health, environmental, and social impact of everyday products.

Education

Innovative Learning Spaces Bridging the Digital Divide

Solution by: **Red de Innovación y Aprendizaje (RIA) by Fundación Proacceso**

→ Through the use of technology, this solution provides quality education in engaging and sustainably constructed settings to low-income communities in Mexico.

The Triple Bottom Line

ENVIRONMENTAL

All RIA centers are built with modular architecture that makes use of recycled materials.[1]

SOCIAL

According to RIA, women who learn to use the computer at a RIA center are 3.8 times as likely to get a job.[2]

ECONOMIC

On every $1 spent on the RIA centers, $1.68 is generated in economic benefits for the community.[3]

Developed: Mexico

Deployed: Mexico

"WE ENVISION A WORLD WHERE ACCESS TO TECHNOLOGY AND QUALITY EDUCATION IS A RIGHT."

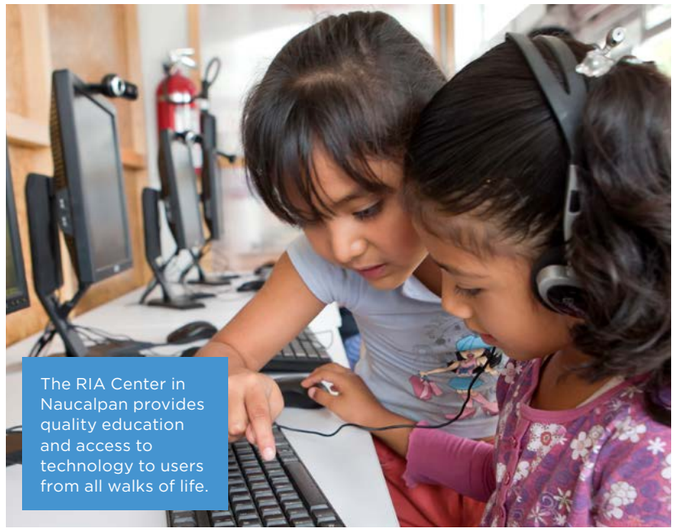
Aleph Molinari,
President, Fondacion Proacceso

Consisting of **70 strategically located and sustainably constructed educational centers**, RIA works towards digital inclusion in low-income communities in Mexico. Simultaneously, by leaving its internal infrastructure exposed, users learn **about the use of low-impact and recycled building materials**.

At each center, users of all ages can take courses in digital literacy, improving academic performance, finishing high school, or how to find work through the Internet. With a comprehensive program for children in computing, reading, math, and science, it has shown that the use of **technology can increase the educational performance** of children in elementary school.

Why a Sustainia100 solution?

Close to five billion people do not have access to the Internet and will be excluded as the world becomes increasingly digital. This solution integrates educational and technological components to positively affect communities. By creating welcoming spaces where users of all ages can access technology and quality educational resources, the RIA reports that it has reached more than 500,000 users from low-income communities, of which more than 140,000 have graduated from its courses.



The RIA Center in Naucalpan provides quality education and access to technology to users from all walks of life.

[1] OECD (2011). "Designing for Education: Compendium of Exemplary Educational Facilities 2011." Paris: OECD Publishing.

[2] Penn International Business Volunteers (PIBV), The Wharton School (2011). Social Return on Investment (SROI) Report. México: Fundación Proacceso & PIBV.

[3] Ibid.

e-Learning Breaks Down Barriers to Education

Solution by: **Khan Academy**

The Triple Bottom Line

ENVIRONMENTAL

This solution delivers great educational benefits with minimal resource consumption or additional infrasctructure.

SOCIAL

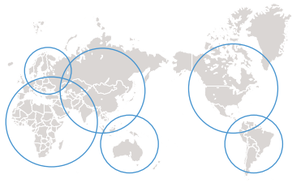
Millions of students learn on the website every month, according to Khan Academy.

ECONMIC

Removing the cost barrier means that all children with access to the Internet can benefit from an education.

Developed: USA

Deployed: Global



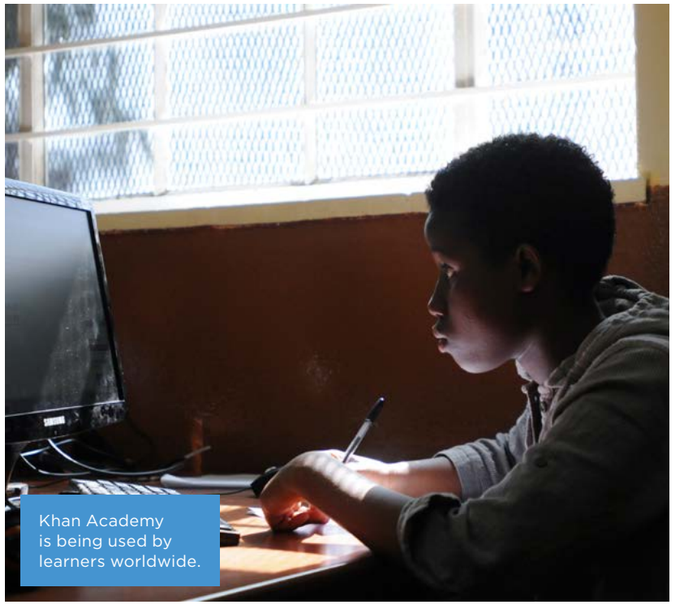
→ This open online educational resource enables universal and personalized learning across disciplines.

Evolving from a series of YouTube videos, Khan Academy demonstrates the potential of open, accessible, and inclusive educational materials. The platform contains **over 5,500 instructional videos and 100,000 practice problems covering more than 30 subjects**, encompassing everything from finance to biology and art history.

Its open nature means that Khan Academy can **bring educational value to all contexts and settings**, from off-grid schools in remote areas to curious retirees. In the classroom, data dashboards help its 350,000 registered teachers to **monitor their students' progress and provide targeted assistance**, with measured improvements in performance. However, with volunteer-driven translations available in 28 different languages, impact has been amplified far beyond the boundaries of school campuses.

Why a Sustainia100 solution?

Internet access spread from 0.4% of the global population in 1995 to 41% in 2014.[1] As this connectivity continues to increase, so will the many benefits of information access and education. Viewed together with this development, Khan Academy represents a powerful vehicle for education that requires no additional infrastructure or investment.



Khan Academy is being used by learners worldwide.

[1] Internet World Stats. 'Internet Growth Statistics.' Mar 2014. Online.

Open Source Software Making Old Computers Act New

Solution by: **Linux Terminal Server Project**

The Triple Bottom Line

ENVIRONMENTAL

The vast amounts of electronic waste produced annually can contaminate the air, water and soil.

SOCIAL

Increased availability of computers is a valuable tool in spreading technological literacy among students.

ECONMIC

The ability to keep using legacy hardware eases the economic strain upon schools with limited resources.

Developed: USA

Deployed: 55 countries including Greece, Nicaragua, and South Korea

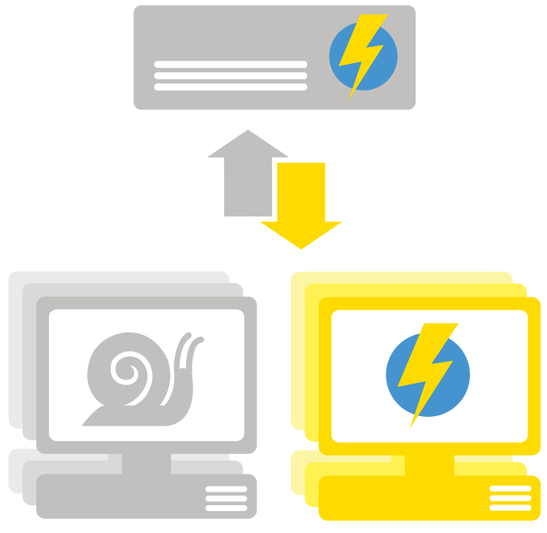
→ By allowing many people to use the same computer simultaneously through different workstations, this open source software keeps old computers out of landfills while helping schools cut costs.

This free software provides schools with the possibility of injecting **new life into their old computers** by turning normal Linux installations into "terminal servers." Workstations consist of legacy computers that no longer have the power to run modern programs. **Instead of being thrown away, these machines can be re-purposed as "dumb terminals"** drawing on the power of the Linux Terminal Server Project (LTSP) server.

In effect, when a workstation user opens a window on their screen to carry out normal activities, the software is actually running on the LTSP server somewhere else in the building. This means that **schools do not need to invest in replacement hardware**, but only one powerful machine to supply computing power.

Why a Sustainia100 solution?

According to UNEP, the lifespan of computers has dropped from six years in 1997 to two years in 2005.[1] At the same time, electronic waste contains hazardous materials, like lead and mercury, which threaten the environment. The LTSP has helped many institutions, including over 180 schools in Greece, to reduce the replacement and maintenance cost of providing their pupils with access to computers while minimizing electronic waste.



[1] UNEP. 'E-Waste Management'. Online : www.unep.org

Solar and Wind-Up Power Delivers Education to Remote Areas

Solution by: **Lifeline Technologies and Lifeline Energy**

→ The Lifeplayer is a solar and wind-up powered MP3 player that provides access to quality education and information in remote schools.

The Lifeplayer stores and plays **interactive audio lessons that can be played anytime in classrooms anywhere**, delivering standardized high-quality education to remote areas at very low cost. Each unit can store up to 128 GB of pre-loaded educational content or recorded voices, and features on-board monitoring and evaluation software.

Currently used in 16 countries, it empowers remote schools with **on-demand access to education and information**, without concern for the availability of electricity or batteries. Through collaboration with, for example, Zambia's Ministry of Education, the technology is building upon proven distance learning methodologies with the aim of educating the millions of **children who attend schools lacking trained teachers and electricity**.

Why a Sustainia100 solution?

UNESCO reports that most primary schools in Sub-Saharan Africa are not connected to the electric grid, while more than two million additional teachers are needed in the region by 2015 to meet the growing need.[1] With this in mind, the Lifeplayer can accelerate the delivery of education to the most underserved children in the world.

The Triple Bottom Line

ENVIRONMENTAL

As a long-lasting and power-independent device, this solution removes the need for toxic batteries that can contaminate the environment.

SOCIAL

While capable of delivering valuable information to isolated individuals, the Lifeplayer also improves academic performance.

ECONOMIC

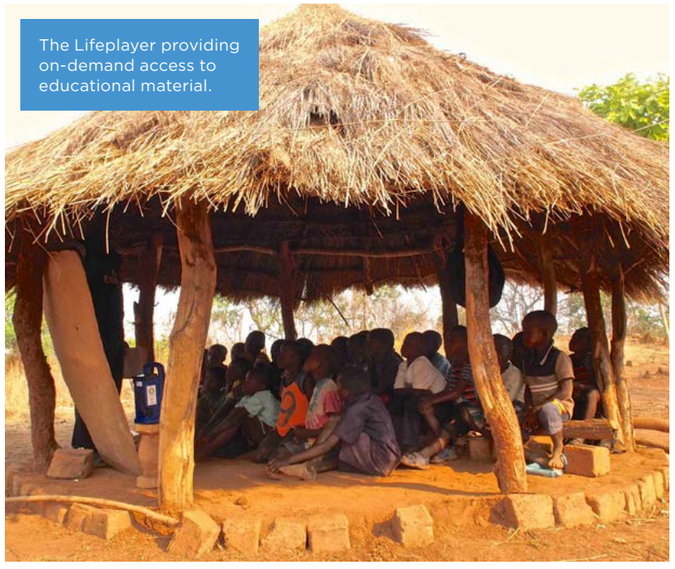
Each unit can serve up to 60 children at once, meaning it costs less than $2 to provide a child with high-quality information.

Developed:
South Africa and UK

Deployed: 16 countries in Sub-Saharan Africa and Asia

"HIGH-QUALITY AND ENGAGING EDUCATION MATERIAL IN SOME OF THE WORLD'S MOST CHALLENGING LEARNING ENVIRONMENTS."

Phil Goodwin, Chief Director, Lifeline Technologies



The Lifeplayer providing on-demand access to educational material.

[1] UNESCO Institute for Statistics. "Survey on Education Quality and Classroom Conditions." 2013.

Customized Teaching Accelerates Private Sector Growth

Solution by: **Educat**

→ By participating in Educat's six-month Accelerator program, entrepreneurs can improve and expand their businesses while developing sustainable practices.

Based in Rwanda, Educat is a social enterprise that enables young change makers to mature their sustainable businesses through diagnostics, mentorship and consultation. The highly customizable Rwanda Business Accelerator program is the product of a **cross-sectoral collaboration with Educat's public, private, and government partners**.

Participating businesses benefit from targeted coaching related to, for example, accounts, legal matters, graphic design, IT and sales. Additionally, by connecting with **environmental organizations or experts**, businesses are able to develop strategies for **sustainability and environmentally-friendly manufacturing techniques**. The program is followed up with monitoring and evaluation to ensure behaviour change and performance.

Why a Sustainia100 solution?

This solution promotes entrepreneurship and leadership among young people in Rwanda, challenging them to think creatively while supporting them to establish innovative businesses. The Accelerator was developed on the basis of Educat's work with thousands of Rwandan entrepreneurs since 2008, with participating businesses reporting significant profit increases since embarking on the program. As it scales, it aims to promote poverty reduction through job creation.

The Triple Bottom Line

ENVIRONMENTAL

Environmentally-responsible business solutions are addressed with all businesses that participate in Educat programs.

SOCIAL

By helping young people improve their businesses, Educat's Accelerator creates jobs, which can ultimately result in poverty reduction.

ECONOMIC

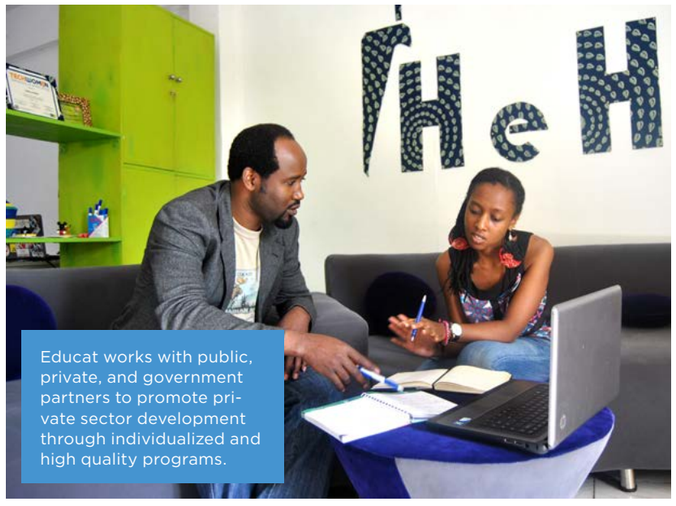
By facilitating job creation, Educat catalyzes economic growth from a grassroots level.

Developed:
Denmark and Rwanda

Deployed: Rwanda

"EDUCAT HAS WORKED HARD TO DEVELOP THE BEST POSSIBLE SUPPORT FRAMEWORK TO ACCELERATE EXISTING SMALL BUSINESSES AND PAVE THE WAY FOR NEW ONES."

Andreas Nørlem, CEO, Educat



Educat works with public, private, and government partners to promote private sector development through individualized and high quality programs.

Energy Sector

Bridging Renewable Energy and Natural Gas Systems
Hydrogenics Corporation

Smart Microgrids for Renewable Energy Access
Gram Power

Harnessing Geothermal Energy while Preserving Forests
The Energy Development Corporation

Saltwater Batteries to Store the Sun's Energy
Aquion Energy

Autonomous Energy System for Remote Islands
The Government of El Hierro, Endesa, and the Canary Islands Technological Institute

Saving Energy through Data and Cloud Software
Opower

Solar Lamps to Replace Kerosene Lighting
SunLife

Solar Plant with Molten Salt Thermal Energy Storage
Abengoa

Liquid Metal Batteries for Renewable Energy Storage
Ambri

Self-Sufficient Solar Street Lighting
Bjarne Schläger Design and Alfred Priess

Solutions deployed

Bridging Renewable Energy and Natural Gas Systems

Solution by: **Hydrogenics Corporation**

→ Hydrogenics' Power-to-Gas technology converts surplus renewable energy into hydrogen and uses existing networks of natural gas pipelines to store and transport it.

The Triple Bottom Line

ENVIRONMENTAL

Hydrogenics optimizes the use of renewable energy sources, thereby potentially replacing fossil fuel power plants.

SOCIAL

The solution strengthens energy security in countries of deployment and provides a rapidly responding energy distribution system.

ECONOMIC

By using the existing natural gas infrastructure, the upfront cost of Power-to-Gas is minimized in comparison with other storage solutions.

Developed:
Canada, Germany, and Belgium

Deployed: UK, Germany, Belgium, Canada, USA, France, and Italy

"HYDROGEN-BASED ENERGY STORAGE SYSTEMS CAN ABSORB SURPLUS ENERGY, RETURN POWER, AND IMPROVE OVERALL UTILITY PERFORMANCE."

Daryl Wilson, President and CEO, Hydrogenics Corporation

Power-to-Gas is a hybrid technology that **converts surplus renewable energy to hydrogen** through electrolysis. The process produces hydrogen by separating water into its basic components using a direct electrical current.

Hydrogenics then discharges hydrogen into the existing natural gas infrastructure. These pipelines and underground facilities provide **storage capacity** enabling hydrogen to be accesed where and when it is needed. Thus, the solution enhances the flexibility of the power system while providing a **source of renewable gas**.

Why a Sustainia100 solution?

Continuous and expanded growth of the share of renewables in centralized and decentralized grids requires effective approaches for managing the mix of energy in the grid. [1] Other large-scale energy storage technologies such as pumped hydro or compressed air are limited to specific reservoirs or cavern sites. Power-to-Gas represents a new energy storage option that can be distributed by existing infrastructure.

Power-to-Gas converts renewable electricity generation when it is not needed into a renewable source of heat and power where and when it is needed.

[1] IRENA. "Smart Grids and Renewables." 2013.

Smart Microgrids for Renewable Energy Access in Remote Areas

Solution by: **Gram Power**

→ Gram Power sets up energy-efficient, smart microgrids in remote areas to provide on-demand, reliable electricity to telecom towers and rural households.

The Triple Bottom Line

ENVIRONMENTAL

The smart grid system replaces fossil fuel power with renewable sources, thereby cutting CO2 emissions significantly.

SOCIAL

Rural communities get a reliable energy supply, replacing unhealthy kerosene use in lighting and cooking.

ECONOMIC

Homes consume power with an accessible prepaid model. 17 US cents a day can buy enough power to operate lights, fans, cell phones, and TVs.

Developed:
India

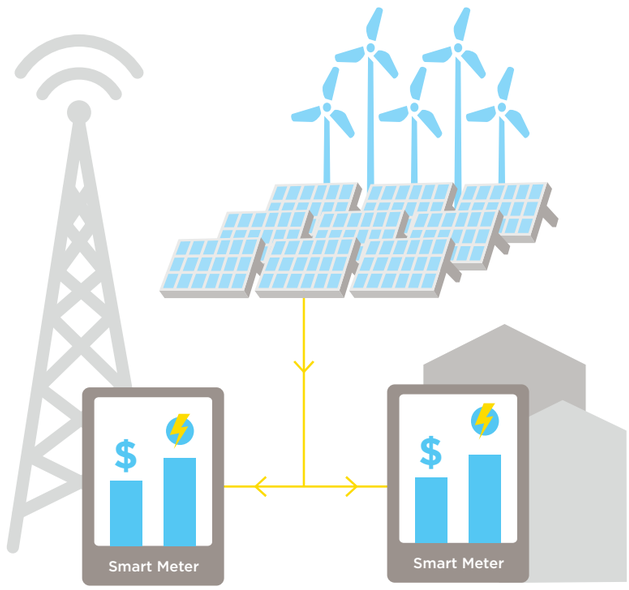
Deployed: India

In off-grid communities and villages with less than six hours of daily power supply, Gram Power sets up generation stations with **renewable sources of energy** and installs distribution lines from the generation station to every home and telecom tower. The microgrid comes with a proprietary **smart prepaid meter for every recipient**. This solution offers reliable power to the microgrid with the smart meter detecting energy theft, while monitoring power consumption of consumers and allowing for **wireless payments**.

Once a microgrid has been installed, a **local entrepreneur is recruited** and trained to operate the plant and sell power. Gram Power sells energy credits at a wholesale price to the entrepreneur, who in turn earns a commission by selling these credits to consumers.

Why a Sustainia100 solution?

The International Energy Agency estimates that more than 1.3 billion people do not have access to electricity.[1] The smart microgrid system developed by Gram Power has been a role model in its field to provide flexible, modular, and reliable power from renewable sources of energy to people in energy-poor communities.



[1] International Energy Agency. "World Energy Outlook 2014". Report. 2014.

Harnessing Geothermal Energy while Preserving Forests

Solution by: **The Energy Development Corporation**

→ The island of Leyte provides the Filipino people with geothermal power while addressing deforestation and offering a livelihood to local communities.

In the world's largest wet steam field, on the island of Leyte, a renewable energy project is **generating 16% of the Philippines' heat and electricity needs**, distributing the power to the national grid. Hot water three kilometers beneath the earth is pumped through pipelines to power plants that converts steam to electricity. The water is then re-injected into a reservoir beneath the earth's surface for recycling and to attain **zero waste for the protection of communities and the environment**.

The Energy Development Corporation shares the economic value of the electricity production with the community by **providing health care services and education**, while protecting existing forests and reforesting bush and grasslands on the island.

Why a Sustainia100 solution?

Geothermal heat use has traditionally been thought most relevant in colder countries. However, this solution illustrates that in warmer climates geothermal heat can be made useful in agricultural and industrial applications as well.[1] WWF estimates that by 2050, geothermal energy could account for around 58 million MWh of electricity per year. The Leyte project serves as a role model for sustainable geothermal power generation with zero CO2 emissions.

The Triple Bottom Line

ENVIRONMENTAL

Geothermal power plants emit 1,000-2,000 times less CO2 than fossil fuel power plants, according to the WWF.

SOCIAL

Electricity produced with geothermal energy is more reliable than fossil-fuel power plants that produce electricity 65% to 75% of the time compared to 90% from geothermal power plants.[2]

ECONOMIC

According the Energy Development Corporation, large geothermal projects lead to substantial investments both in actual production and in surrounding communities. Geothermal power plants provide 2.5 times more jobs than their coal counterparts.

Developed: the Philippines

Deployed: the Philippines

[1] IEA. "Technology Roadmap - Geothermal Heat and Power" 2011.

[2] WWF. "The Energy Report." Report 2011.

Saltwater Batteries to Store the Sun's Energy

Solution by: **Aquion Energy**

→ Aquion Energy changes the economics of renewable power generation in off-grid rural areas by offering an energy storage solution made of low-cost materials.

The saltwater battery enables off-grid homes to make **optimal use of intermittent renewable energy**, making solar photovoltaic panels cost-competitive when compared to unhealthy alternatives like diesel generators or toxic lead-acid batteries. By using abundant non-toxic materials like **saltwater, carbon, and manganese**, the hybrid ion battery creates an electrical current when electrolytes shuttle between manganese oxide-based positive electrodes and carbon-based negative ones.

Aquion Energy uses inexpensive **manufacturing equipment repurposed from food and pharmaceutical industries**, lowering the cost of production. In the end, briefcase-sized batteries are stacked and bolted together, serving villages with renewable energy.

Why a Sustainia100 solution?

By 2030, over 1 billion people are expected to gain access to electricity.[1] Without affordable, safe, and reliable power options, this will necessitate much more fossil fuel consumption. Aquion's environmentally benign batteries enable more solar generation by storing energy produced during the day and making it available on demand. Lead-acid batteries are used for this purpose today, but they are toxic and require air-conditioning to avoid deterioration in some climates, raising costs.

Battery components are stacked together, forming pallets of non-toxic storage solutions for households and villages.

The Triple Bottom Line

ENVIRONMENTAL

The batteries allow solar to displace polluting and unhealthy diesel generators, which could eliminate millions of tons of CO_2 emissions every year.

SOCIAL

Lead-acid recycling is notoriously problematic in developing countries,[2] exposing people, particularly children, to toxic lead. Saltwater-based batteries provide a safe and non-toxic alternative.

ECONOMIC

The levelized cost of the batteries is superior to alternatives like diesel generators, in some applications by as much as 25%.

Developed: USA

Deployed: USA, Australia, Guinea, Haiti, and Germany

"OUR BATTERIES ARE BUILT WITH SUSTAINABLE MATERIALS AS SIMPLE AS SALTWATER AND CARBON."

Professor Jay Whitacre,
CTO and Founder, Aquion Energy

[1] IEA. "World Energy Outlook 2013." 2013.

[2] Blacksmith Institute "Used Lead Acid Battery Recycling." Online.

Autonomous Energy System for Remote Islands

Solution by: **The Government of El Hierro, Endesa and the Canary Islands Technological Institute**

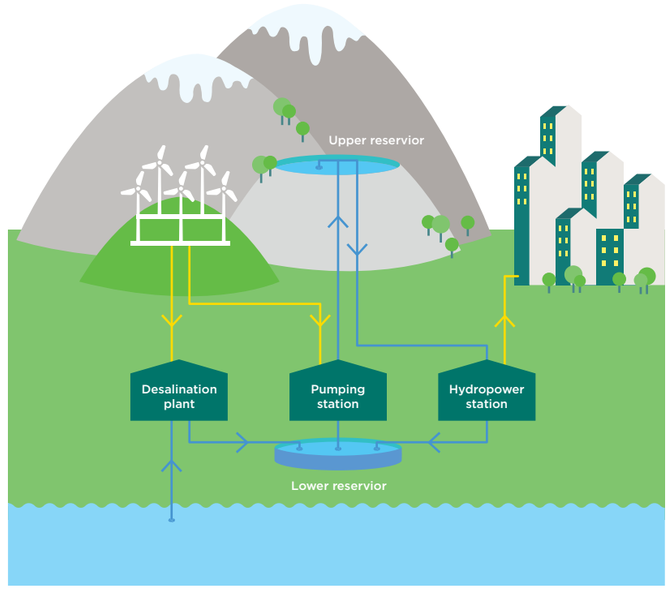
→ The island of El Hierro has established self-sufficient energy production using a major hydro-wind system to electrify the whole island.

The island of El Hierro has **five wind turbines** with a combined installed capacity of 11.5 megawatts, catering for the majority of electricity demand on the island. Surplus energy when wind production exceeds demand is used to pump water from a reservoir at the bottom of a volcanic cone to another reservoir 700 meters above sea level. When energy demand rises, the **water is released to four hydroelectric turbines** to create the electricity needed.

Further excess electricity is used to desalinate water at the island's three desalination plants, delivering almost **three million gallons of water** a day, enough for all drinking water and part of the island's irrigation needs.

Why a Sustainia100 solution?

Islands confront some of the most difficult energy challenges. Their size and remoteness means they pay extremely high energy costs for often unreliable and dirty energy. Yet many islands are blessed with large amounts of sun, wind, and water, making renewable energy a promising solution. The El Hierro energy project generates three times the island's basic energy needs, thereby serving as a role model for other islands.



The Triple Bottom Line

ENVIRONMENTAL

Before the energy project, El Hierro was importing and burning 6,000 tons of diesel per year, emitting 18,700 tons of carbon dioxide.

SOCIAL

Residents, farming cooperatives, fruit and fish canneries and the 60,000 tourists who visit every year will have a reliable electricity and water supply for all activities.

ECONOMIC

The energy partnership expects to generate over $5 million a year in electricity sales, and save almost $2.5 million a year in diesel imports.

Developed: Spain

Deployed: Spain

Saving Energy through Data and Cloud Software

Solution by: **Opower**

→ Opower's cloud software platform uses big data to provide utilities with an opportunity to engage customers in improving their energy efficiency.

Opower uses a combination a **cloud-based platform, big data, and behavioural science**. It helps utilities required by regulators to encourage energy efficiency to reduce energy consumption and improve their customer relationships.

Utilities use Opower's software platform to deliver key customer-facing applications that provide accessible **money-saving information, reduce energy demand**, and improve customer perception of the utility. Opower's software analyzes energy data and presents personalized insights to consumers via the Web and through text, phone, and mail communications in order to motivate reductions in energy consumption.

Opower is showing households their **energy efficiency and usage compared to their neighbours**. This method has turned out to be effective in motivating people to save energy.

Why a Sustainia100 solution?

Using behavioral science and data to drive reductions in energy consumption, Opower states that they have enabled savings of over 4 terawatt-hours of energy, which is equivalent to $458 million in bill savings for customers and over 6 billion pounds of carbon abated worldwide.

The Triple Bottom Line

ENVIRONMENTAL

CO2 reductions from energy savings enabled by Opower equal removing 600,000 passenger vehicles from the road for a full year, according to the company.

SOCIAL

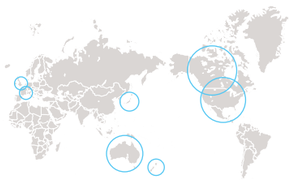
Consumers become motivated to save energy when receiving customized reports, comparing their energy consumption with neighbours.

ECONOMIC

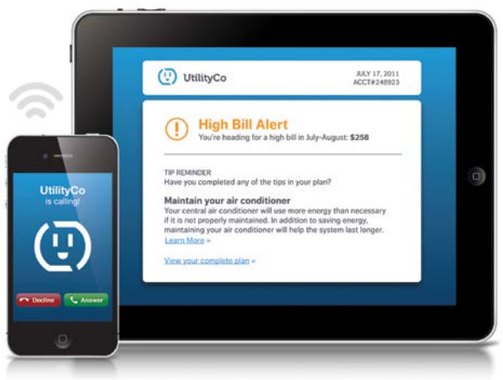
Utility customers benefit by lowering their energy costs and being recognized for using less energy.

Developed:
USA

Deployed: USA, UK, Canada, France, Australia, New Zealand, and Japan



Opower's software platform provides consumers with valuable insights about their energy usage and personalized ways to save energy.



"OPOWER HELPS UTILITIES TRANSFORM THE WAY THEY COMMUNICATE WITH THEIR CUSTOMERS. "

Dan Yates, CEO and Founder, Opower

Solar Lamps to Replace Kerosene Lighting

Solution by: **SunLife**

→ SunLife's MiniSun12H improves health and living conditions in off-grid areas by offering a solar lighting source at the same price as a kerosene lamp.

Eliminating the primary financial barrier of replacing kerosene lamps with a **healthier alternative**, this solar-powered lantern is capable of providing 12 hours of light after 8 hours of charging. The MiniSun12H has the added advantage of **never needing to be refueled** with expensive and environmentally harmful kerosene.

Solar lighting not only makes studying at night less unhealthy, it also removes **the potential safety hazard of burning kerosene** indoors. Finally, the simple design makes the solar lamp durable in rough environments and is reported to last at least three years.

Why a Sustainia100 solution?

Of the common lighting sources, kerosene is the most polluting.[1] The solar lamp serves as a cost-competitive alternative to this fuel. In a simple way, the solar lamp saves money for the poorest families, helps mitigate environmental pollution, and offers a safe and healthy lighting solution. SunLife is determined to spread it beyond Ghanaian homes to neighbouring countries using new and existing networks of authorized distributors.

The Triple Bottom Line

ENVIRONMENTAL

People obtaining light from directly burning fuels emits 190 million tons of carbon dioxide each year.

SOCIAL

According to the World Health Organization, indoor air pollution from fuels such as kerosene is as damaging as smoking two packs of cigarettes daily.[2]

ECONOMIC

According to the company, the poorest people living off-grid will save about 15% of their income usually spent on fuel for lighting and cooking.

Developed:
Ghana and UK

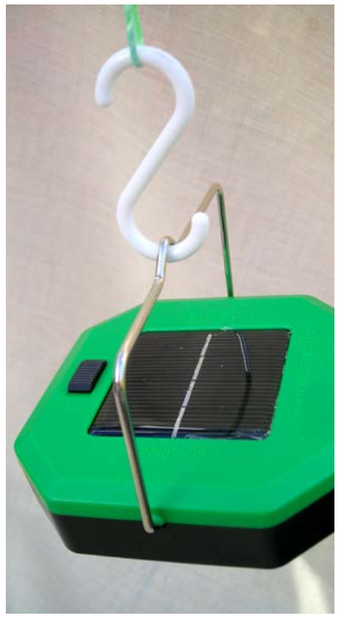
Deployed: Ghana

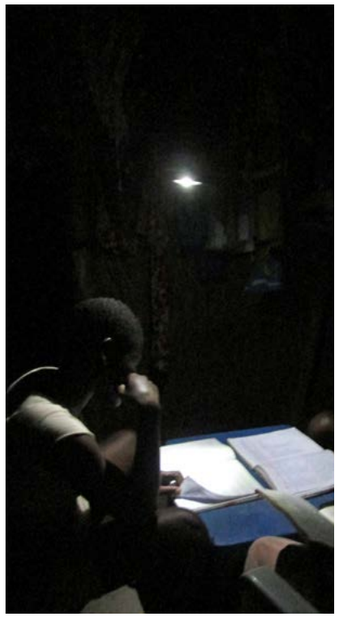
"QUALITY OF LIFE WILL IMPROVE FOR THOUSANDS WITH THE DEPLOYMENT OF THE MINISUN12H."

Stephen Pearson,
Founder and Chairman, SunLife

[1] Mills, Evan. "The Specter of Fuel-Based Lighting." Science 308. 2005.

[2] World Health Organization. "Fuel for Life: Household Energy and Health." 2009.





Solar Plant with Molten Salt Thermal Energy Storage

Solution by: **Abengoa**

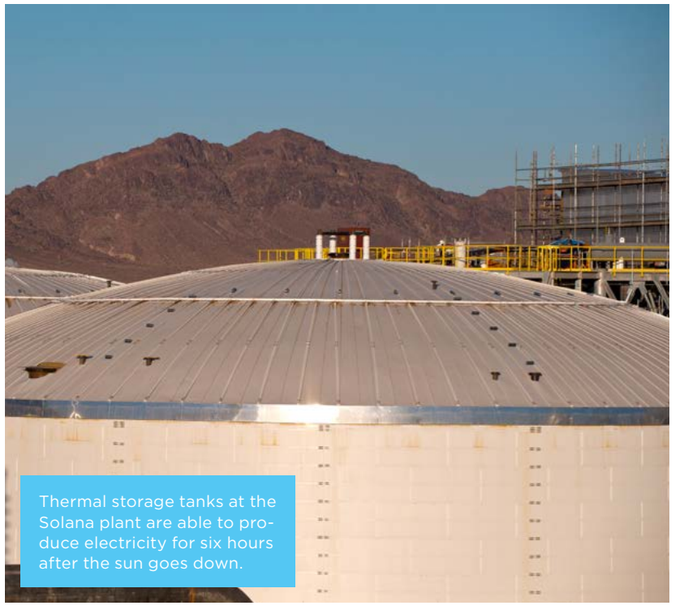
→ Abengoa is one of the first companies to offer solar power with a molten salt storage system that enables the plant to produce energy around the clock.

The Solana Concentrating Solar Power plant in Arizona differs from other solar power plants because of its ability to store the heat from the sun for up to six hours, allowing for **electricity production at night**. This is possible due to its thermal energy storage system consisting of six pairs of hot and cold tanks with a capacity of **125,000 metric tons of salt**.

Salt is a cheap and abundant resource that has the ability to absorb heat and **not evaporate even at extremely high temperatures**. When the sun goes down and stops producing heat for the plant, a fluid exchanges heat with the molten salt tanks that have been heated during the day. The fluid then flows to steam boilers, where it heats water to create steam and enables the plant to produce energy.

Why a Sustainia100 solution?

Thermal storage allows CSP plants to achieve much higher efficiency and dispatch electricity when the sun is not shining. The molten salt in the Solana plant storage is kept at a minimum temperature of 277 °C, which enables a highly efficient production of steam.[1]



Thermal storage tanks at the Solana plant are able to produce electricity for six hours after the sun goes down.

[1] IEA and IRENA. "Concentrating Solar Power Technology brief". 2013.

The Triple Bottom Line

ENVIRONMENTAL

Thermal storage enables Abengoa to produce more than 750 MW, thereby replacing a big part of the fossil-fueled energy production with renewable energy.

SOCIAL

The Solana plant provides 1.1 million customers with reliable energy.

ECONOMIC

With economies of scale and low operating costs, this solution is a serious competitor to conventional power plants, especially across the Sun Belt Region in the South and Southwest of the United States.[1]

Developed: Spain

Deployed: Spain and USA

Liquid Metal Batteries for Renewable Energy Storage

Solution by: **Ambri**

→ Using abundant materials, Ambri has developed an electrical storage solution for grid-scale applications that has no moving parts and reduces the cost of battery manufacturing.

The Triple Bottom Line

ENVIRONMENTAL

The Ambri battery is made of abundant materials and has a longer lifespan than its lithium-ion competitors, according to the company.

SOCIAL

Better storage of energy improves energy security and increases the reliability of a consistent electricity supply without shortages or grid black-outs.

ECONOMIC

Energy storage reduces overall energy consumed during peak hours, enabling cost reductions for electricity at the end-user level.

Developed: USA

Deployed: USA

"WE ARE BUILDING A WORLD-CLASS TEAM THAT IS DEVELOPING A SOLUTION TO THE ENERGY CHALLENGES OF THE 21ST CENTURY."

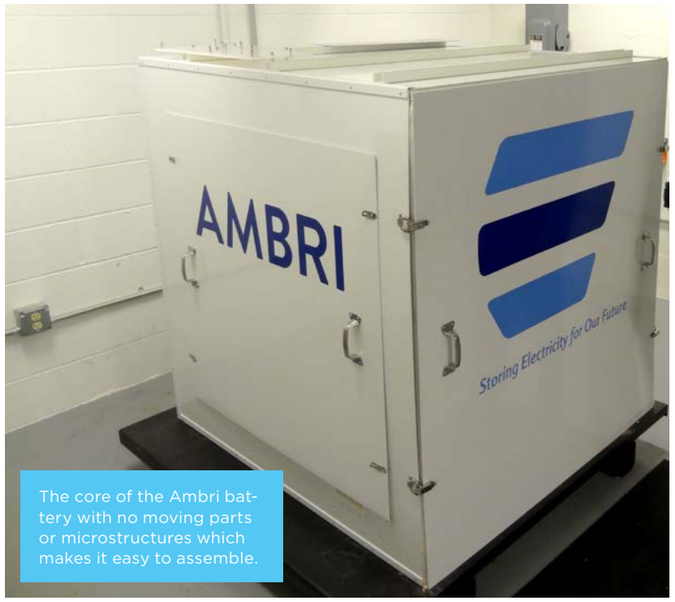
Phil Giudice, President and CEO, Ambri

Ambri is commercializing an **electricity storage technology** known as the Liquid Metal Battery for use in grid-scale applications. Each battery is made up of **two types of liquid metal**: one low-density metal that floats to the top and one high-density metal that sinks to the bottom, with a layer of salt in between. The liquid metals work as positive and negative electrodes that use the salt as a carrier of electrical voltage.

The materials are **abundant and inexpensive**, and the batteries can withstand years of use without degrading. According the company, **the battery still operates at more than 99.5% capacity after 10 years**.

Why a Sustainia100 solution?

Increasing large-scale storage for renewable energy sources such as wind and solar prevents the use of environmentally harmful fossil fuel-powered plants during peak demand hours. Ambri offers a low-cost energy storage solution that allows for wider integration of intermittent renewable energy sources into the grid.



The core of the Ambri battery with no moving parts or microstructures which makes it easy to assemble.

Self-Sufficient Solar Street Lighting

Solution by: **Bjarne Schläger Design and Alfred Priess**

→ The Touché streetlight combines aesthetics with solar energy that self-sufficiently illuminate public spaces around the world.

The Triple Bottom Line

ENVIRONMENTAL

The 91 million streetlights in Europe alone constitute potential for significant CO2 emission reduction if shifted to solar power.[2]

SOCIAL

Touché serves as a prominent sustainable technology in public spaces, thereby facilitating public awareness on renewable energy use.

ECONOMIC

Replacing just one traditional lamp post of approx 100 watt/h translates into 400 kWh of electricity saved annually, according to Bjarne Schläger Design.

Developed: Denmark

Deployed: 15 countries, including Russia, Saudi Arabia, and South Korea

"WE CREATE SELF-SUSTAINING PUBLIC LIGHTING WITH INTEGRATED SOLAR CELLS AND AESTHETIC VALUES."

Bjarne Schläger, Architect MAA and innovator Bjarne Schläger Design

The Touché streetlight is designed with **solar panels that discreetly cover the surface** vertically from top to bottom, showcasing that sustainable public lighting can also be visually appealing. The solar panels provide enough energy for the streetlight to work without interruptions, even in countries where sunlight can be sparse. The solution **requires no electrical connection**, making it applicable both in cities and in countryside areas where grid access is a challenge.

Producing about 2 to 3 times its own consumption, Touché can work as an energy contributor if connected to the grid. The streetlight also features **intelligent communication units** allowing optimal management of the individual lighting profiles by controlling movement sensors, operating data, alarms, and dimming.

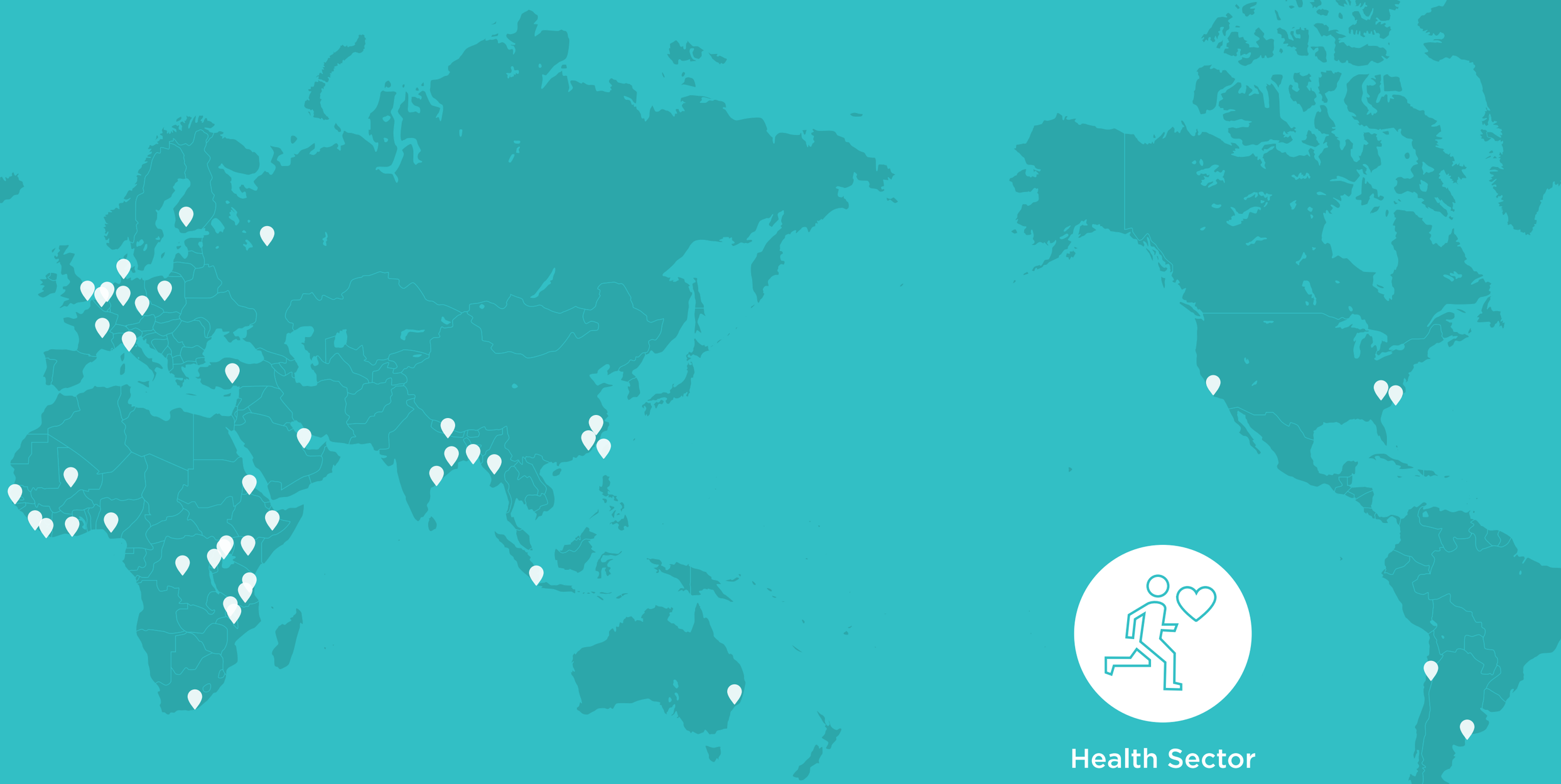
Why a Sustainia100 solution?

The cost of street lighting for municipalities is growing due to rising energy costs and the increasing cost of maintenance and replacement.[1] The Touché streetlight addresses this issue by providing a solution that is energy self-sufficient and capable of producing surplus energy for the benefit of other energy consumers in the grid. The harmonious design will also beautify urban and rural surroundings alike.

The integrated solar cells charge the battery during the day and draw on it during the evening and night. The light control system dims the light to the desired level to maximize the capacity of the battery.

[1] Nishishiba, Masami. "Increasing the Efficiency of Street Lighting in the City of Sandy". 2010.

[2] Planting. "A new light on saving energy". 2009



Solutions deployed

Health Sector

Solar Suitcases Light Up Maternal Health Care
We Care Solar

Open Source Software for 3D-Printed Prosthetics
Robohand

Health Care Rebate for Healthy Eating Choices
FairShare CSA Coalition

Smartphones Helping to Prevent Blindness
Peek Vision

Menstrual Pads Made from Banana Fiber
Sustainable Health Enterprises (SHE)

Designing Hospitals to Maximize Daylight
Skidmore, Owings & Merrill LLP (SOM)

Quality Healthcare Through eHealth Platform
ClickMedix

Carpets that Clean the Air for Better Indoor Climates
Desso

Broadcasting Health Information to Slum Communities
Mali Health Organizing Project

Phototherapy for Neonatal Jaundice in Low-Income Hospitals
D-Rev and Phoenix Medical Systems

Solar Suitcases Light Up Maternal Health Care

Solution by: **We Care Solar**

→ The Solar Suitcase is a compact solar electric system for medical lighting, mobile communication, and essential medical devices designed to be simple, safe, and durable.

The Triple Bottom Line

ENVIRONMENTAL

When replacing a diesel generator, each Solar Suitcase averts eight tons of CO2 per year, according to We Care Solar.

SOCIAL

Saving the life of a mother is crucial for the well-being of her infant.[2]

ECONOMIC

According to the solution, a Solar Suitcase provides significant cost savings for a health care facility by offsetting the costs of purchasing lantern batteries, kerosene lanterns, and generator fuel.

Developed: USA

Deployed: 20 countries in Africa, Asia, and Latin America

"WE CARE SOLAR PROVIDES ESSENTIAL LIGHT AND POWER FOR MATERNAL HEALTH CARE, ALLOWING CHILDBIRTH TO BE A JOYFUL EVENT."

Dr. Laura Stachel, MD, MPH, Co-Founder and Executive Director, We Care Solar

The Solar Suitcase enables safe and timely obstetric care, which ultimately **improves maternal and neonatal outcomes**. We Care Solar supports its technology with educational programs that build local capacity, giving health workers the tools necessary to provide life-saving care.

The Solar Suitcase can be used in a range of medical and humanitarian settings, and has been introduced to more than 600 health care facilities in 20 countries, currently **lighting up skilled care for over 247,000 childbearing mothers each year**, and allowing emergency surgeries to be conducted around-the-clock in rural hospitals.

Why a Sustainia100 solution?

Preventable causes related to pregnancy and childbirth claim 800 lives daily, with developing countries accounting for 99% of this total.[1] Care facilities that lack reliable power to support safe deliveries contribute greatly to the problem. Without electricity, doctors are often forced to cancel sessions or conduct surgery by flashlight, and midwives struggle to deliver babies by light from kerosene lanterns or candles. The Solar Suitcase addresses these very urgent needs.

The Solar Suitcase is an economical, easy-to-use solar power unit that provides maternal health workers with highly efficient medical lighting and power for mobile communication, computers, and medical devices.

Photo: Bradly Wong

[1] WHO "Maternal Mortality". Fact Sheet. May 2014. Online.

[2] University of California, San Francisco, Bixby Center for Global Reproductive Health. "Safe Motherhood". 2013.

Photo: Diane McCarthy

Open Source Software for 3D-Printed Prosthetics

Solution by: **Robohand**

→ Robohand creates and fits affordable 3D-printed mechanical hands and fingers that replace lost limbs and help people regain independence.

Robohand's software **enables patients around the world to 3D-print mechanical hands and fingers**. Components are assembled using medical-grade stainless steel and attached using Velcro strips. The PLA plastic used in Robohand is **derived from renewable resources** such as cornstarch, tapioca roots, chips, or sugarcane. The fitment is customized with wearer functionality, including water resistance, and weighs just 300-700g.

Robohand is anatomically driven, without need for interfacing with nerves or requiring battery power. It is easy to maintain and upgrade with reusable components. **The design is open source**, with schematics and fitment manual available to the general public for free.

The Triple Bottom Line

ENVIRONMENTAL

The materials used to produce the hands are non-toxic and the plastic is biodegradable.

SOCIAL

Robohand enables people to regain use of upper limbs and become more independent.

ECONOMIC

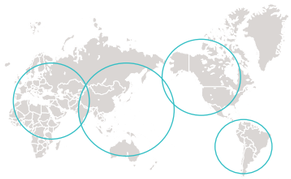
Robohand provides an affordable alternative that costs less than half of conventional prosthetics.

Why a Sustainia100 solution?

There is immense need for affordable upper limb replacement globally. Robohand states that there are more than 61,000 partial hand amputations annually in the United States, while South Africa alone is home to more than 60,000 amputees. Robohand empowers people around the world who lack access to expensive commercial prosthetics by providing a low-cost alternative priced at $500 to $2,000.

Developed: South Africa

Deployed: Global



Robohand empowers people with upper limb disabilities through functional anatomically driven mechanical hands and fingers.

Health Care Rebate for Healthy Eating Choices

Solution by: **FairShare CSA Coalition**

→ FairShare CSA Coalition facilitates reimbursement programs for members through health care providers when buying healthy food at local farms.

FairShare CSA Coalition's reimbursement project builds on existing programs offered by health insurance companies to encourage **healthy lifestyle choices** and reward the positive choices members make. When an individual or family joins an endorsed Community Supported Agriculture (CSA) farm, they submit proof of payment to their health care provider to **receive reimbursement for a portion of the cost**. Reimbursement ranges from $75 to $200 depending on household size.

FairShare CSA Coalition has forged partnerships with 47 member farms in Southern Wisconsin and regional health insurance providers out of a shared understanding of the many **health, community, and economic benefits of local farm membership**.

The Triple Bottom Line

ENVIRONMENTAL

Small-scale organic farmers who sell their food locally are preserving the quality of land and reducing the carbon footprint of food systems.

SOCIAL

Community Supported Agriculture builds relationships between farmers and their consumers.

ECONOMIC

In 2012, member farms generated nearly $7 million in sales and created 57 new jobs, according to FairShare CSA Coalition.

Why a Sustainia100 solution?

Seen as a viable marketing tool, major health care providers have jumped on board, making the reimbursement program readily available to households. The existence of the rebate program helps build a sustainable local food system. By attracting more customers to organic farms, farmers are freed from some of the responsibility of marketing their products, as this is being done directly through health care providers.

Developed: USA

Deployed: USA

"SINCE ENTERING INTO PARTNERSHIPS WITH LOCAL HEALTH CARE PROVIDERS, FARMS HAVE SEEN A TREMENDOUS INCREASE IN CONSUMER INTEREST."

Chris Brockel, Executive Director, FairShare CSA Coalition

CSA members gather at local farms to help with the work, attend on-farm events, get to know their farmer, and create a community.

Smartphones Helping to Prevent Blindness

Solution by: **Peek Vision**

→ This solution is a smartphone application and adapter offering simple, low-cost, high-quality eye examinations to previously isolated patients.

Peek – the Portable Eye Examination Kit – is an **affordable and mobile solution** to the problem of avoidable blindness in low-income countries. Health care workers equipped with a **mobile phone and solar backpack for easy charging** can access extremely remote households, eliminating the need for patients to travel.

Displaying a shrinking letter on screen can provide a simple yet elegant vision test suitable for all languages. Using a specially designed low-cost adapter, smartphones are used to capture images of the retina. Examination results are stored and can be **shared with experts internationally**. Locations of patients are also stored on GPS, helping to coordinate future treatment.

Why a Sustainia100 solution?

According to the World Health Organization, there are 285 million visually impaired people worldwide, around 90% of whom live in developing countries. At the same time, 80% of blindness can be avoided or cured.[1] This solution, recently tested in a study of 2,000 participants in Kenya, and the subject of a pilot study underway in 30 Kenyan schools, is an extremely promising technology for blindness prevention.

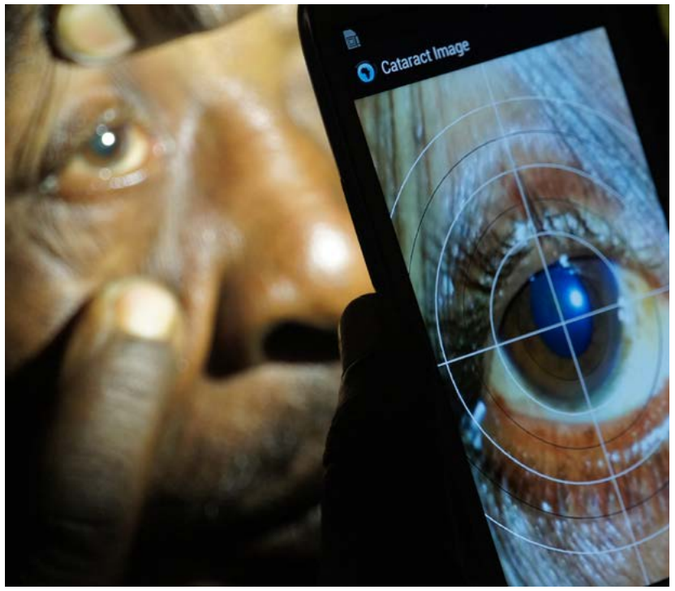


Photo: Peek

[1] WHO. "Visual Impairment and Blindness." Factsheet. Oct, 2013. Online.

The Triple Bottom Line

ENVIRONMENTAL

Peek Vision delivers eye examinations with minimal need for resources or equipment and reduced energy for travelling to health clinics.

SOCIAL

This solution prevents blindness in low-income communities that do not have access to health services.

ECONOMIC

Peek Vision smartphone software is free, and the hardware manufacturing costs are under $170, as opposed to conventional eye examination equipment costing over $170,000, according to Peek Vision.

Developed: UK

Deployed: Kenya

Menstrual Pads Made from Banana Fiber

Solution by: **Sustainable Health Enterprises (SHE)**

→ SHE is reclaiming an abundant resource, banana fiber agro-waste, to produce a menstrual pad that addresses the over-looked demand for affordable access to menstrual products in developing countries.

SHE has designed a menstrual pad, branded as "go!" in Rwanda, that significantly reduces the negative environmental impact of typical pads using a mechanical process that **transforms agro waste (e.g. banana fibers)** into an absorbent core without using any chemicals or super absorbent polymers.

This readily available agro-waste allows the go! pad to be priced lower than multinational brands, enabling girls and women to **access affordable, eco-friendly pads**. SHE's technology enables entrepreneurs to replicate this innovation and deliver an affordable, eco-friendly product that is designed to serve girls' and women's unmet needs. To date, SHE has created 15 jobs and generated income opportunities for 600 farmers.

Why a Sustainia100 solution?

According to UNESCO, 1 in 10 African girls do not attend school while menstruating, and many girls drop out of school after the onset of menstruation because they lack adequate sanitation materials. This lack of access leads to significant costs in terms of education, health, and dignity for girls and women.

The Triple Bottom Line

ENVIRONMENTAL

SHE pads' absorbent core contains no chemicals or polymers.

SOCIAL

SHE empowers girls, women, and their communities to address lack of access to affordable products by creating income opportunities and jobs through local manufacturing and distribution.

ECONOMIC

In Rwanda, SHE estimates that menstruation-related loss in productivity and schooling reduces GDP by $115 million annually.

Developed: USA and Rwanda

Deployed: Rwanda

"WE HAVE CREATED A NEW MARKET FOR ENVIRONMENTALLY FRIENDLY MENSTRUAL PADS, THEREBY CREATING JOBS AND INCOME OPPORTUNITIES ACROSS THE VALUE CHAIN."

Elizabeth Scharpf, Founder and Chief Instigating Officer, SHE

SHE has developed an innovative technology that transforms banana fiber into highly absorbent material, without the use of chemicals, to produce menstrual pads in Rwanda.

Designing Hospitals to Maximize Daylight

Solution by: **Skidmore, Owings & Merrill (SOM)**

→ This hospital applies a natural approach to the enhancement of health and well-being by increasing exposure to daylight and views.

As hospitals have grown larger, more occupants are placed further away from windows, which decreases the amount of natural light available to patients and staff. SOM's design for the Joint and Spine Center at The Christ Hospital in Cincinnati, Ohio, is challenging this norm by **maximizing access to natural light**.

The hospital design maximizes the porosity of the floor plan, driving natural light deep into the nursing unit. All patient rooms have wall-to-wall windows. With these design features, The Christ Hospital caregivers anticipate **faster patient recoveries and better staff performance**, with improved daily life inside the facilities.

Why a Sustainia100 solution?

Recent studies have found that patients exposed to higher-intensity sunlight levels experienced less perceived pain and had 21% less pain medication costs.[1] Hospital staff reported higher job satisfaction and missed fewer hours of work.[2] It is hoped that bringing higher levels of natural light into the hospital will improve patient outcomes and increase patient and staff satisfaction.

The Triple Bottom Line

ENVIRONMENTAL

Increasing natural daylight in hospitals reduces electricity use for lighting.

SOCIAL

Hospitals designed to increase natural light exposure help staff and patients manage both stress and happiness levels.[3]

ECONOMIC

Increased natural light exposure correlates to reduced staff errors, absenteeism, and patient stay times.[4]

Developed: USA

Deployed: USA

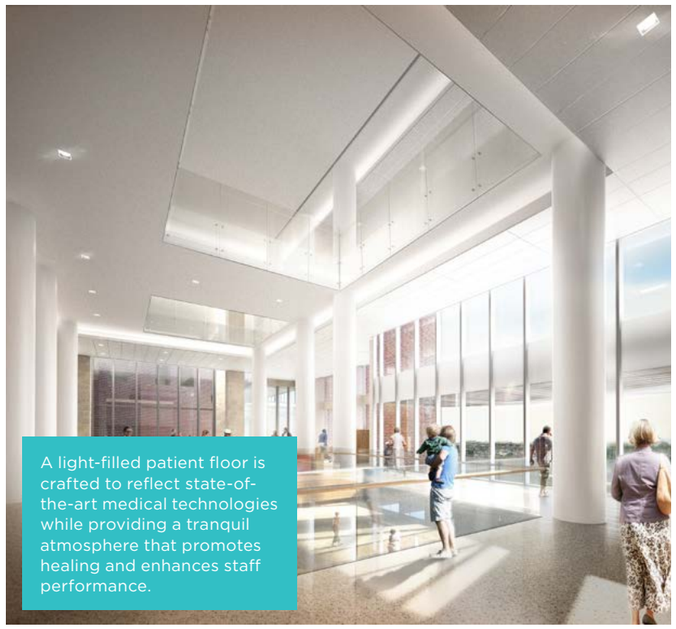
"WE ANTICIPATE THAT THE DESIGN WILL CREATE EXTRAORDINARY PATIENT EXPERIENCES AND ELEVATE THE ENVIRONMENT IN WHICH OUR CARE TEAMS WORK."

Deborah M. Hayes, RN MS NEA-BC, Vice President, Chief Hospital Officer and Chief Nursing Officer, The Christ Hospital

[1] Leather, Pyrgas, Beale, & Lawrence. "Windows in the Workplace: Sunlight, View, and Occupational Stress." Environment & Behavior. 1998.

[2] Shepley, Gerbi, Watson, Imgrund & Sagah-Zadeh. "The Impact of Views on ICU Patients and Staff". Health Environments Research & Design Journal. 2011.

[3, 4] The Center for Health Design. "The Impact of Light on Outcomes in Healthcare Settings." 2006.



A light-filled patient floor is crafted to reflect state-of-the-art medical technologies while providing a tranquil atmosphere that promotes healing and enhances staff performance.

Quality Healthcare Through eHealth Platform

Solution by: **ClickMedix**

→ ClickMedix's eHealth platform enables doctors to serve more patients at lower costs while empowering local health workers to learn from medical experts abroad.

ClickMedix is a mobile eHealth platform used by doctors to care for patients remotely, eliminating unnecessary suffering due to wait time for treatment, lack of access to experienced doctors, and associated costs. Community-based health professionals collect and transmit patient symptoms using **point-of-care diagnostics devices and the ClickMedix app** installed on smartphones or tablets.

Doctors can **review and provide treatment plans for 10 times more patients securely using their phones or computers** when compared with in-person consultations. Community health professionals receive recommended treatment plans provided by distantly located doctors through ClickMedix software installed on their phones. ClickMedix has **impacted the lives of more than 700,000 patients** and enhanced the skills of local health providers in North America, Latin America, Africa, and Asia.

Why a Sustainia100 solution?

Billions of people lack access to quality health care and suffer unnecessarily from diseases. By enabling doctors to serve more patients through mobile technologies, ClickMedix alleviates the impact of this shortage, and allows them to serve patients who need better, faster, and cheaper health care.

The Triple Bottom Line

ENVIRONMENTAL

Using ClickMedix, health organizations can operate without additional infrastructure, energy consumption, and paper use.

SOCIAL

According to the WHO, 57 countries have an absolute shortage of 2.3 million physicians, nurses, and midwives.[1]

ECONOMIC

ClickMedix states that its eHealth platform enables doctors to provide care remotely at less than 10% of the cost compared to other methods of serving patients remotely.

Developed:
USA

Deployed: 17 countries, including Trinidad, Taiwan, and China

"CLICKMEDIX WAS CONCEIVED TO PROVIDE BETTER HEALTHCARE TO THE BILLIONS USING MOBILE TECHNOLOGIES."

Ting Shih, CEO & Founder, ClickMedix

Community health workers in India screen more than 1,000 patients per week suffering from painful ear infections using ClickMedix.

[1] WHO. 'The world health report 2006: working together for health'. 2006.

Carpets that Clean the Air for Better Indoor Climates

Solution by: **Desso**

→ The AirMaster carpet captures and retains fine dust and pollutant particles, providing a healthier indoor climate.

The AirMaster is a specially designed carpet tile that is **eight times more effective at capturing and retaining fine dust** than hard flooring. In contrast to common perceptions, several Northern European asthma and allergy organizations have stated that this carpet indeed is better than hard flooring.[1]

The carpet is made from materials that are **Cradle to Cradle certified and do not contain harmful chemicals**. Desso also has a take-back system, reusing old carpets to make new non-toxic closed-loop carpets. The company facilitates this process by offering a circular leasing plan.

Why a Sustainia100 solution?

Indoor air pollution is a major health problem worldwide, as we spend approximately 70% of our time indoors.[2] This solution contributes to cleaner indoor air, helping to reduce health problems such as asthma. The carpet works to reduce sickness absenteeism in the workplace and improve overall health conditions in buildings in the corporate, education, health care, and government sectors.

The Triple Bottom Line

ENVIRONMENTAL

The solution's take-back system reduces the damaging environmental impact of dumping carpet waste into landfills or incinerators.

SOCIAL

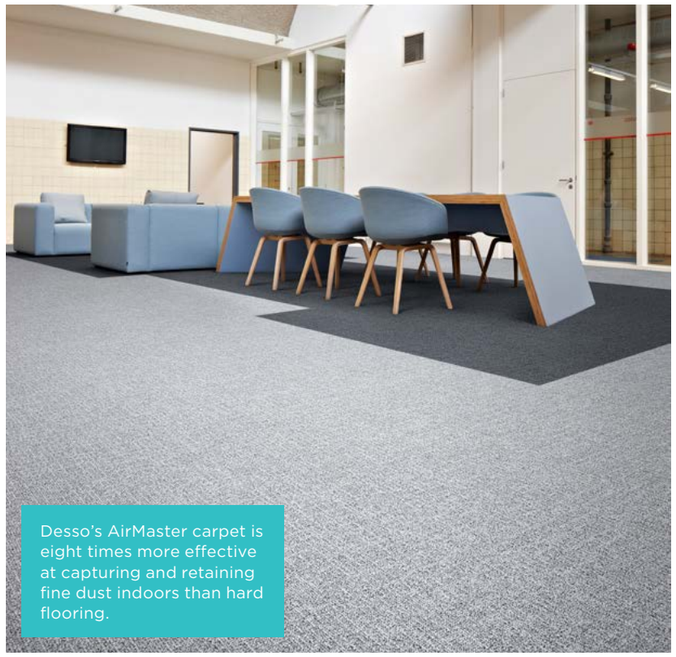
The solution contributes to human well-being, helping to reduce negative health impacts of indoor air pollution.

ECONOMIC

The AirMaster is one of the best-selling and most profitable Desso products, whose market share in commercial carpets grew from 15% to 27% between 2007 and 2013.

Developed:
The Netherlands and Belgium

Deployed: 20 countries, including Qatar, Belgium, and Bulgaria



Desso's AirMaster carpet is eight times more effective at capturing and retaining fine dust indoors than hard flooring.

[1] Based on tests performed by the independent German test institute, GUI.

[2] US Environmental Protection Agency. "Looking for the Pollution Where the People Are." 1994.

Broadcasting Health Information to Slum Communities

Solution by: **Mali Health Organizing Project**

→ Mali Health's interactive radio program sparks discussion and action where health issues are most pressing – in the homes and neighborhoods of slum residents.

Suburban populations are the fastest growing on the planet, where crowding, land use, and sanitation have created new challenges for health. Mali Health uses radio, the most dominant media outlet in Africa, to **engage and organize** slum communities. Broadcasting on Mali's most popular radio station, diverse programing is **designed and implemented by residents to create positive change** for health on every level.

To translate words into results, listener groups adapt key messages from the show to **plan events and interventions in their communities**. Groups use positive deviance strategies to change behaviours, and enforce new modes of transparency in traditional power structures. Local businesses leverage publicity and drive interest in the program by distributing health supplies to participants.

Why a Sustainia100 solution?

The growth of slum communities poses major health risks for residents and for the world at large. Health Radio is both low cost and scalable. By broadcasting into the daily lives of residents, the program improves health among the poor and becomes a platform for better health as well as opportunity.

The Triple Bottom Line

ENVIRONMENTAL

Health Radio educates and mobilizes action around trash disposal, clean water, and improved sanitation.

SOCIAL

Health Radio broadcasts crucial health information, creates empowered users, and inspires communities to organize around their right to health.

ECONOMIC

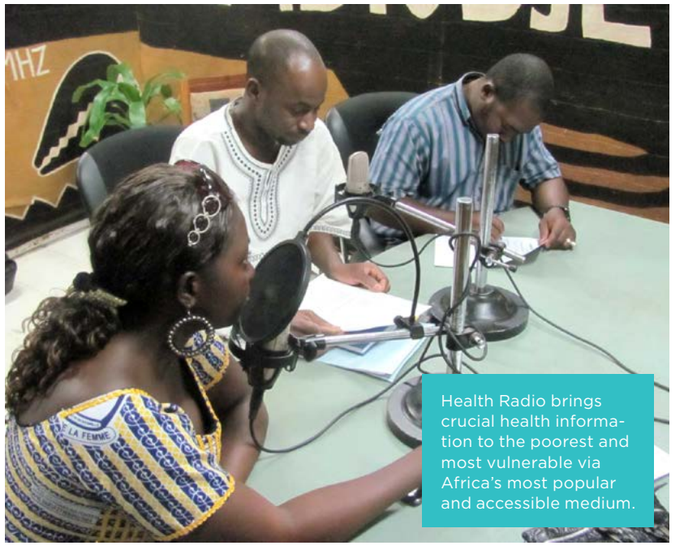
By enabling early detection of common maladies, Health Radio lowers medical costs and saves lives.

Developed: Mali

Deployed: Mali

"INNOVATION DOESN'T ALWAYS COME IN THE FORM OF THE LATEST, CUTTING-EDGE TECHNOLOGY. WE SEE RADIO AS THE IDEAL VECTOR FOR HEALTH CHANGE AMONG THE POOREST OF THE POOR."

Kris Ansin, Executive Director, Mali Health Organizing Project



Health Radio brings crucial health information to the poorest and most vulnerable via Africa's most popular and accessible medium.

Phototherapy for Neonatal Jaundice in Low-Income Hospitals

Solution by: **D-Rev and Phoenix Medical Systems**

→ Brilliance uses energy-efficient LEDs to provide world-class blue light phototherapy to babies without access to effective jaundice treatment.

D-Rev's Brilliance system works with simple blue light phototherapy to shine through a baby's skin and cure neonatal jaundice in days. Brilliance uses **energy-efficient LED lights**, which consume just 40% of the electricity used by traditional fluorescent phototherapy. Furthermore, by using LEDs that last 50,000 hours, Brilliance **eliminates significant bulb waste and cost**: a standard tube bulb device requires a minimum of 12 bulbs per year.

Brilliance is sold through Phoenix Medical Systems for just $500, compared to $3,000 for a comparable device using conventional technology. Since launching in November 2012, **Brilliance has treated over 12,000 babies** in nine African and Asian countries.

Why a Sustainia100 solution?

Neonatal jaundice is not a serious health problem where there is access to quality health care, but in much of the world it can be a significant danger. If left untreated, neonatal jaundice can cause severe brain damage or even death. In fact, it is the world's fifth-leading cause of infant mortality. Brilliance addresses this issue by providing a low-cost treatment system that lasts a long time.

The Triple Bottom Line

ENVIRONMENTAL

Brilliance uses 40% of the electricity of traditional fluorescent phototherapy devices and eliminates the need for costly replacement bulbs.

SOCIAL

Since November 2012, Brilliance has averted over 250 deaths and disabilities.

ECONOMIC

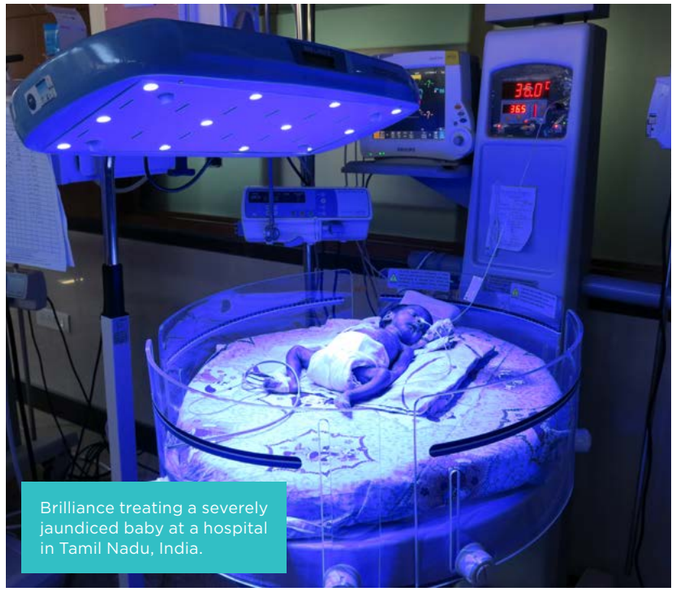
Brilliance retails for only $500 – a fraction the cost of comparable phototherapy devices, which sell for $3,000.

Developed: USA and India

Deployed: 10 countries, including Myanmar, Tanzania, and Colombia

"EVERY CHILD, NO MATTER WHERE THEY ARE BORN, DESERVES ACCESS TO EFFECTIVE MEDICAL TREATMENT. WITH GOOD DESIGN, YOU DO NOT HAVE TO TRADE QUALITY FOR COST."

Krista Donaldson, CEO, D-Rev



Brilliance treating a severely jaundiced baby at a hospital in Tamil Nadu, India.

Cities Sector

Providing Incentives for Recycling in Low-Income Communities
Wecyclers

Mobilizing Behaviour Change for a Zero Waste City
City and County of San Francisco Department of the Environment

Energy Savings Finance the Switch to LED Lighting
Philips

City Drives Innovation for Liquefied Biogas
Göteborg Energi, Lidköping Biogas, and Municipality of Lidköping

Waterless Toilets for Slums
x-runner Venture

Floating Ecosystems for River Restoration and Water Quality
Biomatrix Water Solutions

Communication Platform for Integrating Renewable Energy
Power Plus Communications and partners

Citywide Parking Sensors for Lowering Congestion
Smart Parking and Westminster City Council

Porous Asphalt for Stormwater ManagementNational Asphalt
Pavement Association

Public-Private Partnership for Citywide Retrofitting
City of Melbourne

Solutions deployed

Providing Incentives for Recycling in Low-Income Communities

Solution by: **Wecyclers**

→ Lagos, Nigeria: Wecyclers is fueling social change for the environment by allowing people in low-income communities to capture value from waste using low-cost collection infrastructure.

The Triple Bottom Line

ENVIRONMENTAL

The World Bank estimates that only 10% of waste in Africa is collected, with the remainder either left to pollute communities or burned in open fires.[1]

SOCIAL

About 30-60% of all the urban solid waste in developing countries is not collected, with less than 50% of the population served, creating great health risks.[2]

ECONOMIC

65% of Lagosians earn less than $2 per day,[3] yet 79% of households pay more than $2 per month for waste collection.[4] Wecyclers estimates that recycling could reduce that cost by a third.

Developed:
USA and Nigeria

Deployed: Nigeria

"WE ARE HELPING LOW-INCOME HOUSEHOLDS CAPTURE VALUE FROM THE WASTE THAT EXISTS ALL AROUND THEM."

Bilikiss Adebiyi-Abiola,
Co-founder and CEO, Wecyclers

Wecyclers harnesses the power of urban communities to reclaim neighborhoods from unmanaged waste using a **crowdsourced, rewards-for-recycling platform**. Wecyclers uses a fleet of low-cost cargo bicycles to offer a convenient household recycling service in densely populated low-income neighborhoods. In doing so, it also provides low-income youth with **employment opportunities** as collectors and construction or maintenance artisans.

Families are motivated to recycle their waste, receiving redeemable Wecyclers points over their mobile phone through an SMS-based incentive program. Families can then redeem their points in the form of goods that they value. Meanwhile, **recycling companies purchase the sorted waste for reprocessing**.

Why a Sustainia100 solution?

People living in slum conditions are subject to increased risk of spreading disease, and psychological stress that results from unmanaged waste heaps. This innovative household collection service reduces the amount of waste that ends up in landfills and communities. Wecyclers has already improved the lives of households in the slums of Lagos by providing them with a way to capture economic, social, and health benefits from their waste.

[1] The World Bank. 'Poverty and the Environment.' Report. 2000.

[2] UNEP. 'Developing Integrated Solid Waste Management Plan: Training Manual'. Report. 2009.

[3] Time Magazine. 'Making Over Lagos'. Article. 2011.

[4] Lagos State. 'Lagos State Household Survey'. Report. 2010.

Mobilizing Behaviour Change for a Zero Waste City

Solution by: **City and County of San Francisco Department of the Environment**

→ San Francisco, USA: Through extensive outreach and citizen engagement, San Francisco is pursuing a goal of zero waste by 2020 and has achieved an 80% landfill diversion rate with environmental and social benefits.

San Francisco's Zero Waste Program pursues the best use of materials, in collaboration with producer and consumer responsibility. The program conducts extensive **outreach and assistance** to encourage participation and mandatory compliance. It is entirely funded by "pay-as-you-throw" rates, providing **financial incentives for both citizens and businesses to divert waste**.

The Green Job Training program employs economically disadvantaged people from different backgrounds to conduct outreach in the field. Providing direct face-to-face assistance, the program helps citizens **become aware of waste issues and start sorting waste correctly**. San Francisco has also initiated a Styrofoam food ware ban, plastic bag ban, and mandatory recycling and composting.

Why a Sustainia100 solution?

Waste management in cities is of increasing importance globally, especially as population pressures lead to ever-growing landfills. In San Francisco, increased landfill diversion has mitigated many of these concerns. Composting of primarily food scraps has grown to over 600 tons per day, resulting in nutrient-rich compost, producing healthy food for the city. These efforts also create jobs – one recycling company alone employs 1,000 people citywide.

The Triple Bottom Line

ENVIRONMENTAL

San Francisco reports 80% of all discarded materials are diverted from landfills and reused, recycled or composted.

SOCIAL

The city claims that reuse, recycling, and composting creates on average over 10 times more jobs than landfilling or incineration.

ECONOMIC

Residents, businesses, and institutions in San Francisco save millions of dollars per year by recycling and composting.

Developed: USA

Deployed: USA

"ZERO WASTE IS ONE OF THE MOST IMPORTANT POLICIES A CITY AND COMMUNITY CAN ADOPT AND IMPLEMENT. WASTE IS CAUSED BY US DIRECTLY AND IS THEREFORE OUR RESPONSIBILITY."

Edwin M. Lee, Mayor,
City and County of San Francisco

Energy Savings Finance the Switch to LED Lighting

Solution by: **Philips**

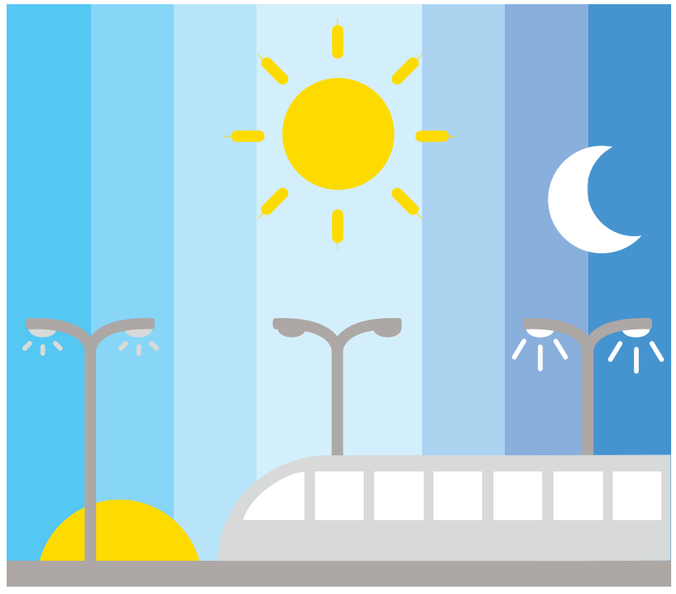
→ Washington D.C., USA: By means of a 10-year performance lighting contract, Philips will install LED lights in the city at no upfront cost.

Having secured a 10-year performance lighting contract with the Washington Metropolitan Area Transit Authority (WMATA), **Philips will upgrade more than 13,000 garage lighting fixtures** in the city. While Philips will be responsible for installation and continual maintenance, **the city will benefit from the opportunity to circumvent the upfront costs of LED installation**. The company will receive payment from the $2 million in savings that WMATA expects to achieve annually.

The modular and adaptable lighting technology will also provide live data on energy consumption, while **further energy savings will be secured as bulbs automatically vary in brightness** according to motion and the availability of natural light.

Why a Sustainia100 solution?

Although streetlights consume around one percent of all electricity in the United States,[1] many cities are prevented from switching to more efficient LEDs. A survey of 288 cities reveals that LEDs are a high priority for 82% of mayors, while 71% reported upfront costs to be a significant barrier.[2] By eliminating this obstacle, performance contracts can help many more cities cut costs and reduce their energy consumption.



The Triple Bottom Line

ENVIRONMENTAL

The LED installations will lead to a 68% reduction in energy consumption and prevent 11,000 tons of CO2 emissions.

SOCIAL

Improved lighting conditions will increase safety levels for 66,000 garage users.

ECONOMIC

According to WMATA, this arrangement will create $600,000 in maintenance savings alone.

Developed: USA

Deployed: USA

[1] Clinton Climate Initiative. "Southeast Regional Workshop: Streetlights". 2010. Online: www.dvrpc.org

[2] Mayors Climate Protection Center. "Energy Efficiency and Technologies in America's Cities". Jan 2014. Online: www.usmayors.org

City Drives Innovation for Liquefied Biogas

Solution by: **Göteborg Energi, Lidköping Biogas, and Municipality of Lidköping**

→ Lidköping, Sweden: Cross-sectoral collaboration in Sweden is efficiently transforming waste into a clean-burning fuel for trucks.

Liquefied biogas is a renewable alternative to conventional diesel in long-haul trucks. At a plant in Lidköping, bacteria biologically transform **organic waste from local food industries into biogas and biofertilizer**. The biogas is cooled to a liquid and used in specially designed truck engines that work just as efficiently as ones burning conventional diesel.

The biofertilizer is used in local agriculture, reducing the need for commercial fertilizers and bolstering food production in the area. Liquefied biogas constitutes a renewable energy source capable of meeting the **increased global demand for using natural gas as a vehicle fuel**, while closing the loop and returning the nutrients in organic waste to agriculture.

Why a Sustainia100 solution?

80,000 tons of organic waste are annually utilized by Lidköping Biogas to fuel 60 long-haul trucks with a renewable alternative to conventional diesel, avoiding 18,000 tons of CO_2 emissions and reducing the need for thousands of tons of commercial fertilizers in local agriculture. Biogas liquefaction is suitable for processing waste from moderately sized cities, and is currently being established in several countries.

The Triple Bottom Line

ENVIRONMENTAL

Transportation is responsible for approximately ¼ of global greenhouse gas emissions from fossil fuels.[1]

SOCIAL

Liquefied biogas replaces conventional diesel, which results in more deaths than car accidents in the USA and the UK.[2]

ECONOMIC

Liquefied biogas increases the value of recycling waste and produces an alternative fuel on par with the cost of conventional diesel.

Developed: Sweden

Deployed: Sweden

Liquefied biogas reduces greenhouse gas emissions and improves urban air quality, while enabling nutrients to be recycled back into agriculture.

"LIQUEFIED BIOGAS IS AN IMPORTANT PIECE IN FUELING TRANSPORTATION IN A SUSTAINABLE WAY."

Christina Nilsson,
CEO, Lidköping Biogas

[1] International Transportation Forum. "Reducing Transport Greenhouse Gas Emissions." 2010. Online.

[2] Forbes. "Diesel Exhaust More Deadly Than Car Accidents." 2013. Online.

Waterless Toilets for Slums

Solution by: **x-runner Venture**

→ Lima, Peru: This solution brings waterless, affordable, and reliable sanitation to urban low-income households.

x-runner brings an appealing **waterless sanitation solution to low-income households** without access to conventional toilets in the capital of Peru, Lima. With **subscription to a pick-up plan**, households receive a waterless, resource-separating toilet combined with a weekly service that collects waste directly from the home. At the treatment hub, human feces are safely processed through composting, thereby generating a supply of **natural fertilizers for farmlands**.

This customer-oriented model creates an instant improvement in the lives of families, while keeping human waste out of waterways and **maintaining the cleanliness of neighborhoods.**

Why a Sustainia100 solution?

More than 750 million people live in urban low-income areas without access to proper sanitation.[1] Furthermore, where water is scarce, a sewage-based solution cannot work. In Lima, the world's second most polluted capital, close to a quarter of the population is not connected to the public sewer network.[2] This attractive, affordable, and easy-to-install system successfully addresses low-income families' health, social, environmental, and financial challenges.

The Triple Bottom Line

ENVIRONMENTAL

Every month, x-runner converts more than 2.5 tons of waste that would otherwise pollute the land and waterways into compost.

SOCIAL

x-runner reports that 93% of its customers felt the system had a positive impact upon their lives.

ECONOMIC

By means of its subscription model, customers avoid large upfront investments, making sanitation affordable to more people.

Developed:
Germany and Peru

Deployed: Peru

x-runner provides smell-free, waterless, and reliable sanitation to urban households that do not have a conventional toilet.

"AT X-RUNNER, WE BELIEVE IN A WORLD WHERE EVERY SINGLE PERSON CAN FULFILL HIS MOST BASIC NEEDS WITH THE DIGNITY EVERYONE DESERVES."

Isabel Medem,
CEO, x-runner Venture

[1] WHO and UNICEF. 'Joint Monitoring Programme For Water Supply and Sanitation'. Online: www.wssinfo.org/data-estimates/tables

[2] Future Megacities. 'Water Management in Lima (Peru): Project in Brief'. Online.

Floating Ecosystems for River Restoration and Water Quality

Solution by: **Biomatrix Water Solutions**

→ Forres, Scotland: This solution creates small floating islands that mimic nature to tackle pollution, algae, and sewage contamination, resulting in revitalized waterways.

Biomatrix Water Active Ecosystems have been developed to provide a concentrated natural solution to improve water quality. **The designs harness the power of nature** to provide a long-term sustainable water quality management solution, which **uses no chemicals and gets better with time as the system grows**.

This technology combines the latest developments in ecological engineering with new biofilm research and traditional wastewater treatment processes. Whole-system engineered ecologies provide an energy efficient, low life cycle cost treatment solution. Ultimately, the solution naturally **improves water quality, increases animal habitat, and provides protection to riverbank infrastructure**.

Why a Sustainia100 solution?

The degradation and pollution of waterways is a serious global issue. Biomatrix Water Solutions' restoration systems are an easy-to-install, modular, scalable technology, which can be site-specifically designed to suit many climates or embankments. The systems increase waterfront amenities and biodiversity, bringing thriving natural ecosystems to some of the world's most challenged urban waterways.

The Triple Bottom Line

ENVIRONMENTAL

Biomatrix has reported up to 86% reduction in coliforms, as well as a 45% and 62% reduction in ammonia and phosphates, respectively.

SOCIAL

Biomatrix endeavors to design systems that can be enjoyed by locals who frequent the waterfront, while meeting environmental policy requirements.

ECONOMIC

Biomatrix claims to offer a more economical, less invasive alternative to many waterfront civil works options.

Developed:
Scotland

Deployed: Philippines, UK, USA, China, India, and Brazil

Before: The Biomatrix system is placed in the river and lets nature do its work.

After: Once fully grown the system extends the natural riverbank.

"WE ARE PASSIONATE ABOUT PROVIDING SOLUTIONS THAT BRING WATERWAYS TO LIFE."

Galen Fulford, Managing Director, Biomatrix Water Solutions

Communication Platform for Integrating Renewable Energy

Solution by: **Power Plus Communications, University of Duisburg-Essen, MVV Energie, DREWAG, IBM, IFEU, IZES gGmbH, Fraunhofer IWES, and Papendorf Software Engineering**

→ Mannheim, Germany: By means of a real-time communication platform, "energy butler" devices help homes to optimize consumption according to the availability of renewable energy.

The Triple Bottom Line

ENVIRONMENTAL

This solution makes the best use of renewable energy locally, where and when it is most readily available.

SOCIAL

The energy butler engages city dwellers in the wider energy market, giving them access to better value and sustainable choices.

ECONOMIC

Energy providers can propose tariffs that take all conditions into account.

Developed: Germany

Deployed: Germany

"WE HAVE TESTED THE FUTURE OF ENERGY SUPPLY WITH NEW APPROACHES DESIGNED TO COPE WITH THE GROWING SHARE OF RENEWABLE ENERGY IN DISTRIBUTION NETWORKS."

Ingo Schönberg
CEO, Power Plus Communications

This solution, based in the German city of Mannheim, involves an **intelligent power grid that balances energy demand and supply**. A communication platform, provided by broadband powerline, is the key technology in the project. All components and participants in the system – energy production, distribution, and consumption – are linked in real time.

An "energy butler" is **the interface between this smart grid and the 1,000 households connected**. It collects information about energy prices and the origin of energy supplies. This helps to optimize energy consumption in the home, either manually or automatically, **according to the availability of renewable energy** and electricity prices.

Why a Sustainia100 solution?

By connecting the participants of the energy economy, energy prices can be communicated in real time. Applying variable tariffs based on real-time pricing allows the smart home to choose to use renewable energy when it is most plentiful. According to Power Plus Communications, results have demonstrated that city dwellers do react to price fluctuations when informed of market prices.

In Mannheim, Germany, this solution helps bring renewable energy to the grid.

Citywide Parking Sensors for Lowering Congestion

Solution by: **Smart Parking and Westminster City Council**

→ London, UK: By installing parking bay sensors across the city, this solution allows motorists to directly access available parking spaces – reducing congestion, air pollution, and fuel consumption in the process.

The Triple Bottom Line

ENVIRONMENTAL

Air pollution is lowered by reducing time spent cruising for available parking, which according to Smart Parking accounts for a significant amount of urban traffic.

SOCIAL

As air pollution from traffic congestion leads to 2,200 premature deaths annually in America's largest cities alone, this solution has significant health benefits.[1]

ECONOMIC

Users benefit from lower motoring costs by saving on fuel and wasting less time looking for parking spaces.

Developed: UK and New Zealand

Deployed: 11 countries, including the UK, United Arab Emirates, and the Czech Republic

"SMART PARK HELPS CITIES REDUCE CONGESTION AND POLLUTION THROUGH THE USE OF INTELLIGENT TECHNOLOGY."

Charlie Leaper, Managing Director, Smart Parking

[1] Levy et al. "Evaluation of the Public Health Impacts of Traffic Congestion: A Health Risk Assessment." Environmental Health, 2010, 9:65.

This solution delivers real-time information regarding parking space availability to smartphone users in order to **improve urban air quality and reduce congestion**. This is made possible by installing accurate and durable infrared sensors which **detect when vehicles are present** and transmit the information to a central server via zone controllers.

Following a successful trial, and around 100,000 downloads of the accompanying app, this solution is scaling in the West End of London. Having already installed over 3,500 parking bay sensors, work will continue over three years to install **up to 10,000 across central London Borough**.

Why a Sustainia100 solution?

According to Smart Parking, half a million vehicles compete for 12,000 parking spaces in the City of Westminster daily. The company also reports that 30% of traffic is made up of drivers seeking an open parking space, while 15% are empty because they cannot be located. This technology offers a solution to the problem that can easily be adopted by drivers.

Smart Parking's ParkRight app clearly shows parking categories and real-time space availability in Westminster.

Porous Asphalt for Stormwater Management

Solution by: **National Asphalt Pavement Association**

→ Portland, USA: By allowing rainwater to seep through it, porous asphalt is an effective stormwater management tool that can increase road safety, improve water quality, and replenish water tables.

The Triple Bottom Line

ENVIRONMENTAL

Porous asphalt reduces surface runoff, which can wash contaminants like oil or minerals into waterways unfiltered.

SOCIAL

Effective stormwater management minimizes the disruption to city life caused by heavy rainfall, and increases road safety.

ECONOMIC

Porous asphalt's cost advantage is partly created by its elimination of many standard stormwater system elements.[2]

In function and performance, porous asphalt is very similar to the conventional alternative. Made **without the need for additional materials or equipment**, this material achieves its porous qualities through the removal of fine particles. Coarse particles allow water to seep through to the underlying recharge bed, and ultimately to the soil, during rainfall. This **process also filters rainwater**, with a high removal rate for total suspended solids, metals, oil, and grease.[1]

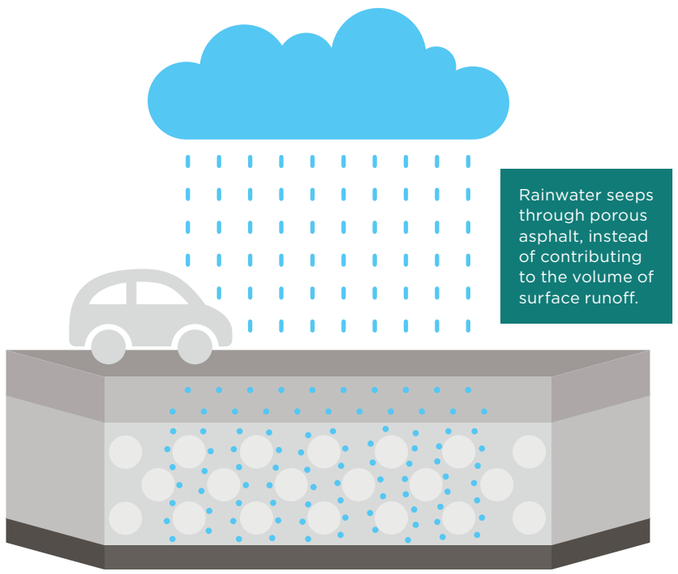
The solution has been implemented in several cities across the United States, including Portland, which has been working on greening its streets since the 1990s. As part of these efforts, porous pavements have helped to prevent stormwater from reaching the city's combined sewer system and overflowing into the Willamette River.

Why a Sustainia100 solution?

Streets make up 35% of Portland's impervious surface, contributing greatly to runoff problems during rainfall. In response, porous asphalt can reduce contamination of waterways and lessen the strain on infrastructure, while offering a more natural solution complete with absorption, filtering and cleaning of rainwater.

Developed: USA

Deployed: USA



[1] National Asphalt Pavement Association. "Porous Asphalt". Online: www.asphaltpavement.org

[2] Ibid.

Public-Private Partnership for Citywide Retrofitting

Solution by: **City of Melbourne**

→ Melbourne, Australia: This solution offers building owners, tenants and investors access to long-term finance for building upgrades at attractive terms.

The Triple Bottom Line

ENVIRONMENTAL

High-performing, efficient buildings reduce the consumption of non-renewable resources such as fossil fuels.

SOCIAL

Green buildings come with a better indoor climate, which supports a healthier workforce.

ECONOMIC

The retrofitting of existing commercial office buildings provides an excellent return on investment due to increased levels of workforce productivity.

Melbourne's Environmental Upgrade Agreement (EUA) system is part of the city's efforts to meet its goal of reaching carbon neutrality by 2020. It consists of an agreement between a property owner, a bank, and local government that facilitates **a building upgrade to improve energy efficiency**. This can include the installation of renewable energy systems or upgrades to plants and equipment such as insulation.

Building owners take out a loan with a lending body, which is repaid to the bank via the local council. The loans offered by the EUA come with competitive rates over a longer time period. **Local government involvement reduces risk of potential default to the bank**, while the building owner can pay back the loan over 10 years, if required.

Why a Sustainia100 solution?

Although 560 buildings have undertaken some form of retrofit since 2008, over 50% of emissions in Melbourne are generated by the commercial sector. If 1,200 buildings improve their energy efficiency by 38%, the equivalent of 383,000 tonnes of CO2 emissions will be avoided annually. Because access to finance can be a barrier, the EUA mechanism was developed to support building owners to fund retrofits.

Developed: Australia

Deployed: Australia

"WHAT MAKES CITIES REALLY SUCCESSFUL IS THEIR ABILITY TO BE AGILE, ADAPTIVE, INNOVATIVE AND CO-OPERABLE. IN MY CITY WE CARE A LOT ABOUT THOSE QUALITIES."

Robert Doyle, Lord Mayor, Melbourne

Resources Sector

Construction Products Made From Natural Waste
Ecor and Noble Environmental Technologies Corporation

Platform for Sharing Products with Peers
Zilok

Prepaid Shipping for Donations
Give Back Box

Biodegradable Diapers Reducing Waste
gNappies and gDiapers

Shower System Recycles and Cleans Water
Orbital Systems

Water Treatment Plant Producing Renewable Energy
Cambrian Innovation

Reusable Bottle System for Cleaning Products
Replenish

Carbon-Negative Plastic
Newlight Technologies

Paper Made from Banana Plants and Old Textbooks
TNF Ecopapers and EARTH University

Biodegradable Plastic from Waste Materials
Bio-on

Solutions deployed

Construction Products Made From Natural Waste

Solution by: **Ecor and Noble Environmental Technologies Corporation**

The Triple Bottom Line

ENVIRONMENTAL

The solution shows a new and effective way of using waste materials as a substitute.

SOCIAL

The simple technology enables people in remote places to construct sustainably.

ECONOMIC

The components in Ecor's products are easily accessible in most areas of the world, with limited waste acquisition costs.

Developed:
USA

Deployed: Switzerland, Serbia, and USA

"EVERY ARCHITECT WANTS TO WORK WITH ENVIRONMENTALLY FRIENDLY MATERIALS. ECOR HAS PROVEN ITS ABILITY TO REPLICATE THE SHAPES OF ANY IMAGINABLE FORM."

Robert L. Noble, Founder and CEO, Noble Environmental Technologies Corporation

→ Ecor is a commercialized material made from natural waste that can be used to manufacture a wide range of construction products.

Ecor is a flexible and multiuse material for construction, interior design, and furniture. It is made from **cellulose fibers, an abundant material found in urban, farm, and forest waste**. Waste materials such as cardboard, wood, and byproducts from agriculture are combined with water, heated, and pressurized to make Ecor products. The material is used for walls, panels, and displays, and is even sturdy enough to create small buildings.

It can also be **recycled into new products after use and contains no chemicals, petroleum, or other additives**. The process that goes into making the material is simple, resulting in Ecor's success in commercializing, distributing, and outsourcing production.

Why a Sustainia100 solution?

This solution shows a simple yet effective sustainable substitute for polluting materials, such as oil-based plastics, using waste as a resource. The material is biodegradable and can be recycled into new products. In order to be close to the resources for production, Ecor has set up plants in the United States, Switzerland, and Serbia, and will soon open a new one in Indonesia.

Platform for Sharing Products with Peers

Solution by: **Zilok**

→ Zilok has developed a peer-to-peer website with a critical mass of users renting out private products for generating income and better use of resources.

The trouble with renting private products is finding the person who can offer the exact product needed. Zilok's platform and algorithm for **peer-to-peer rental makes it easy to borrow a sewing machine or lend a kayak**.

Zilok has achieved a critical mass of people renting out their private products to make the selection on the website reflect a **wide variety of products from a range of locations in the United States and three countries in Europe**. It is a safe way for ordinary people to earn extra income, with Zilok charging a percentage of the earned amount to sustain the business.

Why a Sustainia100 solution?

The total material costs of making new products are often more than we think. For instance, a mobile phone has a total material cost of 26 kilos. This solution enables people to easily rent and lend their belongings, changing consumption patterns towards owning fewer products and thus using fewer materials.

The Triple Bottom Line

ENVIRONMENTAL

Easy access to renting possibilities can save billions of tons of material input for production and slow down resource depletion.

SOCIAL

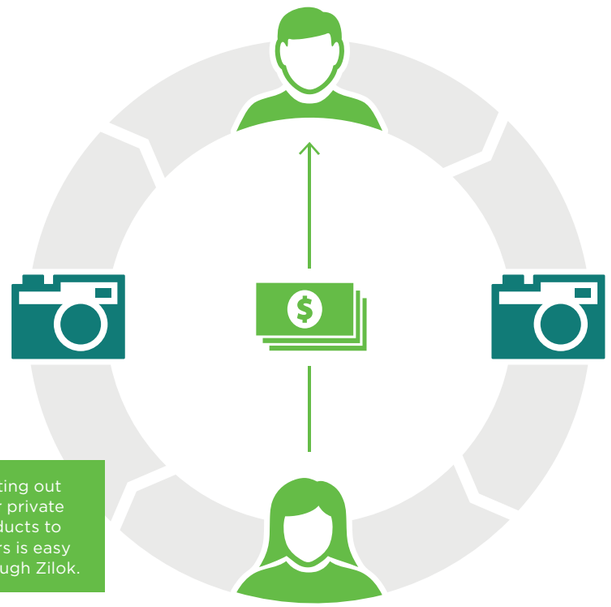
Peer-to-peer rental between individuals connects them across cultural differences and gives access to a variety of products they normally would not have access to.

ECONOMIC

The solution makes it easy for people to earn an income on products that they do not use and to rent products at a reasonable price.

Developed:
Belgium and France

Deployed: Belgium, France, UK, and USA



Renting out your private products to peers is easy through Zilok.

[1] The Finnish Ministry of the Environment "Household MIPS." Report. 2008.

Prepaid Shipping for Donations

Solution by: **Give Back Box, in collaboration with Newegg, Overstock, UPS, Goodwill, Salvation Army, and St. Vincent DePaul**

→ Give Back Box makes it convenient and cost-free for people to donate unwanted products cluttering their homes by providing a prepaid shipping label for boxes from online stores.

Give Back Box works with online stores and shipping companies to make it convenient for their customers to **donate household items to charities**. It is a cost and hassle-free way to ship boxes to charity, containing high-quality items that would **otherwise have been thrown out**.

Items are placed in a shipping box, the box is sealed, **the prepaid shipping label is attached, and the package sent as usual**. It is even possible to print Give Back Box labels at home. The average household in the United States has $7,000 worth of unused and unwanted goods according to Give Back Box. The donation of these goods could benefit charities.

Why a Sustainia100 solution?

Every day 10 million boxes are shipped via Internet shopping in the United States. It is estimated that this will increase by 15 to 20% every year; the boxes often end up in landfills instead of being recycled. The Give Back Box system creates an incentive to recycle both boxes and items, and save resources used in manufacturing.

The Triple Bottom Line

ENVIRONMENTAL

Give Back Box recycles clothes and other household items – along with the cardboard box itself.

SOCIAL

By donating unwanted goods, Give Back Box helps some of the 50 million people in the USA living below the poverty line.

ECONOMIC

Donating through Give Back Box does not cost anyone a penny – not the online shopper, not the retailer, not the shipper, and not the charities.

Developed:
USA

Deployed: USA

"CHANGING THE WAY PEOPLE SHOP ONLINE FOREVER!"

Monika Wiela, CEO, Give Back Box

Give Back Box allows online shoppers to donate their unwanted and unused household goods with ease and without cost.

Biodegradable Diapers Reducing Waste

Solution by: **gNappies and gDiapers**

→ With gNappies' compostable diapers, families can reduce waste significantly during the first years of a baby's life.

Diapers account for as much as 50% of household waste in families with small children.[1] gNappies are **designed with a reusable cover and a biodegradable disposable insert**. When the insert is soiled, it is removed and can be composted with food waste or flushed down the toilet.

The cover is made from cellulose rayon and fluffed wood pulp which comes from **sustainably grown and harvested softwood** that is finely granulated. The cover can be washed together with regular clothes. The diaper inserts contain sodium polyacrylate, a plant-based, non-toxic water absorbing polymer.

Why a Sustainia100 solution?

According to the United States Environmental Protection Agency, diapers account for 2% to 4% of all waste in USA, the EU, and Australia. One baby's use of diapers amounts to 150 kilos of wood, 25 liters of petroleum for plastics, and 10 liters of chlorine per year. gNappies significantly reduce waste from diapers and decompose in less than two months.

The Triple Bottom Line

ENVIRONMENTAL

gNappies are Cradle to Cradle certified and do not contain chemicals that are harmful to the environment.

SOCIAL

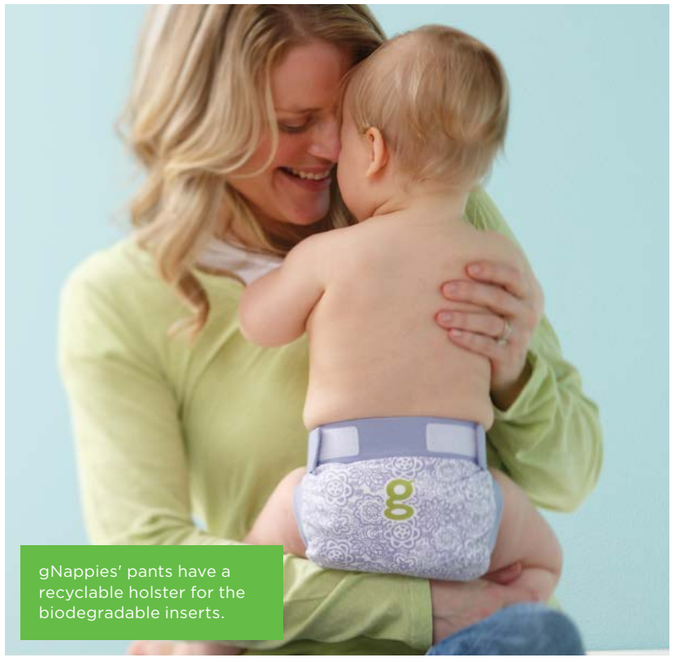
gNappies are made from materials that do not harm babies' health.

ECONOMIC

Diapers can be a big expense for families. By recycling the pants, and only paying for the inserts, the cost of diapers is reduced significantly.

Developed: **Australia**

Deployed: 28 countries, including UK, USA, and most EU countries

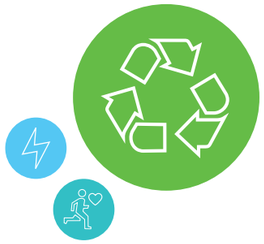


gNappies' pants have a recyclable holster for the biodegradable inserts.

[1] Real Diaper Association. "Diaper Facts." Online: www.realdiaperassociation.org.

Shower System Recycles and Cleans Water

Solution by: **Orbital Systems**



The Triple Bottom Line

ENVIRONMENTAL

Orbital Systems' shower unit slashes water consumption of showering by almost 90% compared to conventional showers.

SOCIAL

The shower unit creates awareness on water usage in people's daily lives.

ECONOMIC

By reducing water and energy consumption, the Orbital Systems shower unit lowers customers' utility bills.

Developed: **Sweden**

Deployed: Sweden

→ Orbital Systems' efficient shower unit saves up to 90% water and 80% energy, while increasing comfort and hygiene.

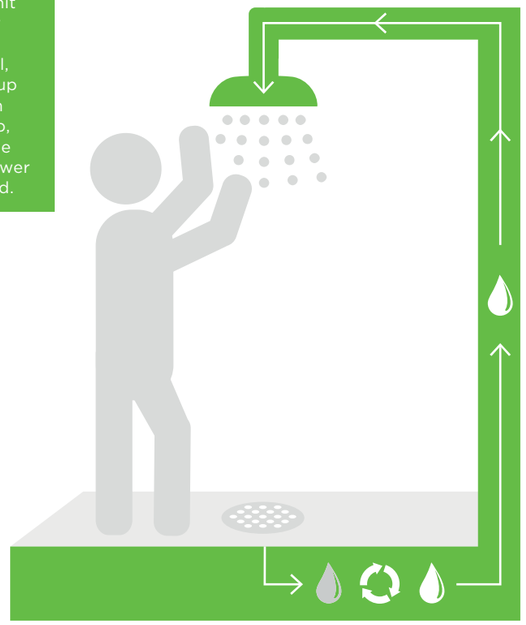
This solution is an innovative water recycling technology for homes and public recreational buildings. Orbital Systems states that the shower unit can save over 90% on water by **pumping it through a filter and reusing it during the same shower**. The water is purified to drinking quality, and in most cases leaves it cleaner than the original tap water.

For a 10-minute shower, the system uses just five liters of water while an ordinary shower would use 150 liters of water. The water is already heated and therefore the system uses up to 80% less energy than regular shower systems.

Why a Sustainia100 solution?

Showering is one of the largest sources of water use in Western homes. Orbital Systems has developed a solution that addresses this issue without disrupting the comfort of everyday living. The solution has already been installed in several public recreational centers in Sweden, and has proven to clean water effectively at an affordable price.

The Orbital Systems shower unit purifies shower water to drinking quality level, pumps it back up in the system in a recycling loop, and discards the water after shower session is ended.



"ORBITAL SYSTEMS IS AN EFFICIENT TECHNOLOGY INNOVATION WHICH ALLOWS FOR BOTH LASTING PROFITABILITY WHILE CONTRIBUTING TO A MORE SUSTAINABLE PLANET."

Niklas Zennström, Mentor and Investor, Orbital Systems

Water Treatment Plant Producing Renewable Energy

Solution by: **Cambrian Innovation**

The Triple Bottom Line

ENVIRONMENTAL

The solution converts industrial wastewater streams into heat and renewable electricity.

SOCIAL

Cleaning water for agriculture suports healthy food production.

ECONOMIC

The solution is economically viable, with a return of investment of up to 25%, and the modular system is pre-fabricated for low-cost installation.

Developed: **USA**

Deployed: USA

→ EcoVolt is an easily implementable commercial wastewater treatment system that generates electricity and heat while cleaning water.

EcoVolt is the world's first industrial-scale wastewater treatment and reuse system that is based on a bioelectrical process. It can be **implemented easily at breweries, wineries, and food processing plants to clean water** at the source while simultaneously providing electricity for production. This means decreasing a company's carbon footprint and **turning environmental liabilities into a source of revenue**.

The first deployment of EcoVolt is at the California-based Bear Republic Brewing Company. It uses electrically active organisms to rapidly eliminate 80% to 90% of biological oxygen demand and **converts CO2 into biogas (methane) that is used onsite to generate heat and electricity**. The system provides more than 50% of the company's electricity usage and recycles the water.

Why a Sustainia100 solution?

Drought is an increasing problem in the global food industry, with clean water becoming a scarce commodity in many places. The EcoVolt treatment system handles these issues effectively. It benefits the environment with clean water and the production of renewable energy which lowers the carbon footprint in production.

Reusable Bottle System for Cleaning Products

Solution by: **Replenish**

→ Replenish is a series of cleaning products that allow for reuse of spray bottles, reducing waste generation and transportation costs.

Replenish has developed a new concept for the cleaning industry by **selling empty reusable spray bottles** and non-harmful cleaning chemicals as an add-on. A capsule containing concentrated cleaner chemicals is screwed on to the bottle, which is then filled with water from the faucet. One capsule contains enough chemical cleaner for the bottle to be refilled four times, and the capsule can be recycled.

Traditional cleaning products contain approximately 95% water and five percent actual chemical cleaner. **By transporting capsules and not bottles full of water**, Replenish significantly reduces the transportation costs and CO2 footprint of its cleaning products.

Why a Sustainia100 solution?

The Replenish bottle is 100% recyclable and is tested for at least 10,000 trigger pulls, making it last for years of daily use. Replenish aims to eliminate 1 billion bottles from landfills and reduce the negative environmental impacts of chemicals by recycling the bottles and using only cleaning chemicals that do not harm nature or humans.

The Triple Bottom Line

ENVIRONMENTAL

The cleaning chemicals are 98% plant-based, biodegradable, non-toxic to aquatic life, and pH neutral.

SOCIAL

Replenish's cleaning products are not harmful to humans or local environments.

ECONOMIC

The Replenish bottle is an investment of $7 and can be used 10,000 times. The capsule costs $1 to $5 less than conventional cleaning products.

Developed: USA

Deployed: USA

The Replenish system reuses the bottle and replaces the pod.

Carbon-Negative Plastic

Solution by: **Newlight Technologies**

→ AirCarbon converts greenhouse gases into a plastic material, thereby replacing oil-based plastics at a competitive price and performance.

AirCarbon is a carbon-negative plastic, meaning that it **captures carbon from methane and other greenhouse gases from the air to make plastic materials**. It can match oil-based plastics in price and performance, representing a more sustainable alternative to traditional plastics.

AirCarbon is being **produced on a commercial scale** at two production sites in California, and is used to make chairs, bags, and cell phone cases. Costumers include some of the largest manufactures in the furniture, packaging, and electronics industries.

Why a Sustainia100 solution?

Millions of tons of carbon are emitted into the air every day. AirCarbon captures that carbon and uses it as a resource to make products that would otherwise be made from oil. The products made from AirCarbon are carbon-negative, even after calculating the emissions from the energy used in production.[1]

The Triple Bottom Line

ENVIRONMENTAL

A study by Newlight Technology found that if 63% of global fossil fuel-based plastics were replaced with carbon-negative plastic, it would capture enough carbon on annual basis to stabilize climate change by 2050.

SOCIAL

Capturing carbon emissions can reduce the effects of climate change and prevent mass migration from climate crisis areas.

ECONOMIC

According to Newlight Technologies, AirCarbon is less expensive than oil-based plastic, making it an easy choice for companies concerned about CO2 emissions.

Developed: USA

Deployed: USA, South Korea, and France

"CLIMATE CHANGE CAN BE SOLVED WITH MARKET-DRIVEN SOLUTIONS LIKE AIRCARBON TO REVERSE THE FLOW OF CARBON."

Mark Herrema, Co-Founder and CEO, Newlight Technologies

[1] NSF Sustainability and Trucost have independently verified AirCarbon as a carbon-negative material.

Carbon-negative chair and products made by turning air and greenhouse gases into plastic.

Paper Made from Banana Plants and Old Textbooks

Solution by: **TNF Ecopapers and EARTH University**

→ In Costa Rica, waste materials from organic banana production are mixed with recycled books to produce paper.

The agricultural industry produces 42 million tons of bananas every year worldwide. One of the **byproducts from banana production are stems made of a fiber fit for manufacturing paper** that is 100% compostable. As the first of its kind in the world to be sold on a commercial scale, TNF Ecopapers has developed "the banana paper," which mixes banana stems and recycled paper from outdated textbooks.

The paper can be used for writing, but since the long fibers are tough and long, it is durable and well-suited for wrapping and cardboard boxes. The production process **does not require use of new wood-based materials**, and the innovation has sparked similar paper production using byproducts of coffee and mango farming.

Why a Sustainia100 solution?

Deforestation in Costa Rica is a serious threat to biodiversity and ecosystems due to the growing agricultural business. By combining organic farming with the use of waste materials, deforestation can be significantly reduced. According to the EARTH University, each ton of banana paper from TNF Ecopapers reduces air pollution by 74% and water pollution by 35% compared to conventional paper.

The Triple Bottom Line

ENVIRONMENTAL

Production of the banana paper involves no use of chemicals and saves between 17 to 20 trees per ton produced.

SOCIAL

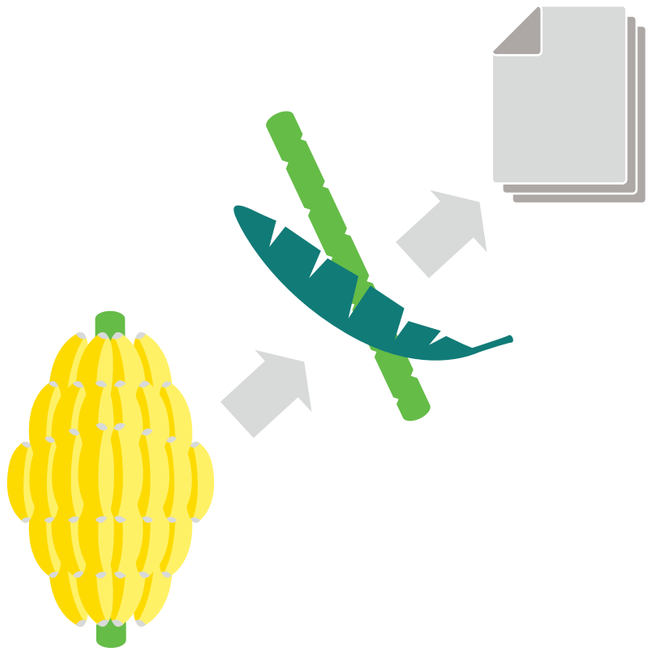
The project has been monitored by EARTH University, which has been helping the project develop into a sustainable business and secure fair worker conditions.

ECONOMIC

By using waste from production and discarded books, there is no material cost for TNF Ecopapers to produce the eco-friendly paper.

Developed:
Costa Rica

Deployed: Costa Rica and USA



Biodegradable Plastic from Waste Materials

Solution by: **Bio-on**

→ Bio-on addresses the problem of plastic pollution in our oceans and landfills by producing 100% natural biodegradable plastic made from waste materials.

Biodegradable plastics (or bio-plastics) from Bio-on are made from **waste agricultural materials**. The plastic is produced through a bacterial fermentation of byproducts of sugar beet and cane production that comes from local agriculture. The material is completely natural, and requires no chemical organic solvents.

The **bio-plastic dissolves naturally when it comes in contact with bacteria but does not dissolve when used for packaging**, such as water bottles, because no bacteria are present to biodegrade the plastic. The material is known as PHA (short for Polyhydroxyalkanoate) and can be used to produce materials whose properties vary greatly. The first product to be commercially made from PHA is a Flos lamp designed by Philippe Starck.

Why a Sustainia100 solution?

Oil-based plastic can be found in oceans, soil, and even in most human bodies. It is a severe risk for human health, wildlife, and natural ecosystems. By substituting oil-based plastic with natural and biodegradable plastic, such as PHA, these risks can be mitigated.

The Triple Bottom Line

ENVIRONMENTAL

The Bio-on technology uses no fossil fuels and no solvents in production. The biodegradation occurs in natural water sources.

SOCIAL

Bio-plastic could eliminate many of the health concerns associated with traditional plastic production, use, and disposal.

ECONOMIC

Bio-plastic has a wide range of potential applications and is a replacement for oil-based plastics. It is gaining popularity in various fields involving packaging, medical equipment, and coating materials.

Developed:
Italy

Deployed: Italy

"BIO-PLASTICS ARE MADE FROM WASTE MATERIALS – NOT FROM PRODUCTS INTENDED FOR FOOD PRODUCTION. THIS, COMBINED WITH COMPLETE BIODEGRADABILITY IN WATER, IS THE BIG ENVIRONMENTAL ADVANTAGE."

Marco Astorri, CEO, Bio-on

Bio-plastic can make various products from medical equipment to packaging and interior design – such as this lamp.

Methodology

We strive to continuously improve the Sustainia100 and make it a valuable tool that can guide the transformation to a sustainable society. This is why transparency into our process and methodology matters to us. It allows our readers to engage with us, evaluate our choices and help us improve the Sustainia100 each year.

FINDING THE SOLUTIONS

Sustainia has given consideration to any project or initiative submitted to our research team. In early 2014, we issued a formal call for submissions to the global sustainability community. A comprehensive communications effort resulted in sustainability entrepreneurs from ***70 countries*** across the globe submitting their projects as applicants for the Sustainia100. Together with our own extensive research into trends and new developments within 10 sectors, this resulted in ***900+ applicants*** for review.

The applicants represented a wide variety of organizations and companies with diverse business models and approaches to creating a more sustainable world. All applicants were reviewed using Sustainia100's five evaluation criteria, which enabled us to select ***200 Candidates*** to be presented to our external ***Advisory Board*** of sector experts.

SELECTING THE NOMINEES

To ensure consistency, Advisory Board members were asked to observe the ***Evaluation Criteria*** when making their judgments on solutions within their field of expertise. They were also encouraged to apply their sector-specific expertise and knowledge about sustainability during this process, and to share all considerations or concerns in meetings with Sustainia's research team.

Guided by input from advisors, we requested additional information from 140 candidates. With this information, we were able to answer outstanding questions and qualify our final selection of the 100 solutions published and described in the Sustainia100. [1]

HOW WE UNDERSTAND SUSTAINABILITY

The concept of "sustainable development" was introduced in 1987 by the World Commission on Environment and Development, in the report "Our Common Future" (also known as "the Brundtland Report"). The report defines sustainable development as:

> "... development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:
>
> - the concept of '**needs**,' in particular the essential needs of the world's poor, to which overriding priority should be given; and
> - the idea of **limitations** imposed by the state of technology and social organization on the environment's ability to meet present and future needs."

The notion of the triple bottom line – environmental, social, and economic sustainability – is inspired by the definition from the Brundtland Report. For all of the solutions, we provide key benefits within the triple bottom line to underline in which ways the solutions are contributing to the advancement of sustainable development.

[1] The information featured in the Sustainia100 is correct to the best of our knowledge, based on extensive research as well as information provided by organizations and companies behind the solutions.

Evaluation Criteria

Sustainia100 solutions meet five criteria:

READILY AVAILABLE

Sustainia100 candidates must be more than vague ideas or blueprints. Candidates must be concrete projects that are making an impact in societies and markets. We do include candidates that are only prototypes if they have strong commitments from investors or partners that suggest further development.

SCALABLE

Sustainia100 candidates should be able to scale up activities. This entails that candidates can have a wider and lasting impact beyond their present location and circumstances. Scalable solutions are replicable in wider contexts and are characterized by backing from strong partners or sound business models.

POSITIVE ENVIRONMENTAL IMPACT

Sustania100 candidates represent an improvement from the status quo in terms of having a positive impact on global climate or local environmental factors. The best candidates incorporate cutting-edge technologies or methods that challenge present standards and business as usual.

FINANCIALLY VIABLE

Sustainia100 candidates must show that the cost of their project is justified in light of its promised benefits. Candidates are not discredited for relying on subsidized or highly philanthropic business models but affordability and financial sustainability of projects are key qualities for Sustainia100 candidates.

IMPROVE QUALITY OF LIFE

Sustainia100 candidates are assessed on their ability to deliver a better and more sustainable life for the people they impact. Candidates should bring about real change by enhancing well-being for the individual and for communities and by addressing social needs across societies.

The Sustainia100 Advisory Board

Our Advisory Board consists of 21 experts from 11 international research organizations:

ELLEN MACARTHUR FOUNDATION

Ken Webster, Head of Innovation

EPEA INTERNATIONALE

Jenny Pfau, Senior Scientist and Project Manager

EUROPEAN ENVIRONMENT AGENCY

Lars Fogh Mortensen, Head of Group, Sustainable Consumption & Production and Waste Group

Marco Veneziani, Sustainable Consumption & Production and Waste Group

INTERNATIONAL FEDERATION FOR HOUSING AND PLANNING

Regitze Marianne Hess, Chief Operating Officer

NATURAL RESOURCES DEFENSE COUNCIL

John Romano, Global Policy Fellow

NORDIC FASHION ASSOCIATION

Johan Arnø Kryger, Deputy Head of Secretariat and Senior Manager, Danish Fashion Institute

NORWEGIAN UNIVERSITY OF LIFE SCIENCES

Kyrre Rickertsen, Professor, Norwegian University of Life Sciences

UNITED NATIONS WORLD FOOD PROGRAMME

Anne Poulsen, Director, United Nations World Food Programme

UNIVERSITY OF CALIFORNIA, BERKELEY

John Zysman, Professor

David Roland-Holst, Professor

WORLD RESOURCES INSTITUTE

Holger Dalkmann, Director, EMBARQ, World Resources Institute

Juan Miguel Velasquez, Associate, EMBARQ, World Resources Institute

WORLD WILDLIFE FOUNDATION

Stefan Henningsson, Senior Advisor, Climate Innovation

Elmar Grosse Ruse, Project Manager, Climate & Energy

Jeet Mistry, Urban Development Expert, Sustainable Cities Programme

Robert Ddamulira, Regional Energy Coordinator

Rafael Senga, Manager, Energy Policy Asia-Pacific

INDEPENDENT ADVISORS

Brian Edwards, Emeritus Professor of Architecture, ECA, Edinburgh University

Graham Vickery, Ph.D., Information Economics, former Head of the Information Economy Group, OECD

Sass Brown, Assistant Dean, the Fashion Institute of Technology, author of "Eco Fashion"

Disclaimer: The members of the Sustainia100 Advisory Board have contributed their knowledge in vetting solutions within sectors of expertise. However, the selection of solutions to be featured in the Sustainia100 is the sole responsibility of Sustainia. Moreover, the opinions expressed by the Advisory Board members do not necessarily represent the official opinion of the Advisory Board members' organizations.

Sustainia Award

The Sustainia Award is an annual international award selected from the Sustainia100 solutions that honors outstanding performances within sustainability.

Taking place in Copenhagen only days before the launch of the fifth IPCC report, the Sustainia Award this year will be a call for action to start scaling the available solutions needed to address the world's urgent sustainability and climate change challenges.

Sustainia Award Ceremony 2013: Under the direction of artist Olafur Eliasson, audience members co-created a live art installation, illuminating the Royal Danish Theatre with hundreds of Little Sun solar lanterns.

The Award Committee

Arnold Schwarzenegger
Honorary Chairman of Sustainia Award Committee and Former Governor of California

Connie Hedegaard
European Commissioner for Climate Action

Gro Harlem Brundtland
Former Prime Minister of Norway

Dr. Rajendra Pachauri
Nobel Laureate and Chairman, Intergovernmental Panel on Climate Change (IPCC)

To select the Sustainia Award winner, the Award Committee reviews and agrees on the most groundbreaking Sustainia100 solution. The winner is picked for its significant ability to build a greener and more prosperous future for us all.

All 100 solutions in the **Sustainia100 are nominees for the Sustainia Award**. The winner will gain global awareness around its groundbreaking efforts, and Sustainia will, along with its partners, dedicate time and resources to **help the winner scale for greater impact**.

For the annual Sustainia Award celebration, Sustainia attracts **over 1,000 people** from its community, demonstrating that sustainability can indeed sell tickets when presented in an appealing way. We also invite our friends and followers to get engaged, vote, and celebrate their favorite solution. The Sustainia Community Award is the voice of the global community and a recognition of the winner's ability to create enthusiasm and inspire a broader audience to embrace sustainability.

In the last week of October this year, Copenhagen will be the scene of both the launch of the IPCC´s Fifth Assessment Report and the Sustainia Award Ceremony. The IPCC report documents the grave impacts of climate change and underlines the urgency of showcasing solutions to help secure a green and desirable future. In 2014, the Sustainia Award Ceremony will be more than a celebration of sustainable solutions – it will be a global call for immediate action and an inspiration on how to start a solution revolution.

This year, the Sustainia Award winner will be announced at the Sustainia Award Ceremony on October 30th, 2014. The ceremony will be held at the Royal Danish Theatre in Copenhagen, Denmark.

JOIN US!

2013 Sustainia Award Winner:

TaKaDu

The winner of the Sustainia Award 2013, TaKaDu, is a pioneer in integrated water network management, with its innovation helping to protect the world's most valuable resource: water. Water loss due to network inefficiencies is a large challenge for the world's water supply. According to the World Bank, water loss amounts to 25–30% of the world's water production and results in an annual loss of $14 billion for water utilities.

TaKaDu has created a unique Software-as-a-Service solution that is transforming the way water networks are operated and managed. The **TaKaDu** solution harnesses the utilities' multiple data sources, and translates them into actionable insights. Utilities get real-time alerts on network issues — faults, leaks, bursts, pressure fluctuations, flow and level irregularities, and water quality — allowing them to resolve network problems faster. This saves time and money and protects the water supply.

In Melbourne, early detection of leaks was improved by 14 days on average with the **TaKaDu** service. In Chile, the town of Antofagasta has improved its reduction of total water losses from 30% to only 23% over the past five years with the help of the software service, saving some 800 million liters of water per year.

"TODAY'S SUSTAINIA AWARD WINNER IS A GREAT EXAMPLE OF THE SOLUTIONS WE NEED. WITH AN ADVANCED TECHNOLOGY, **TAKADU** IS HELPING ADDRESS A SERIOUS ISSUE FACING MANY COMMUNITIES:, SCARCITY OF WATER. THEY ARE TRUE GREEN ACTION HEROES."

Arnold Schwarzenegger, former Governor of California,
Honorary Chair of Sustainia Award Committee

RECENT DEVELOPMENTS:

New Market Expansion

Since winning the Sustainia Award, **TaKaDu** has expanded into two new markets: the Netherlands and Brazil. This brings the number of countries where **TaKaDu** is deployed in water utilities to a total of eight, with the other six being Australia, Chile, Israel, United Kingdom, Spain and Portugal. In October 2013, **TaKaDu** announced the closing of a $6 million private equity investment led by 3M New Ventures.

TaKaDu is also building partnerships in the developing countries of Asia and Latin America in order to support water management in these regions and help utilities maximize the use of data.

Two new markets:
the Netherlands & Brazil

Why TaKaDu is a Sustainia Award Winner

With fresh water being the source of life on Earth, we need solutions to ensure we don't squander it. Sustainia Award Winner **TaKaDu's** readily available technology helps us use our most precious resource smarter and more efficiently by greatly decreasing the volume of water losses throughout the distribution networks. With rising challenges due to global population growth and the effects of climate change, the demand for water will increase significantly over the next century. This solution is a real game changer – once scaled it will increase the quality of life for millions of people around the world.

2013 Sustainia Community Award Winner:

Liter of Light

The 2013 Sustainia Community Award winner, Liter of Light, is a Philippine-based organization that provides solar light for off-grid housing in the developing world. The solar lamp developed by Liter of Light is a simple design using only a plastic bottle filled with water, and a small amount of bleach to keep the bottle algae-free. Inserted through the roof, each solar bottle refracts sunlight with the intensity of a 55-watt light bulb.

Using basic tools and carpentry skills, volunteers and local entrepreneurs can light up their communities during the daytime for just $2 per installation. This is a long-term investment, since each lamp has a lifespan of about 5 years. The nighttime upgrade with a solar panel retails at $10. With the lamps made by grassroots entrepreneurs and women's groups in the Philippines, the cost of finished goods is reduced by 40%.

With 350,000 lamps installed in over 10 countries across five continents, **Liter of Light** creates local jobs and teaches green skills. Since 2011, when the initiative started, 370 grassroots entrepreneurs have been trained by **Liter of Light** to install the solar lamps. Each entrepreneur services an average of 11,000 homes per year.

"THIS INNOVATION IS ALREADY PROVIDING CLEAN AND AFFORDABLE LIGHTING TO THOUSANDS OF PEOPLE WITHOUT ELECTRICITY, AND HAS SCALING POTENTIAL IN MANY MORE COUNTRIES."

Gro Harlem Brundtland, Former Prime Minister of Norway,
Member of Sustainia Award Committee

RECENT DEVELOPMENTS:

Empowering Local Typhoon Relief Efforts

Since the Sustainia Award Ceremony, **Liter of Light** has been heavily involved in the relief efforts in the aftermath of typhoon Haiyan. Touted as the strongest typhoon in history to make landfall, approximately 90% of the infrastructure in Tacloban, Philippines, was destroyed. A five-meter-high storm surge flattened buildings and homes and destroyed all access to communication and basic necessities such as food, water, and electricity.

With its simple off-grid solution, **Liter of Light** has focused on installing bunkhouses and street lights in Tacloban. **Liter of Light** has furthermore initiated a partnership with Philips Lighting to speed up the relief efforts. The goal is to simplify the technology to make it simpler and easier to produce, in order to halve the cost of the product.

To date 1,300 solar lamps and 250 streetlights have been made by Liter of Light for the disaster areas of Cebu, Bohol, and Tacloban, in the Philippines.

Why Liter of Light is a Sustainia Community Award Winner

Over 1 billion people around the world suffer from lack of access to energy, including 15 million people in the Philippines. To address energy poverty, solutions should involve local materials, easily replicable technologies and livelihood-generating enterprises. Most developing countries and regions have access to the simple materials necessary for a **Liter of Light** lamp, which greatly increases the applicability of the technology throughout the world.

Want to get involved with Sustainia?

We are committed to helping our partners accelerate sustainable change in companies, cities, and industries.

Sustainia's partners are companies and organizations that wish to be transition pioneers guiding the way to a more sustainable economy and the advancement of new business models.

Our partners share a dream of developing an economy and a society capable of meeting people's needs within the boundaries posed by nature and resource scarcity. Sustainia partners seek to becom leaders of sustainability in their field and assist each other in the transformation.

We go on a journey with companies to shape them into sustainability front-runners. Together with our passionate team of researchers, analysts, writers, designers, event specialists, and communication and social media experts we provide the innovation, inspiration, arguments, analysis, facts and a network to help our partners accelerate a global position within sustainability.

Connect with Sustainia
sustainia@mm.dk

OUR FOUNDING PARTNERS:

"Summarizing Sustainia in one word for me is inspiration. DNV's vision is to have a global impact for a safe and sustainable future. Sustainia, to a large extent, provides content to this vision and inspiration to our daily work"

— Bjørn Kj. Haugland,
Chief Sustainability Officer, DNV GL Group

"As a philanthropic foundation Realdania is engaged in Sustainia because of our engagement and commitment towards creating a more sustainable world. Sustainia helps us to communicate our mission to improve quality of life and benefit the common good by improving the built environment"

— Jesper Nygård,
CEO, Realdania

"As a company with a long track record of working within sustainability, Sustainia is a breath of fresh air that can support our wish to communicate sustainability in a clear, fun and easy to understand way"

— Lise Kingo,
Executive Vice President & Chief of Staff, Novo Nordisk

Areas where we help our partners:

STRATEGY AND INNOVATION PROCESSES

For those looking to **create change in a more sustainable direction**

- We are an active partner in the strategic transformation processes that build the right culture and mindset to equip partners for their sustainability journey.
- We help identify solutions, innovations, and best practices that will inspire companies and organizations in strategy development.

INSPIRATION AND INSIGHT

For those who are **curious and want to be inspired**

- We offer inspirational talks and presentations on sustainability trends and innovations; the sustainable business case; visions for a more sustainable future; sustainable behavior and mindset; and sustainable buildings, health and fashion.
- We moderate and facilitate workshops, strategic sessions, and conferences on topics related to sustainability.

RESEARCH AND ANALYSIS

For those who need a **visionary, inspiring, and action-oriented analysis or report**

Sustainia has grown out of the tradition and culture of one of the largest independent think tanks in Scandinavia, Monday Morning. We therefore have a solid understanding of how to research and analyze complex information and data and present these in a manner that empowers decision-makers.

- We produce analyses, publications, and reports within all key areas of sustainability – sector-focused, or on new trends and innovations.
- We also publish research, surveys, and indexes on all topics related to sustainability.
- We apply the unique Sustainia approach in the way we communicate our findings.

See next page for more on Sustainia reports and publications →

SUSTAINABILITY COMMUNICATION

For those looking to **tell their story**

Translating a complex issue, like a sustainability vision, calls for the right language and insight. Achieving the vision starts with the right story. In our partnerships with companies and organizations, we create new tools for dialogue and storytelling in relation to sustainability.

- We help our partners co-create internal and external narratives for sustainability in a company or organization.
- We use our experience and strong track record in developing communities and setting an agenda on social media to help our partners in their strategic communication and community building efforts.

Sustainia is part of the Monday Morning Global Institute

In 2012, **Monday Morning Global Institute** founded **Sustainia** with the ambition to document, demonstrate, and communicate how sustainable solutions can **improve quality of life around the world**.

Monday Morning Global Institute is a leading Scandinavian innovation tank that rebels against the classic notion of a think tank. Whereas a think tank focuses on developing thoughts and ideas, an innovation tank turns thoughts into action – it is a catalyst for change. The name "Monday Morning" symbolizes a new beginning and an open mind. That has been the guiding principle for Monday Morning, since its founding 25 years ago. A common denominator has been innovating sustainable and resilient societies and enterprises – often inspired by the Nordic way of creating competitive environments. The work is presented in numerous regional and global networks and cross-sector partnerships, and is published in a wide range of international publications.

Explore more from Sustainia

Sustainia has a number of publications that lay out the path to a sustainable future for our key stakeholders.

True to our overall vision of a sustainable society, Sustainia identifies, evaluates, and celebrates market and community solutions. We also complete sector and city analyses. With these innovative insights and perspectives, we are dedicated to creating a sustainable trajectory for the future.

The Book Guide to Sustainia

Guide to Sustainia describes the overall vision and model of Sustainia, and demonstrates a new way of communicating about sustainability. By using clear language and straightforward illustrations, the book demonstrates the sustainable society we could live in ten years from now based on solutions available today.

Sustainia100

Sustainia100 is our annual guide to 100 innovative solutions from around the world that presents tangible projects, initiatives, and technologies at the forefront of sustainable transformation. By identifying leading solutions in 10 key sectors, **Sustainia100** gives investors, business leaders, politicians, and consumers in-depth insights into the trends and technologies within their field.

The **Sustainia100 2014** is based on a comprehensive **review of more than 900 projects** by Sustainia's research team. The solutions have been vetted by the Sustainia100 Advisory Board of 21 sector experts from 11 international research organizations. Over the last three years, **Sustainia has built a comprehensive database of 1700+ sustainability solutions** from every corner of the globe.

SUSTAINIA SECTOR GUIDES

Our sector guides aim to accelerate the spread of sustainable solutions in business and society at large and to explore the opportunities and arguments for change by pointing to state-of-the-art solutions.

Health Sector Guides

The **Sustainia Guide to Co-Creating Health** explores how well-being and good quality of life can be built into our everyday lives. The guide provides insights, cases, and tools for co-creating health in a sustainable society. It takes you to the health-empowering society, where different stakeholders work together to make healthy choices the norm, not the exception.

Person-Centered Care – Co-Creating a Healthcare Sector for the Future zooms in on the health care sector and explores the benefits of focusing on the most important resource in the health process – the patient – thereby applying a holistic focus on people's well being.

Building Sector Guides

The **Buildings** sector guide showcases the sustainable buildings of tomorrow. The guide presents arguments and solutions to create healthy, environmentally friendly, and productive living spaces that improve quality of life.

The **Green Guide for Universities** highlights how universities can be a catalyst for the transition to a more sustainable society. This guide is targeted at university management, employees, and students seeking inspiration on how to create more sustainable universities.

Sustainia City Guides

Sustainia City Guides showcase the future for our cities. By zooming in on existing city development plans as well as green solutions, the guides demonstrate the sustainable urban environment we could achieve. Sustainia City Guides provide new insights to urban planning, sustainability innovation in the built environment, and communications tools for city stakeholders.

Read all our publications online at:
sustainia.me

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