

SUSTAINIA



2013

→ A Guide to
100 sustainable
solutions



10
SECTORS

100
SOLUTIONS

128
COUNTRIES
OF DEPLOYMENT

→ A Guide to
100 sustainable
solutions

Who's behind?

Management

Erik Rasmussen, Founder of Sustainia

Laura Storm, Executive Director lss@mm.dk

Christopher Sveen, Director of Business Development csv@mm.dk

Editors

Christian Eika, Manager of Research & Development cef@mm.dk

Esben Alslund-Lanthén, Analyst ela@mm.dk

Lead Writers

Bjørn Hvidtfeldt Larsen, Research Analyst

Emil Damgaard Grann, Research Analyst

Justin Gerdes, Freelance Analyst

Contributing Writers

Solvej Karlshøj Christiansen, Project Manager

Marie Louise Gørvild, Communications Manager

Sector Research

Bjørn Hvidtfeldt Larsen, Research Analyst

Christian Eika, Manager of Research & Development

Emil Damgaard Grann, Research Analyst

Esben Alslund-Lanthén, Analyst

Morten Jastrup, Senior Analyst, Building Sector mja@mm.dk

Sandra Neale, Senior Analyst, Health Sector sne@mm.dk

Solvej Karlshøj Christiansen, Project Manager, Fashion Sector skc@mm.dk

Design

Lisa Haglund, Graphic Design

Liv Caroline Hotvedt Laursen, Illustration

Sustainia photos

Søren Malmose, 2012

Sustainia100 Advisory Board

See full list of Advisory Board members in the Methodology chapter page 160

The Sustainia Secretariat

c/o Monday Morning

Valkendorfsgrde 13, P.O. Box 1127

DK-1009 Copenhagen K

Phone: +45 33 93 93 23

www.sustainia.me

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



These certifications represent the prevention of 3.97 tons of CO2 emissions.



BUILDING THE WORLD
OF TOMORROW

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↖
Connie Hedegaard
Calling for action at the
Sustainia Award Ceremony,
October 2012

“The solutions are available and they’re profitable”

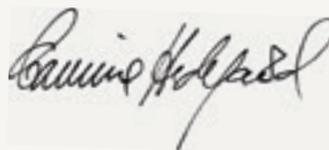
Don’t tell it. **Show it.** This rule applies to the art of writing, but also very much to the transition to a more sustainable society.

And the solutions collected here do just that. They show it. They show that there are **loads of good ideas and initiatives** out there. They show that this transition is doable. And they show the contours of a society that is **both healthier and wealthier** than the one we have today.

The solutions are available and they are profitable. Our challenge is to bring them to scale. Political power can help this happen by creating a framework with targets, standards, and pricing.

But the power of example is just as important, perhaps even more so, to most people. Seeing that **sustainable solutions actually work.** That they are profitable. Beautiful. Desirable.

That is in the end what will make people change and choose sustainable solutions.



Connie Hedegaard

European Commissioner for Climate Action and member of the Sustainia Award Committee

Solutions Transforming our Society

Sustainia100 Criteria

✓ Readily available

✓ Positive environmental impact

✓ Financially viable

✓ Improve quality of life

✓ Scalable

Sustainia100 is an annual guide to 100 innovative solutions from around the world that 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 100 outstanding sustainable solutions in 10 key sectors, Sustainia100 gives investors, regional developers, business leaders, politicians, and consumers in-depth insights to some of the most promising projects and technologies. We see it as a best practices toolbox for those looking for successful sustainable developments in the workplace, production facilities, municipalities, homes, schools, cities – wherever!

Building on the 2012 edition of the Sustainia100 and the great interest it inspired, Sustainia has expanded its research efforts, gone through thousands of projects, explored new developments at research facilities and innovation hubs. We have carefully vetted over 500 solutions in order to present you with this year's Sustainia100. The result is a unique overview of market proven solutions that highlight the most cutting-edge developments and investment potential around the globe.

The solutions profiled in the Sustainia100 are based on our triple-bottom line approach towards sustainability: *environmental, social, and economic.*

They also have the potential to scale up across markets and societies.

The Sustainia100 is launched each year in June. But our efforts to identify state-of-the-art solutions are ongoing. Sustainia has developed a comprehensive database of sustainable solutions, projects, and technologies from every corner of the globe across a wide range of sectors. Reviewing this data, we can confidently say that impressive progress is being made around the world, and we look forward to sharing these developments with you.

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

WHAT MAKES A SUSTAINIA100 SOLUTION?

The Sustainia100 shows progress within the environmental, social, and economic spheres of our societies. Sustainia has adopted a systematic approach to finding solutions in concert with a global sustainability community.

Our online platform enables innovators from around the globe to submit a solution. These submissions are supplemented by extensive research carried out to ensure geographic and sector diversity.

Finally, the solutions are carefully vetted and selected using the Sustainia100 Criteria, in consultation with our Advisory Board of external, independent sector experts.

(See more in Methodology-chapter)

100 Solutions Reveal New Trends & Developments



Using Big Data for Energy Savings ↑



Mobile Management of Life-Saving Medicine ↓



New Fashion from Fabric Discards ↑



Commercializing Demand Response in the Grid ↑



Peer-to-Peer Borrowing and Lending ↑

Over the past year, the Sustainia research team considered thousands of solutions to select the final Sustainia100. Based on the extensive amount of data and research, trends and developments have emerged. Before you dive deeper into the solutions, projects, and technologies, we want to pan out for an introduction to the trends and insights reflected in the Sustainia100.

TREND: New manufacturing technologies and sustainable production

We have been excited to see innovative solutions surface in sectors rather new to the sustainability scene. One of these sectors is the fashion industry. There is a long way to go, but some of the most groundbreaking solutions are appearing in this industry, such as sophisticated dyeing methods and young designers finding new approaches to reduce waste.

TREND: Technologies that interact with consumer behavior

More solutions acknowledge the importance of consumer behavior by giving users access to data and information that drive them to change their behavior or make their life easier. This not only encourages users to reflect on their consumption, but also to take control and make decisions that fit their routines and lifestyle.

TREND: Sharing resources and reducing costs

Sharing resources is emerging everywhere from heavy machinery and cars to tools and appliances helping save resources, capital investments, and overall cost structure related to them. This also adds a social element to sustainable living by facilitating interactions between neighbors, colleagues, and residents.

TREND: Mobile technology breaking barriers of poor infrastructure

A truly inspiring development is also under way in the health sector, where we see a strong trend of tech solutions taking advantage of the high mobile penetration in sub-Saharan countries in order to deliver medical care to citizens and manage medical supplies.

TREND: Big Data to big analytics

Big Data is making a big bet on sustainable innovation. In Sustainia100, you will find solutions that can collect large data sets without infrastructure plug-ins or sensors, as well as solutions that use this data to find the leaks in your water pipes.

Exciting as these trends are, we're reminded of the most important takeaway: The Sustainia100 solutions are making lives, economies, and environments better around the world

A World of Solutions

Sustainia100 brings forth cases, trends, and insights from all over the world.



25 solutions are deployed in **Africa**, spanning **26 countries**



26 solutions provide **health benefits**



27 solutions are finding new ways to use **IT for sustainability**



About half of the solutions impact the **energy sector**



19 solutions were developed in **Asia**, spanning **10 countries**



In North America, 7 solutions are cleaning up the **fashion industry**



28 solutions have an **educational purpose**

Solutions deployed in emerging economies



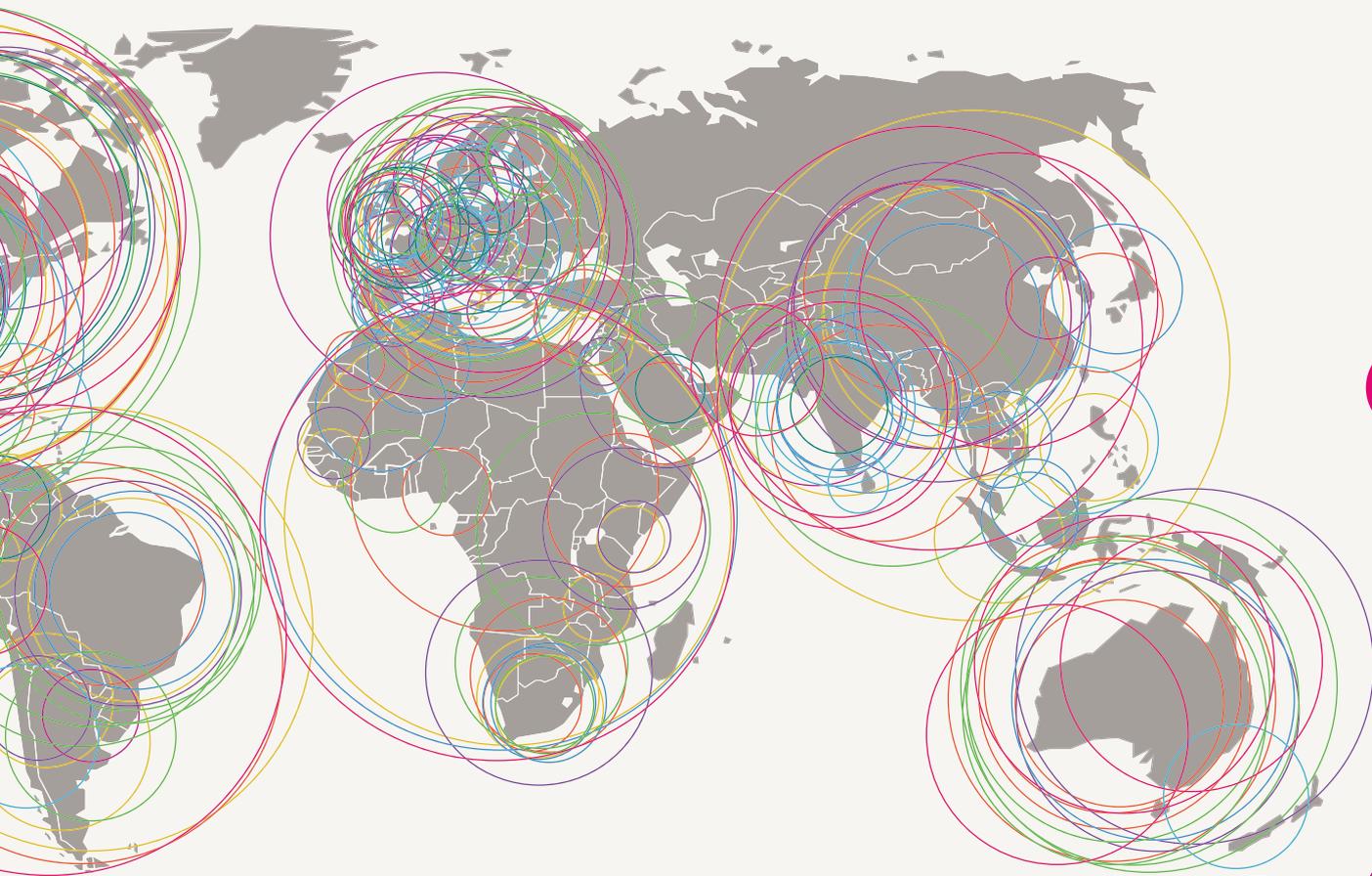
19 in **India**
13 in **Mexico**
13 in **South Africa**
10 in **Kenya**



In South America, 17 solutions are impacting the **resource sector**



Solutions deployed in 128 countries



Circle colors correspond to
our 10 sectors

Sustainia Award

The Sustainia Award is an annual international award that honors outstanding performance within sustainability.

Sustainia invites thought leaders and citizens with a passion for sustainability to celebrate the winners during a festive evening in Copenhagen.





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 and Former Director-General, World Health Organization



Dr. Rajendra Pachauri
Nobel Laureate and Chair, Intergovernmental Panel on Climate Change (IPCC)

Governor **Arnold Schwarzenegger** leads a high-level committee of sustainability leaders that selects the award winner and join Sustainia's celebration of the innovative entrepreneurs who are guiding the world toward a **greener and more prosperous future for us all**.

All 100 solutions in the **Sustainia100** are nominees for the **Sustainia Award**. The Sustainia Award is given to a solution, technology, or initiative with a significant potential to help build a more sustainable future. The award 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 Sustainia Award celebration, Sustainia **gathers more than 1,400 people** in its community, emphasizing that sustainability can indeed sell tickets when it is presented in an appealing way. We also invite our friends and followers to get engaged, vote, and celebrate their winner. This award, the **Sustainia Community Award**, is the voice of global consumers and a recognition of the winner's ability to create enthusiasm and inspire a broader audience to embrace sustainability. Last year, community members from **115 countries** voted for their favorite solution.

JOIN US!

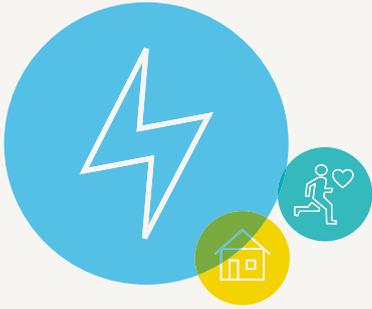
The Sustainia Award and Sustainia Community Award winners are announced in autumn 2013 at the Sustainia Award Ceremony, held at the Royal Danish Theater, in Copenhagen.



Ten finalists for the Sustainia Award will also be presented to world business leaders and politicians during the UN Global Compact Leaders Summit in NY on the occasion of the opening of the 68th Session of the UN General Assembly in September 2013.



2012 Sustainia Award Winner Azuri Technologies



Azuri took home the award for their Indigo pay-as-you-go solar solution for homes located in off-grid areas in the developing world.

The combination of **solar** and **mobile phone technologies** enables users to avoid unaffordable up-front costs and instead pay for their solar electricity as they use it by purchasing scratch-cards.

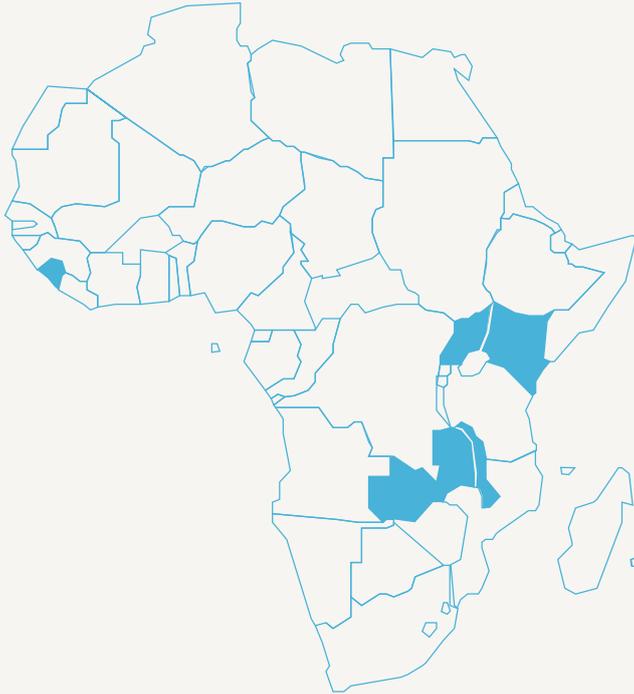
In Kenya, a scratch-card costs **\$1.40** and provides **eight hours of fossil fuel-free lighting** for two rooms and mobile phone charging for a week. Indigo replaces kerosene as the primary source of energy for lighting, **cutting a family's energy expenses by up to 50%**, which also makes the solution financially viable to low-income families.

Since winning the Sustainia Award, **Azuri has grown rapidly and gained widespread attention**. The company expanded into countries in East and Southern Africa and initiated deployment of the Indigo solution in West Africa. Having secured a landmark finance facility from Barclays Corporate Finance to accelerate further deployment, Azuri is ready to transform the lives of an additional **30,000 rural customers** in sub-Saharan Africa.

Azuri benefitted from the international recognition and celebrity **endorsement from Arnold Schwarzenegger** that accompanied the Sustainia Award. **This has raised the profile of the brand and its position as a sustainable business.**



The Azuri solar solution, Indigo, brings great value to off-grid communities through a combination of easily available solar technologies and mobile financing.



Developed in
UK



Deployed in
**Kenya, Uganda,
Zimbabwe,
South Sudan, and
Sierra Leone**

www.azuri-technologies.com



SINCE WINNING THE SUSTAINIA AWARD, **AZURI EXPANDED WITHIN EAST AND SOUTHERN AFRICA AND STARTED DEPLOYMENTS IN WEST AFRICA**, INCLUDING A ROLLOUT IN SIERRA LEONE.

2012 Sustainia Community Award Winner Chicago Lakeside Development



Winning the hearts and minds of the Sustainia community, Chicago Lakeside Development was voted winner of the Sustainia Community Award 2012.

The solution represents a great opportunity for Chicago to recreate itself for the 21st century by **setting new standards for sustainable living**.

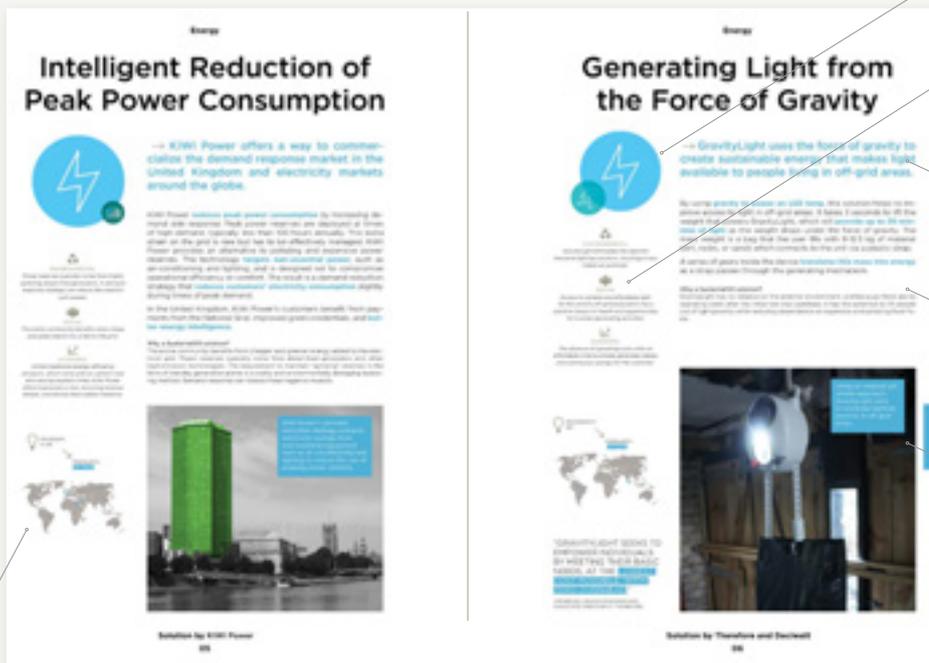
Chicago Lakeside Development is a transformative model for U.S. city planning and could upend the traditional thinking of how people live and work across the country.

www.chicagolakesidedevelopment.com

How to Read the Solutions

This guide takes you through 100 solutions. We describe each solution and zoom in on key aspects such as sectors, geography, and benefits on the Triple Bottom Line of sustainability: *social, economic, and environmental.*

This is what to look for when reading:



DESCRIPTION
A straightforward explanation of how the solution works.

JUSTIFICATION
The key arguments as to why this solution is in the guide.

IMAGE
Provides a visual anchor point for the reader to understand each solution.



Solution developed in



Solution deployed in

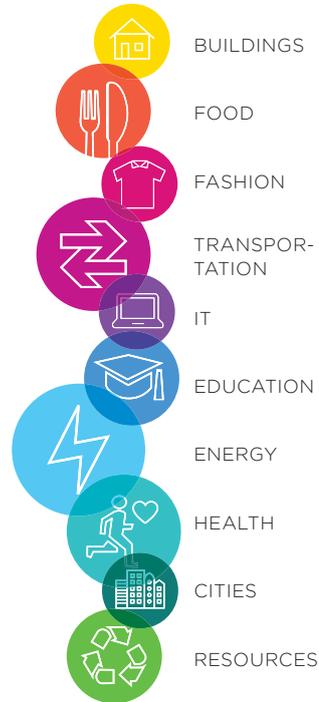


Geography

Sustainia100 is a journey around the world. In the description for each solution, we will show you both where it was **developed** and the country or countries where the solution is **deployed**. This reveals the contexts that each solution is benefitting.

You will discover that great solutions are being developed, tested, and used in a **wide variety of countries**.

Sectors



The solutions are divided into sectors. Each sector is equipped with a **sector icon** making it easy to navigate solutions based on which sectors you are interested in.

Many of the solutions in this guide impact more than one sector and are thus equipped with several **icons proportionate in size** with the impact that the solution has on each sector. Solutions that impact multiple sectors are placed in the sector that it impacts the most.

The cross-sector impact of most solutions reflects the holistic approach that characterizes sustainable solutions.

The Triple Bottom Line

Apart from the sector icons, the three icons below represent the triple bottom line of sustainability. For each solution, at least two of the three elements are highlighted.



ENVIRONMENTAL

Here you will find key arguments and statistics on how the solution benefits the environment, i.e. by limiting CO2 emissions, chemical use, etc.



SOCIAL

Here you will find key arguments that illustrate social sustainability, i.e. how the solution improves well-being and quality of life etc.



ECONOMIC

Under this icon, you will find key arguments or statistics that illustrate the economic sustainability of the solution, i.e. why it has a positive economic impact.



Key trends

Building sector

*Integrating new
forms of renewables*

*Applying low-tech
solutions in
developing economies*

*Utilizing natural
resources for
air-conditioning,
lighting, and heating*

*Sustainability
throughout a building's
life-cycle*

*Onsite water
treatment systems*



Algae Clean Energy and Wastewater Treatment



→ Ennesys' biomimetic solution uses microalgae for the triple advantage of wastewater remediation, clean energy generation, and thermal insulation of buildings.



ENVIRONMENTAL

One hundred percent of wastewater from office or residential buildings can be recycled, generating 8 kWh of clean electricity, according to Ennesys.



SOCIAL

In developing countries, local water treatment leads to an increase of water availability for sanitation, reducing the risk of disease transmission.¹



ECONOMIC

Harvesting both solar and biological energy leads to low-cost heat and power production, as well as reduced heating and cooling demand in buildings.

In photo-bioreactors placed on building roofs or façades, **microalgae growth** in sunlight is enhanced by the supply of wastewater. Pollutants are assimilated and increase biomass production. After harvesting, the biomass can be transformed locally to **produce power, heat, or cooling**, and the **water is cleaned**.

The functioning demonstrator in France has proven the quality of the cleaned water, suitable for irrigation or sanitation. The positioning of photo-bioreactors on the roof and façades of buildings improves their thermal behavior, **providing better insulation** and user comfort.

Why a Sustainia100 solution?

Combining wastewater remediation and clean energy production, Ennesys' technology allows city districts to recycle their organic waste and produce energy to cover local consumption. The low cost of the electricity generated and the wastewater treated makes the technology scalable to other settings, particularly where decentralized water remediation is required.



Deployed in **France, Brazil, Chile, Israel, Morocco**



Ennesys' water cycle recovers biologic energy from wastewater and solar energy to grow microalgae, locally transformed into heat and power, recycling wastewater to irrigation and sanitation quality.

¹ WHO, "Domestic Water Quantity, Service Level and Health."

A Learning Thermostat



→ The Nest Learning Thermostat can reduce heating and cooling costs by learning the habits of its users.

The Nest Learning Thermostat remembers what temperatures you like, creates a custom schedule for your home, and **adjusts temperature settings when you're away**. The company says that once the Nest has learned your schedule, it can **save up to 20% on heating and cooling bills**.

The Nest can be remotely controlled via a smartphone, tablet, or laptop. Nest's System Match optimizes controls for a home's particular heating and cooling system, while the Nest Leaf guides users to energy-efficient temperature settings. The "Energy History and Energy Report," enables users to see how much energy they've used and provides tips on how to lower utility bills.

Why a Sustainia100 solution?

Nest alleviates the hassle of having to program a thermostat - just 11% of homeowners program their programmable thermostats because they're too complicated. Home heating and cooling accounts for about half of the average household's energy bill. The Nest Learning Thermostat keeps users comfortable while helping them save energy.



ENVIRONMENTAL

Nest addresses 10% of US energy consumption - residential heating and cooling.



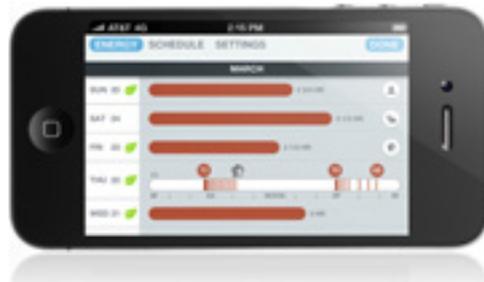
SOCIAL

By learning its users' habits and adjusting accordingly, the Nest gets around people's tendency to forget to program home thermostats.



ECONOMIC

According to Nest, once the thermostat has learned your schedule, it can save up to 20% on heating and cooling bills.



Developed in USA

Deployed in USA, Canada



Bringing Sunlight into Every Room



→ The Parans system captures the rays of the sun and brings it deep into buildings, creating a skylight even four floors down.

Parans' **solar lighting system** brings sunlight into the indoor environments where we work, learn, and live. Natural light confers health benefits that cannot be substituted by artificial light. The technology uses fiber optic cables to **transport sunlight far into buildings**, which reduces the electricity used for illumination and cooling. The thin and flexible cables make it simple to install in new buildings or retrofit into existing buildings.

Why a Sustainia100 solution?

Many of today's buildings are designed so that artificial light is needed throughout the day. Parans' solution allows buildings to use sunlight directly for illumination, enhancing the quality of our indoor environments, as we need sunlight for good health.



ENVIRONMENTAL

Lighting accounts for almost 20% of global electricity consumption, according to Parans.



SOCIAL

Sunlight keeps us awake and alert, syncing our 24-hour rhythm, hormone balance, and boosting the immune system.



ECONOMIC

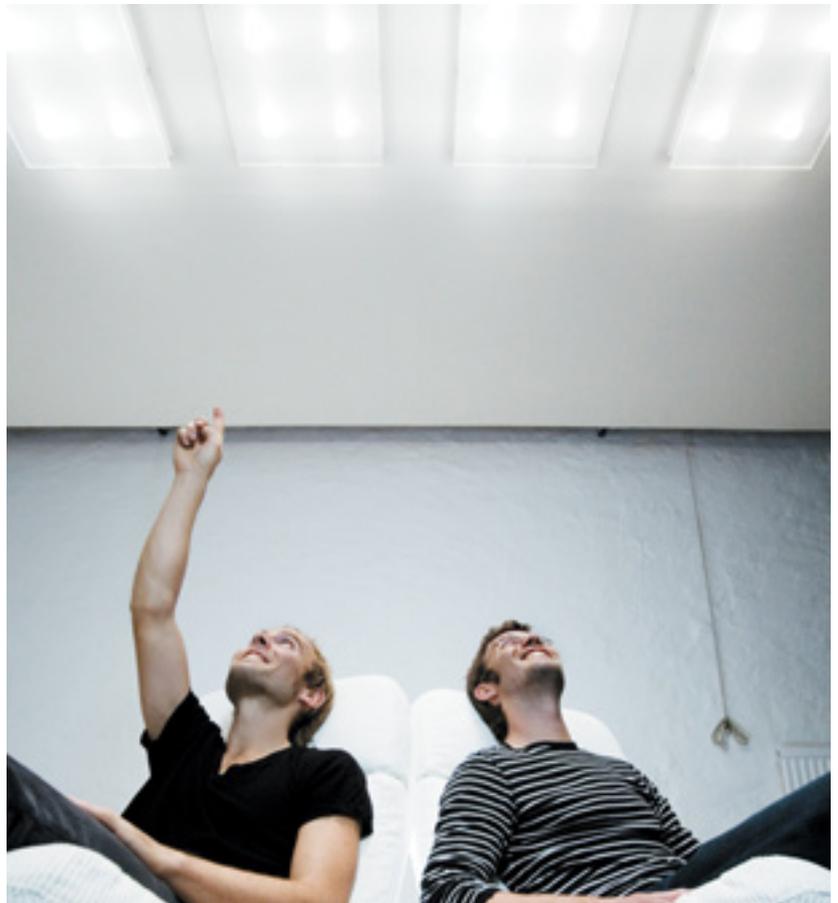
According to the company, workers exposed to natural light are more productive and sick less often.



Developed in Sweden



Deployed in **33 countries** in Europe and North America



Solar Air-Conditioning with Energy Storage



→ ClimateWell's CoolStore technology powers solar air-conditioning systems with integrated energy storage to provide heating during winter, cooling during summer, and hot water every day.

ClimateWell has developed a triple-state absorption technology that **converts and stores solar energy into heating and cooling** without need of electricity. The high-density integrated energy storage in a "dry" salt has no moving parts, is fully scalable, and cost-effective. The ClimateWell CoolStore component (essentially a glass tube) is directly integrated into a solar collector, making installation easy, with no need for external equipment.

The technology can be applied in single-family homes and commercial buildings alike, and can even be used for heat-driven **air-conditioning for heavy-duty vehicles and trucks**.

Why a Sustainia100 solution?

According to ClimateWell, 25% of the world's energy consumption is used for heating and cooling of buildings, with the largest part of this energy coming from fossil fuel-powered space heaters and electrically driven chillers. As the world's first solar collector with combined heating, cooling, and energy storage, this solution delivers twice as much energy compared to today's state-of-the-art solar collectors, increasing energy savings and reducing CO2 emissions.

ENVIRONMENTAL
According to ClimateWell, a typical residential user of CoolStore-powered solar air-conditioning reduces the home's CO2 footprint by 15 tons annually.

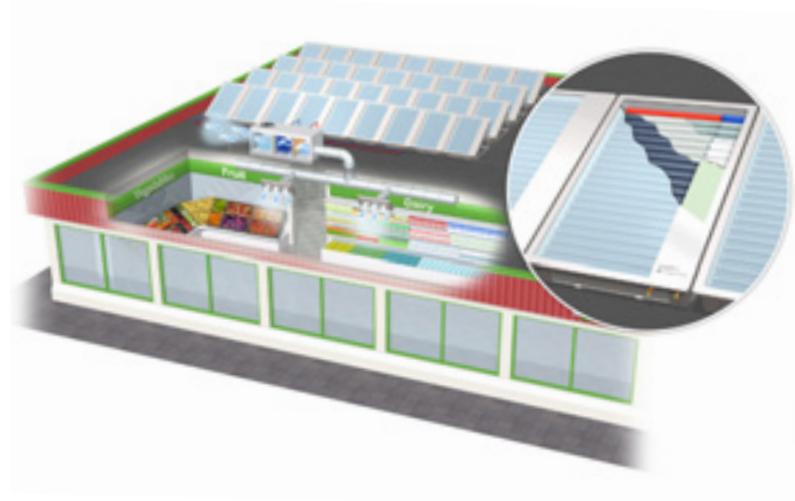
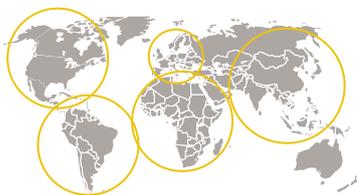
SOCIAL
As ClimateWell's solar cooling solutions run without electricity, off grid areas could benefit from cooling and cold storage of foods and medicine.

ECONOMIC
A typical U.S. homeowner using ClimateWell-powered solar cooling cuts energy bills by 50%, according to the company.

Developed in Sweden, USA, Germany

Deployed in 16 countries in Europe, North America, South America, Africa, and Asia

The ClimateWell CoolStore component (the "tube") is integrated in to conventional solar thermal collectors, only powered by the sun, to deliver heating and cooling to buildings.



"AT CLIMATEWELL WE ARE COMMITTED TO DELIVERING **ENERGY EFFICIENCY THAT PAYS FOR ITSELF.**"

PER OLOFSSON, CEO CLIMATEWELL

Generating Energy from Water in Pipelines



→ Lucid Energy provides a new way for industries to generate renewable energy around the clock from the water in their pipelines.

The LucidPipe is an **in-conduit hydropower technology** that enables water-intensive industrial, municipal, and agricultural users to produce carbon-free, **low-cost electricity from water pipelines** and effluent streams. The technology recaptures energy embedded in fast-flowing water inside of large-diameter, gravity-fed pipelines without disrupting pipeline operations.

The LucidPipe spherical turbines spin as water passes through them, producing a consistent and **non-weather-dependent source of energy**. A market study recently completed by Navigant Consulting sizes the opportunity for sales of Lucid Energy's in-pipe hydropower product at \$5-6 billion in the USA alone.

Why a Sustainia100 solution?

The U.S. EPA estimates that \$633 billion in water infrastructure upgrades are needed to replace aging pipelines and to satisfy new demand over the next 20 years. By incorporating LucidPipe turbines into new and upgraded pipelines, millions of megawatt-hours of carbon-free, low-cost electricity can be generated.



ENVIRONMENTAL

According to the U.S. EPA, 6% of the energy consumed in the USA alone is used to purify and deliver water.



SOCIAL

Delivering drinking and irrigation water requires energy that is often in short supply, expensive, and dependent on fossil fuels that further deplete resources.



ECONOMIC

In the USA, drinking water and wastewater facilities spend nearly \$4 billion per year on energy; by incorporating the use of LucidPipe, millions of megawatt-hours of low-cost electricity can be generated.



Developed in USA



Deployed in USA, China, Brazil, Mexico, Chile, Canada, Italy, Spain, and South Africa



“LUCID ENERGY IS IMPROVING THE ECONOMICS OF DELIVERING SAFE, CLEAN WATER WHILE REDUCING DEPENDENCE ON FOSSIL FUELS.”

GREGG SEMLER, PRESIDENT AND CEO, LUCID ENERGY

Bottling the Power of the Sun



→ Liter of Light redesigns solar lighting for the developing world using plastic bottles. The simple design creates local jobs and teaches green skills.



ENVIRONMENTAL

Discarded plastic bottles are reused and upcycled to a daylighting system in 10 minutes.



SOCIAL

Liter of Light prevents fires and inhalation of toxic fumes from kerosene lamps.



ECONOMIC

Each lamp saves households \$10 monthly in electricity costs and 200 kilograms of carbon emissions per year.

A Liter of Light is a plastic bottle filled with water and a bit of bleach. Inserted through the roof, each **solar bottle refracts sunlight** with the intensity of a 55-watt light bulb. Using simple tools and basic carpentry skills, volunteers and local entrepreneurs can light up their communities for just \$2. The **nighttime upgrade with a solar panel** retails at \$10. Built by grassroots entrepreneurs and women's groups in the Philippines, the cost of finished goods are reduced by 40%.

Liter of Light has grown from one home in Laguna, Philippines, to **350,000 lights in 10 countries** in just 20 months. Three hundred and seventy grassroots solar entrepreneurs are trained in 20 months, with each entrepreneur servicing an average of 11,000 homes per year.

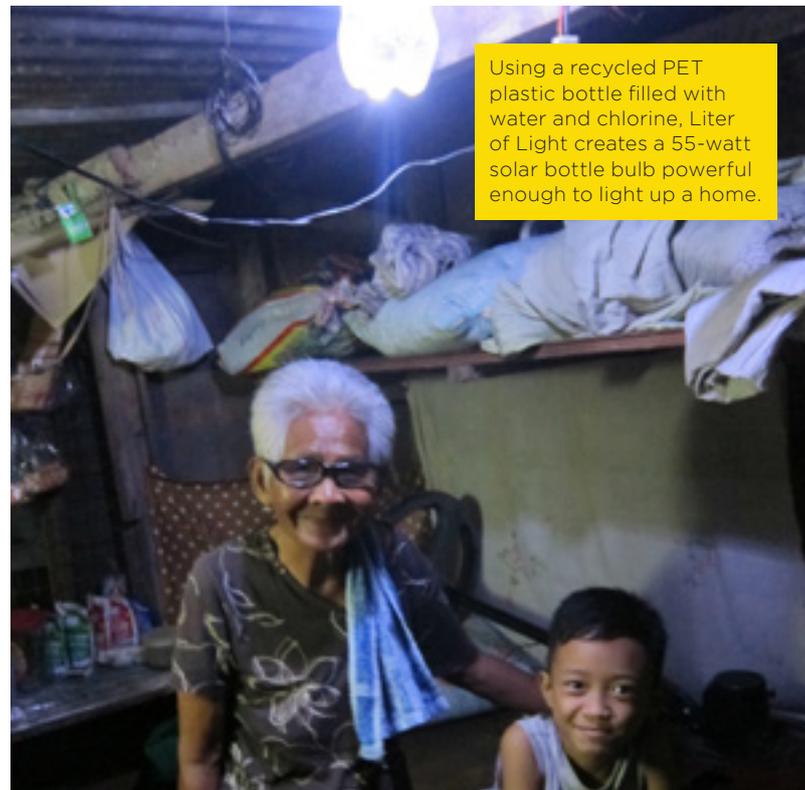
Why a Sustainia100 solution?

Over 1 billion people around the world suffer from lack of access to energy, including 15 million people in the Philippines. Energy poverty will only be solved by using local materials, easily replicable technologies, and livelihood-generating enterprises. Liter of Light is helping end energy poverty one bottle at a time.



Developed in Philippines

Deployed in **Indonesia, Cambodia, Bangladesh, India, South Africa, Kenya, Colombia, Peru, Mexico, Spain**



Using a recycled PET plastic bottle filled with water and chlorine, Liter of Light creates a 55-watt solar bottle bulb powerful enough to light up a home.



Through a simple, open source, do-it-yourself daylight technology, customers can use the savings from their electricity bills to purchase a locally built upgrade for lighting at night.

WE WANT TO REFRAME THE WAY PEOPLE THINK ABOUT SOLUTIONS TO CLIMATE CHANGE, NOT AS A PRODUCT OF INDUSTRIALIZED NATIONS, BUT AS **A GIFT THAT DEVELOPING COUNTRIES CAN SHARE WITH THE REST OF THE WORLD.**

ILLAC DIAZ, EXECUIVE DIRECTOR, MYSHELTER FOUNDATION

THE IDEA BEHIND

Liter of Light is a grassroots solar movement that empowers the most under-resourced communities through the creation of livelihood programs. The organization trains women from low-income and water scarce regions to assemble locally sourced, sustainable, and affordable solar products.

Off-the-shelf micro solar products already help millions but are not always the best solution in the long term. They are often imported, patented, hard to repair, and too expensive. This means that financing is required, e.g. through aid or micro credits, which may not always be an option.

By training locals to supply green technologies to their own communities, Liter of Light is changing the story about sustainable development. From one where poor countries wait for aid to one where poor people acquire the skills and tools to proactively improve their quality of life.

www.aliteroflight.org

Wood-Hybrid Building System up to 30 Stories



ENVIRONMENTAL

The LifeCycle Tower improves CO2 balance by up to 90%, resource efficiency up to 50%, and ensures high recyclability and flexible usage.



SOCIAL

Production of system elements by regional companies saves time and resources, creates new jobs and business opportunities for SMEs, and reduces dust, dirt, and noise on site.



ECONOMIC

Forty percent of global resource consumption is caused by the building industry, according to Cree.



Developed in Austria

Deployed in Austria



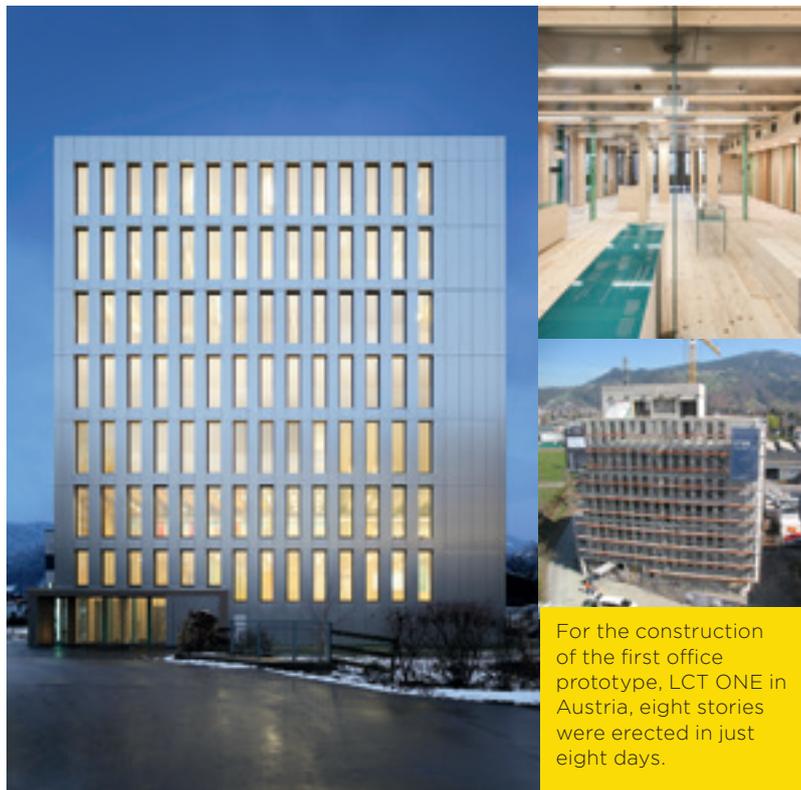
→ The LifeCycle Tower is a sustainable building system for wood-hybrid, multi-story construction up to 100 meters and 30 stories.

The Cree **timber building system**, LifeCycle Tower, is based on achieving sustainability through material selection. The unenclosed wood structure provides a comfortable living and working environment, saves resources, and promotes health. According to Cree, buildings can reach 30 stories and **construction times are cut in half**.

Building layout, outside façades, surfaces, and interiors are individually planned by architects, while system components such as slabs, columns, inside façade, and building services ensure the building's quality and functionality. The **technology is open source** in order to scale the solution globally.

Why a Sustainia100 solution?

The concept is a new development and state-of-the-art building system for urban sustainable architecture because of its resource efficiency, with an exposed wood load-bearing structure, system approach and off-site prefabrication of system elements. An eight-story office building in Austria shows the technological, ecological, and economic advantages of the hybrid-timber construction system.



“WITH THE LIFECYCLE TOWER WE FOLLOW AN OPEN-SOURCE APPROACH WHICH MEANS TO GLOBALIZE KNOWLEDGE AND LOCALIZE VALUE CREATION.”

HUBERT RHOMBERG, CEO CREE

For the construction of the first office prototype, LCT ONE in Austria, eight stories were erected in just eight days.

Optimal Light, Natural Air



ENVIRONMENTAL

The light and air chamber minimizes the use of HVAC and electrical systems, reducing the environmental footprint compared to an average building.



SOCIAL

The first of its kind in the region, the building has made an impact socially by being dubbed by locals as the "ecological building," which raised awareness of sustainability.



ECONOMIC

According to the architects, their solution reduces energy costs by an average of 25%.



Developed in Mexico

Deployed in **Mexico**



"AS PROBLEM SOLVERS, WE MUST ASPIRE TO DESIGN ELEMENTS THAT WILL MAKE A **POSITIVE IMPACT ON OUR HEALTH AND NATURAL RESOURCES.**"

RAMON GUILLOT, ARCHITECT, LEED AP,
GUILLOT ARQUITECTOS

→ In a Tijuana building, Guillot Arquitectos' light and air chamber improves the health and productivity of occupants by providing natural light and air.

The air light chamber developed by Guillot Arquitectos captures natural air from the base of a tubular element and redirects it to the building's various levels, **reducing the usage of heating, ventilation, and air conditioning** (HVAC) systems. Because the chamber is made of low-E glass and perforated sheet metal, it also allows natural light to permeate. This gives occupants a more natural setting. The chamber increases worker productivity and improves health, and also helps **reduce energy costs by** an average of **25%**.

Why a Sustainia100 solution?

By Mexican standards, the light and air chamber makes an unprecedented impact in energy efficiency and office comfort while still providing good design that, according to the company, stands out to locals as an inspirational glimpse into a more sustainable future.



Wind Energy-Generating Skyscraper



→ The Pearl River Tower, located in the city of Guangzhou, China, is one of the world's most energy-efficient high-rise structures.

The 309-meter Pearl River Tower's sculpted body directs wind to a pair of openings at its mechanical floors, where **turbines generate energy** for the building. Integrated solar panels, a double skin curtain wall, a chilled ceiling system, under-floor ventilation, and daylight harvesting are additional technologies that contribute to the building's energy efficiency.

The tower's integrated design approach results in a substantial decrease in the amount of electrical power required to operate the building's cooling, heating, dehumidification, ventilation, and lighting systems. Full implementation of Pearl River Tower's sustainability strategies will result in overall **energy savings of approximately 50%** compared to China's baseline energy code.



ENVIRONMENTAL

Energy savings of approximately 50% compared to China's baseline energy code and associated conventional design guidelines.



ECONOMIC

Pearl River Tower's design offers increased revenue potential resulting from the elimination of fan rooms and the reduction of airshaft sizes.

Why a Sustainia100 solution?

Energy efficiency coupled with onsite renewable energy generation reduces the need for electricity from fossil-fuel power plants, lowering energy-related greenhouse gas emissions. The Pearl River Tower addresses the difficult task of constructing sustainable high rises.

Developed in USA

Deployed in China



The tower's sculpted body directs wind to a pair of openings at its mechanical floors, where traveling winds push turbines, which generate energy for the building.

"PEARL RIVER TOWER SHOWS THE SHAPE OF THE 21ST CENTURY—A HIGH-PERFORMANCE DESIGN THAT INTEGRATES ARCHITECTURE, ENGINEERING AND TECHNOLOGY TO CREATE **A HIGHLY SUSTAINABLE SUPER-TALL BUILDING.**"

RICHARD F. TOMLINSON, II, PARTNER, SOM

Rainwater-Harvesting Schools



ENVIRONMENTAL

According to UNEP, there is 13 times the amount of rain falling in Africa than is needed by its population¹.



SOCIAL

According to WHO, 40 billion work hours are lost every year in Africa because of the need to collect water.



ECONOMIC

Waterbank schools can be built for the same cost as conventional schools, using locally available materials and local expertise.



Deployed in Kenya, Senegal, Malawi



“A WATERBANK SCHOOL ENLISTS THE RAIN TO TRANSFORM A CHILD’S HEALTH, EDUCATION AND THE FUTURE OF THEIR COMMUNITY.”

JANE HARRISON,
EXECUTIVE DIRECTOR, PITCHAFRICA

¹ICRAF & UNEP, “Potential for Rainwater Harvesting in Africa: A GIS Overview.”

→ PitchAfrica has developed a school building concept for disadvantaged communities in semi-arid regions that provides clean water year round and imparts sustainability lessons.

Waterbank schools are low-cost **rainwater-harvesting school buildings** comprising a large roof, a central underground cistern, and an **integrated ceramic water filtration system** providing clean water and food year round. The school buildings integrate community spaces with a wide range of school needs: classrooms, offices, dormitories, canteens, and sport-courts. The first Waterbank school, built in Kenya, captures, stores, and filters **350,000 liters of water** a year. Since opening, attendance has risen by 25% to 95% and instances of waterborne disease have **dropped to zero** among pupils.

Why a Sustainia100 solution?

The majority of the 345 million people in Africa without access to clean water live in regions with inadequate rainfall. The World Bank estimates that 200,000 classrooms need to be built in sub-Saharan Africa each year. Waterbank schools place a sustainable supply of clean water at the heart of the school, improving children’s health, while educating them about sustainable lifestyles and practices.

A Waterbank school costs the same as a conventional school but provides triple the space and harvests 350,000 liters of clean water annually.







Key trends

Food sector

*Reducing
food waste*

*Energy-efficient
production*

*Prolonging lifetime
of food products*

*Safer and more efficient
cooking methods*

*Reusing waste
products*

in.gredients

ON TAP JUST BAKED

...and more! We have a variety of breads, pastries, and more. All baked fresh daily. We also have a variety of pastries, including croissants, danishes, and more. All baked fresh daily.

HAPPY HOUR 4-7 PM
Best Limonade
New Today

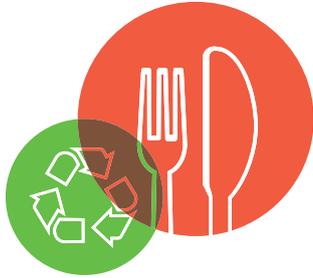
ON YOUR PLATE
...and more! We have a variety of breads, pastries, and more. All baked fresh daily. We also have a variety of pastries, including croissants, danishes, and more. All baked fresh daily.

OUR FARMERS
...and more! We have a variety of breads, pastries, and more. All baked fresh daily. We also have a variety of pastries, including croissants, danishes, and more. All baked fresh daily.

ZUPP SPECIALS!!!
...and more! We have a variety of breads, pastries, and more. All baked fresh daily. We also have a variety of pastries, including croissants, danishes, and more. All baked fresh daily.



Package-Free Grocery Store



→ By encouraging customers to bring their own containers and fill them with real, local food, the in.gredients grocery store reduces food waste and packaging.



ENVIRONMENTAL

On average, the in.gredients store sends less than five pounds of trash and zero pounds of food waste to the landfill each month.



SOCIAL

The produce grown in the volunteer-run garden goes back to neighborhood-supported agriculture, providing fresh, healthy food for the community.



ECONOMIC

Sixty-nine percent of the cost of goods sold has been from local vendors, supporting the local economy and helping to build the community.

According to the company, 40% of food is thrown away. in.gredients provides customers with a solution to food and packaging waste while **building community** around a sustainable food system.

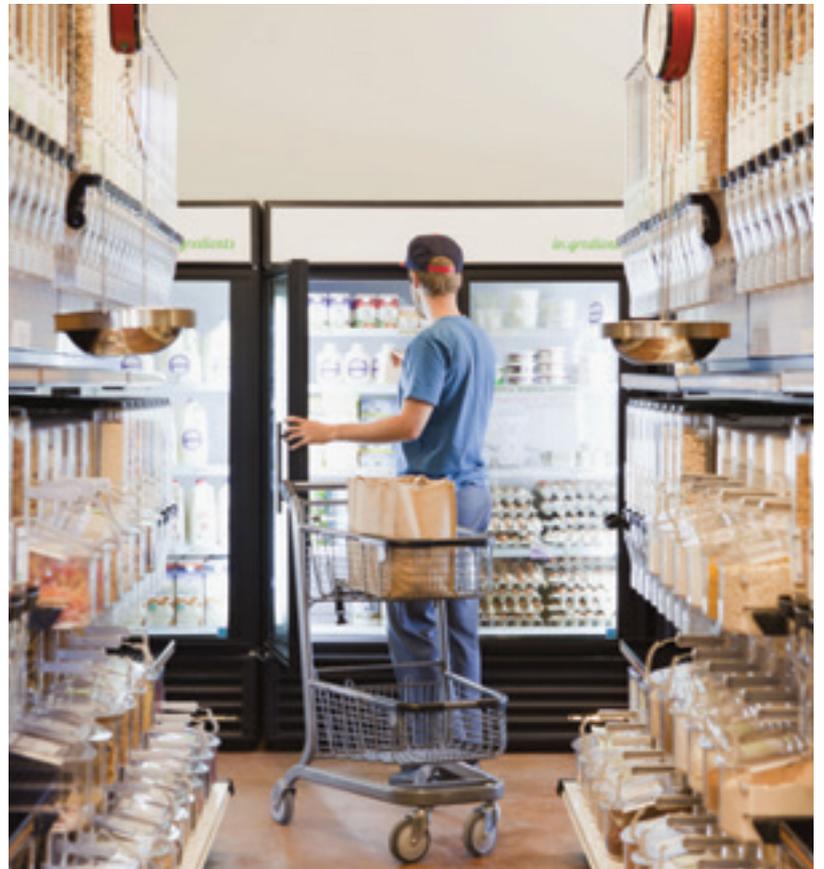
Customers bring in any container, weigh and label their containers, and fill it with bulk food and household items, **reducing food and packaging waste**. The business model incorporates a neighborhood food hub, with an outdoor space and organic garden.

Why a Sustainia100 solution?

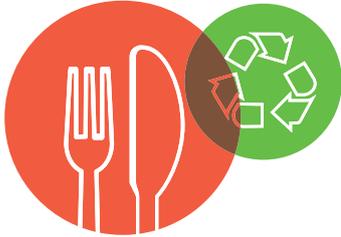
In the U.S., each person generates almost two kilos of trash per day. In.gredients' customers shop for healthy, local food and reduce the amount of waste sent to the landfill. In order to provide the community with high-quality products that support the local economy, a majority of the products are locally grown and produced.



Deployed in **USA**



Seawater Desert Greenhouses



→ The Seawater Greenhouse transforms seawater into cool, humid air, fresh water, salt, and nutrients, enabling crops to be grown in hot, arid regions.



ENVIRONMENTAL

Unlike traditional greenhouses, which often rely on fossil fuels for temperature control, Seawater Greenhouses use only seawater and sunlight to control growing environments.



SOCIAL

Food can be grown where agriculture is constrained by a lack of water and high temperatures, leading to improved food access in water-scarce areas.



ECONOMIC

According to the company, the technology enables development of land normally considered unsuitable for agriculture, coupled with lower capital and operating costs.

Developed in UK

Deployed in Canary Islands, Abu Dhabi, Oman, Australia



The world is not short of water; it is just in the wrong places and too salty. Converting seawater to fresh water, in the right places, offers great potential. Seawater Greenhouse uses seawater to **cool, sterilize, and humidify the air** going into the greenhouse. Cooler and more humid conditions reduce the water demand of plants several-fold, typically by 4-8 times that of plants grown outside.

In addition to the saved fresh water, both the **yield and quality of plants are higher**.

Why a Sustainia100 solution?

With an increasing global demand for fresh water, agriculture is under pressure as one of the most water-dependent sectors. In general, agriculture uses 60-80% of the planet's scarce fresh water¹. Shortage of water affects the carbon cycle, as shrinking forests reduce carbon capture.



¹ The Guardian, "growing food in the desert: is this the solution to the world's food crisis?"

Keeping Food Fresh from Farm to Fork



ENVIRONMENTAL

The UN acknowledges that the demand for food increases steadily with the growth of the world population, negatively impacting food resources and prices.



SOCIAL

FreshPaper empowers families and farmers to address food waste, reducing the tremendous amounts of land, energy, and water lost across the entire food system.



ECONOMIC

FreshPaper keeps food fresh 2-4 times longer by naturally inhibiting bacterial and fungal growth, working like refrigeration without energy and infrastructure costs.



Deployed in 35 countries, including: USA, Canada, France, Italy, Germany, Spain, Denmark, UK, Greece, Australia, New Zealand, Mexico, Brazil, Argentina, Thailand, Japan, India, South Africa, Malawi, Haiti



"SIMPLE IDEAS ARE OFTEN THE MOST POWERFUL."

KAVITA M SHUKLA, INVENTOR & FOUNDER, FENUGREEN

→ A piece of paper can reduce global food waste. Low cost, compostable, and infused only with organic spices, FreshPaper keeps produce fresh 2-4 times longer.

FreshPapers are sheets of paper that are simply dropped into containers, boxes, and bags of produce. By **keeping food fresh** from farm to fork in a scalable and sustainable way, while significantly reducing resource and energy costs, FreshPaper promises to positively impact the food economy and transform the lives of the 1.6 billion people who still lack access to refrigeration. FreshPaper has spread from a single farmer's market to **farmers, retailers, and consumers in over 35 countries.**

Through its "Buy a Pack, Give a Pack" initiative, Fenugreen matches purchases with donations of FreshPaper to food banks, and is now working to provide FreshPaper to farmers in the developing world.

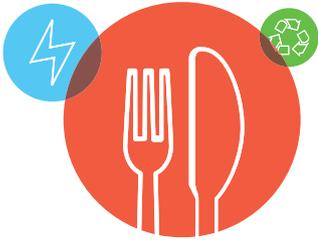
Why a Sustainia100 solution?

While the world's farmers harvest enough to feed the planet, we lose 25% of our food supply to spoilage, leaving 800 million hungry and exacting staggering societal and environmental costs.



FreshPaper is a simple 5"x 5" sheet that can keep several pounds of produce fresh.

Lighting System “Listens” to Plants



→ With LED lighting systems including smart biofeedback, Heliospectra automates plant production while achieving longer durability, energy savings, and increasing yield.

The Heliospectra LED lighting system with biofeedback “listens” to plants by using reflected light and fluorescence. This information helps the system optimize the light spectrum to **produce only the necessary light** required, while encouraging desired plant characteristics. The result is energy and water saved, **yield increased, waste reduced**, and quality improved.

A software management system provides growers with improvements based on the results of the whole grower community. The data is **aggregated in an online database** with predictive algorithms creating the best light conditions for growers depending on the type of crops and environmental conditions.

Why a Sustainia100 solution?

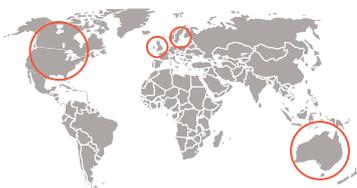
With changes due to global warming, increased population, and urbanization, there is a need for locally produced food with continuous and regular crops. With LED-based lighting systems, it is possible to reduce energy costs, create healthier and more durable plants, and reduce waste as well as the need for transportation.


ENVIRONMENTAL
The system can reduce CO2 emissions by 21 million metric tons annually if used by 20% of the market.¹


ECONOMIC
Reduction in energy costs and waste, as well as increased yield, improve economic and environmental performance.

 Developed in Sweden, UK, USA, Australia

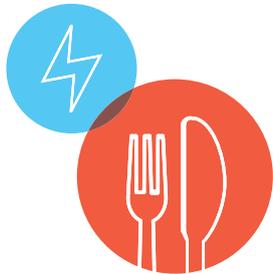
Deployed in Sweden, UK, USA, Australia



Solution by Heliospectra

¹ WWFClimate Solvers, “L4A Efficient Greenhouse Lighting.”

Intelligent Thermostats for Beverage Cooling



→ This solution minimizes energy use by observing consumer behavior and learning about the working environment refrigeration appliances operate in.

Elstat's Energy Management System is an intelligent thermostatic control for commercial refrigeration appliances. The controllers have the ability to **gather traffic and consumption data** around the cooler. This data is used to build an accurate overview of shop opening hours, cooler usage, and its ability to bring freshly loaded beverages to the desired temperature.

The solution achieves energy savings in the range of 25-40%, by **knowing exactly when drinks need to be cool** and assures the optimum serving temperature when the shop is open and people use the cooler.

Why a Sustainia100 solution?

Refrigeration is claimed as one of the greatest innovations in the history of the food and beverage industry, providing consumers both rich and poor with a safe and convenient solution. Yet its primary functions have barely changed in 100 years and remains a significant contributor of CO2 emissions. By intelligently adjusting the functionality of the refrigerator to the needs of the users, it is possible to gain energy, and economic savings.



ENVIRONMENTAL

According to Elstat, the product is capable of preventing the release of the equivalent of 2.2 million metric tons of CO2 annually.



ECONOMIC

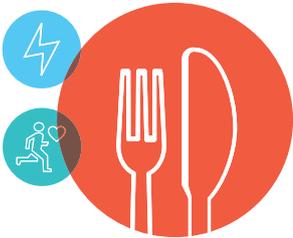
Elstat claims a potential of \$560 million saved annually in energy costs.

Developed in UK

Deployed in 90+ countries across Africa, Asia, Australia, Europe, North- and South America.



Cheaper Meals with Heat-Retention Cookers



→ The Wonderbag saves energy, water, and time by making cooking more energy efficient.

The Wonderbag is a **non-electric, heat-retention cooker** that enables food that has been brought to boil on a stove or fire to **continue cooking for hours** after it is removed from the fuel source. The insulating abilities of the bag allow food to finish cooking without the use of additional fuel.

The solution is time efficient, as there is a limited need for tending to the food. Instead, time can be better spent looking after children, earning an income, or doing essential chores. Wonderbag enables families to save energy and money.

Why a Sustainia100 solution?

In developing countries, there are huge challenges connected to the cooking process. Staple diets require long cooking hours, with limited access to energy and water. The heat-retention cooker makes it possible to limit the use of both. With limited access to clean fuels, the use of charcoal or wood for cooking is widespread. These cooking processes result in smoke inhalation and serious health risks.



ENVIRONMENTAL

According to the company, using the Wonderbag saves up to half a metric ton of carbon emissions per year.



SOCIAL

Using the heat-retention cooker reduces risk of smoke inhalation and burns.



ECONOMIC

According to the company, the Wonderbag reduces usage of cooking fuels by up to 60%.



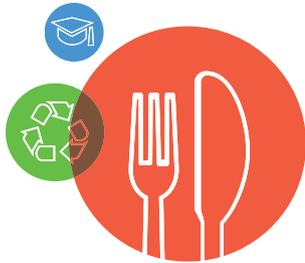
Developed in South Africa



Deployed in **South Africa, Turkey, Rwanda, Somalia (Somaliland), UK, Nigeria**



Making Chutney out of Waste Food



→ Rubies in the Rubble limits food waste by reusing surplus fruit and vegetables to make new food products, while employing disadvantaged individuals.



ENVIRONMENTAL

According to the company, avoidable food waste is responsible for 20 million metric tons of CO2 per year.



SOCIAL

By hiring individuals struggling to get back into employment, it is possible to strengthen confidence, skills, and level of responsibility.



ECONOMIC

The UK generates over 16 million metric tons of food waste every year, costing an estimated \$34 billion annually.

Rubies in the Rubble addresses food waste by **using otherwise discarded fruit and vegetables** to produce chutneys and jams. The fruit and vegetables are picked fresh from the market before they are discarded. Preserves are a good way of making use of seasonal gluts and therefore provide a good starting point to address food waste.

The company also provides **training and employment opportunities** for individuals needing help back on the employment ladder.

Why a Sustainia100 solution?

According to the company, 16 million metric tons of food is wasted each year in the UK; research indicates that 60% of this is preventable. Avoidable food waste is responsible for 20 million metric tons of CO2 per year. By focusing on employing disadvantaged individuals, the company also addresses the social challenge of almost 1/4 of all working age Londoners being unemployed.

Developed in UK

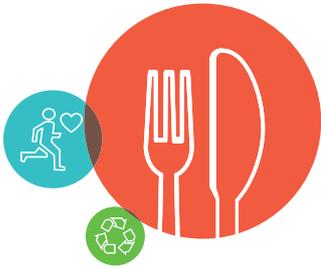
Deployed in UK



“ENDEAVOURING TO MAKE FOOD THAT **NOT ONLY TASTES GOOD BUT IS GOOD.**”

JENNY DAWSON, FOUNDER, RUBIES IN THE RUBBLE

Replacing Animal Protein in Diets



→ **Beyond Meat replaces animal protein with plant protein. Doing so, the start-up creates nutritional value at a lower cost with an improved environmental footprint.**



ENVIRONMENTAL

According to the International Livestock Research Institute, livestock systems occupy 45% of the world's surface area and cause up to 51% of worldwide greenhouse gas emissions.¹



SOCIAL

Plant protein has a positive impact on human health while also addressing animal welfare.



ECONOMIC

Meat production is expensive due to its resource use; 2,500 gallons of water are required to produce a single pound of meat.²



Developed in USA

Deployed in USA, Canada



Americans consume 1/2 pound of protein per day versus the recommended 1/2 pound per week. Beyond Meat's Chicken-Free Strips are a plant protein that **mimics real chicken's texture**, bite, and succulence. Free of gluten, GMOs, cholesterol, trans-fats, hormones, and preservatives, the Chicken-Free Strips are made from a soy and pea protein blend that provides 19 grams of protein and 120 calories per 3 oz. serving.

The company's first product is soy based, but future products could replace the controversial ingredient with ingredients like lupin, barley, or mustard seed protein.

Why a Sustainia100 solution?

Plant protein benefits human health while addressing critical issues of climate change, resource scarcity, and animal welfare. Beyond Meat's manufacturing footprint is small enough to allow it to be replicated in any corner of the world. Relative to animal protein, Beyond Meat promises comparable nutrition at a lower cost with a lower environmental impact.

“WOULD WE CONTINUE TO RAISE AND EAT ANIMALS IN SUCH STAGGERING NUMBERS IF **A DELICIOUS AND PERFECT PLANT-BASED REPLICATION OF MEAT** EXISTED? I DECIDED TO FIND OUT — AND FOUNDED BEYOND MEAT.”

ETHAN BROWN, FOUNDER AND CEO, BEYOND MEAT



Solution by Beyond Meat

¹ World watch institute, "livestock and climate change."

² Robbins, john, "Diet for a new america."



Red Worms Transform Waste into Fertilizer



→ **Byoearth promotes vermicomposting and its organic fertilizer in rural and urban communities in order to improve the living conditions of vulnerable populations.**

Byoearth uses red worms to **transform biodegradable waste** into 100% organic fertilizer through a digestion process. The solution combines vermicomposting with poverty eradication in vulnerable rural and urban areas and educates farmers on how to **avoid the dependency of chemical fertilizer**. The resulting produce is sold in the most remote areas of Guatemala.

The technique of using red worms is well known and holds the capacity for more environmentally friendly waste management while at the same time **empowering women** and disadvantaged communities.

Why a Sustainia100 solution?

Forty percent of the world's soil is heavily degraded, compromising the ability to grow food and nurture families. Vermicomposting transforms waste into a business while restoring damaged soil and saving water. The solution is replicable worldwide and is already empowering women in its production process and boosting the productivity of farmers.



ENVIRONMENTAL

The fertilizer produced by worms adds beneficial bacteria to soil and improves the soil's condition and nutrients.



SOCIAL

Byoearth empowers women in urban and rural Guatemala and incorporates them in the production chain, creating a new source of income.



ECONOMIC

According to Byoearth, farmers can save 15-25% of water when they use vermicomposting.



Developed in Guatemala

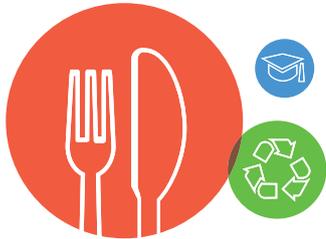


Deployed in **Guatemala**



Guatemalan woman in vermicomposting production plant.

Redistributing Cosmetic Food Waste



→ **Gleaning Network UK saves fresh fruit and vegetables from being wasted on UK farms, and redistributes them to food poverty charities.**



ENVIRONMENTAL

According to the Gleaning Network UK, approximately 10% of the UK's greenhouse gas emissions come from producing, transporting, storing, and preparing food that is never eaten.



SOCIAL

One metric ton of gleaned produce provides roughly 12,500 portions of food, and Gleaning Network UK plans to reach 36 metric tons of produce by September 2013.



ECONOMIC

Gleaning Network UK estimates that increasing the proportion of a farmer's crop reaching the shelves by just 5% increases profit margins by up to 60%.



Deployed in **UK**



Farmers across the UK often have no choice but to leave tons of their crops unharvested. **Not because it is inedible, but because it does not look appealing.** According to the Institution of Mechanical Engineers, as much as half of all the food produced in the world – equivalent to 2 billion metric tons – ends up as waste every year.

Gleaning Network UK coordinates teams of volunteers, local farmers, and food redistribution charities to **salvage food and redistribute it to food poverty charities** like homeless hostels. So far, several tons of British produce have been redistributed, and the network is growing.

Why a Sustainia100 solution?

According to FareShare, 5.8 million people suffer from deep poverty in the UK, and this number is on the rise. Meanwhile, an estimated 20-40% of UK fruit and vegetables are rejected even before they reach the shops, often because of strict supermarket cosmetic standards. Gleaning Network UK target to reduce food waste and food poverty at the same time.



Volunteers reclaim apples from being wasted at a farm in Kent. Two metric tons of apples from this one day were donated to FareShare in London.



shiny

RULES OF THE RAIL

Put clothes on the rail... expect them to be taken





Key trends

Fashion sector

*Designing for
disassembly*

Upcycling services

*Reinventing the
fashion calendar*

Waterless textile dyeing

*Turning trash into
trendy clothes*



Clothes Swapping Parties



→ Fashion is fabulous but doesn't come cheap - for consumers or the environment. Futerra's swishing concept organizes clothes swapping parties around the world.



ENVIRONMENTAL

According to Futerra, a garment that is swished rather than bought new saves an average of 0.4 kg CO2 and cuts toxins and water use.



SOCIAL

Swishing lets women celebrate their individual style in a collaborative and celebratory way.



ECONOMIC

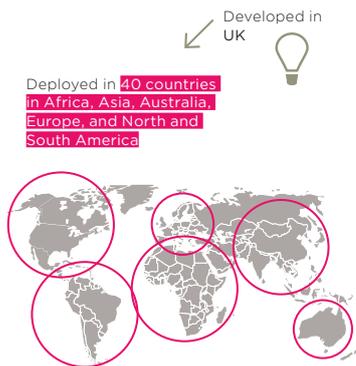
Futerra estimates that over 7,000 women in the UK swish 25,000 items every year, saving the participants substantial amounts on clothing expenditures.

Swishing gives women the chance to get new clothes without making an environmental impact. It's a simple but powerful idea: Women **bring at least one high-quality item** they no longer want to a Swishing party. Everything is collected and displayed, and everyone **chooses something** they love **to take home**.

Swishing is **open source**. Anyone can throw a party. Organizers download a pack from the Swishing website and **promote their event through the site, Twitter, and Facebook**. Swishing is a party, and its social nature has global appeal. Hundreds and thousands of women go to Swishing parties, from "Klädbyte" parties, in Sweden, to "Cambalache," in Colombia.

Why a Sustainia100 solution?

Swishing is closed loop - there are no new items at a Swishing event. Participating changes women's habits by making second hand glamorous. The collaborative and celebratory approach has the potential to be scaled extensively.



"IMAGINE FINDING A PERFECT NEW OUTFIT. NOW IMAGINE IT **COSTS YOU NOTHING**, YOUR FRIENDS HELPED YOU CHOOSE IT, AND IT **CAME SERVED WITH A GLASS OF BUBBLY**. THAT'S SWISHING"

LUCY SHEA, FOUNDER, SWISHING



Swishing parties are glamorous, social, and fun. And they're redefining fashion around the world.

Design for Disassembly



→ **Timberland's Design for Disassembly boots are designed to pursue a cradle-to-cradle goal.**

The Design for Disassembly (DFD) boots have the potential to be recycled to a much greater degree than other footwear. When boots are returned to Timberland, the company estimates it will be able to **recycle at least 50% of the materials** in a factory in the Dominican Republic. DFD shoes **use fewer materials** and **more recycled content** than earlier generations of Timberland's Earthkeepers boots, keeping materials out of landfills.

Timberland says it will continue to work with designers and its value chain to get closer the ultimate goal: **a true cradle-to-cradle product.**

Why a Sustainia100 solution?

Timberland is on a mission to make shoes with better materials using organic cotton, recycled PET plastics, and recycled rubber as the first step towards reducing the company's carbon footprint.



ENVIRONMENTAL

Timberland has saved approximately 500 metric tons of carbon with its switch to DFD Earthkeepers boots.



SOCIAL

DFD encourages consumers to think about the full life cycle of the products they consume, and creates jobs in the Dominican Republic.

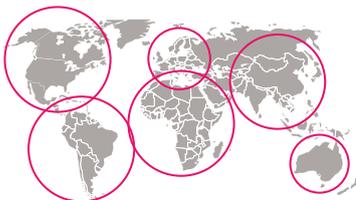


ECONOMIC

Carbon savings resulting from the switch to manufacturing DFD boots is equivalent to the energy and heating used during three months at Timberland's New Hampshire, USA, headquarters.

Developed in USA

Deployed in 61 countries in Africa, Asia, Australia, Europe, and North and South America



PRODUCT
Cradle-to-Cradle

Making quality boots and shoes is an inherently labor-intensive, resource-intensive endeavor. That's why we focus on each step of the process to use less material and create less waste in the environment.

Use of Eco-conscious Materials (Footwear)
Share of 2014 Footwear Products

Recycled Materials	36.7%
Organic Materials	4.2%
Recycled Rubber	48.8%
Recycled PET	10.3%

Product Step of Impact

Product Recycling Partners

Voices of Challenge

Product Recycling Partners

Product Step of Impact

Product Recycling Partners

Vintage Clothing Library



→ **United Archive is a sustainable style library allowing women to borrow, wear, and return from a curated selection of quality vintage clothing.**



ENVIRONMENTAL

United Archive's clothing library extends the lifecycle of underutilized garments.



SOCIAL

The access over ownership model is an affordable alternative to fast fashion that allows more people to wear quality garments.



ECONOMIC

Australians spend approximately \$1.7 billion annually on clothing they do not wear, according to United Archive.



Developed in Australia



Deployed in **Australia**



Solution by United Archive

Sharing Design Globally for Upcycling Locally



→ Trash to Trend is a Web platform that enables upcycling by helping designers to cooperate with mass producers, brands, local services, and end users.

Upcycling means creating new value for waste materials in each stage of the lifecycle of a material. Trash to Trend offers a solution to scale the opportunities for **upcycling through a user-friendly Web platform**, with tools for learning, cooperation, and creation of an upcycling market. This solution enables designers to play the central role not just in designing a garment but also in offering input in material development that **reduces toxicity without losing durability** and **improving production methods** towards zero waste and material reuse. Finally, Trash to Trend assists designers in developing new services that enable changes in how people act when purchasing and treating their clothes.

Why a Sustainia100 solution?

Upcycling done in mass production in Bangladesh demonstrates that each new garment made of waste materials uses an average 85% less water and creates 84% less CO2 compared to a typical mass-produced item.

ENVIRONMENTAL
The Trash to Trend platform can lead to significant savings in resource consumption by spreading high-quality upcycling design.

ECONOMIC
Upcycling enables cost-cutting in mass production, it demands low investment in R&D, and gives fast outcomes in terms of sales and reduction of energy and resource use.

Developed in Estonia, Bangladesh

Deployed in Estonia, Latvia, Lithuania, Bangladesh, India, Norway, Sweden, Denmark, Finland



FROM PRODUCTION WASTE TO A NEW PRODUCT BEFORE LEAVING THE FACTORY


marker


cutting leftovers


rollends


overproduction

CRAZY SAVINGS

84% less 

calculated per item

85% less 

calculated per item

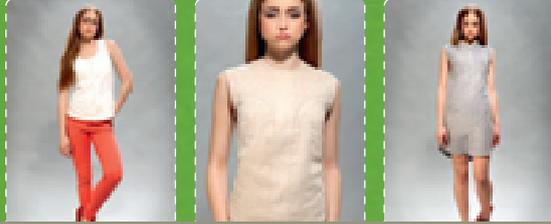
EFFICIENT
Parallel production with main collection.

IMMEDIATE
Fast design process, in cooperation with brand design team.

ACCESSIBLE
Global approach, possible for everybody around the world

GREEN
More efficient than recycling: faster, much less energy, water and time consumed.

➔



➔

Reversible, Versatile and Sustainable Fashion



→ In 2012, Loomstate launched a fashion line called “Loomstate 321 – 3 ways 2 wear 1 piece”. The concept combines color, reversibility, and versatility using one knit fabric: Tencel.



ENVIRONMENTAL

Tencel is produced from renewable and sustainable resources using a closed-loop system with minimal impact on the environment.



SOCIAL

Loomstate hopes its 321 line will encourage customers to rethink fast fashion and find more value in each piece of purchased clothing. Clothing oneself in sustainable apparel encourages sustainable living.



ECONOMIC

By creating high-quality apparel that can be worn in multiple ways, the 321 line limits the garments that a customer needs to purchase, saving money and time.

Tencel comes from sustainably grown forests of beech and eucalyptus tree that require less land, water, and soil nutrients than any other natural fiber. **Ninety-nine percent** of solvents used to process the wood pulp into soft, silky threads **are recycled** in a closed-loop system. Loomstate says it is dedicated to organic cotton but is also **constantly learning about new sustainable fibers**, like Tencel, and incorporating them into its designs.

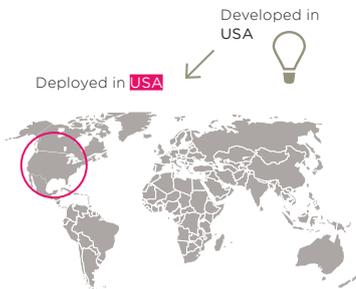
Why a Sustainia100 solution?

Fashion has been an incredibly wasteful industry. Loomstate aims to change that by producing long-lived clothing made from sustainably grown materials. The 321 collection goes even further by reducing the amount of clothing a person needs to purchase. Each garment is constructed with multiple layers of colorful fabric that can be flipped and reversed and worn multiple ways. The mission, Loomstate says, is to unite sustainability with modern style.

“SUSTAINABILITY IS ABOUT LOOKING AT OUR PRODUCTS AS THE EMBODIMENT OF COMMUNITIES AND ECOSYSTEMS IN WHICH WE OPERATE.

CONSIDERING THE LIFE AND IMPACT OF A PRODUCT IS HOW WE DRESS SMART.”

RHETT GODFREY,
DIRECTOR OF SUSTAINABILITY,
LOOMSTATE



Solution by Loomstate

Sustainable Clothing made Profitable



→ Years of commitment to achieving sustainability certifications have led to Neutral.com developing a holistic approach to produce basic clothing for consumers and other labels.



ENVIRONMENTAL

With the GOTS sustainable cotton and the EU Eco-Label certificates, Neutral.com cleans and reuses wastewater, uses wind energy, reduces and recycles waste



SOCIAL

Combining Fairtrade and certified organic cotton is life changing for farmers, the SA8000 certification is the highest worker rights standard.¹



ECONOMIC

Neutral.com proves that the extra cost of certifications is a profitable business model when products are designed to create added value for consumers, companies and organizations.

Truly sustainable clothing production requires **holistic approaches** and certified processes. Neutral.com is producing basic clothing using organic cotton, recycling wastewater and waste and using alternative energy to power factories while giving poor farmers extra money with Fairtrade and workers proper rights. The process is **certified and monitored** by independent, internationally recognized organizations to ensure a **trustworthy** final product.

With its credibility, Neutral.com has become a platform for businesses, NGOs, the public sector and other fashion labels to improve their own sustainable storytelling thereby making the products **attractive business propositions** beyond selling directly to consumers.

Why a Sustainia100 solution?

Neutral.com is certified according to best in class environmental, social and ethical standards: GOTS, EU Eco-Label, Fairtrade and SA8000. By making a profit, the company is paving the way towards structural change in the huge and highly scalable market for basic clothing.



Developed in Denmark and India

Deployed in India



“WE BELIEVE IN BEING OKAY. WITH **100% COMMITMENT TO CERTIFIED CLOTHING**, WE CAN IMPROVE OUR PLANET, MAKE PEOPLE HEALTHIER AND GIVE FARMERS HOPE. THAT’S OKAY.”

LARS BECH, FOUNDER, NEUTRAL.COM



¹Environmental Justice Foundation, “The Deadly Chemicals in Cotton”.

Neutral.com is about leveraging people's passion for sustainable change to create best practice in production.



Textile Dyeing without Water or Waste



→ The use of supercritical fluids in textile dyeing completely eliminates the use of water and reduces the energy required to dye textiles.



ENVIRONMENTAL

Supercritical fluids technology eliminates use of water in dyeing textiles.



SOCIAL

Water-poor areas around the world can become or continue to be viable locations for textile manufacturing.



ECONOMIC

Applied Separations claims that the use of supercritical fluids in textile dyeing will require 50% less energy and 50% fewer chemicals, cutting production costs.

Employing supercritical fluids technology in textile dyeing has the **potential to revolutionize the textile industry**. This waterless solution not only conserves a valuable and diminishing resource, it also uses less energy than traditional water-based textile dyeing.

Rather than using aqueous or solvent solutions, Applied Separations' technology **uses supercritical CO₂** to take up the dye, which replaces water completely. And instead of sending the spent mix to waste-treatment facilities (or into rivers and lakes, as is sometimes done in less-developed production facilities), **the dye-mix can be captured and reused**. The CO₂ for the process is taken from the environment and returned to it, **creating no pollution and no waste**.

Why a Sustainia100 solution?

The textile industry is a major consumer of water, as evidenced by the 25 liters of water required to dye just one T-shirt. Applied Separations' supercritical fluids technology is viable and currently under production with industry partners. 2013 looks to be a breakthrough year for the technology, allowing the process of textile dyeing to become more resource efficient.



Developed in USA

Deployed in USA, East Asia



“APPLIED SEPARATIONS IS EXCITED TO HELP REINVENT THE TEXTILE INDUSTRY. **GREEN IS NOT JUST A COLOR.**”

ROLF SCHLAKE, PRESIDENT AND CEO, APPLIED SEPARATIONS.

Reinventing the Fashion Calendar



→ The Anti-[fashion]-Calendar is an educational and production concept for young designers wanting to reduce consumption and waste and drive the industry towards ethical fashion.



ENVIRONMENTAL

According to the U.S. EPA, 13 million tons of textiles are disposed of each year in the USA.



SOCIAL

Employment in the fashion industry is seasonal, with mass layoffs in between seasons. The Anti-[fashion]-Calendar addresses this social challenge in developing countries.



ECONOMIC

Making resource allocation more balanced throughout the year, the Anti-[fashion]-Calendar ensures stable cash flows for upcoming designers.

Study NY's Anti-[fashion]-Calendar reinvents the fashion calendar by educating young designers to create **fewer styles** and work **closer to season**. The concept offers emerging designers a model for producing small capsule collections of 3-4 styles monthly, allowing more freedom and clarity in the design and development of each piece. Furthermore, with this concept, Study NY is demonstrating that **collaboration** with artisans **in remote countries** such as Peru and Afghanistan **is viable for producing limited-edition, handmade goods**.

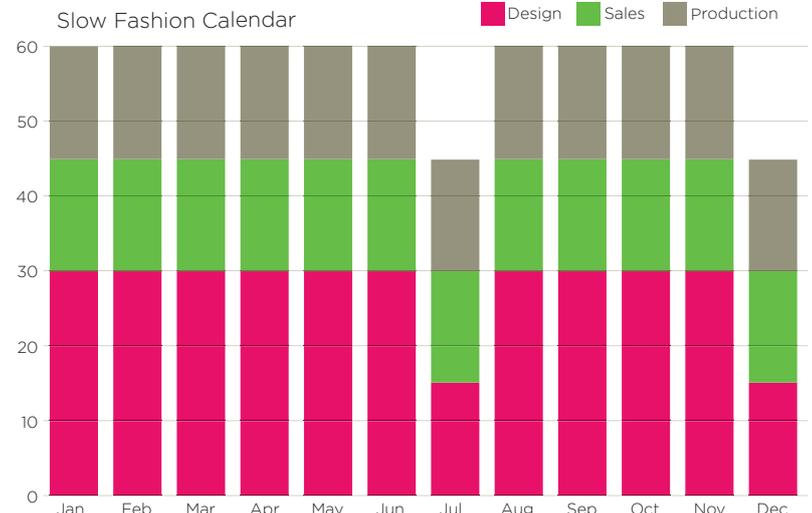
The Anti-[fashion]-Calendar slows down consumption by eliminating waste and educating consumers to be more aware of the sustainability of their purchases, **leading to a permanent change in the world's consumption habits**.

Why a Sustainia100 solution?

The Anti-[fashion]-Calendar improves the way future generations of designers manage cash flow, reduces waste, and provides consumers with an understanding of quality in ethically made clothing. It also provides retailers with more consistent and seasonal products.



Fast fashion has created a dependence on cheap, disposable clothing and unsustainable production methods, victimizing the workforce in developing countries and increasing waste in consumer nations.



“THE WANTS OF THE PRIVILEGED NATIONS SHOULD NOT AFFECT THE QUALITY OF LIFE OF OTHERS. INSTEAD, **OUR PURCHASING POWER SHOULD BE USED TO HELP THOSE IN NEED.**”

TARA ST JAMES, OWNER, STUDY NY

Upcycling Jewellery



→ Reworking and reusing perfectly good textiles and accessories not only reduces waste but is part of good living. Sustainable fashion isn't just another trend; being resource-minded is the future.



ENVIRONMENTAL

Upcycling fast fashion accessories keeps perfectly good materials from entering landfills. By pursuing opportunities for reuse, the UK alone could reduce its reliance on raw materials, including rare earths, by up to 20% by 2020.



SOCIAL

Lumoi says its upcycling jewellery service illustrates the true value of finite natural resources, giving people an option to change their habits.



ECONOMIC

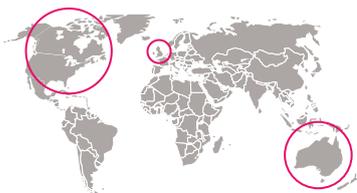
UK businesses can save up to \$35.75 billion through low- or no-cost improvements in the efficient use of resources, according to research from the Department for Environment, Food and Rural Affairs in the UK.



Developed in UK



Deployed in UK, Canada, Australia



Lumoi creates eclectic, **sustainable jewellery** made from unwanted materials shipped to their upcycling service. “Fast fashion” accessories encourage wastefulness due to their low cost and lack of quality. Lumoi redesigns these “undesirable” materials into new objects of beauty. The company ensures its jewellery is **hand-crafted** to the highest standard for durability so accessories last. This approach ensures **environmentally friendly production**, avoids waste, and results in sustainable jewellery.

Why a Sustainia100 solution?

The need to find alternative ways to deal with waste has never been greater. Consumers throw an astonishing amount of textiles and accessories into landfills each year. Lumoi says its upcycling service is an eco-friendly way to dispose of broken, fast fashion jewellery.



Solution by Lumoi Jewellery

New Fashion from Fabric Discards



→ Piece x Piece creates women’s clothing from discarded fabric samples recovered from local fashion studios. Each garment is original, handmade, and sewn in small quantities.



ENVIRONMENTAL

Design houses discard 5,000 or more swatch cards every year used for development. Piece x Piece uses these new and viable fabrics which are normally thrown away in the early stages of clothing design.



SOCIAL

At least 75% of consumers think about the ecological and social impacts of the clothes and products they purchase. This group is a powerful force in the consumer market.



ECONOMIC

Piece x Piece reduces waste and stimulates San Francisco’s economy by creating fair wage jobs and manufacturing locally.

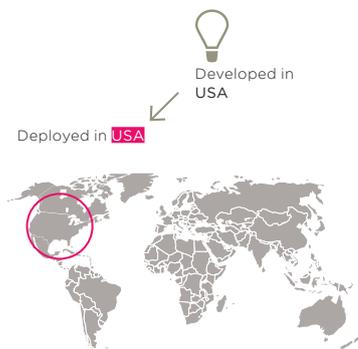
Piece x Piece was established in response to the large amount of fabric waste common in the fashion industry. The company says its mission is to **create beauty from fabric waste**, and to stimulate thinking about what “waste” really means and how we address it.

Why a Sustainia100 solution?

Thousands of sample fabric swatches are discarded each season; until now, it had been difficult to imagine a use for them. The result of ongoing reclamation, experimentation, and design, each Piece x Piece garment is, by nature, one-of-a-kind. The fabric used in each piece is selected from an ever-changing stock of luxury discards.

“PIECE X PIECE IS A **THOUGHTFUL DISRUPTION TO THE TRADITIONAL PATH** ONE USUALLY TAKES IN THE APPAREL INDUSTRY FROM FABRIC MILL TO LANDFILL.”

ELIZABETH BRUNNER,
FOUNDER AND CREATIVE DIRECTOR, PIECE X PIECE



Piece x Piece creates beautiful, high-quality clothing from discarded fabric samples recovered from local design studios.

Solution by Piece x Piece



Key trends

Transportation sector

*Sharing is gaining
ground*

*Electric means of
transportation*

*Ships powered by
renewables*

*Hydrogen cars in mass
production*

*New ways of EV
charging*



BUSINESS AREA
Nordic Real Estate Summit

BROSTADEN

merVärde

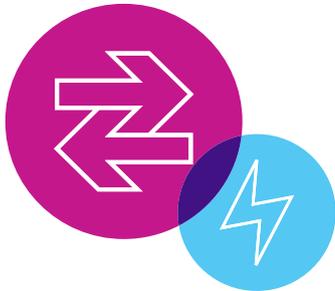
Europe's
Greenest
Technology



BROSTADEN

FP0 609

Solar-Powered EV Charging Stations



→ Combining solar chargers in parking lots with an IT and energy management system, Solbanken is an easy-to-use, rental option for renewable EV charging.



ENVIRONMENTAL

Transportation accounts for over half of global oil consumption, and is set to increase with a predicted doubling of passenger cars.¹



SOCIAL

Air pollution in cities caused by traffic is on the world's top 10 list of killer diseases, according to WHO.



ECONOMIC

Solelia's rental solution allows for solar-powered charging with no upfront investment needed from the customer.

Solbanken (The Sun Bank) enables solar charging in connected chargers **using parking lots as solar energy parks**. The Solbanken platform connects new or existing photovoltaic (PV) systems to **EV charging stations with smart grid functionalities** such as "direct charging" from nearby solar systems and adjustment of power consumption to real-time solar production.

Should additional electricity be needed, Solbanken automatically purchases clean solar electricity from external producers. The shading PV canopy offers **protection against the sun and rain**, and requires minimal area in parking lots.

Why a Sustainia100 solution?

Transportation accounts for over half of global oil consumption, and this share will increase if the number of passenger cars doubles as predicted by the IEA. Replacing gasoline cars with electric cars is not as environmentally friendly if they are driven on fossil fuel-based electricity. WWF estimates that Solelia's solar-powered charging can save 21 million tons of CO2 emissions per year by 2022.

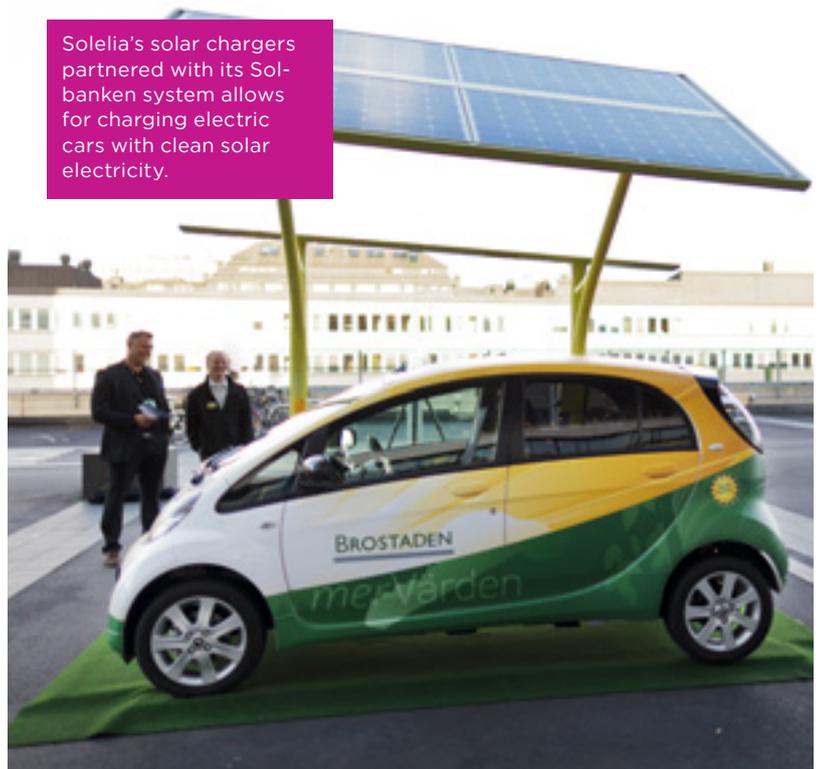
Developed in Sweden



Deployed in Sweden, Norway

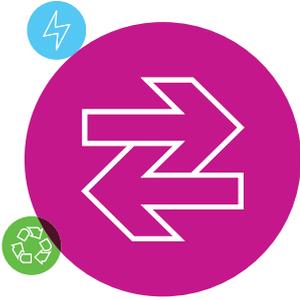


Solelia's solar chargers partnered with its Solbanken system allows for charging electric cars with clean solar electricity.



¹International Energy Agency, "World Energy Outlook 2012."

Kite-Powered Ships



→ A wind propulsion technology based on large towing kites enables cargo ships to cut costs and reduce emissions.

SkySails propulsion for cargo ships is a **wind-propulsion system** based on large towing kites that can be installed on new ships and **retrofitted onto most existing ships**. The technology offers a solution that can make a major environmental impact by reducing the carbon emissions of the world's merchant fleet. Three cargo ships are currently equipped with SkySails, with a fourth ship expected to add the technology soon.

Why a Sustainia100 solution?

Cutting-edge solutions in the field of renewable energy are needed in order to meet the challenges faced by the shipping industry. Depending on the prevailing wind conditions, a ship's fuel consumption and emissions can reportedly be reduced by up to 30% by using the SkySails system. The latest SkySails product has a maximal propulsion power of more than 2 MW, which approximates 2,700 horsepower and is equivalent to a ship engine.



ENVIRONMENTAL

SkySails' technology can save 100 million tons of CO2 annually if adopted broadly by the world's merchant fleet, according to the company.



SOCIAL

Due to toxicity of ship emissions, there are more than 50,000 premature deaths each year in the coastal areas of the EU.



ECONOMIC

According to SkySails, the technology can save up to 10 tons of oil per day, which equals cost savings of approximately \$5,000 daily.

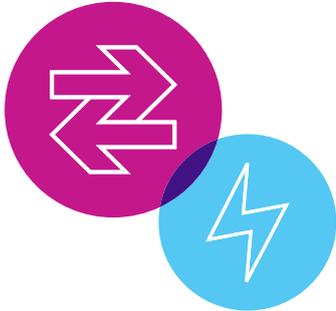
Developed in Germany

Deployed in Germany, Switzerland, Greece



Photo: SkySails

Wireless EV Charging



→ Using inductive transfer of energy, Qualcomm has developed a technology capable of wirelessly charging EVs - even when driving.

Qualcomm's Halo EV charging technology uses **inductive wireless energy** transfer to eliminate the plug-in cord used by EVs today. The technology works by fitting cars with a receiver pad that enables **automatic charging** when the car is parked via a transmitter pad embedded in the road.

Qualcomm claims that its technology transfers power with the **same efficiency as a cable**. The company aims to embed wireless charging in continuous strings along the roadway, with EVs constantly being **powered as they drive** over them. Qualcomm is trialing its technology in London with a fleet of 50 vehicles.

Why a Sustainia100 solution?

Wireless EV charging addresses key challenges to electric car uptake: charging convenience and battery size and cost. The technology could be rolled out across cities and eventually on major transit routes, significantly reducing the number and size of batteries needed for EVs and enabling electric car owners to travel greater distances.


ENVIRONMENTAL
According to Qualcomm, 15% of the total environmental burden from EVs comes from the batteries.


SOCIAL
Doing away with the plug-in cord makes use of electric vehicles more convenient.


ECONOMIC
Wireless charging can make EV batteries smaller and cheaper because they need only be charged in small, frequent bursts.

 Developed in Ireland, USA

Deployed in **Denmark, Finland, France, Germany, Norway, Poland, The Netherlands, Sweden, USA**



In London, a two-year trial, in association with Renault, will test the feasibility of and issues around wireless charging of EVs.

Peer-to-Peer Carsharing



→ A new collaborative consumption initiative helps people save money, make better use of existing resources, and think local by sharing their cars.



ENVIRONMENTAL

According to Buzzcar, a properly shared car takes 8 cars off the road. Buzzcar optimizes the utilization of existing cars, so fewer cars are added to the streets.



SOCIAL

More than 20,000 people have joined Buzzcar, participating in collaborative car consumption.



ECONOMIC

According to Buzzcar, owners renting out their car earn an average \$130 monthly and renters save up to 40% compared to traditional car renting.

Buzzcar is a peer-to-peer carsharing platform, currently operating in France, where **people rent out their own cars**. The platform is available online with a location-based mobile app. The service matches people ready to share their car with people looking for a car to rent by the hour or by the day.

To ensure quality, after each rental, **drivers rate the cars**, and the owners rate the drivers, building a vehicle and driver history. The company also covers liability insurance.

Why a Sustainia100 solution?

Carsharing means fewer cars on the streets, less traffic jams, and less pollution. According to the company, car production represents at least 30% of carbon emissions over the car's lifetime; Buzzcar reduces the need for car production and differs from traditional carsharing, as the solution doesn't add cars to the streets, but simply makes better use of cars already on the road.



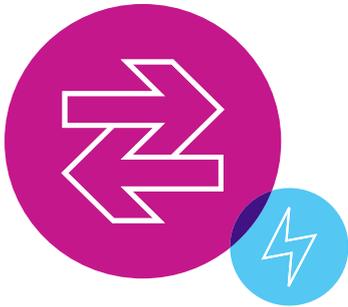
Buzzcar makes it simple to connect people ready to share their vehicles with people looking to rent a car

Developed in France

Deployed in France



Hydrogen-Powered Fuel-Cell Car



→ **Hyundai ix35 Fuel Cell is the world's first series-produced, commercially available hydrogen-powered fuel-cell car. It offers zero harmful tailpipe emissions and quiet operation without range compromises.**



ENVIRONMENTAL

When the hydrogen used to power cars is from a carbon-neutral source, near carbon-neutral, emission-free personal transportation becomes possible.



SOCIAL

The Hyundai ix35 Fuel Cell contributes to improved health through cleaner air.



ECONOMIC

Hydrogen can be produced locally at or near the point of use, meaning that every community can become an energy producer.¹

The third-generation fuel-cell electric vehicle (FCEV) from Hyundai is powered by hydrogen and driven by an electric motor, resulting in **zero harmful tailpipe emissions** and **quiet operation**. A single tank of hydrogen gives a range of almost 600 kilometers, and **refuelling takes just a few minutes**, according to Hyundai.

In January 2013, the Hyundai ix35 Fuel Cell became the first fuel-cell car in the world to **enter series production**. Deliveries to municipal and private fleets are already under way, with 1,000 units to be built by the end of 2015.

Why a Sustainia100 solution?

The ix35 Fuel Cell demonstrates how hydrogen-powered FCEVs offer an effective solution that can help deliver sustainable mobility, as hydrogen refuelling infrastructure grows and production volume increases. When produced directly from renewable sources, hydrogen can be 100% clean, if produced directly from renewable sources. The only tailpipe emissions are water vapor.

Developed in South Korea

Deployed in **Belgium, Denmark, The Netherlands, Norway, South Korea, Sweden, UK, USA**



The Hyundai ix35 Fuel Cell is the world's first series-produced fuel-cell car. Fuelled by hydrogen in just minutes, it emits only water vapor, and boasts a near-600-kilometer range.

“THE IX35 FUEL CELL SHOWS WE ARE COMMITTED TO **A SOCIETY OF SUSTAINABLE ENERGY AND ZERO-HARMFUL EMISSIONS** IN ROAD TRANSPORT.”

IVAN FOSSAN, ADM. DIRECTOR, NORLED

¹ Centre for Energy, Canada: “How Is Hydrogen Produced?”



Urban Bike-Sharing

→ **Hangzhou, China, boasts the world's largest bike-sharing program.**

The Hangzhou bike-sharing system has **60,600 bikes operating from 2,700 stations**. Bike-sharing stations can be found **every 100 meters**. Users can ride for free for the first hour, followed by 1 yuan (\$0.16) for the second hour, 2 yuan (\$0.33) for the third hour, and 3 yuan (\$0.49) for each additional hour.

First-time users pay a 200-yuan (\$32.50) deposit to obtain a smart card for bike-sharing use. **Smart-card technology** facilitates automated check-in and check-out at bicycle docking stations. Hangzhou Public Bicycle plans to expand to 175,000 bikes by 2020.

Why a Sustainia100 solution?

The Hangzhou Public Transport Corporation launched the bike-sharing system in 2008, in response to growing traffic congestion and air pollution. A March 2010 survey of Hangzhou Public Bicycle members and non-members found that 30% of bike-share users incorporated bike-sharing into their commute. The survey also found that the bike-sharing system captured modal share from bus transit, walking, cars, and taxis.



ENVIRONMENTAL

Bike-sharing can displace trips by car, which reduces tailpipe emissions and traffic congestion.



SOCIAL

Quick and convenient bike-sharing programs make it easy to get around by bike, which promotes healthy living.



ECONOMIC

The bikes are free to use the first hour and provide a free or cheap alternative to cars for shorter distances.



Developed in China

Deployed in **China**



Solution by Hangzhou Public Transport Corporation

Electric City Bus with 250-km Range



→ With a range of 250 kilometers on a single charge, this all-electric bus has the ability to deliver large-scale sustainable public transportation.



ENVIRONMENTAL

If all buses in Shenzhen, China, are replaced by the ebus, potential CO2 emissions reductions are over 1 million tons per year, according to company data.



SOCIAL

The ebus enables swift public transport at very low noise levels.



ECONOMIC

In Shenzhen alone, if all the public transportation were electrified, the city would save about \$563 million annually.

BYD ebus is a pure electric city bus with **no tailpipe emissions and very low noise levels**. The bus is powered by BYD's Fe (lithium iron phosphate) batteries, which are characterized by high energy density, long service time, and low cost, according to the company. Powered by three battery packs with a combined capacity of 324 kWh, the lightweight BYD ebus has a **range of 250 km** on a single charge in urban conditions.

With a charging power of 60 kW, BYD ebus can be fully charged in about 5 hours, and thus can be charged at night during off-peak hours. BYD says that the **chemical materials contained in the battery can be safely recycled**.

Why a Sustainia100 solution?

With the ebus, BYD aims to gradually replace gasoline or diesel buses with fully electric models that can dramatically reduce air pollution from the transportation sector. The ebus is estimated to reduce operating costs by 30% or more and fuel cost savings by up to 80% compared to a standard diesel bus.

Developed in China

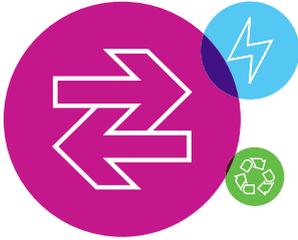


Deployed in **The Netherlands, UK, Denmark, Uruguay, Hungary, Colombia, Canada, USA, China**



Solution by BYD Company Limited

Battery-Driven Car Ferry



→ Environmentally friendly ferry operation is not a distant dream. This smart, clean, and silent battery driven ferry will soon be at sea in Norway.

The world's first large all-electric car ferry is a **100% battery driven aluminium catamaran**. The 80-meter-long vessel will be able to carry 120 cars and 360 passengers across the Sognefjord, in Norway.

The ferry is designed with energy efficiency as highest priority, affecting operation, hull shape, materials, and on-board systems. The ferry will ply its route 34 times daily, with a crossing time of 20 minutes. The estimated **time at port is 10 minutes**, which will be used to fully charge the on-board, 1-MWh lithium-polymer battery pack.

Why a Sustainia100 solution?

The electric car ferry now being produced by Fjellstrand does not discharge any greenhouse gases while operating. Compared to a standard diesel ferry serving the same route, the electric ferry will save about 1 million liters of fuel annually and prevent 570 metric tons of CO2 from entering the atmosphere, according to Norled. Besides environmental benefits, the ferry will feature lower operational and maintenance costs.


ENVIRONMENTAL
Domestic ferries in Norway emit approximately 400,000 metric tons of CO2 per year¹.


SOCIAL
With no air pollution or noise, the electric ferry is a pleasant and healthy alternative for both passengers and crew.


ECONOMIC
Compared to a standard diesel ferry, an electric ferry will save approximately 30% on fuel, operational, and maintenance costs.

Developed in Norway



Deployed in Norway



¹ Opdal, O.A.: "Batteridrift av ferger".

Empowering Auto-Rickshaw Drivers



→ **Three Wheels United tackles the challenges faced by the working poor in the auto-rickshaw sector in India while reducing CO2 emissions and air pollution.**



ENVIRONMENTAL

By replacing two-stroke engines with cleaner-burning four-stroke models, TWU reduces harmful particulate and CO2 emissions.



SOCIAL

Banks now consider TWU's drivers to be worthy customers, with drivers able to receive health, life, and accident insurance.



ECONOMIC

According to TWU, the solution increases the net earnings of drivers by over 70% from existing levels.

Three Wheels United (TWU) is based on a three-pillar solution: **fair loans to drivers** enabling them to purchase their own auto-rickshaws, the possibility of additional streams of income to the drivers through advertisements, and **clean technology that lowers fuel costs** and lessens environmental harm.

TWU has been operational in Bangalore for the past two years, and has achieved a total of 120 vehicles on the road and over 700 drivers registered in their savings scheme. They expect to reach a total of 750 vehicles in Bangalore by the end of 2013.

Why a Sustainia100 solution?

With over 5 million auto-rickshaws in India, the sector serves between 10% and 20% of the daily engine-driven city commutes. TWU's model makes drivers owners of their vehicles and encourages savings, while ensuring that the drivers are under a social security system. According to TWU, air pollution is reduced by 40%.



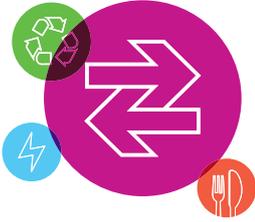
Developed in India, the Netherlands



Deployed in **India**



Zero Emissions Transport Refrigeration System



→ Thermo King's CryoTech transportation refrigeration system reuses CO2 for cooling, resulting in clean, green, and silent deliveries of perishable goods.

Thermoking has developed a technology, CryoTech, reusing CO2 in an innovative open-loop system that provides airflow for refrigeration in the load space of trucks and trailers. The CO2 used for cooling is a byproduct of ammonia production, resulting in no new greenhouse gas emissions.

Thermo King CryoTech units achieve a significant reduction in emissions and improved performance over conventional diesel-powered units. The system offers faster temperature recovery, which is ideal for the distribution market, where the cooling unit is often interrupted as drivers deliver goods at multiple locations.

Why a Sustainia100 solution?

The system has zero harmful emissions during the cooling cycle. Depending on application, CryoTech claims that the solution can deliver a 75% to 90% reduction in total greenhouse gas emissions. CryoTech units are virtually silent during operation and are an estimated 90 percent quieter than conventional diesel refrigeration units. This ensures reductions in urban noise pollution and happy neighbors in delivery areas.

ENVIRONMENTAL
Zero harmful emissions during the cooling cycle.

SOCIAL
Enables sustainable deliveries in urban areas by eliminating diesel engine noise.

ECONOMIC
Reduces operational costs and may spare retailers and distribution companies from costs to comply with stricter noise and emissions regulations.

Developed in Ireland, USA

Deployed in Denmark, Finland, France, Germany, Norway, Poland, the Netherlands, Sweden, USA



Sound Pressure (dBA) - Values at Typical Listening Distances



Solution by Thermo King



The Thermo King CryoTech solution enables clean, green, and silent deliveries of perishable products in urban areas while maintaining the load at high standards.



“WITH MORE THAN 600 UNITS IN SERVICE TODAY, WE HAVE SUCCESSFULLY SHOWN THAT THERMO KING CRYOTECH SOLUTION REPRESENTS **THE SUSTAINABLE TRANSPORT REFRIGERATION SYSTEM OF THE FUTURE.**”

PASCAL RICHARD, PORTFOLIO LEADER FOR AIR SOLUTIONS, TRUCK AND TRAILER, THERMO KING, EMEA

THE IDEA BEHIND

Ingersoll Rand and its family of brands — including Thermo King® and Trane® — aim to provide products, services and solutions that tackle a number of sustainability issues and advance the quality of life.

With award-winning products such as the SLXe, T-Series and CryoTech, Thermo King is committed to protect food and perishables during transportation by delivering efficient and sustainable transport refrigeration solutions. Trane, another brand of Ingersoll Rand, is creating and sustaining safe, comfortable and efficient environments by enhancing the quality and comfort of air in buildings.

To advance these efforts, the Ingersoll Rand Center for Energy Efficiency and Sustainability (CEES) was created and is further driving energy efficiency and sustainability into the innovation pipeline, manufacturing operations and employee education initiatives of Ingersoll Rand. The company believes that premier performance and enduring results will come from addressing urgent global social and environmental challenges in a way that is valuable to customers.

www.europe.thermoking.com





Key trends

IT sector

*Big Data is
booming*

*IT for empowerment
in developing
countries*



*Enabling resource
sharing*

*Household energy
solutions*

Apps are taking over



Connecting Kenya's Unconnected



→ Leveraging solar power and a new approach to delivering high-reliability broadband connectivity, this solution opens up the world of the Internet to rural Africans.



ENVIRONMENTAL

Solar energy is powering the broadband Internet.



SOCIAL

Access to the knowledge and connectivity potential of the Internet can unlock unprecedented social change and community creation.



ECONOMIC

Promoting education and enabling micro business, Internet access can drive significant positive economic impact.

Using a new approach to **wireless broadband** called dynamic spectrum access, Microsoft and its partners have built a mobile broadband network that **taps into previously unused TV spectrum**, also known as TV White Spaces, to establish broadband Internet connections. Using the television frequency **allows signals to travel much greater distances**, and is claimed to outperform traditional wireless networking experiences.

The wireless broadband connections are powered by solar panels, making the solution available off grid. This innovative approach to delivering broadband Internet is providing the benefits of the knowledge society to some of the most rural and **difficult-to-reach areas in Kenya**.

Why a Sustainia100 solution?

With billions of people still not connected to the Internet, new approaches must be developed, and they must be anchored in innovative and sustainable models. This solution is sustainable and scalable because of its healthy underlying business model and the nature of the multi-pronged approach.



Deployed in **Kenya**



Microsoft and partners installing one of dozens of solar panels used to power wireless broadband connections to the Internet in rural Africa.



Solution by Microsoft, Indigo, and Adaptrum

Software for Reducing Water Loss



→ TaKaDu's software uses data from sensors to create actionable alerts about water network anomalies sent to users via an easy-to-use Web application.

TaKaDu has developed a novel approach to **water network monitoring** that helps water utilities increase network efficiency and save water. The solution **takes data from existing sources**, analyzes it using sophisticated statistical algorithms, and automatically **locates and classifies water network events**, such as leaking pipes, at early stages.

By using TaKaDu, utilities know sooner about network anomalies, such as leaks and meter faults and their location, gain improved network visibility, and can make better use of their resources. As a result, utilities using TaKaDu increase their team and network efficiency while saving water, energy, money, and time. As a software-as-a-service solution, it can be **deployed quickly and remotely**, with no need for capital expenditure or onsite installation, allowing for wide adoption and scalability.

Why a Sustainia100 solution?

Water utilities experience large losses due to inefficiencies in various parts of the water supply network. TaKaDu helps reduce water loss and increase network efficiency.



ENVIRONMENTAL

According to TaKaDu, water loss amounts to 25-30% of the world's water production, equivalent to \$14 billion annually.



SOCIAL

The World Bank estimates that reducing water losses in developing countries by 50% could provide water to an additional 90 million people.



ECONOMIC

TaKaDu claims to increase field crews' efficiency and the early awareness of leakage events by 50%, generating greater water savings at lower cost.

Developed in Israel

Deployed in **Australia, UK, Spain, Portugal, Israel, Chile**



"THE GLOBAL WATER CRISIS IS ACTUALLY A WATER MANAGEMENT CRISIS."

Amir Peleg, Founder and CEO, TaKaDu



Mobile-Based Farming Information



→ Airtel Africa's "Voice of the Farmer" initiative uses mobile phone networks to provide farmers in developing countries with agricultural information.



ENVIRONMENTAL

By the end of 2013, Airtel aims to eliminate the use of diesel to power its network.



SOCIAL

Voice of the Farmer offers farmers a way to share experiences and exchange information about social gatherings, events, and job opportunities.



ECONOMIC

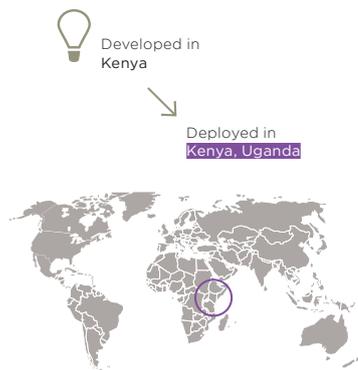
Timely, accurate agricultural information could help farmers increase productivity, which boosts yields and earnings.

Working with the GSMA, mobile service provider Airtel Africa has initiated a project to provide approximately **250,000 small-holder farmers** in Kenya **reliable and relevant agricultural information** via their mobile phones.

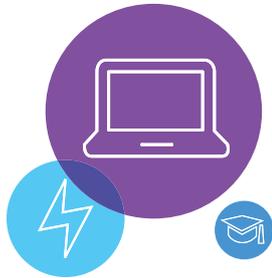
The project, dubbed "Sauti ya Mkulima" (Swahili for "Voice of the Farmer"), offers farmers access to pertinent agriculture-related information, advice, and research that will help them **make better decisions about their crops**, increasing the productivity of their yield, as well as their potential income.

Why a Sustainia100 solution?

Better-informed farmers can increase the productivity of land already under cultivation. Airtel is exploring the use of alternative forms of energy, include hybrid battery banks and solar and wind power, to power its Africa operations. In recent months, 105 solar sites have been set installed in Nigeria, reducing the use of diesel generators from 24 hours to 3 to 4 hours daily.



Using Big Data for Energy Savings



→ Combining mobile, cloud, and innovative Big Data technology, Bidgely empowers consumers to lower their energy bills by delivering real-time feedback and insights into energy consumption.

Bidgely's Appliance Tracing is a **cloud-based** technology that analyzes energy data from millions of homes and generates appliance-level insights **without any plug-level sensors inside the homes**. With cloud-based disaggregation algorithms, Bidgely extracts energy signatures that are unique to appliances in any household, measures energy consumption by each appliance, and **identifies the source of the greatest inefficiencies**, whether it's an appliance or a behavior.

Using Web and mobile apps, Appliance Tracing takes the guesswork out of savings and **provides customers with tools and tips** to make informed decisions on how to become more energy efficient.

Why a Sustainia100 solution?

Bidgely is a zero-touch, scalable technology that leverages the existing grid infrastructure and unlocks the potential of residential energy efficiency. Bidgely is already helping thousands of families to reduce their energy usage by 5-30% and live more sustainably.

Bidgely's cloud-based software extracts appliance-level insights from electric meter data, helping consumers identify inefficiencies and deliver energy efficiency at a massive scale.



Solution by Bidgely

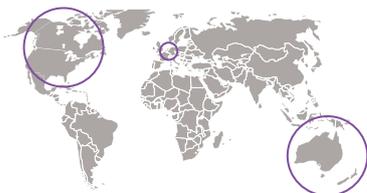
ENVIRONMENTAL
 According to Bidgely, \$50 in annual energy savings in every U.S. home is comparable to the CO2 absorbed by 4 billion trees.

SOCIAL
 Less money spent on energy bills leaves more disposable income to meet other necessities in life.

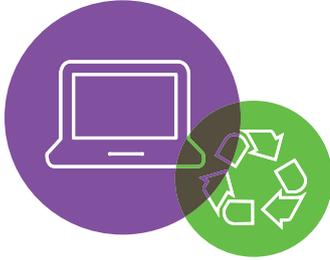
ECONOMIC
 According to the company, customers realize savings of between 5-30% on energy bills.

Developed in USA

Deployed in USA, Canada, the Netherlands, Australia, New Zealand



Online B2B Sharing Marketplace



→ FLOW2 is a business-to-business marketplace where companies and institutions can share equipment and the skills and knowledge of personnel.

Via FLOW2 companies of all sizes in the construction, agriculture, health care, transportation, real estate, and service industries can **share their underutilized overcapacity** of goods and services. The marketplace unites demand and supply. **Owners generate a higher turnover and renters reduce costs** by not buying products or hiring personnel.

Business flexibility is magnified by working together and combining efforts. Doing more with what one already has leads to more sustainable businesses.

Why a Sustainia100 solution?

By helping keep in check overproduction, less raw materials and energy will be consumed and less CO2 will be emitted. FLOW2 gives a longer life to goods and enables every company worldwide to contribute to a more sustainable world.



ENVIRONMENTAL

With FLOW2, less new equipment needs to be produced, resulting in less energy and raw materials wasted.



SOCIAL

FLOW2 builds on collaboration and trust, which leads to better bonds and connectedness between people and companies.



ECONOMIC

Companies renting out their capacity gain an improved return on investment for assets, and renters reduce investments in new equipment or permanent employees.

Developed in
Luxembourg



Deployed in
The Netherlands,
Belgium, Luxembourg,
Germany



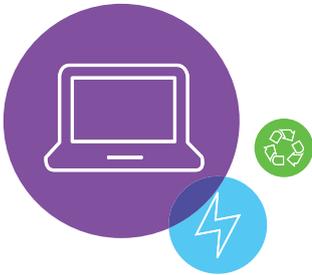
“FOR COMPANIES TO BE MORE SUSTAINABLE, THINKING PATTERNS BASED ON COLLABORATION, SHARING AND TRUST, ARE VERY IMPORTANT.”

KIM TJOA, FOUNDING MEMBER FLOW2.

Companies renting out their capacity gain an improved return on investment for assets, and renters reduce investments in new equipment or permanent employees.



Environmental Scoring of Companies



→ To encourage the development of sustainable supply chains, amee has created a freely accessible repository of environmental data on businesses and organizations in the UK.



ENVIRONMENTAL

Credible environmental data on carbon emissions, water usage, and waste generation enable meaningful action towards sustainable supply chains.



SOCIAL

Transparency provides insight for researchers and consumers.



ECONOMIC

Companies gain further insight into their supply chains, and can use this information to reduce environmental and economic risks - remaining profitable despite increasing resource scarcity and price volatility.

Developed in UK

Deployed in UK



“AMEE PASSIONATELY BELIEVES THAT **GREENER BUSINESS IS BETTER BUSINESS**”

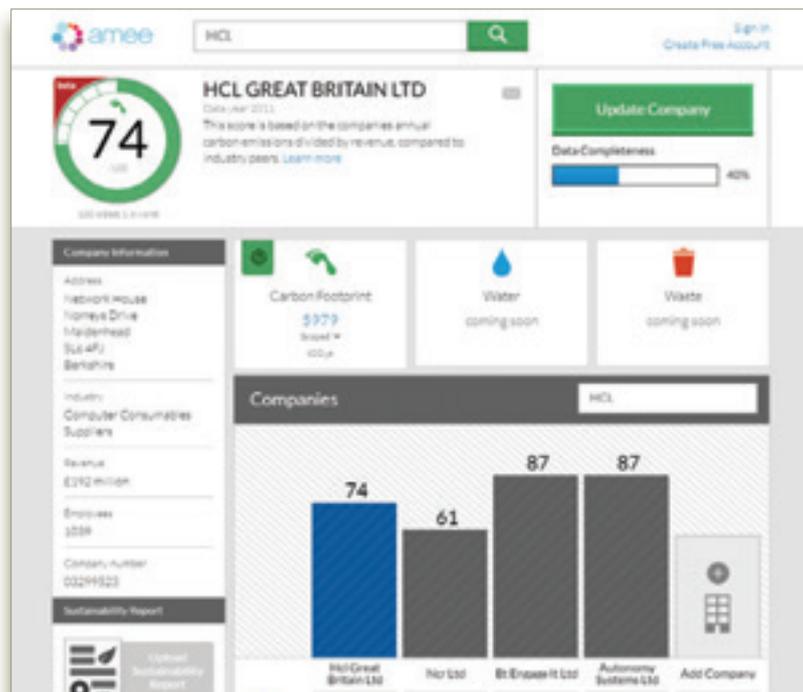
TIM MURPHY, CEO, AMEE

amee has created the largest publicly available **repository of environmental data** by combining a range of data sources with its own statistical modeling system. Every business and organisation is given a unique profile, which provides key environmental data such as annual carbon emissions. **Companies are also given a score**, the AMEEscore, to enable comparison with industry peers.

Companies are then encouraged to update their profiles with actual data. By doing so, they demonstrate their **commitment to transparency and sustainability** – attributes increasingly valued by companies with large supply chains.

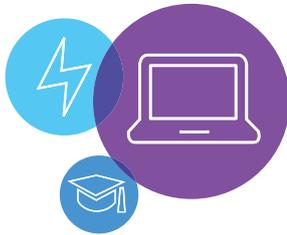
Why a Sustainia100 solution?

The lack of credible environmental data on companies' environmental performance is one of the biggest barriers to achieving more sustainable supply chains. Amee's commitment to free and transparent environmental data, as well as use of big data, has the potential to disrupt conventional business models and scale globally.



Solution by amee UK

Solar-Powered IT-Centers



→ Combining solar power and energy-efficient IT, NICE Centres offer ambitious young Africans technology solutions for education, work, and business.



ENVIRONMENTAL

Through energy efficiency and the use of solar, NICE Centres have a low environmental footprint.



SOCIAL

NICE Centres help people gain access to an income, either directly by bringing in outsourced work or indirectly through education.



ECONOMIC

According to the World Bank, improved access to the Internet results in GDP growth.

NICE Centres are solar-powered IT-centers that combine several benefits under one roof: a shop selling IT and renewable energy products; **educational facilities offering training** courses in business and technology; business hubs offering flexible work spaces and networking opportunities to ambitious youth; and an outsourcing area offering **computer-based work** to people to help them **generate income**.

There are six NICE Centres operating in Gambia; local entrepreneurs operate two as franchises. NICE Centres are financially viable businesses, as people pay for products and services on a **pay-per-use basis**. The existing NICE Centres in Gambia have demonstrated their financial sustainability, and NICE plans to **scale up to 250 centres across Africa** by 2020.

Why a Sustainia100 solution?

A 10% increase in Internet access generates 1.1-1.4% additional GDP growth¹. NICE is giving people in Africa affordable access to the Internet and helping them to use the Internet in a productive manner. By using solar power and energy-efficient computers, the environmental impact of the centers is reduced.

Developed in the Netherlands



Deployed in **Gambia**



¹The World Bank, "Information and Communications for Development - Extending Reach and Increasing Impact."



Solar-powered NICE Centres offer ambitious youth in Africa technology solutions for education, work and business.

Green Outdoor Site for Wireless Networking



ENVIRONMENTAL

Up to 30% of site energy can be saved, and the compact structure of the site saves up to 50% of building materials, according to Huawei.



SOCIAL

Huawei's Mini-shelter reduces noise, and its small size saves up to 70% of land resources.

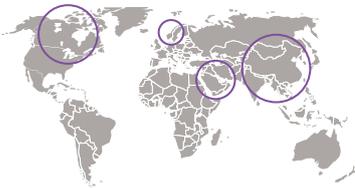


ECONOMIC

According to a Huawei analysis, the Mini-shelter helps carriers save more than 30% on operating expenses annually.

Developed in China

Deployed in Norway, Canada, Kuwait, Saudi Arabia, Bangladesh, China



“OUR MINI-SHELTER IS A DEMONSTRATION OF HUAWEI'S COMMITMENT TO A GREENER ICT ENVIRONMENT”.

TAO HONGMING, VICE-PRESIDENT OF HUAWEI NETWORK ENERGY PRODUCT LINE

→ With a smartly controlled separate cooling system and compatible design, Huawei's Mini-shelter reduces energy consumption for cooling and makes the wireless site more environmentally friendly.

A wireless site or “hotspot” is a fixed communications location that allows devices such as computers, tablets, or smartphones in proximity of the site to access the Internet. Huawei's Mini-shelter greens wireless sites by **separating the equipment and battery compartment** according to different temperature requirements, which ensures **zero energy waste** from the cooling system.

Compared with traditional solutions, the Mini-shelter **saves up to 80% of energy consumption for cooling**. Thanks to a highly integrated and standardized modular design, the Mini-shelter an increased housing capacity, realizing easy site acquisition and fast deployment.

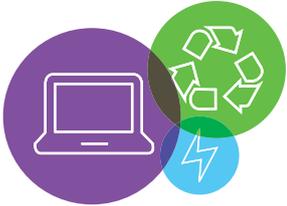
Why a Sustainia100 solution?

For a traditional indoor wireless site, cooling energy takes up more than 40% of the site's energy consumption. Huawei's Mini-shelter, with its focus on energy savings, drastically reduces this power consumption for cooling. More than 100,000 Mini-shelters have been deployed in 60+ countries, realizing more than 250,000 tons of CO2 emission reductions per year, according to Huawei.





Industrial Symbiosis Web Platform



→ The Web-based platform SYNERGie enables organizations in an industrial symbiosis to record and analyze resource data, identifying links between participating companies.



ENVIRONMENTAL

Industrial symbiosis helps divert resources away from landfills, reduces industrial water usage, carbon emissions, and demand for virgin materials.



SOCIAL

Supporting a new way of doing business, industrial symbiosis is based on increased collaboration and trust between companies.



ECONOMIC

The platform aids companies in achieving cost savings through reduced waste disposal, purchasing, storage, and transport costs, and creates value for previously unvalued resources.

International Synergies has developed SYNERGie, a Web-based platform that offers database functionality, project management, and reporting tools for companies participating in industrial symbiosis programs. It enables users to **record and manage information about resources** such as waste materials, byproducts, processing capacity, waste heat, water, logistics, and expertise, which also include **associated financial and environmental benefits**.

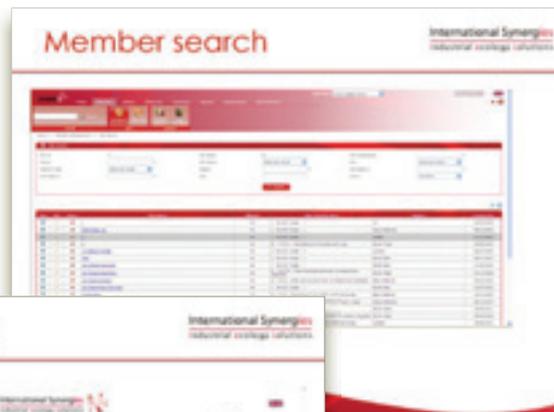
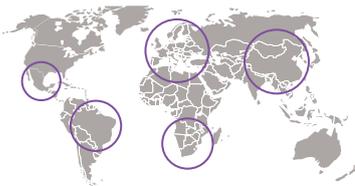
Together with technical support the platform provides companies and organizations with opportunities to **maximize the value of their resources**, reduce costs, generate revenue, and move towards zero waste.

Why a Sustainia100 solution?

In an industrial symbiosis, companies exchange products, byproducts, and waste, which reduces the environmental footprint of industrial areas. SYNERGie provides companies with information that drives cooperation and more resource-efficient business models.

Developed
in UK

Deployed in **Belgium, Brazil, China, Finland, Hungary, Mexico, the Netherlands, Poland, Romania, Slovakia, South Africa, Turkey, UK**



Solar-Powered PCs for Education



→ Thinlabs and its partners are creating affordable solar-powered computers for educational use in rural areas of developing countries.



ENVIRONMENTAL

Solar powered and made of environmental friendly and recyclable materials.



SOCIAL

IT in education helps foster social progress, and with their large 22" screens the models encourage a collaborative learning culture.



ECONOMIC

Zero power costs and 5-7 years of guaranteed life results in a low total cost of ownership.

Using solar energy to power batteries for **cheap energy efficient desktop computers**, this solution seeks to address many of the challenges related to the adoption of computers in the schools of developing countries, e.g. scarcity of electricity and usually high initial as well as maintenance costs.

These computers are designed for an average lifespan of 5 to 7 years and are built **using low power components**, reducing the power consumption below 30 Watts. The batteries are capable of **running for a whole school or working day** without having to be charged. The product is currently in development and should be ready by early July, according to ThinLabs.

Why a Sustainia100 solution?

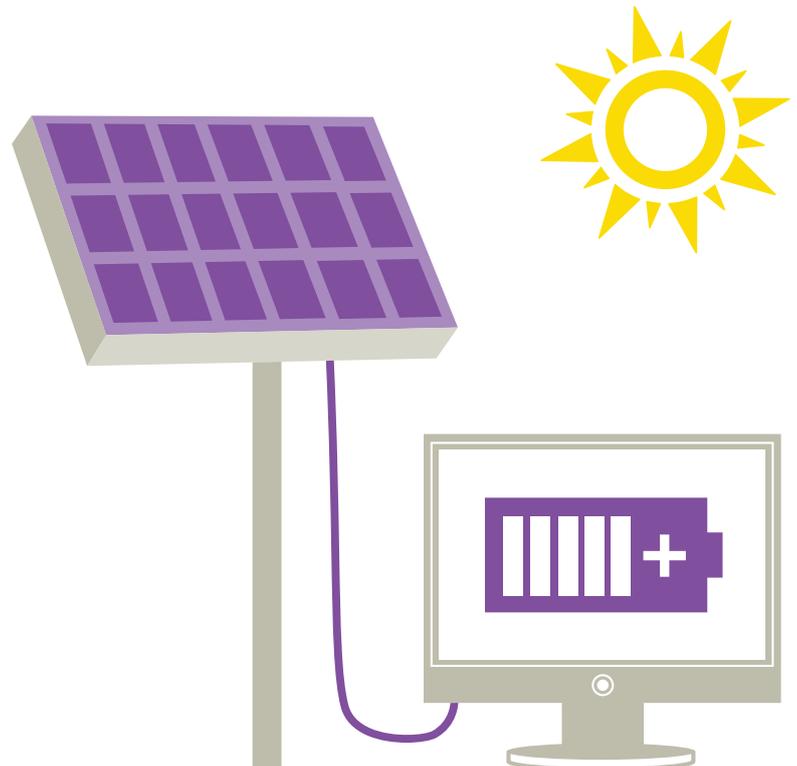
One thing available in plenty in the developing world is the sun. Using solar energy for powering computers with low power consumption, along with a long life span of hardware, is contributing to making this solution environmentally-friendly. Disseminating this solution will improve access to IT and thus help to foster social and economic progress.



Developed in USA



Deployed in India







Key trends

Education sector

*Creating markets for
sustainability*

Nudging consumers

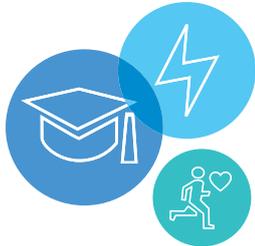
*Teaching
sustainable values
to youth*

*Crowdsourcing
sustainability visions*

*Aiding green
entrepreneurship*



Community Light Centers



→ Community Light Centers provide solar-powered lighting as an enabler of social and economic development in areas lacking reliable electricity in developing countries.



ENVIRONMENTAL

According to Philips, more than 90% of the environmental impact of lighting occurs in the usage phase, a phase powered here by sunlight.



SOCIAL

Enables development at a communal level of social activities such as sport, education, and healthcare.



ECONOMIC

Community Light Centers extend the day for economic activity, increasing employment. Furthermore, they offset the need for big investments in power grids.

Philips' Community Light Centers are **areas dedicated to making a social and economic impact** by enabling sports, education, rural healthcare, and **extended hours of commercial activities**. The areas measure 1,000 m2 (the size of a small soccer pitch) and are lit with a new generation of innovative, solar-powered LED lighting systems that provide light to enable life at a communal level after dark.

Philips will create **more than 100 of the centers** across Africa over the next two years. Partnering with the Dutch Football Association (KNVB) to develop the concept further in Africa and South America, the project also has the backing of the UN's Sustainable Energy for All (SE4ALL) initiative.

Why a Sustainia100 solution?

This solution offers the prospect of sustainable economic and social development at a communal level for parts of the world that suffer from energy poverty. It also involves a technology leap to the latest 21st century solutions, with a minimal carbon footprint.

Developed in the Netherlands, South Africa, China



Deployed in [South Africa](#), [Botswana](#), [Mozambique](#), [Malawi](#), [Tanzania](#), [Kenya](#), [Ethiopia](#), [Nigeria](#), [Ghana](#), [Morocco](#), [Algeria](#), [Egypt](#)



“WE NOW HAVE A REALLY EXCITING OPPORTUNITY TO HELP ENABLE **SOCIAL AND ECONOMIC DEVELOPMENT ACROSS EMERGING MARKETS.**”

RONALD DE JONG, CHIEF MARKET LEADER AND MEMBER OF THE PHILIPS EXECUTIVE COMMITTEE



Philips Community Light Centers enable social and economic development for communities currently living without electricity.

Kick-Starting Markets for Affordable Housing



→ Developing a market for affordable housing in West Africa, based on ancient construction techniques, this solution provides sustainable homes in rural areas.



ENVIRONMENTAL

Each Nubian Vault house saves trees, avoids transport of imported materials, and saves the equivalent of 2 tons of CO2.



SOCIAL

Decent housing is the second priority for people in West Africa, after paid work.



ECONOMIC

Each Nubian Vault built generates, on average, \$1,000 in local economic impact (salaries of the masons and unskilled workers), according to AVN.

Association La Voûte Nubienne's (AVN) is based on three integrated concepts. The first one being **a roof**: The Nubian Vault is a simplified, standardized, and proven adaptation of an ancient Egyptian building technique based on vaulted earth roofs, using only locally sourced materials.

The second concept is **a skill**: AVN animates a network of masons who train apprentices for free through apprenticeships on each building site. The third integrated concept is **a market**: AVN disseminates the techniques by creating autonomous markets in which villagers pay the masons, supporting the trained masons in their determination to become independent entrepreneurs. **This integrated concept leads to the emergence of autonomous markets** through which, once started, the Nubian Vault technique is diffused organically.

Why a Sustainia100 solution?

AVN helps avoid unnecessary transportation of materials and improves quality of life in the long term for masons and homeowners. The solution is already spreading throughout Burkina Faso, Mali, and Senegal.

Developed in France

Deployed in Burkina Faso, Mali, Senegal, Benin



“THE NUBIAN VAULT IS A CONSTRUCTION TECHNIQUE **URGENTLY NEEDED BY MILLIONS OF AFRICANS** AND PROBABLY THE NEXT REVOLUTION IN AFFORDABLE HOUSING.”

THOMAS GRANIER, CO-FOUNDER, DIRECTOR, ASSOCIATION “LA VOÛTE NUBIENNE”

Solution by Association “La Voûte Nubienne”

Fixing the World One Device at a Time



→ iFixit is a free, publicly editable repair manual with a mission to empower people to fix their stuff and save money while keeping electronics out of landfills.



ENVIRONMENTAL

Electronics are resource-intensive to make and hazardous to dispose of; repair extends the life of electronics.



SOCIAL

iFixit's half-million registered users answer repair questions, contribute repair guides, and support other like-minded fixers.



ECONOMIC

According to iFixit their repair manuals have sparked hundreds of independent repair businesses around the world.

Most people want to fix what's broken; they just lack the resources to do so. iFixit's specialized tools and free, **step-by-step repair manuals** minimize the barrier to repair — even for beginners.

E-waste is one of the fastest-growing components in the global waste stream. Americans alone throw away over 300 million electronics every year. iFixit writes and hosts repair manuals for **everything from computers to cars**, so people around the world have the instructions they need to fix what they own, instead of throwing things away.

Why a Sustainia100 solution?

Last year, iFixit served 29.5 million people across 106 countries, helping to extend the life of electronic devices and spreading the message of repair, reuse, and responsible consumerism.



Deployed in 90+ countries worldwide, including **Poland, Germany, USA, Brazil, India, Thailand, Taiwan, Mexico, and Egypt**



“E-WASTE IS A PROBLEM WITH GLOBAL RAMIFICATIONS **REPAIR IS PART OF THE SOLUTION.** IFIXIT FIGHTS FOR A FUTURE WHERE TECHNOLOGY IS A SUSTAINABLE PART OF OUR LIVES.”

KYLE WIENS, CEO, IFIXIT



Environmental Experiences for Children



→ By engaging young children in outdoor exploration and play, this solution helps future generations understand and value the environment while adopting a more active lifestyle.



ENVIRONMENTAL

Pupils grow up to become better-informed adult consumers who are conscious about their own lifestyles and practices.¹



SOCIAL

American children aged 3-12 spend only 1% of their time outdoors.²

Project Learning Tree trains teachers to **incorporate environmental education into school curricula**. Too much time spent inside is contributing to obesity, attention problems, hyperactivity, and lack of appreciation for the earth's resources. Taking children outside regularly to explore nature increases physical activity and **improves performance at school**.

Developed for children aged 3-6, Project Learning Tree's Environmental Experiences for Early Childhood guide provides educators, youth group leaders, child care providers, and parents with more than 130 activities to engage children in outdoor exploration and play. The activities integrate art, literature, math, music, and movement. Topics include exploring nature with five senses and experiencing trees through the seasons.

Why a Sustainia100 solution?

Teaching children to understand and value nature is vital to raising the next generation of environmental stewards. Project Learning Tree connects children to nature, develops critical-thinking, and encourages students to take action to improve their environment.

Developed in USA

Deployed in USA, Mexico, Japan



Project Learning Tree helps the youngest of learners interact with nature and the world around them through approaches that are developmentally appropriate – and fun!

¹World Forum Foundation, "Re-connecting the World's Children to Nature."

²Hofferth, "Changes in American Children's Time, 1997-2003."

Tying Energy Savings to Learning Opportunities



→ Okehampton College showcases how significant reductions in energy use can be realized in an educational institution and translated into saved costs and opportunities for learning.



ENVIRONMENTAL

According to Okehampton College, the initiative has reduced carbon emissions by more than 200 tons annually, and further reductions are expected.



SOCIAL

Okehampton College has raised energy awareness and influenced the attitudes thousands of people – pupils, local businesses, staff, and other stakeholders.



ECONOMIC

Realizing reductions in energy spending of 50%, Okehampton College is slashing costs.

Through initiatives ranging from curricular activities to adoption of **extensive energy monitoring systems**, Okehampton College has achieved energy reductions and a reduced environmental footprint. By installing state-of-the-art renewable energy generation systems, much of Okehampton College’s **energy consumption is covered by clean sources**, and building retrofits have been applied as well.

But the college hasn’t limited the green campus to technical aspects. It recognizes the human factor by offering energy monitoring clubs and has integrated energy into the curriculum, linking sustainability to the school’s core activity. The school is also dedicated to disseminating its experiences, and has **helped more than 200 other schools adopt similar initiatives**.

Why a Sustainia100 solution?

The initiative provides an excellent academic grounding for pupils to become sustainably minded, while offering valuable lessons for scaling to other educational institutions.



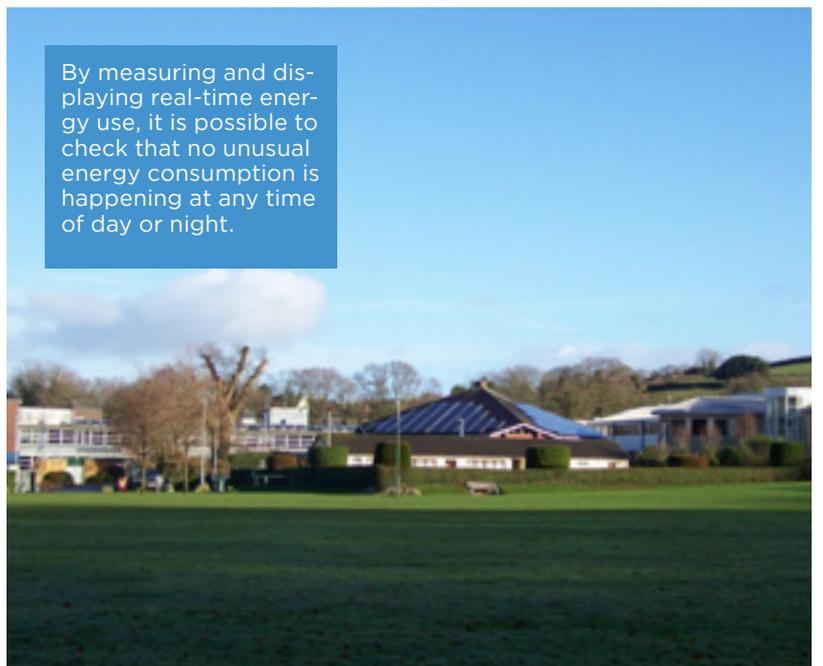
Deployed in **UK**



“AS WELL AS PROVIDING AN EXCELLENT ACADEMIC GROUNDING FOR OUR PUPILS, WE PROMOTE **THE NEED TO LIVE SUSTAINABLY.**”

DARYLL CHAPMAN, PRINCIPAL, OKEHAMPTON COLLEGE

By measuring and displaying real-time energy use, it is possible to check that no unusual energy consumption is happening at any time of day or night.



Cash for Recycling



→ Rewarding people with cash to recycle is a very practical, highly effective solution that promotes environmental protection and educates communities.



ENVIRONMENTAL

Recycling results in less consumption of natural resources and energy, with fewer landfills, and a cleaner local environment.



SOCIAL

Everyone in communities, whether rich or poor, homeless or jobless, can earn extra income by selling sorted garbage to Wongpanit.



ECONOMIC

Wongpanit is helping municipalities in East Asia to reduce funds allocated to waste collection and disposal.

Asking people to save the environment by recycling is not always enough. But a powerful **economic incentive** and showing how to do it right can make people take action while learning about recycling of precious resources. Wongpanit's **franchise recycling business solves waste problems** at the root cause by **changing people's perception of waste** from useless, dirty garbage to valuable resources.

Wongpanit provides recyclers with an incentive by buying sorted garbage. The solution makes it possible for entire communities to effectively save the environment as well as support economic activity.

Why a Sustainia100 solution?

Wongpanit's activities increase recycling in communities and the business model educates people about the true value of the resources that are thrown away in the streets, in nature, or taken to landfills. Wongpanit also offers training to communities on how to start recycling businesses.



Developed in Thailand



Deployed in Thailand, Malaysia



Wongpanit provides a daily buying price list for more than 220 items of recyclable waste to attract people, communities, organizations, and manufacturers to sort and sell their waste. Prices are quoted in Thai Baht/kg.

"I BELIEVE THAT WASTE DOES NOT EXIST ON THIS PLANET, **MERELY MISPLACED RESOURCES.**"

DR. SOMTHAI WONGCHAROEN, PRESIDENT, WONGPANIT

Linking Sustainability to Commerce



→ **Combining scientific research and commercial insights helps businesses turn the vision of sustainability into new products.**



ENVIRONMENTAL

Uncovering data and generating knowledge to quantify and qualify how products and services impact the environment is essential for advancing sustainability.



SOCIAL

The center offers an environment for academics and private businesses to build stronger relations and a common understanding of sustainability challenges.



ECONOMIC

Companies can create value through sustainability if coupled with the right knowledge and deep insight into which sustainability issues matter the most for their bottom line.

Businesses increasingly focus on **quantifying the return on sustainability**. Companies need knowledge in this area and on how to link environmental, social, and governance efforts with market impact and value creation. The Duke Center for Sustainability & Commerce delivers **academic-driven research and education programs** in the nexus of sustainability and business.

As part of Duke's Nicholas School of the Environment, the center is dedicated to engaging with industry to serve as a catalyst for creating a new generation of knowledge, solutions, and products that can bring sustainability into the marketplace.

Why a Sustainia100 solution?

The Duke Center for Sustainability & Commerce helps close the gap between vision and reality by advancing new knowledge to help businesses innovate. It builds new knowledge on multiple levels and educates students, graduates, and executives from around the world to help businesses meet global sustainability challenges.

Developed in USA



Deployed in USA, India, South Africa, China, Brazil



“UNIVERSITIES PLAY A CRITICAL ROLE IN **DEVELOPING AND DISTRIBUTING TECHNOLOGIES, POLICIES, AND INDUSTRY LEADERS** TO ADDRESS SUSTAINABILITY CHALLENGES.”

DR. JAY S. GOLDEN, CENTER DIRECTOR AND ASSOCIATE VICE PROVOST, DUKE UNIVERSITY



Demonstrating Sustainable Buildings



→ **Green Solution House is a knowledge and conference center for climate technology and sustainability where affiliated researchers analyse, develop, and share knowledge on site.**



ENVIRONMENTAL

GSH showcases positive solutions to address energy consumption in buildings, which accounts for up to 40% of global energy demand.



SOCIAL

GSH stimulates knowledge sharing, increases local sustainable knowhow, and strengthens the "Bright Green Island" brand of Bornholm.



ECONOMIC

Situated on the remote island of Bornholm, Green Solution House will create 100 jobs for craftsmen and some 70-80 jobs in the tourism sector.

The Green Solution House (GSH), on the Danish island of Bornholm, brings together principles from Cradle to Cradle, Active House, and DGNB-DK in a single demonstration facility, and integrates a **personalized monitoring card** to inform each guest of their interaction with the building's energy balance through **live climate simulations**. By bringing nature inside, the house combines quality of life and sustainability, introducing **living green walls** with local plants for sun shading and living machines for cleaning wastewater.

GSH is designed with a light-optimizing modular façade that produces clean energy and improves the indoor environment. Selected building parts are **designed for disassembly** and continuous improvement, ensuring that GSH remains a living showroom for the newest green innovations. GSH will be completed in spring 2014.

Why a Sustainia100 solution?

The project exemplifies the sustainable development of a remote area, where the holistic design approach to energy, water management, biodiversity, indoor air quality, and materials helps push the boundaries for what a green building can be.

Developed in Denmark

Deployed in Denmark



Green Solution House will bring together first-movers from the building industry, and showcases how sustainable solutions can enhance architecture.

“THE GREEN INNOVATIONS DEVELOPED THROUGH THE REALIZATION OF GREEN SOLUTION HOUSE WILL ACTIVELY BE **SHARED AS OPEN SOURCE AND CAN BE REPLICATED WORLDWIDE.**”

TRINE RICHTER, MANAGING DIRECTOR, GREEN SOLUTION HOUSE



In Bornholm 75% of the energy produced comes from renewable sources. This contributes to the island's position as a living laboratory for sustainable societies.

TO STAY AHEAD YOU HAVE TO WAKE UP EARLY. BORNHOLM IS THE FIRST PLACE IN DENMARK THAT SEES THE SUNRISE – THIS LEAP AHEAD SYMBOLISES **OUR CORE IDEA AND VISION OF BECOMING A 100% GREEN AND SUSTAINABLE SOCIETY BY 2025.**

METTE TIENSUU, INTERNATIONAL RELATIONS MANAGER, BRIGHT GREEN ISLAND

THE IDEA BEHIND

Bright Green Island, Bornholm is a 588 km² living laboratory showing solutions and initiatives that can create a sustainable society today. The island has deployed a long range of solutions that together show how some of the world's energy and sustainability challenges can be addressed while benefitting the local community.

With its holistic approach to sustainability, Green Solution House will contribute further to making Bornholm the go-to-place for inspiration on how to implement sustainability in communities. Technology plays a central role in making Bornholm's energy supply renewable and more efficient. But Bright Green Island is more than just technology. It is a mind-set anchored with large parts of the island's population that is dedicated to implementing sustainability in all aspects of life. As such, Bornholm provides unique opportunities for others to learn how solutions and new approaches to sustainability can be implemented and scaled.

www.brightgreenisland.com

Crowdsourcing the Future City



→ **Nexthamburg introduces community-driven crowdsourcing, engaging citizens to create, discuss, and collaborate on common projects and visions for a better urban future.**



ENVIRONMENTAL

Nexthamburg addresses sustainability issues in a creative way, aiming to achieve behavior change and to raise awareness of the benefits of sustainable lifestyle.



SOCIAL

Nexthamburg has connected a community of citizens who want to change the city positively - enabling them to act like urban developers.



ECONOMIC

Over time, Nexthamburg says its process can help to reduce conflict costs in planning processes by matching policies and projects to citizens' ideas and needs.

Nexthamburg is a collaborative, non-profit, **citizen-driven think tank** for the urban future. Beginning in 2009, over 800 ideas as been created and collected into a citizens' vision published in 2012. With its **community of 7,000 people**, Nexthamburg now works on 40 projects ranging from small interventions to big political issues like future mobility or scenarios for the Port of Hamburg.

Since 2010, Nexthamburg has partnered with several institutions, including the municipal government, allowing for the **transfer of ideas back into governmental processes**. Nexthamburg has initiated the transfer of its model to an independent incubator, starting in Belgrade and Bangalore.

Why a Sustainia100 solution?

Top-down governmental participation is reaching its limits - especially when addressing sustainability issues that may impact lifestyle such as traffic and consumption. Project backers say Nexthamburg has proven that opening a creative and independent channel for collaboration has led to a new planning culture that increases acceptance, even for critical issues - a model that may lead to more durable solutions in other cities.

Developed in Germany

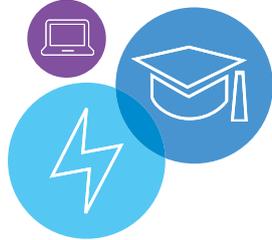


Deployed in **Germany, Serbia, India**



Solution by Nexthamburg

Power-Saving Electricity Monitor



→ With its simple numbers and colors, Wattson keeps homeowners interested in and aware of the need to save electricity.



ENVIRONMENTAL

Buildings account for 40% of global greenhouse gas emissions. If users are made aware of energy waste, they can reduce planet-warming emissions.



SOCIAL

By learning good practices at home, energy users can save electricity at school, in the workplace, or wherever they happen to be.



ECONOMIC

According to Energeno, a user survey found that households using Wattson cut electricity use by an average of nearly 20%.

Wattson is a handheld electricity monitor that shows energy users **how much electricity is being used in the home**, using very simple numbers to display money, watts, or carbon. With its unique color system, showing when there is high or low energy use, anyone can see, at a glance, whether there is unusual electricity consumption.

The software Holmes also enables users to track usage over time, **helping them root out electricity waste**. The system can also be used with solar photovoltaic systems, or other onsite generation systems.

Why a Sustainia100 solution?

The proliferation of smart phones, tablets, and other electricity-hungry gadgets threatens to overwhelm efficiency gains made elsewhere in buildings. By raising awareness about electricity consumption in the home or at work, energy users are able to make better choices that reduce their carbon footprint and save money at the same time.

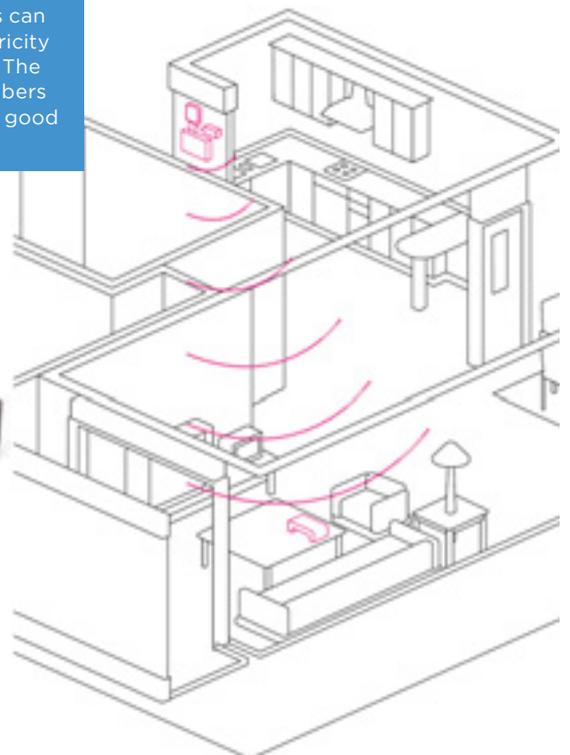
Developed in UK

Deployed in [UK](#), [France](#), [Germany](#), [Australia](#), [Italy](#), [Spain](#), [the Netherlands](#), [Belgium](#), [Austria](#), [Latvia](#), [Lithuania](#), [Brunei](#), [Singapore](#), [Switzerland](#), [South Africa](#), [Greece](#)



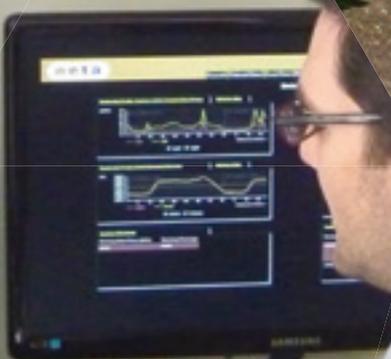
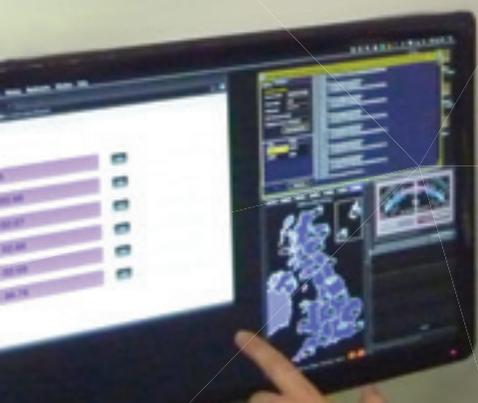
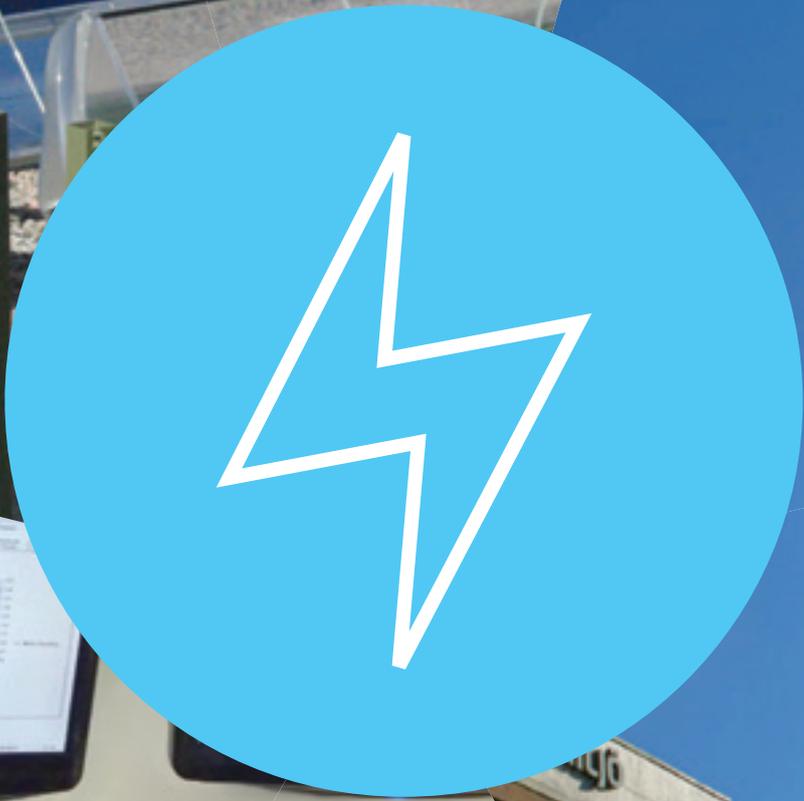
With Wattson, families can learn about their electricity use around the house. The simple colors and numbers raise awareness about good practices.

- ABOVE AVERAGE USAGE
- YOUR AVERAGE USAGE
- BELOW AVERAGE USAGE
- EXPORTING ELECTRICITY



“BY MAKING WATTSON AND HOLMES SIMPLE, WE KNOW THAT **FAMILIES CHANGE THE WAY THEY USE ELECTRICITY.**”

MARK ELLIOTT, COO, ENERGENO





Key trends

Energy sector

*New biomass
production methods*

*High-efficiency
solar energy*

*Smart energy
systems*

Improved LED lighting

*The ocean as
an energy source*



Solar Generation of Heat, Steam, and Electricity



→ Solar collectors follow the sun, producing electricity, heat, and steam in the same system, which improves the economics of rooftop renewable energy generation.

Absolicon's concentrating **solar collectors follow the sun and concentrate light**, which makes them capable of producing electricity, heat, and steam in the same system.

The solar collectors help reduce production costs, while simultaneously providing a high degree of energy efficiency in the form of thermal energy, solar electricity, solar cooling, solar heat, and solar steam. This solution improves the economics for utilizing the often-times unused **renewable energy potential of building rooftops**.

Why a Sustainia100 solution?

Concentrating solar collectors are flexible and can greatly improve the economics of renewable energy generation, helping to overcome important barriers to a more sustainable energy supply.



ENVIRONMENTAL

According to Absolicon Solar, solar concentrators have the potential to replace 100 gigawatts of fossil heat in European industry, reducing CO2 emissions by 40 million tons annually.



SOCIAL

The solar concentrators are produced locally, creating jobs, and reducing dependence on imported fuel.



ECONOMIC

Replacing natural gas with solar concentrators has only five years payback time in sunny regions, the company claims.

Developed in Sweden



Deployed in [Sweden](#), [Germany](#), [Italy](#), [Greece](#), [Chile](#), [India](#), [Spain](#)



Intelligent Reduction of Peak Power Consumption



→ KiWi Power offers a way to commercialize the demand response market in the United Kingdom and electricity markets around the globe.

KiWi Power **reduces peak power consumption** by increasing demand side response. Peak power reserves are deployed at times of high demand, typically less than 100 hours annually. This extra strain on the grid is rare but has to be effectively managed. KiWi Power provides an alternative to polluting and expensive power reserves. The technology **targets non-essential power**, such as air-conditioning and lighting, and is designed not to compromise operational efficiency or comfort. The result is a demand reduction strategy that **reduces customers' electricity consumption** slightly during times of peak demand.

In the United Kingdom, KiWi Power's customers benefit from payments from the National Grid, improved green credentials, and **better energy intelligence**.

Why a Sustainia100 solution?

The entire community benefits from cheaper and greener energy added to the electrical grid. Power reserves typically come from diesel-fired generators and other high-emission technologies. The requirement to maintain "spinning" reserves in the form of standby generation plants is a costly and environmentally damaging balancing method. Demand response can reduce these negative impacts.



ENVIRONMENTAL

Power reserves typically come from highly polluting diesel-fired generators. A demand response strategy can reduce the need for such assets.



SOCIAL

The entire community benefits when cheap and green electricity is fed to the grid.



ECONOMIC

Unlike traditional energy-efficiency products, which come with an upfront cost and varying payback times, KiWi Power offers businesses a new, recurring revenue stream, and shrinks their carbon footprint.



Developed in UK



Deployed in UK, Israel



Solution by KiWi Power

Thermal Storage for Smart and Green Heating



→ This district heating network with thermal storage responds to peak consumption, limits fossil fuel consumption, and maximizes use of renewable energies.

The need for heating varies over the course of a day, depending on the available sunlight and outdoor temperatures. In a **multi-fuels district heating network**, there are some periods with no particular need for the energy produced from biomass. At other times, additional conventional boilers have to be enlisted.

Borås energi och miljö, the public company that owns the district heating network in Borås, Sweden, has deployed a storage cell – a gigantic, 37,000-m³ reservoir – to **uncouple supply from demand** and increase energy efficiency. The heating system is optimized by **storing the produced energy as hot water** during low usage periods. When demand for heat peaks, the hot water is then sent to the district heating network.

Why a Sustainia100 solution?

This solution has a tremendous scalability potential since there are thousands of heating networks globally to which it can be applied. Depending on storage capacity, the energy reserve can supply heating networks anywhere from a few hours to a few days, helping to reduce greenhouse gas emissions significantly.



ENVIRONMENTAL

This solution reduces fossil fuel dependency and slashes greenhouse gas emissions by about 5,500 metric tons annually.



SOCIAL

Thermal storage reduces local air pollution and improves urban air quality.



ECONOMIC

Integrating thermal storage into district heating offsets the need to build new heating plants to supply peak consumption.



Developed in Sweden

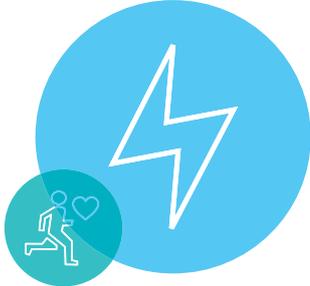


Deployed in **Sweden**, **France**



A gigantic, 37,000 m³ reservoir stores hot water when production exceeds heating demand and releases energy when demand exceeds production.

Generating Light from the Force of Gravity



→ GravityLight uses the force of gravity to create sustainable energy that makes light available to people living in off-grid areas.

By using **gravity to power an LED lamp**, this solution helps to improve access to light in off-grid areas. It takes 3 seconds to lift the weight that powers GravityLight, which will **provide up to 30 minutes of light** as the weight drops under the force of gravity. The mass weight is a bag that the user fills with 9-12.5 kg of material (dirt, rocks, or sand) which connects to the unit via a plastic strap.

A series of gears inside the device **translates this mass into energy** as a strap passes through the generating mechanism.

Why a Sustainia100 solution?

GravityLight has no reliance on the external environment, and because there are no operating costs after the initial low-cost purchase, it has the potential to lift people out of light poverty while reducing dependence on expensive and polluting fossil fuels.



ENVIRONMENTAL

GravityLight eliminates the need for kerosene lighting solutions, resulting in less indoor air pollution.



SOCIAL

Access to reliable and affordable light for the world's off-grid population has a positive impact on health and opportunities for income-generating activities.



ECONOMIC

The absence of operating costs after an affordable initial purchase generates steady and continuous savings for the customer.



Developed in UK



Deployed in Sri Lanka



Using an original yet simple approach, GravityLight aims to eliminate lighting poverty in off-grid areas.



GRAVITYLIGHT SEEKS TO EMPOWER INDIVIDUALS BY MEETING THEIR BASIC NEEDS, AT THE **LOWEST COST POSSIBLE, WITH ZERO OVERHEAD.**

JIM REEVES, DESIGN ENGINEER AND ASSOCIATE DIRECTOR AT THEREFORE

THE IDEA BEHIND

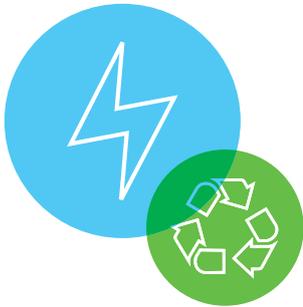
About 1.5 billion people worldwide live without reliable access to electricity. These people rely instead on biomass and fossil fuels to meet their entire energy demand, including indoor lighting.

Deciwatt is working to connect the world's unconnected populations by offering low-power electronics together with off-grid energy generation. Gravity Light is their second project - which is currently at a prototyping stage and has been able to secure funding via Indiegogo.

Deciwatt also envisages other projects to allow the same off-grid populations to access the world's knowledge via the internet, peer-to-peer communication, and education. Deciwatt is working to make this possible by applying well-known electronics and building momentum from the ground up.

www.deciwatt.org

Capturing Carbon for Reuse as Fuel



→ LanzaTech captures and reuses carbon, transforming waste and residues into resources through a unique gas fermentation technology.

LanzaTech has developed a biological process in which **microbes convert carbon monoxide** containing gases produced by industries such as steel manufacturing, oil refining, and chemical production, as well as gases generated by gasification of forestry and agricultural residues, municipal waste, and coal, **into fuel and chemical products.**

The solution **mitigates carbon emissions from industry** and produces low-carbon fuels without adversely impacting food production. LanzaTech's process has successfully operated at demonstration scale and is now entering commercialization.

Why a Sustainia100 solution?

LanzaTech was created with a vision of meeting the increasing global demand for affordable, low-carbon fuels and sustainably produced chemicals. Universal access to sustainable energy will catalyze the Third Industrial Revolution.



ENVIRONMENTAL

Life-cycle analysis by Tsinghua University and Michigan Technological University has shown a 60% reduction in carbon footprint of ethanol produced from steel mill waste gases compared to conventional petroleum-based gasoline.



ECONOMIC

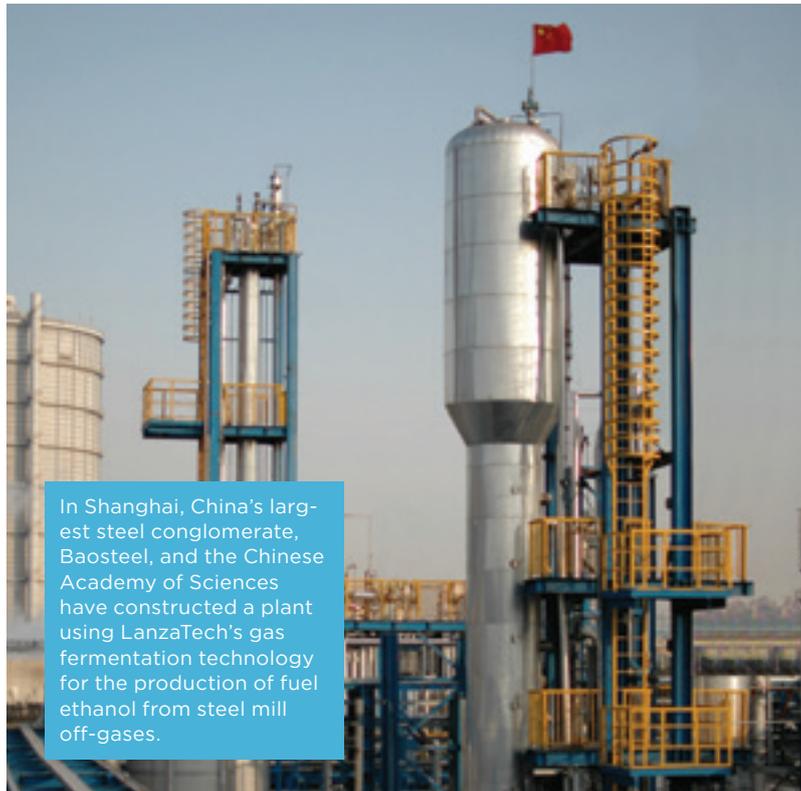
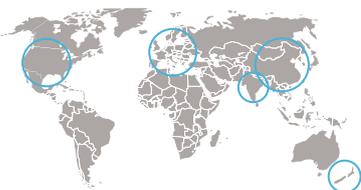
65% of steel mills worldwide use technology that could be retrofitted to use the LanzaTech process, which translates to 30 billion gallons of ethanol. At today's price for ethanol, \$2.37 per gallon, LanzaTech represents a \$71-billion opportunity.



Developed in USA, China, New Zealand

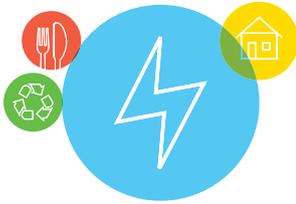


Deployed in **New Zealand, China, USA, India, Europe**



In Shanghai, China's largest steel conglomerate, Baosteel, and the Chinese Academy of Sciences have constructed a plant using LanzaTech's gas fermentation technology for the production of fuel ethanol from steel mill off-gases.

Using the Ocean to Power Tropical Islands



→ The Curaçao Ocean Ecopark is developing an ocean thermal power plant and combining it with natural cooling of buildings by using deep ocean water.



ENVIRONMENTAL

The technology has the largest recoverable potential at the lowest projected cost of all renewable ocean conversion technologies¹.



SOCIAL

The Ocean Ecopark provides opportunities for attracting new industries and research, benefitting the population on Curaçao.



ECONOMIC

On the island of Curaçao, energy-related imports currently amount to more than \$5,000 per household per year.

Dutch Bluerise BV is developing its first ocean thermal energy conversion (OTEC) plant, allowing the tropical island of Curaçao, located in the southern Caribbean Sea, to **use the ocean as a power plant**. The technology generates electricity **by exchanging heat between the warm surface and the cool depths** of the ocean.

In addition, the Curaçao Ocean Ecopark will use deep ocean water to cool buildings in the local airport with **savings of up to 90% of the electricity** typically required for air-conditioning, according to Bluerise. The Ocean Ecopark will integrate a range of sustainable solutions, ranging from fresh water production to ocean-cooled greenhouses and fish farming.

Why a Sustainia100 solution?

Tropical regions will account for a large share of global increases in energy demand. Providing a sustainable, scalable, and economical energy solution for these regions will address a major sustainability issue while serving as an incubator for OTEC technology.

Developed in the Netherlands

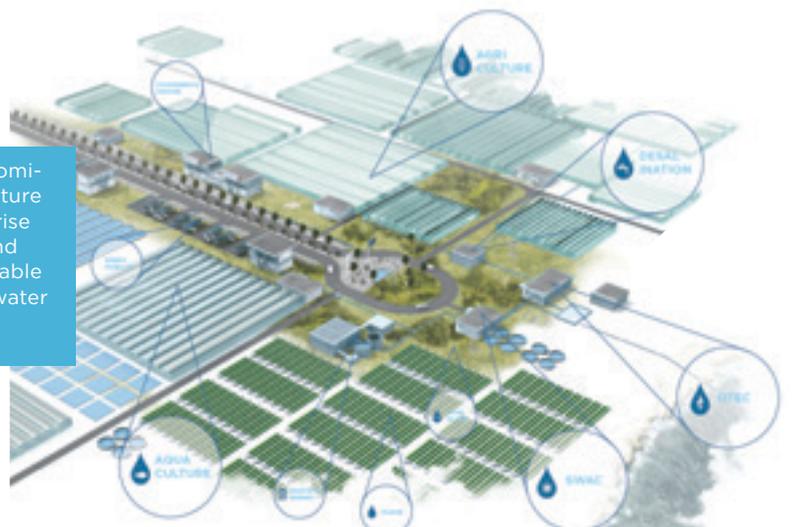
Deployed in Curaçao



“THE DEEP OCEAN PROVIDES A NEW SOURCE OF WEALTH, ONE THAT IS SUSTAINABLE AND **CAN PROVIDE NOT ONLY ENERGY BUT ALSO FRESH WATER AND FOOD** FOR AN INCREASING DEMAND IN TROPICAL REGIONS.”

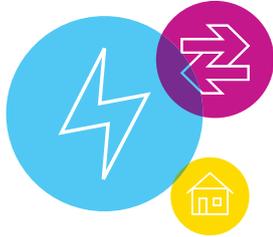
REMI BLOKKER, CEO, BLUERISE

By clustering economically viable and mature technologies, Bluerise aims to incubate and commercialize scalable energy, food, and water solutions.



¹International Institute for Applied Systems Analysis, “2012 Global Energy Assessment Report.”

EVs as an Electric Power Supply



→ “LEAF to Home” is a backup power supply system that can transmit the electricity stored in the batteries of Nissan LEAFs to a residential home.



ENVIRONMENTAL

The ability of EV batteries to store and dispatch electricity as needed provides flexibility to the grid and reduces the need for dirty fossil fuel-fired peaker power plants.



SOCIAL

EVs connected to a LEAF to Home unit could provide electricity to neighbors without power during outages.



ECONOMIC

The EV Power Station encourages homeowners to charge EVs at night, when demand is low and electricity is cheaper.

The “LEAF to Home” **power supply system** can supply electricity from Nissan LEAF electric vehicle onboard batteries to a home when used with the “EV Power Station” unit developed by Nichicon. Electricity is delivered from the LEAF’s battery pack via a rapid charging connector and Power Control System **connected to the home’s distribution board**.

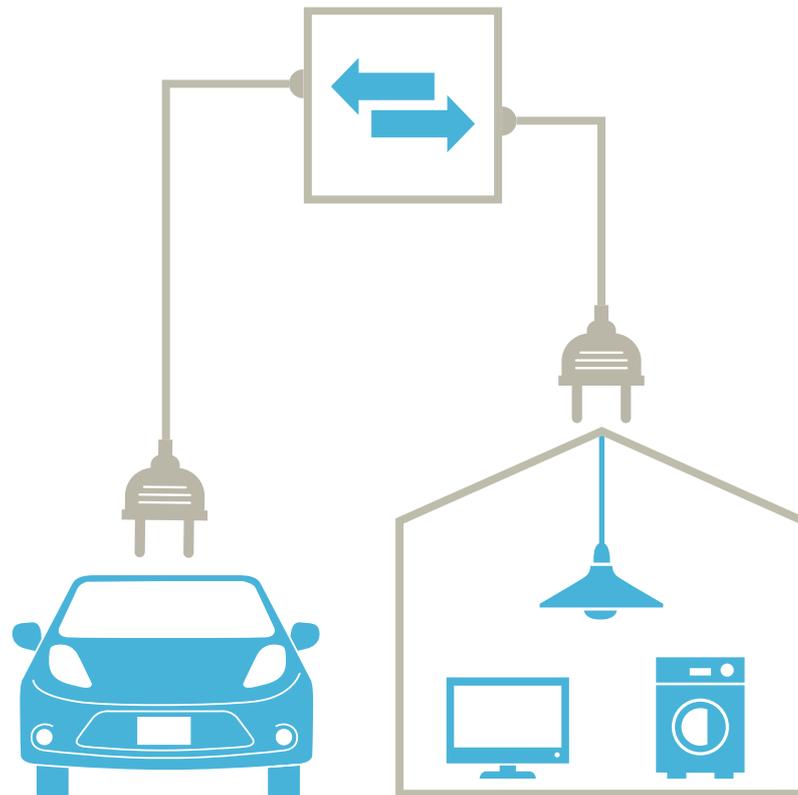
The system has enough output to allow all household electronics to function at once, even during morning and evening consumption peaks. The LEAF’s lithium-ion batteries can store up to 24kWh of electricity, **sufficient to supply an average Japanese household** for about two days.

Why a Sustainia100 solution?

In Japan, the tsunami and Fukushima disaster has increased demand for renewable energy and distributed storage solutions. Private homeowners have come to recognize the need for flexibility, and the government is taking steps to encourage adaptation of new technologies that will allow households to power themselves at times when demand is at the peak or during power outages.

Developed in Japan

Deployed in **Japan**



Solution by Nissan and Nichicon

Making Every Light Intelligent



→ Digital Lumens' intelligent LED lighting systems provide wireless controls and performance metrics to achieve savings of up to 90% on lighting costs.

With intelligence capabilities at the **fixture and system levels**, Digital Lumens' intelligent LED lighting systems deliver concrete energy savings and flexibility that makes the value proposition of LED adoption more tangible to companies. Each system is **wirelessly integrated** with Light Rules technology, which helps maximize lighting energy efficiency by managing and fine-tuning settings to **match business needs** and provides detailed key performance metrics reports to act upon.

The company's vision of an intelligent and connected future is backed by a strategic partner program that brings the proven advantages of integrated intelligence to the **full range of commercial and industrial lighting applications**. Digital Lumens claims that this initiative will take the cost of controls from dollars to pennies on a per square foot basis.

Why a Sustainia100 solution?

According to the U.S. Department of Energy, lighting uses 29% of U.S. electricity, with 58% in the commercial and industrial sector alone. Digital Lumens makes energy efficiency improvements measurable by offering valuable insight into lighting-related costs, while also providing organizations with the tools needed to make a change towards greater energy efficiency.


ENVIRONMENTAL
Digital Lumens accelerates energy efficiency in commercial and industrial buildings by driving LED adoption.


SOCIAL
Increased lighting control in commercial buildings makes for a better working atmosphere and higher productivity.


ECONOMIC
Digital Lumens claims to save large-scale customers up to 90% on lighting-related costs, realizing more than \$25 million annually for its customers.

 Developed in USA

Deployed in USA, Canada, UK



"OUR VISION HAS ALWAYS BEEN TO MAKE EVERY LIGHT INTELLIGENT, WHICH DRIVES RADICAL ENERGY EFFICIENCY AND BUILDS A PLATFORM FOR DISTRIBUTED BUILDING INTELLIGENCE."

BRIAN CHEMEL, FOUNDER AND CTO, DIGITAL LUMENS



Intelligent LED lighting systems deliver energy savings, flexibility, and unique value to commercial and industrial customers.

“Energy Forests” in Former Coal Mines



→ European GreenWood Company is developing an “Energy Forest,” a sustainably harvested source of biomass for European combined heat and power (CHP) plants, on previously disturbed land in the Czech Republic.



ENVIRONMENTAL

The Energy Forest replaces coal mining with reforestation and CO₂-neutral clean energy production.



SOCIAL

The Energy Forest will include recreational pockets, which will be open for use by locals. The project does not use food-producing agriculture land.



ECONOMIC

The project will provide jobs for approximately 100 inhabitants in an economically depressed region. Production is expected to commence in early 2014.



Developed in Denmark



Deployed in Czech Republic, Italy, Denmark



The objective is to produce a CO₂-neutral energy feedstock in the form of biomass (wood pellets). Production will occur in a sustainable, closed-loop environment. The customers are to be Europe’s CHP plants. The European GreenWood Company plans to establish a 15,000-hectare poplar Energy Forest at the site of a deteriorated former coal mine in the northern Czech Republic.

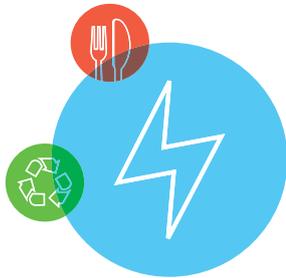
The Energy Forest is planted in circulating fields to maintain annual harvests over a five-year cycle. Annual production is estimated to be 225,000 tons of wood pellets. Under the closed production model, the European GreenWood Company maintains full ownership of all stages in the value chain (raw materials, production, supply, and distribution).

Why a Sustainia100 solution?

Production facilities for the Energy Forest are powered by renewable wind and biomass electricity and use proven technologies while reusing existing coal-mining infrastructure.



Waste to Energy without Combustion



→ O2E Technology's waste conversion technology is an innovative approach to recycle organic waste to create new products such as fuels, chemicals, electricity, and local food.



ENVIRONMENTAL

According to O2E Technologies, pollutants such as chlorine, sulfur, mercury, chromium, and other heavy metals are removed from feedstocks and neutralized in its waste conversion units.



SOCIAL

Organic household waste and industrial plastic and packaging waste can be converted locally for new high-energy fuels, chemicals, and compost and fertilizer to boost food production.



ECONOMIC

O2E Technologies' waste-to-energy technology is in operation in Germany, where it is successfully transforming waste to valuable resources.

Developed in Germany, UK, Austria, Spain

Deployed in Germany, Spain



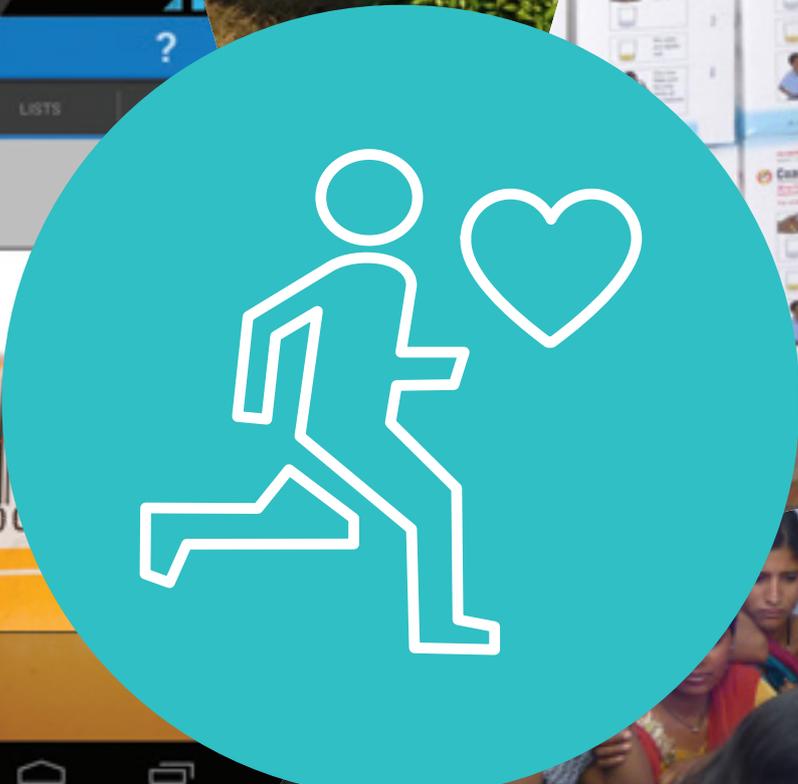
O2E Technologies uses a patented catalytic depolymerisation process to **convert organic wastes** (including biomass, plastic, and rubber) into high-caloric **fuels for energy production**, and into **compost and fertilizers** that can be used for local food production. According to the company, the self-contained process can convert municipal solid waste and any organic waste streams quickly into chemical derivatives (diesel, oil, benzene, kerosene), fertilizer, or directly into electricity and heat.

Why a Sustainia100 solution?

O2E Technologies' waste-to-energy technology can process waste without need for landfills, dumpsites, or incineration - thus avoiding greenhouse gas emissions from storage or combustion of waste material. The company's waste conversion units are modular and scalable.



Fertilizers and compost are some of the byproducts from the patented depolymerisation process.





Key trends

Health sector

*IT as a health
enabler*

*Instruments for
sanitation and
disinfection*

*Safe and efficient
cook stoves*

*Innovative water
purification*

*Africans
benefitting from
mobile phones*

Solar Water Purification and Distillation



ENVIRONMENTAL

Three hundred million families purify water via boiling daily. Replacing boiling with F Cubed's solution means a reduction of 1-2 tons of CO2 per family/year.¹



SOCIAL

estimates that 23 billion productive days are lost annually through illness and disease caused by contaminated water sources.²



ECONOMIC

According to F Cubed, universal access to improved water sources by 2015 would result in an annual economic benefit of \$344 billion.

→ F Cubed's solar energy technology purifies, desalinates, and distils any water source by mimicking the natural water cycle, with minimal ongoing costs.

F Cubed aims to be a solution to the world's clean water issues using only **natural renewable solar energy to produce purified water** from any contaminated feed water source. The technology is bio-mimicking the natural water cycle of evaporation and condensation to produce pure distilled water. In addition, it produces a second water supply of UV disinfected, heated, and filtered water, precipitating inorganic compounds and **leaving no waste**.

Each panel has a 20-year operating life and treats an average of 20 liters per m2/day of water, exceeding WHO drinking water standards, with zero carbon footprint.

Why a Sustainia100 solution?

Contaminated drinking water causes over 3.4 million deaths per year, huge health costs, and loss of productivity. The F Cubed solution purifies water; eliminates the need for boiling; is low-cost, modular, and robust; and provides a positive global environmental impact while improving the quality of life for millions of people.



Developed in Australia

Deployed in 36 countries, including Australia, China, Fiji, Sri Lanka, Botswana, Peru and USA.



¹Thomas Clasen, "Estimating the Scope of Household Water Treatment in Low- and Medium-Income Countries."

²WHO, "Safer Water, Better Health: Costs, Benefits, and Sustainability of Interventions to Protect and Promote Health."



Photo courtesy of WaterAid Bangladesh

Before the F Cubed water purification solution in Maddhyabil Village, people needed to travel two hours to collect safe drinking water after the 2009 cyclone Aila destroyed all water facilities in the village.

SOLAR, NOT CARBON, IS THE SOLUTION TO WATER PURIFICATION. OUR GOAL IS TO PROVIDE CLEAN DRINKING WATER TO THE UNDER SERVED, ELIMINATE WATER BORNE DISEASES AND DRAMATICALLY REDUCE CARBON EMISSIONS.

PETER JOHNSTONE, FOUNDER AND CEO, F CUBED

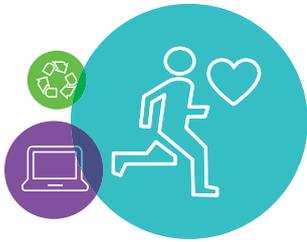
THE IDEA BEHIND

F Cubed creates cost-effective, state-of-the-art solar stills that use sustainable, renewable solar energy for water treatment. The panel's simplistic, modular and robust design is targeted at developing countries with the most remote and isolated regions, and allows for fast and easy installation with no tools or prior training.

F Cubed water panels can process some of the most contaminated waters to produce pure, clean drinking water and a secondary stream of UV-disinfected, filtered hot water for cleaning. F Cubed's system is not limited to just the domestic market, it can also be applied to the treatment of industrial wastewater for meeting safe-discharge standards and to create a new industry of sustainable salt-harvesting by recapturing the flow-through water for further processing. This enables a Zero Liquid Discharge System with smaller environmental footprints.

www.fcubed.com.au

Mobile Management of Life-Saving Medicine



→ Using mobile and electronic mapping technologies, SMS for Life is eliminating drug stock-outs and improving access to health care.



ENVIRONMENTAL

Poor forecasting results in an unnecessary burden being placed on the environment in terms of transportation and production of emergency orders.



SOCIAL

SMS for Life helps ensure that patients have timely access to pharmaceuticals when they need it, thus saving lives.



ECONOMIC

The economic impact of malaria is estimated to cost Africa \$12 billion a year.¹

Maintaining adequate supplies of medicine is challenging in remote areas. SMS for Life eliminates the risk of people reaching a health care facility and finding it's out of stock of essential medicines by **sending weekly stock request messages** to the mobile phones of registered health facility workers. They then send information back for free by SMS. District officers use the messages to decide on orders and redistribution of medicines between sites. This **eliminates stock-outs**, increases access to health care, and **reduces deaths**.

In Tanzania, the partnership has focused on anti-malarial stocks, which are critical because medication must be taken within 18-24 hours of the onset of symptoms to be fully effective.

Why a Sustainia100 solution?

Poor tracking of drug supplies leads to unnecessary deaths from preventable and curable diseases like malaria. SMS for Life is impacting the lives of Tanzanians by protecting the population from the risk of reaching a health care facility that has run out of stock of vital anti-malarial drugs. The system has reached over 5,000 health care facilities in Tanzania, and is now being rolled out in other African countries.

Developed in Tanzania

Deployed in Tanzania, Cameroon, Ghana, Kenya, Democratic Republic of the Congo



“TRANSFORMING SOCIETIES IS ABOUT WORKING COLLABORATIVELY TO PROVIDE SIMPLE, COST EFFECTIVE, AND SCALABLE SOLUTIONS THAT **BRING ABOUT LONG-TERM CHANGE.**”

JIM BARRINGTON, DIRECTOR, SMS FOR LIFE

¹Greenwood, Bojang, Whitty, and Geoffrey, “Malaria.”



SMS for Life harnesses the power of mobile and electronic mapping technologies to create a scalable and sustainable solution to the problem of drug stock-outs.

Self-Cleaning, Solar-Powered Toilet



→ Researchers from Caltech have developed a solar-powered, self-cleaning toilet able to convert human waste into hydrogen and fertilizer.



ENVIRONMENTAL

Flush toilets require 10 times more water than our daily drinking water requirement.



SOCIAL

1.5 million children under the age of five die each year because of sanitation problems, according to the WHO.



ECONOMIC

Caltech's toilet system does not need expensive sewer systems or water supply infrastructure.

Caltech's toilet system uses the sun to power an electrochemical reactor. The reactor **breaks down water and human waste into fertilizer and hydrogen**, which can be stored in hydrogen fuel cells as energy. The treated water can then be **reused to flush** the toilet or for irrigation. The system can function off-grid and without any subsurface infrastructure.

The creators aim for a price of \$1,000 per unit, which may be a barrier to extensive scaling. A new prototype will be available in July 2013, and is planned to be deployed in India by early 2014 for further testing.

Why a Sustainia100 solution?

2.6 billion people do not have access to safe and affordable toilet facilities. Providing stand-alone sanitation facilities for developing countries and remote areas can eliminate the contamination of ground water, soil, and ecosystems caused by inappropriate human waste disposal, and thus improve human health and reduce child deaths.



Developed in USA



Deployed in USA, India, Peru, China, Thailand, Kenya



Cancer Prevention and Telemedicine Treatment



→ Through the creative use of existing social infrastructure and telemedicine, CIDRZ has developed a cervical cancer prevention solution for sub-Saharan Africa.

Electronic Cervical Cancer Control (eC3) is a **low-cost, high-impact approach to cervical cancer prevention** developed in Zambia. The program uses traditional marriage counselors to raise awareness in the target community about cervical cancer. Nurses then screen, diagnose, and treat pre-cancer and cancer patients. **Telemedicine** is used for immediate remote consultation and peer-review, with **digital photography** used as a diagnostic tool.

Using eC3 as its operational matrix, the program has opened 25 clinics across Zambia, **screened over 100,000 women**, and treated 20,000 pre-cancers or cancers since its inception in 2006. The program is integrated into the public health system, and is expanding nationally. Over 225 healthcare professionals from 12 African nations have received onsite training in how to deploy eC3 in their countries.

Why a Sustainia100 solution?

Cervical cancer kills 250,000 women each year, with the vast majority living in developing nations. In sub-Saharan Africa, it is the number one cause of cancer-related death, largely due to a lack of physicians, under-capacitated laboratories, and under-developed health care systems.



SOCIAL

The program reduces the psychological and social consequences associated with cancer, such as anxiety, fear of death, job and school absences, and inadequate childcare.



ECONOMIC

Keeping women healthy is crucial to economic stability in sub-Saharan Africa, where women have the primary responsibility for maintaining the household and food production.

Developed in Zambia

Deployed in [Zambia](#), [Cameroon](#), [Tanzania](#), [Nigeria](#), [South Africa](#), [Botswana](#), [Zimbabwe](#)





THE CIDRZ CERVICAL CANCER PREVENTION PROGRAM IN ZAMBIA IS A SCALABLE MATRIX OF MODERN TELECOMMUNICATIONS TECHNOLOGY, TASK SHIFTING AND COMMUNITY MOBILIZATION THAT SAVES LIVES.

DR. CHARLES HOLMES, CEO, CIDRZ

THE IDEA BEHIND

The Centre for Infectious Disease Research (CIDRZ) is a Zambian NGO that started in 2001 to help increase the health of Zambians. Besides programs for the prevention of cervical cancer and breast cancer control, the centre also works with the treatment and care of people infected with HIV and tuberculosis.

CIDRZ collaborates with the Zambian government to strengthen primary healthcare systems. The centre also conducts research into healthcare practice and training for the benefit of local communities.

www.cidrz.org

Slashing Diesel Engine Particle Emissions



→ Achieving almost zero particle emissions from heavy-duty diesel engines, Dinex has developed an exhaust system that significantly reduces air pollution-related diseases.



ENVIRONMENTAL

Dinex' exhaust system delivers reductions in particulate and black carbon emissions from diesel engines.



SOCIAL

Reduced pollution from diesel engines will improve local air quality, reduce air pollution-related diseases, and improve quality of life in urban areas.



ECONOMIC

According to the company, the health benefits of the exhaust system are proven to be economical in the reduction of premature deaths and health costs connected to poor air quality.

Dinex' development of modern exhaust systems includes a range of different **emission-control technologies** manifested in the Combined Diesel Particulate filter and SCR catalyst. The system facilitates **close to zero particle emissions from heavy-duty diesel engines**. This includes harmful gasses such as nitrogen oxides, un-combusted hydrocarbons, carbon monoxide, and particulates. Removing these gasses will **improve local air quality and reduce air pollution-related diseases**.

Dinex' aims to replace the conventional exhaust system with a "chemical factory" capable of saving CO2 while ensuring cost-effectiveness and not compromising fuel economy.

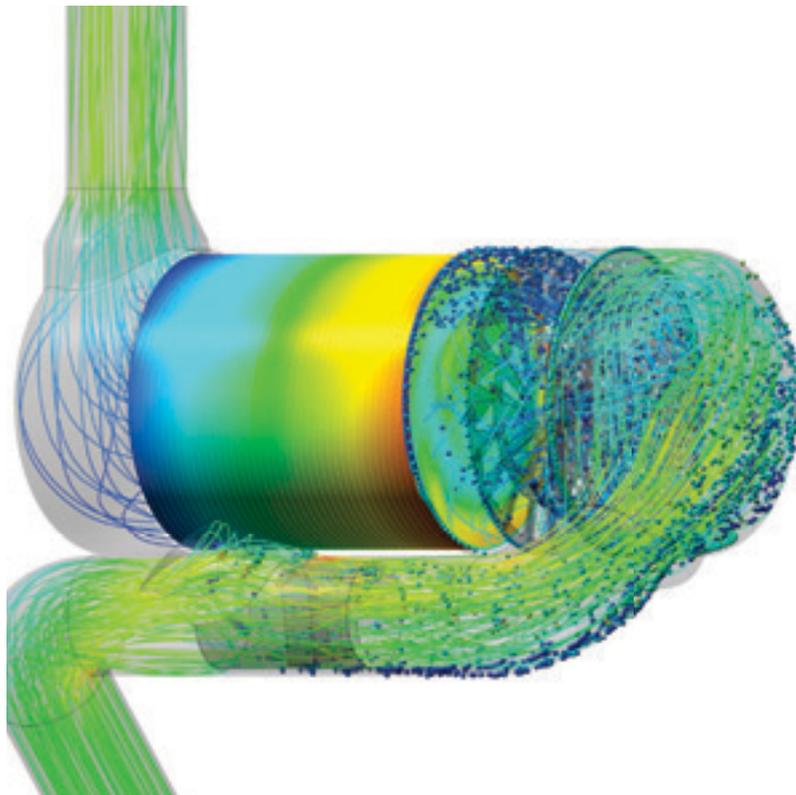
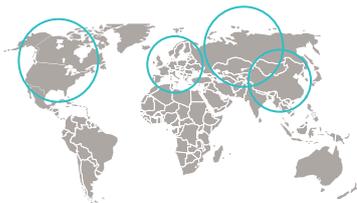
Why a Sustainia100 solution?

Particulates and gasses polluting the air is an increasing challenge in many large, heavily trafficked cities. This solution enables a significant reduction in harmful and polluting gases, as well as an almost 100% elimination of particulates. Emissions reductions from diesel engines contribute to a healthier local environment for urban dwellers and people living near transportation corridors.

Developed in Denmark

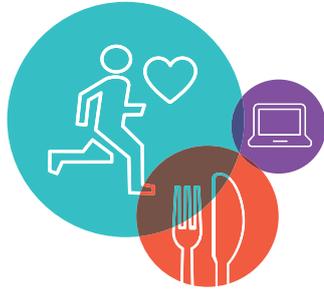


Deployed in Europe, North America, Russia, China



Solution by Dinex Group

Empowering Healthier Food Choices



→ Combining smartphones with nutritional knowhow, the FoodSwitch app provides shoppers with insight into the nutritional content of packaged foods.



ENVIRONMENTAL

The crowdsourced data provides researchers with the information required to drive global food manufacturers towards more environmentally friendly products.



SOCIAL

Poor diets contribute to the global epidemics of obesity, high blood pressure, and diabetes, impacting the lives of billions of people around the world.



ECONOMIC

FoodSwitch is a low-cost, scalable solution that empowers consumers' and researchers' efforts to reduce the billions of dollars of health care costs attributed to poor diets.

FoodSwitch is a smartphone app that employs **barcode scanning and a large food composition database**. Shoppers download the app and use their phone camera to acquire the product barcode, which is matched to a food in the database. A traffic light label consisting of red, yellow, and green colors indicates levels of fat, saturated fat, sugar, and salt in the selected product. Concurrently, the app searches a **database of 40,000 products** for similar but healthier replacements and suggests specific alternative brands to buy instead.

FoodSwitch uses **crowdsourcing to provide researchers with information** on and a photograph of products not present in the app and is thus continuously expanding its database.

Why a Sustainia100 solution?

FoodSwitch is an accessible and easy-to-use app that provides insight into the nutritional content of packaged foods. The immediate point-of-sale advice helps consumers to make healthier and more sustainable food choices.



Developed in Australia

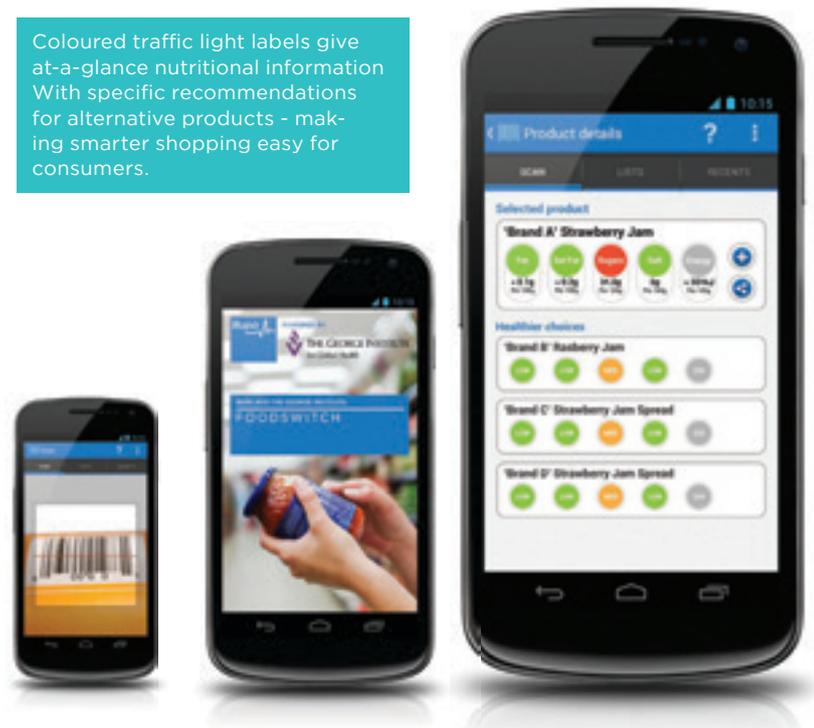
Deployed in **Australia**



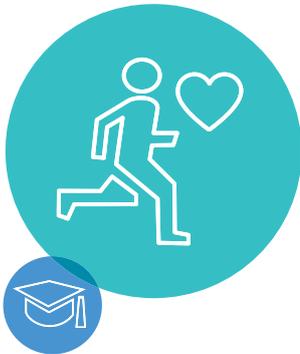
Coloured traffic light labels give at-a-glance nutritional information. With specific recommendations for alternative products - making smarter shopping easy for consumers.

“IT STARTED AS A TOOL TO INFORM CONSUMERS ABOUT HOW TO SHOP HEALTHIER. IT’S TURNED INTO A TOOL THAT INFORMS US ABOUT **WHAT THE FOOD INDUSTRY IS UP TO.**”

BRUCE NEAL, PROFESSOR OF MEDICINE AND INVENTOR OF FOODSWITCH



Audio-Instructed Infection Prevention



→ This talking device simplifies the process used to sterilize medical instruments, making the techniques more accessible, which prevents infections and saves lives.

By adding **audio instructions** to an **autoclave**, a proven medical instrument sterilizer, OttoClave makes this essential device more accessible for use in resource-constrained areas. A sterilization monitor talks to users in their native language, providing users with directions on how to clean reusable medical instruments and confirms when sterilization has been successful.

This solution **makes regular sterilization simpler** and more convenient. The monitor connects to a pressure cooker, which cleans instruments up to the standards required by the U.S. Centers for Disease Control and Prevention. Solar collectors can also power the device, making it a truly off-grid solution.

The technology is currently undergoing rigorous testing in the Kavre district of Nepal, in preparation for rapid deployment across Nepal and India.

Why a Sustainia100 solution?

Dirty surgical instruments cause up to 1 in 3 patients to become infected in resource-constrained areas after undergoing simple procedures. In these areas, basic infection control measures such as using autoclaves have the potential to save millions of lives and lead to major cost savings for health care systems.



ENVIRONMENTAL

OttoClave takes advantage of existing manufacturing capacity and distribution networks to minimize waste.



SOCIAL

Dirty medical instruments cause infections that can kill patients. A simple sterilization system can improve the status quo immediately.



ECONOMIC

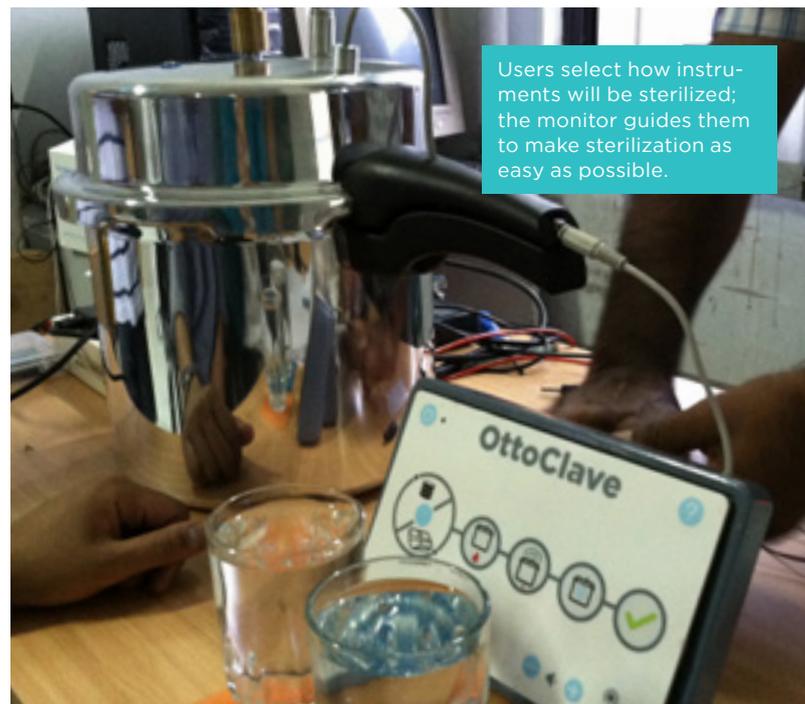
Better infection control will lead to major cost savings to health care systems globally.¹



Developed in USA, Nepal



Deployed in **Nepal**



Users select how instruments will be sterilized; the monitor guides them to make sterilization as easy as possible.

¹Pittet, Allegranzi, Storr, "Infection Control as a Major World Health Organization Priority for Developing Countries."

High-Efficiency Cook Stove



→ Greenway Grameen Infra has developed an efficient biomass cook stove that delivers clean combustion without any moving parts.



ENVIRONMENTAL

According to the company, a Greenway Smart Stove mitigates 1.8 tons of GHG emissions annually.



SOCIAL

Emissions from traditional cook stoves are responsible for 4 million premature deaths annually, according to the Global Alliance for Clean Cookstoves.



ECONOMIC

The Greenway Smart Stove uses 65% less fuel than traditional mud stoves, leading to reduced fuel costs and need for fuel gathering.

The Greenway Smart Stove is a user co-created biomass stove that delivers **65% fuel savings and 70% smoke reduction** and works with any solid biomass fuel.¹

Over 3 billion people worldwide, including 68% of India's population, still cook daily meals on unhealthy, inefficient traditional mud stoves or indoor open fires. This stove employs a **patent-pending air-flow generator** that ensures clean combustion without any moving or motorized parts. The unit retails for \$23. Usage of the stove prevents the **release of 1.8 tons of greenhouse gas emissions annually**, while reducing household air pollution levels to those deemed safe by the WHO.

Why a Sustainia100 solution?

Families burning biomass do not have access to modern fuels such as petroleum gas or electricity due to lack of infrastructure and the cost. This solution makes use of locally available biomass, burning it cleaner and healthier.

Developed in India

Deployed in India, Bangladesh



“DESIGN FOR SUSTAINABILITY SHOULD BE **DRIVEN BY ACTUAL USERS.**”

ANKIT MATHUR, CTO, GREENWAY GRAMEEN INFRA

¹Test report by the Indian National Biomass Cookstoves Initiative.



The Greenway Smart Stove delivers 65% fuel savings and 70% smoke reduction as compared to traditional mud stoves.

Innovating Eye Surgery



→ Aravind Eye Care is innovating health care by employing production and service principles from other industries to increase access to eye surgery in India.



SOCIAL

Aravind makes surgery available to disadvantaged people in rural India who may not even know they have options to regain their vision.



ECONOMIC

Aravind is able to do more than double the amount of eye surgeries compared to the UK National Health System, at one one-thousandth of the cost.¹

Since 1976, Aravind has been able to attain a position as a high-volume and high-quality institute providing eye care for thousands of people annually. Aravind's surgeons conduct **2,000 operations a year**, on average. By comparison, U.S. surgeons only conduct 125 per year. The high number of surgeries does not mean more mistakes, or a compromise on quality, and makes state-of-the-art eye surgery **accessible to the masses**.

Building on an innovative business model that pushes for ever higher efficiency and greater outreach to disadvantaged patients, Aravind has become a network of multiple hospitals across India, and **300 clinics in India** and beyond are using the Aravind model.

Why a Sustainia100 solution?

With its ultra-efficient, high-quality system of clinics and integrated training programs, Aravind is expanding no-fee surgery to the masses, curing unnecessary blindness. Patients only pay if they want to, and the majority pays only a symbolic amount or nothing at all. These surgeries are then funded by fees from paying patients.



Photo: Reuters/Landov

¹Tina Rosenberg, "A Hospital Network With a Vision."

Online Hospital Treatment



ENVIRONMENTAL

Global eHospital reduces the need for transportation and office space.



SOCIAL

Being able to get medical consultations from home eliminates queuing, shuttling between different hospital sections, appointment hassles, and traveling stress.



ECONOMIC

Global eHospital cuts transportation costs, and a typical query can cost as little as \$10, according to MediAngels.

→ MediAngels is an innovative global eHospital aiming to remove geographical barriers between health care consumers and medical specialists from around the world.

Health care is human capital intensive, as the best doctor for a particular disease may not be within traveling distance. At MediAngels, you potentially have every doctor available regardless of physical location. MediAngels makes it **possible to consult a specialist not available** locally for any ailment, at any given time, **directly from home**.

MediAngels also has an extensive plan for philanthropy, planning to **make free consultations available in remote areas** of China, India, and sub-Saharan Africa.

Why a Sustainia100 solution?

Delivering quality health care at the click of a mouse, MediAngels transcends barriers of distance, cost, and time zones, and enables consultations with specialists when convenient, which also cuts transportation costs and emissions. It is important to stress that MediAngels currently is only meant to complement, not replace, the physical interaction between physicians and patients.



Developed in India



Deployed in **India, China,** and sub-Saharan Africa





Waste to energy incinerator to chill

Key trends

Cities sector

*Involvement through
open source
software*

*Partnerships between
public, private, and volunteer
organizations*

*Adapting concepts to
local city context*

*Retrofitting while
respecting cultural
heritage*

*Saving resources and
building community
through sharing*

heat from waste
treatment plant used
for water

Retu
temp.

Climate Resilient Neighborhood



→ The City of Copenhagen wants to create a green climate resilient neighborhood in the city's Østerbro district.

In the Klimakvarter (climate neighborhood), located in Copenhagen's Østerbro district, planners want to **prepare the city for heavy rains** with green solutions at street level. The improvements create lush, green urban spaces while **leading water from cloudbursts away from inhabited buildings** to areas where it causes no damage.

The solutions are being developed **in cooperation with local residents** and target both public (streets) and private areas (inner courtyards).

Why a Sustainia100 solution?

Researchers expect that climate change will bring more heavy rains and cloudbursts to Copenhagen's densely built city center, where the sewer system is ill-equipped to handle the increased rainfall. Expanding the sewer system would be expensive, and would require digging up large parts of the city for decades, disturbing traffic and disrupting city life.



ENVIRONMENTAL

Climate adaptation solutions improve urban biodiversity, reduce CO2 emissions, and reduce the urban heat island effect in the city.



SOCIAL

Access to green areas increases public health and provides new spaces for social interaction.



ECONOMIC

Green and surface-based climate adaptation provides a double benefit (reducing the cost of damage from cloudbursts, increasing liveability) and is cheaper than expanding sewers.



Developed in Copenhagen, Denmark



Deployed in Denmark



Large areas of asphalt will be transformed into green areas, trees and rain-gardens. By optimizing the streets, a green, thriving urban space can be created while still leaving room for cars, cyclists and pedestrians.

Klimakvarter will transform Østerbro to the greenest urban district in Copenhagen and the first climate adapted city area in Denmark.

Photo courtesy of TREDJE NATUR



IN THE FUTURE WE WILL GET MORE RAIN, HIGHER SEA LEVELS AND WARMER WEATHER. KLIMAKVARTER IS ADAPTING TO CLIMATE CHANGE BY USING BLUE AND GREEN ELEMENTS IN THE URBAN SPACE, WHICH WILL **MAKE COPENHAGEN AN EVEN GREENER AND MORE ATTRACTIVE CITY IN WHICH TO LIVE.**

AYFER BAYKAL, MAYOR OF THE TECHNICAL AND ENVIRONMENTAL ADMINISTRATION, THE CITY OF COPENHAGEN

THE IDEA BEHIND

The approach of Klimakvarter is to view rainwater as a positive – and visible – element in the city. The project sees rainwater as a resource that should be showcased, not as a hazard to be flushed away underground. By retaining rainwater above ground in green reservoirs, swales and storage tanks, rainwater becomes an active part of a neighbourhood's urban identity and residents' lives.

Children will be using rainwater at playgrounds, while parents tap storage tanks to water plants. Klimakvarter aims to solve the technical problem of a sewer system being too small to handle the increased amount of rainwater due to climate change with positive elements such as parks, swales and resilient urban spaces. Awareness of rain as a resource is created, along with bigger incentives to create resilient neighbourhoods among the citizens.

www.klimakvarter.dk

Dynamic Parking Pricing



→ SFpark is pioneering parking management using demand-responsive pricing to make parking easier for urban dwellers in San Francisco, while reducing emissions due to circling for parking.



ENVIRONMENTAL

Thirty percent of traffic in central business districts is vehicles searching for parking.¹



SOCIAL

Double-parked cars cause accidents, and distracted drivers looking for parking are more likely to collide with pedestrians, cyclists, or other cars. Better parking management results in fewer accidents and safer roads.



ECONOMIC

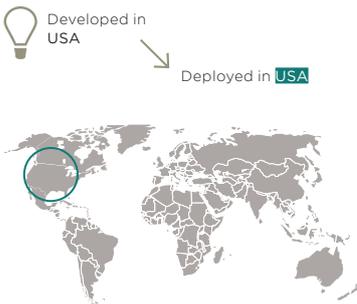
Better parking management is good for economic vitality by making it easier to access and enjoy the city's commercial areas.

Under the slogan "Circle Less, Live More," SFpark manages parking demand in San Francisco by collecting and distributing **real-time information** about where parking is available. To help achieve the right level of parking availability, SFpark periodically **adjusts meter and garage rates**. The aim is to reduce double parking and the time distracted drivers circle looking for parking. The program reduces congestion, wasted time and fuel, while improving the speed and reliability of public transit, access to businesses, and road safety.

Furthermore, SFpark engages citizens by **encouraging independent developers and researchers to use its public data** and open source code to create new apps and data.

Why a Sustainia100 solution?

Effective parking management encourages potential drivers to take other modes of transportation and reduces carbon emissions. Lessons learned from the project are documented and publicly available, which will help scale demand-responsive pricing to the entire city and persuade other cities to adopt a similar approach.



"BETTER PARKING MANAGEMENT IS A POWERFUL TOOL FOR IMPROVING A CITY'S SUSTAINABILITY, QUALITY OF LIFE, AND ECONOMIC COMPETITIVENESS."

JAY PRIMUS, PROGRAM MANAGER, SFPARK

¹Shoup, "Cruising for parking."



Peer-to-Peer Borrowing and Lending



→ Save money and resources by sharing goods and skills with your neighbors.

NeighborGoods.net is a **social platform for peer-to-peer borrowing and lending**. Need a ladder, wheelbarrow, or power drill? Borrow it from your neighbor. Have a bike, backpack, or sleeping bag collecting dust in the garage? Lend it out, and make a new friend.

NeighborGoods facilitates transactions with a reservation calendar, automated reminders, wishlist alerts, and private messaging between neighbors. NeighborGoods also keeps track of members' loaned property. Neighbors can rate each other and flag another member's account if something goes wrong. Borrowing and lending items on NeighborGoods is free, but members may charge a deposit or a rental fee for the use of their items.

Why a Sustainia100 solution?

NeighborGoods notes that Americans spend \$22 billion annually on self-storage. Sharing with NeighborGoods can give a second life to little-used gear, tools, and products. If a consumer borrows an item instead of buying something new, it saves money and resources and builds bonds between neighbors.



ENVIRONMENTAL

By sharing goods, consumers increase energy and resource efficiency and save resources at every step of the life cycle.



SOCIAL

Neighbors helping neighbors builds social capital and resilient local communities.



ECONOMIC

NeighborGoods says the average active neighbor has saved over \$2,000 and saved his or her neighbors twice that amount.



NeighborGoods connects neighbors to share resources, helping them save money and build stronger communities.



“WHEN I CREATED NEIGHBORGOODS, I THOUGHT SHARING WAS ABOUT THE OBJECTS. I LEARNED VERY QUICKLY, **SHARING IS ABOUT PEOPLE.**”

MICKI KRIMMEL, FOUNDER & CEO, NEIGHBORGOODS

Intelligent Streetlights



→ **Tvilight uses smart controls to adjust the illumination and energy levels of streetlights.**



ENVIRONMENTAL

The 91 million streetlights in Europe consume over 68 terawatt-hours of electricity annually. Huge reductions in GHG emissions can be realized with intelligent streetlights.



SOCIAL

Intelligent streetlights improve public safety and reduce light pollution.



ECONOMIC

Europe's 91 million streetlights consume over \$13 billion in electricity annually.

Developed in **The Netherlands**

Deployed in **The Netherlands, Ireland, Germany, UK, USA, Canada, Australia, India, United Arab Emirates**

The Tvilight system dims streetlights if there is no occupancy nearby. Lights then glow when traffic is detected, creating a path of light.



"TECHNOLOGY IS THE KEY TO SOLVE TODAY'S ENVIRONMENTAL CHALLENGES. THIS PRINCIPLE IS THE FOUNDATION OF OUR COMPANY."

CHINTAN SHAH, CEO, TVILIGHT

Real-Time Ridesharing App



→ SideCar is a ride-matching app that connects willing drivers on the roads with people needing a ride.



ENVIRONMENTAL

By preventing single-occupancy car trips, SideCar helps reduce vehicle tailpipe emissions, often the largest source of air pollution in cities.



SOCIAL

By connecting willing drivers with people in need of a ride, SideCar can help build a feeling of community.



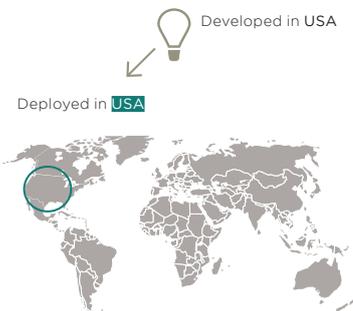
ECONOMIC

Users in the San Francisco Bay Area often pay about half as much for long-distance trips booked with SideCar as the same trip made by taxi.

Pre-screened **drivers willing to make their private cars available** to people in need of a ride are alerted via the SideCar mobile phone app when a ride is requested from someone nearby. If drivers accept the request, passengers are taken to their destination. At the time passengers submit a SideCar pick-up request, they **receive a suggested average “donation”** for their trip. Payments are voluntary and are handled via a cashless system between smartphones.

Why a Sustainia100 solution?

Filling empty seats in cars already on the road makes better use of roads and highways, which saves energy, relieves congestion, and reduces air pollution. The service also makes car transport available to those without a car.



While on the road, Sidecar’s app matches drivers with extra seats with people in need of a ride.



City Design with Daylight



→ A new design method is optimizing distribution of daylight in cities to revitalize buildings and neighborhoods while reducing energy consumption.



ENVIRONMENTAL

In 2012, Henning Larsen Architects designed more than 500,000 m2 of buildings with an energy consumption of 40 kWh/m2/yr, a reduction of 15 million kWh compared to Danish regulatory standards.



SOCIAL

More daylight will increase the social capital of a neighborhood, due to a comfortable and improved microclimate.



ECONOMIC

Daylight is a marketable attribute in real estate. It reduces energy consumption and increases the appeal and market value of buildings.

Daylight is a valuable resource to harness in cities. Henning Larsen Architects and partners have developed a method for sustainable urban planning that systematically **analyses and maps daylight** in urban areas and buildings, putting in place an operational strategy for sustainable renovation in residences and on a city level.

The method is a **scalable tool for urban planners**, with value-adding benefits for residents, owners, and authorities. The new design method has been developed based on scientific research, which proves that using daylight as the sole means of **revitalizing cities and buildings** has a tremendous positive influence on the environment in cities and the energy consumption of buildings.¹

Why a Sustainia100 solution?

Daylight has a significant influence on the health and comfort of citizens. It is essential that urban planners incorporate daylight in their designs, and acknowledge the possibility of energy-related synergies between the various elements that make up a city. This method makes possible the design of cities and buildings that improve the quality of urban life while reducing environmental impact.



Developed in Denmark



Deployed in **Denmark, Faroe Islands, Germany**



Through daylight simulations, urban areas can be planned to optimize the distribution of daylight. This approach reduces the energy consumption of buildings and increases the quality of its indoor and outdoor spaces.

¹ Henning Larsen Architects: "What about daylight?"

Solution by Henning Larsen Architects, Algreen Arkitekter, The Royal Danish Academy of Fine Arts, and Realdania

Low-Carbon Growth in an Emerging City



→ The Colombian city of Montería is showcasing how cities in emerging economies can grow their economies while adapting to and mitigating climate change.

Montería's population of 400,000 is increasingly being exposed to climatic changes such as heavy rainfall and risk of flooding. Montería Green City 2019 is a pioneering Latin American city initiative that targets current and future greenhouse gas (GHG) emissions, **adapting the city to climate change**, and improving urban growth. The plan comprises 26 actions to address 15 challenges in order to **reduce GHG emissions by 20% by 2019**. The actions cover areas ranging from urban mobility, with increased use of bikes, to waste management, and protecting the city's natural heritage with biodiversity and reforestation.



ENVIRONMENTAL

Non-OECD countries are responsible for over 50% of current GHG emissions and are projected to account for the bulk of increases until 2035.¹



SOCIAL

One million trees will be planted in Montería over the next 10 years, with increased access to public parks and recreation.



ECONOMIC

Montería has gained regional and national recognition, increasing competitiveness and attracting investors, according to Proactiva Medio Ambiente.

Through a **public-private partnership** with Proactiva Medio Ambiente in 2011, Montería was the first Colombian city to calculate its carbon footprint. Montería has since developed a detailed plan together with key stakeholders in the city, notably the university, companies, farmers, and architects, as well as the public.

Why a Sustainia100 solution?

Montería Green City 2019 will guide the next 10 years of the city's history towards balanced and innovative growth that respects the environment, reduces carbon emissions, and ensures the quality of life for Monterians.

Developed in Colombia, Spain

Deployed in **Colombia**



Improving mobility, Montería is increasing use of bicycles as a means of urban transportation.

¹IEA, "World Energy Outlook 2011."

Inner-City Bus Rapid Transit



→ Streets in Mexico City’s downtown were rebuilt to accommodate a new bus rapid transit (BRT) line, Line 4, while preserving historical structures.



ENVIRONMENTAL

Metrobus Line 4 has reduced particulate emissions by 94%, NOx emissions by 75%, and CO2 emissions by 35% compared to its predecessor.



SOCIAL

Line 4 serves up to 50,000 passengers daily, and has connected the public transport network in Mexico City better.



ECONOMIC

Users of Line 4 pay just \$2 dollars for the ride from the airport to Mexico City’s historical city center.

Mexico City’s pioneer mobility project, Metrobus Line 4, utilizes all of the components of a successful bus rapid transit (BRT) system: **dedicated lanes, enclosed stations** with levelled access and pre-payment, large buses with multiple doors, advanced fare collection, and a sleek image. Inaugurated in April 2012, Metrobus Line 4 runs through Mexico City’s historical downtown, with an extension to the international airport.

Line 4 was carefully **designed to preserve the colonial architecture** of the historical city center. Metrobus Line 4 operates the first hybrid buses deployed in Latin America.

Why a Sustainia100 solution?

Metrobus Line 4 is a showcase project that has improved mobility and public health, without sacrificing the cultural heritage of Mexico City’s Historical District. The BRT line has reduced travel times along its route and has improved the connectivity of the city’s existing transportation infrastructure. The reorganization of public transport in the city center has made it a more pleasant and attractive place for tourists to visit and residents to call home.



“METROBUS LINE 4 PROVIDES AN EFFICIENT TRANSPORT, **CLEAN AND SAFE TRANSPORTATION THAT RESCUES AND INTEGRATES VALUABLE HISTORICAL SPACES.**”

ADRIANA LOBO, DIRECTOR, CTS-MÉXICO

River-Assisted District Cooling



→ The City of Gothenburg, Sweden, built a district cooling system supplemented by free cooling provided by the river Göta älv.



ENVIRONMENTAL

The system reduces CO2 emissions by up to 80% compared to conventional air-conditioning.



SOCIAL

District cooling provides much higher availability and reliability than the stand-alone alternatives.



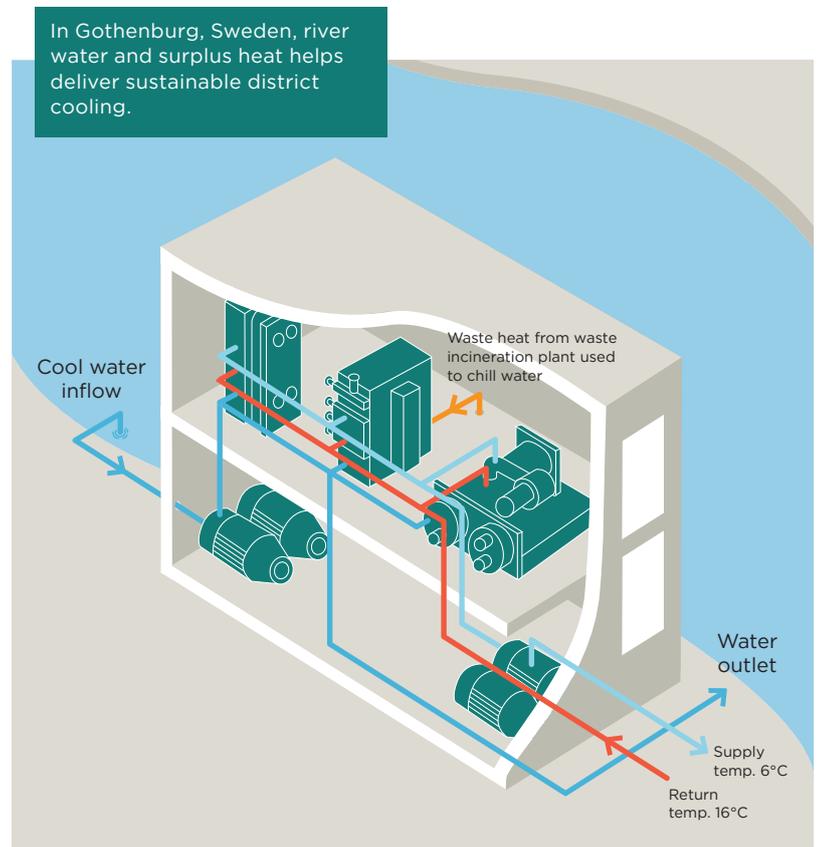
ECONOMIC

In return for investing in an energy transfer station, customers only pay for the cooling they use.

Gothenburg, Sweden, uses **free cooling** from the river Göta älv to pre-cool water used in its large-scale district cooling system. By using a **combination of river water for pre-cooling and waste heat** from an incineration plant to drive its absorption chillers, Gothenburg substantially **lowered CO2 emissions** compared to conventional cooling methods. Customers get the environmental benefit of sustainable cooling at an affordable cost.

Why a Sustainia100 solution?

Gothenburg's district cooling system harnesses free, local resources - river water and surplus heat - in order to offer citizens a cost-competitive, energy-efficient alternative to conventional air-conditioning. District cooling in Gothenburg is a sustainable way of providing a solution for a growing cooling market.





Retrofitting an Inner-City District



ENVIRONMENTAL

Energy usage at King's Cross will be at least 39% less than industry norms.



SOCIAL

Improved quality of life is expected through transforming the physical environment and creating new affordable housing, parks, public spaces, and sports facilities.



ECONOMIC

Energy-efficient design will provide residents and tenants with significant savings on energy costs.

→ In the heart of London, the King's Cross development is achieving sustainability while protecting cultural heritage.

The 66 acre development at King's Cross is creating a new piece of London: 50 new buildings, 2,000 new homes, 20 new streets, and 10 new parks and public spaces. The cultural heritage of the area was given priority during the “retrofitting” process. **Reuse of heritage buildings** and programs to create affordable homes are in place in order to protect social and cultural diversity. King's Cross includes energy-efficient buildings, with all new buildings achieving a BREEAM “Excellent” rating, green transportation, and a **tree-planting program**.

Eighty percent of power demand is to come from renewable technologies like **roof-mounted wind turbines and solar panels** as well as a combined heat and power (CHP) plant that is 80% efficient, compared to 30% in the conventional UK electricity supply. However, with the CHP plant being gas powered, King's Cross should develop a plan to achieve 100% renewable energy in order to be truly inspirational in terms of energy production.

Why a Sustainia100 solution?

When complete, 45,000 people will live, work, or study in King's Cross, demonstrating that sustainable solutions are viable, can improve people's lives, and are available on a massive scale in cities.



“AT KING'S CROSS, **SUSTAINABILITY INFLUENCES EVERYTHING WE DO AND THE BENEFITS ARE ALREADY BEING DELIVERED.** IF YOU NEED PROOF THAT SUSTAINABILITY WORKS, I WOULD ENCOURAGE YOU TO COME AND SEE IT FOR YOURSELF.”

DAVID PARTRIDGE, DIRECTOR, ARGENT







Key trends

Resources sector

*Creating
closed loops*

*Repairing and reusing
broken items*

*Eliminating waste
generation*

*Upscaling waste
products*

*Ensuring clean
drinking water*

Chlorine Generator Kills Waterborne Pathogens



→ **WaterStep's M-100 chlorinator provides up to 38,000 liters of safe water daily, advancing quality of life by eradicating waterborne illness and improving hygiene.**



ENVIRONMENTAL

The M-100 manufactures chlorine and sodium hydroxide as byproducts that can be combined to create a safe saline solution at the conclusion of the treatment process.



SOCIAL

WaterStep's chlorination process has been deployed in 24 countries, bringing safe water to close to 1 million people daily.



ECONOMIC

Clean water makes people more productive members of their communities.

Functioning as a mini-water treatment plant, the M-100 provides a continuous supply of safe water. It is a **flexible system** easily paired with filtration, storage tanks, and hand pumps, depending on its site of deployment. Further, it is **portable** and can be carried from station to station to purify water.

The M-100 is **easily operated by non-technical individuals** using salt and a 12-volt car battery or solar panel. The design results in faster, thorough sanitation of water through the distribution of manufactured chlorine gas that kills waterborne pathogens.

Why a Sustainia100 solution?

A child dies every 48 seconds due to waterborne illnesses. The UN declared 2013 International Year of Water Cooperation, reporting that 2.5 billion people lack access to basic sanitation. WaterStep's solution empowers collaboration in both development and disaster situations, providing safe water and sanitation remedies. The M-100's byproducts, chlorine and sodium hydroxide, can be used in first aid and kill mosquito larvae to enhance community stability.

Developed in USA

- Deployed in **Brazil, Democratic Republic of Congo, Costa Rica, Dominican Republic, Ethiopia, Ghana, Guatemala, Haiti, Pakistan, Honduras, India, Iraq, Kenya, Malawi, Mexico, Myanmar, Nicaragua, Panama, Peru, Sierra Leone, Tanzania, Thailand, Uganda, USA**





Water is diplomacy and empowerment that requires the participation of communities everywhere to generate compassion and peace.

WATERSTEP EQUIPS AND EMPOWERS PEOPLE TO PROVIDE **SAFE WATER SOLUTIONS FOR HEALTHIER COMMUNITIES** BY USING A SIMPLE, AFFORDABLE, ADAPTABLE, EFFICIENT, AND ROBUST CHLORINE GENERATOR.

MARK HOGG, FOUNDER AND CEO, WATERSTEP

THE IDEA BEHIND

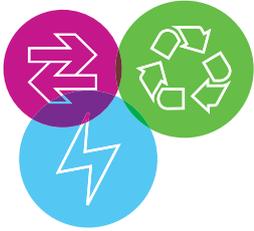
Using tools like the M-100 chlorinator, WaterStep actualizes a vision for the future in which: all medical facilities have access to safe water; disaster-relief efforts utilize efficient options other than bottled water; a virtual water company is dependent on people rather than infrastructure; and water education is available via mobile devices.

WaterStep is working towards this vision through various projects, such as implementing flood-relief efforts in Pakistan, developing backpacks designed to easily carry the M-100 between communities, and teaching hand-pump repair coupled with sanitation classes in Malawi.

Partners as diverse as the United States Southern Command, General Electric, Ivy Technical Institute and Mahindra Satyam are invested in this future through skill-based volunteering that spans their employee network. Sustainable water solutions connect people of all backgrounds, histories and religions to save lives.

www.waterstep.org

Integrated Bioenergy Production for Aviation



→ Utilizing seawater and desert land, this solution produces bioenergy and food by using waste streams from one subsystem as input for the next.



ENVIRONMENTAL

A Salicornia-based biofuel could result in a 100% reduction in life-cycle GHG emissions.¹



SOCIAL

Thirteen percent of the world's people live in arid zones². This solution can provide new jobs and opportunities in resource-challenged regions.



ECONOMIC

Alternative fuels help diversify supply for the aviation industry, generating options for the purchase of fuel, which represents close to 40% of an airline's operating costs.

Taking advantage of the synergies and interactions between several subsystems, the Integrated Seawater Energy and Agriculture System (ISEAS) uses non-arable desert land, irrigated with seawater, to produce bioenergy and food. The system integrates fish or shrimp farming with the production of the salt-tolerant crop Salicornia and sea mangroves. Utilizing the oilseed from the Salicornia plant, liquid biofuel for aviation is produced via hydro-processing, with leftover biomass from this process as well as the mangrove production made available for bioenergy.

The benefits of the integrated system stem from the use of co-products from each process to supplement energy or material inputs for the other processes with the end result being biologically treated seawater.

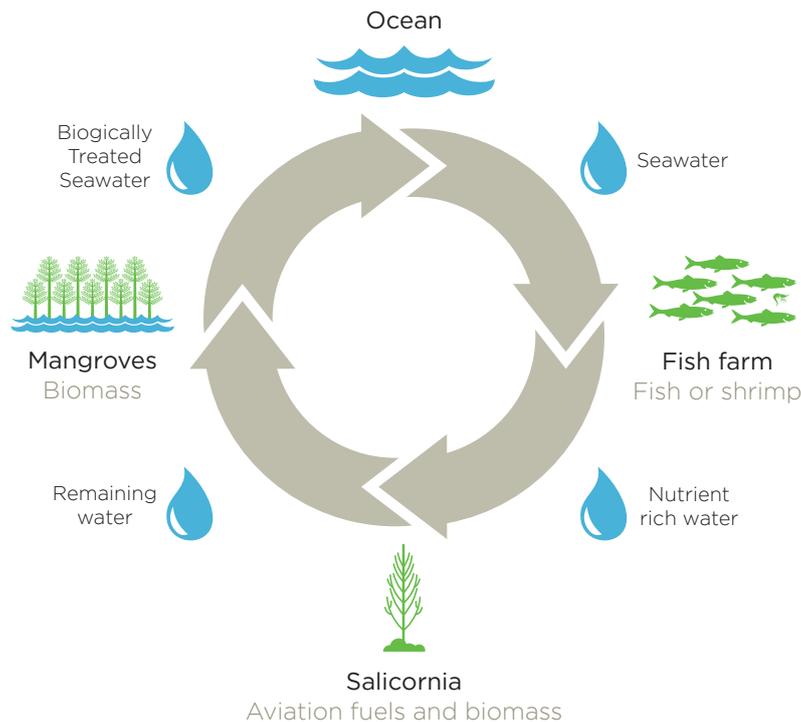
Why a Sustainia100 solution?

The ISEAS has the potential to provide drop-in aviation and other types of bioenergy with life-cycle greenhouse gas emissions less than those of conventional fossil fuel-based aviation fuels. The ISEAS offers the additional benefits of using seawater, not freshwater, while making productive use of marginal land.

Developed in United Arab Emirates



Deployed in United Arab Emirates

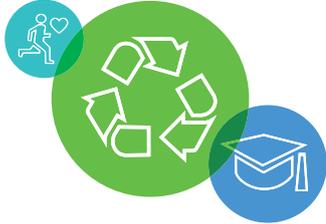


¹Stratton, Wong, and Hileman, "Life Cycle Greenhouse Gas Emissions from Alternative Jet Fuels."

²Valerio Crespi, "Global Desert Aquaculture at a Glance."

Solution by The Boeing Company, Etihad Airways, UOP-Honeywell, Safran, and the Masdar Institute of Science and Technology

Waste Education and Collection



→ TerraCycle is a global initiative focused on the collection and repurposing of otherwise non-recyclable waste streams working in 21 countries worldwide.



ENVIRONMENTAL

Over 2.5 billion pieces of waste collected and recycled have resulted in a 40-80% carbon savings over traditional disposal options, the company claims.



SOCIAL

Over 25 million students have engaged in TerraCycle's recycling and environmental education programs.



ECONOMIC

Almost \$8 million has been donated to schools since 2008.

TerraCycle runs recycling fundraisers that collect and reuse over **60 different non-recyclable waste streams** ranging from pens to hospital waste to cigarette butts. Any school, charity, individual, or business can **sign up for free** to earn money for non-profits by collecting trash they used to throw away.

For every piece of waste a collector returns, two cents (or the local equivalent) is donated to a school or non-profit of their choice. The collected material is recycled or **upcycled into consumer products, building materials, and industrial applications.**

Why a Sustainia100 solution?

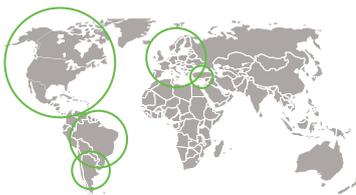
Garbage is a major global environmental issue. Recycling rates remain low in most countries, and environmental education is not a priority at most schools. TerraCycle's solution helps to reduce waste today by providing an incentivized collection system, while also focusing on educating younger generations to become more sustainable citizens. The solution does not solve the vast issue of waste production itself, but it is a positive contribution to waste management.



Developed in Australia, South Korea, Japan, India, China, Columbia, Italy



Deployed in USA, Canada, Mexico, Argentina, Brazil, UK, Ireland, France, Germany, Spain, Belgium, Luxembourg, The Netherlands, Austria, Switzerland, Denmark, Sweden, Norway, Hungary, Israel, Turkey



Restoring Desert Land using Livestock



→ The Savory Institute promotes large-scale restoration of the world's grasslands using properly managed livestock, while educating and empowering people living in desert regions.



ENVIRONMENTAL

Dry, infertile, exposed soil is unable to store carbon, releasing it into the atmosphere.



SOCIAL

The Savory Institute establishes locally led and managed hubs around the world empowering people to use properly managed livestock to heal the land.



ECONOMIC

The Savory Institute has joined a collaboration of sheep producers in Argentina that works to restore 40 million acres of grasslands and add value to the wool produced.

The Savory Institute uses livestock to combat desertification. By enhancing biological decay, the timely stomping and excrement from a large number of animals holds the potential to **reverse dry, exposed land into healthy grasslands with rich soils.**

The Savory Institute is empowering people to reverse desertification by teaching them **Holistic Management**, a decision making process used to ensure livestock are at the right place, at the right time, for the right reasons, with the right behavior. Savory Hubs offer **consulting** and **training services**, and provide access to land, networks, and funding resources necessary to expand the practices across regions.

Why a Sustainia100 solution?

For many years, large swaths of grasslands around the world have been turning into barren deserts. An estimated one-third of the Earth's surface is covered with grasslands threatened by desertification. The possibility of restoring the land provides opportunities not only for food production and social development, but could positively impact efforts to slow climate change by keeping carbon in the ground that would otherwise be released into the atmosphere with desertification.



Developed in USA

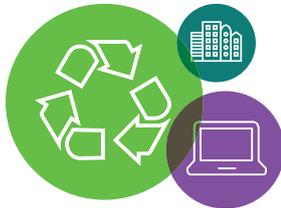


Deployed in USA, Canada, Mexico, Australia, Pakistan, Kenya, Namibia, New Zealand, South Africa, Brazil, Chile, Argentina, Turkey, Sweden, Zimbabwe, UK, Spain



Solution by The Savory Institute

Intelligent Waste and Recycling Collection



→ **BigBelly Solar provides garbage collectors with real-time data and onsite compaction to bring cost savings, environmental benefits, and ease traffic congestion.**



ENVIRONMENTAL

BigBelly Solar slashes greenhouse gas emissions, and reduces fuel consumption, from garbage trucks.



ECONOMIC

Garbage collectors save money by using less fuel and allocating staff to other tasks, as well as reducing landfill tipping fees.

Through the use of solar power and smart monitoring technologies, BigBelly Solar makes garbage collection intelligent with **benefits to cities, transit organizations, and college campuses.**

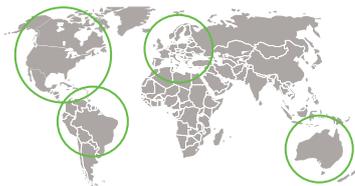
By providing garbage collectors with real-time data and historical reporting for collection sites, this solution makes it possible to switch from uninformed schedules to just-in-time collection. These insights mean that collection frequency can be slashed to **conserve fuel, reduce emissions, and make operations more efficient.**

Why a Sustainia100 solution?

BigBelly Solar is bringing 21st Century technology solutions to a service that has seen little innovation in many decades. Garbage trucks are some of the least efficient vehicles on the road, some only getting 2 miles per gallon. Taking these trucks off the road conserves fuel, limits emissions, avoids traffic jams, and cuts down on wear and tear on the streets. The BigBelly garbage collectors are powered by 100% renewable solar energy.

Developed in USA

Deployed in **USA, Canada, Mexico, Brazil, Colombia, Panama, UK, France, Spain, Sweden, Denmark, Germany, Austria, Switzerland, Australia, Monaco, Ireland, Belgium**



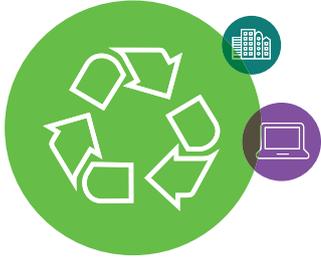
“BIGBELLY SOLAR IS HELPING THOUSANDS OF COMMUNITIES HELP THE ENVIRONMENT WHILE **SAVING MONEY AND CREATING CLEANER PUBLIC SPACES.** EVERYBODY WINS.”

JIM NORROD, CEO, BIGBELLY SOLAR



Solution by BigBelly Solar

Extending Life of Goods through Trade Rings



→ **Netcycler brings back the value of the things you own, and enables you to use that value to get the stuff you actually want and need.**

Netcycler makes it **easy to swap**, sell, and buy pre-owned items. Using computer algorithms, the service is able to automatically combine the item wishes and offers for several people into **trade rings of up to five people**. This significantly increases the probability of matching offers and wishes compared to traditional one-to-one swapping.

Users simply list the items they no longer need and **make a wishlist** of items they would like to get. After that, the service builds trade proposals based on these offers and wishes.

Why a Sustainia100 solution?

When a pre-owned item finds a new owner, it means there is no need to buy a new manufactured item. By limiting the need for manufacturing, Netcycler limits the use of resources and energy, transportation, and therefore CO2 emissions. Swapping extends the life of goods and keeps stuff out of landfills. It is a positive step towards the creation of a closed-loop system.

ENVIRONMENTAL
Netcycler reduces the use of resources and energy to manufacture new goods.

SOCIAL
Instead of using money to buy new items, the consumer can use existing goods as a currency when swapping.

ECONOMIC
The advanced categorization and automatic trade ring technology makes using the service easy, which expands the market for reuse of goods.

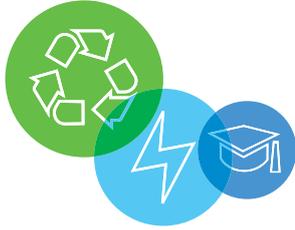
Developed in Finland

Deployed in **Finland, Germany, UK, USA**



Netcycler allows for up to five people to enter a trade ring generated from their offers and wishes, including the possibility of cash payment.

Repair Broken Items at the Local Café



→ Instead of throwing items away, Repair Cafés strive to bring them back by making repair a social activity in communities.



ENVIRONMENTAL

Because of the Repair Café concept, more items can continue to be used, which saves raw materials and energy and reduces CO2 emissions.



SOCIAL

At the Repair Café, people with practical repair skills, who tend to be sidelined in Western societies, are highly appreciated.



ECONOMIC

The Repair Café saves money because items that can be repaired by a volunteer repair expert do not have to be replaced by new ones.

Repair Cafés are free meeting places where **volunteer repair experts** help neighbors fix broken items that they have brought from home. This way, **new social interactions between neighbors** are established and people with practical skills use and pass on their skills to others.

The products that are repaired and **saved from the trash bin** keep items and raw materials in use. As a result, energy consumption from the production of new items is avoided and money is saved. The Repair Café Foundation helps local groups in Europe and beyond start their own repair meetings and Repair Cafés in their community.

Why a Sustainia100 solution?

People in the Western world create waste by consuming and throwing away vast amounts of stuff. This would not be necessary if people would use and appreciate the practical repair skills still present in the communities. The Repair Café Foundation helps communities to identify the people who possess these skills and involve them in the local Repair Café.



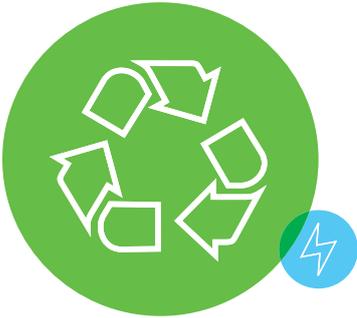
Developed in the Netherlands



Deployed in the Netherlands, Belgium, Germany, France, UK, Italy, Brazil, Australia, USA, Canada



Decentralized Wastewater Treatment



→ Treating wastewater on site, the Bio-Booster allows for water reuse and preserves the local aquatic environment within a given watershed.



ENVIRONMENTAL

Removal of pollutants and pathogens from wastewater ensures that the water treated and returned back to nature or reused is clean and safe.¹



SOCIAL

BioBooster can be located within residential areas with no hazard to personnel and surrounding neighbors and without unwanted odors.



ECONOMIC

BioBooster provides an alternative to centralized wastewater treatment plants, with reduced energy for piping and pumping stations.

Grundfos BioBooster is a full-scale **decentralized wastewater treatment plant** based on an advanced membrane ultrafiltration process. The filtration process **removes bacteria** from the wastewater, which can be reused for irrigation of recreational areas and crops. The modularity of the plant will match exact wastewater capacity and specific types of flows from both industrial and municipal sources.

Supporting the concept of a self-sustained village, the decentralized treatment plant **does not require infrastructure** such as pipes and pumping stations, translating into reduced energy costs. The plant is **remotely monitored**, which ensures constant regulation of the processes.

Why a Sustainia100 solution?

The world's population is growing and demanding more water. But only 3% of the Earth's water is fresh, of which only 1% is available for consumption. By treating wastewater, it is possible to protect the local aquatic environment from waste and enable water reuse, which helps to conserve fresh water.

Developed in Denmark

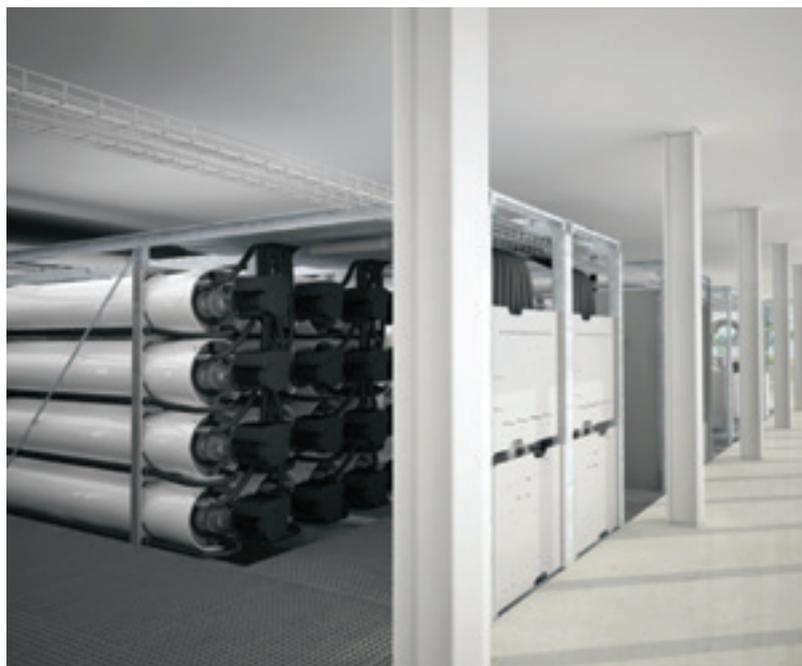
Deployed in Denmark, Norway, Sweden



“WATER SCARCITY CAN BE FOUGHT BY TREATING WASTEWATER LOCALLY AND REUSING IT. **IT REQUIRES A PARADIGM SHIFT IN THE WAY WE VIEW AND MANAGE WASTEWATER.**”

BENT GADGAARD, MANAGING DIRECTOR, GRUNDFOS BIOBOOSTER A/S

¹ Safir4eu, “Vegetables Irrigated with Recycled Water Are safe.”



The full-scale decentralized wastewater treatment plant will remove pathogens from hospital wastewater on the grounds of Herlev Hospital, Denmark.



Cash for your Mobile Phone



→ **Mazuma Mobile has prevented over 4 million mobile phones from reaching landfills by giving consumers cash for their used handsets.**



ENVIRONMENTAL

Reuse is the most effective form of recycling, as it prevents the need for additional virgin resources to make new products.



SOCIAL

Mazuma Mobile enables those in emerging markets to have access to new technology and to the Internet.



ECONOMIC

By repurposing the phone, or recycling its components, Mazuma increases the lifespan of a mobile phone.

Mazuma Mobile offers cash for your old handset. Mazuma uses an onsite Waste Electrical and Electronic Equipment (WEEE) Directive-compliant facility to test and categorise mobiles for reuse.

Fully working and repairable phones are reused by approved reuse partners; **non-repairable phones are recycled** by approved recycling partners. Since 2007, Mazuma Mobile has paid customers a total of \$275 million and recycled over 4 million mobile phones.

Why a Sustainia100 solution?

With millions of consumers storing old handsets, Mazuma Mobile provides an economical and ecological solution for the hundreds of thousands of mobiles destined for landfills, or left unused in kitchen drawers, each month. By reusing the recycled handsets in emerging countries, Mazuma Mobile is able to improve the quality of life for, and provide Internet access to, those in developing countries for whom new technology is not readily available. Mazuma Mobile has already established long-term relationships with approved partners in China and Africa. The next step should be to address end-of-life challenges for the mobile phones recycled in developing countries.



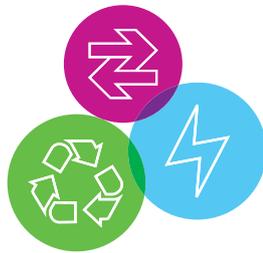
Developed in UK, Australia



Deployed in **UK**, **Australia**



Capturing CO2 to Create Beneficiary Byproducts



→ This carbon capture and neutralization solution lowers CO2 emissions, reuses waste material and water, and creates aluminium and water as byproducts.



ENVIRONMENTAL

According to Cuycha Innovation Oy, the technology is capable of reducing CO2 emissions by 40% to 90% while reusing waste minerals.



ECONOMIC

Apart from the lowering of CO2 emissions, this solution provides valuable and commercially usable byproducts.



Developed in Finland, Botswana, South Africa, UK, Australia



Deployed in Finland, Botswana, South Africa

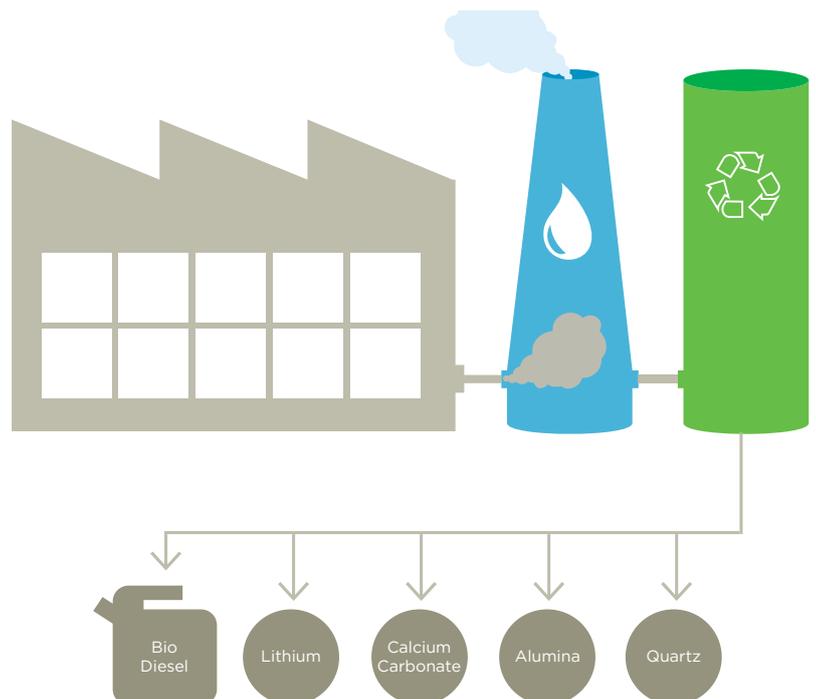


Cuycha Innovation's solution captures CO2 emissions from flue gas and **neutralizes** and permanently binds them in carbonate form. According to the company, this method enables a **40% to 90% reduction of CO2 emissions**. The flue gas is washed with water or mine drainage to form carbonic acid. The resulting mildly acidic water is passed through a series of reaction silos filled with crushed feldspar. This material is readily available as it forms over 60% of the Earth's crust.

The byproducts of this process are typically valuable, easily marketable compounds like aluminium oxides, various carbonates, and bicarbonat water. Joint ventures have been set up in Africa, Australia, and the UK, with one plant under construction and three industrial projects in the implementation phase.

Why a Sustainia100 solution?

Carbon capture solutions often stall due to high energy consumption. It is unverified whether this solution will be able to overcome this barrier and scale globally, but if the potential is realized across multiple industries, carbon capture and neutralization could represent an important building block for the sustainable society.



Solution by Cuycha Innovation

“THESE
SOLUTIONS ARE
TRANSFORMING
OUR HOMES,
RESHAPING OUR
CITIES, AND
BRINGING NEW
IDEAS TO ENTIRE
COMMUNITIES.”

Governor Arnold Schwarzenegger,
Honorary Chair of Sustainia Award Committee,
Chairman of Regions20

“WITH ITS 100 SOLUTIONS
TO BUILD OUR FUTURE,
THIS INNOVATIVE INITIATIVE,
SUSTAINIA, PRESENTS A WORLD
OF OPPORTUNITIES.”

Helle Thorning-Schmidt,
Prime Minister of Denmark

“WITH THE SUSTAINIA100
THERE IS NO EXCUSE
FOR NOT CHOOSING A
SUSTAINABLE PATH TO THE
FUTURE. THE SOLUTIONS ARE
THERE. READY FOR USE.”

Gro Harlem Brundtland,
former Prime Minister of Norway and
former General-Secretary WHO

“THE SUSTIANIA100
PROCESS HAS
INSPIRED MANY
COMPANIES,
CONSUMERS, AND
POLICY MAKERS.”

Georg Kell,
Executive Director, UN Global Compact,
Sustainia Award Ceremony 2012

Methodology

We strive to continuously improve Sustainia100, and make it a valuable tool that can guide the transformation to a sustainable society.



Finding and selecting the solutions

In early 2013, we launched a *campaign* to get submissions from the global sustainability community. Together with our own extensive research into trends and new developments within 10 sectors, this resulted in **500+ applicants** analyzed for final review.

We reviewed solutions from 79 countries, spanning all 10 sectors, and representing a wide variety of business models. All applicants were reviewed using five criteria, which enabled us to select **215 Candidates** to be presented to our external *Advisory Board* of sector experts.

Picking the nominees

Advisory Board members were asked to observe our Evaluation Criteria when making their judgments on solutions within their fields of expertise. They were also encouraged to apply their sector-specific sustainability expertise during this process, and to share all considerations or concerns in meetings with Sustainia. Advisory Board members were invited to suggest alternative candidates that they felt deserved consideration.

We requested additional information from 143 candidates. With this information, we were able to answer outstanding questions and qualify our final selection of the 100 solutions and projects **published** in this book.

How we define 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, and is also a pivotal point of reference for evaluating the solutions.

Evaluation Criteria

Sustainia100 solutions meet five criteria

1. Readily available

Sustainia100 candidates must be more than just vague ideas or blueprints. Sustainia100 is all about solutions that are accessible and able to move us towards a sustainable society today. It does include solutions that are not yet realized and some that are only prototypes. Such cases have been included because they have strong commitment from investors, partners, markets, or politicians that suggest further development is likely in progress.

2. Positive environmental impact

At the very least, Sustainia100 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 the “business as usual” mentality.

3. Financially viable

The cost of a given solution or project must be justified in light of its promised benefits. Candidates are not discredited for relying on subsidies or highly philanthropic business models. But affordability and financial sustainability are key qualities for Sustainia100 candidates.

4. Improve quality of life

Solutions and projects that make for a better and more sustainable life is what Sustainia is all about. Solutions are assessed on their ability to deliver such improvements. Sustainia100 solutions should enhance the quality of life for citizens, and help communities bring about real change.

5. Scalable

The ability to scale up is essential. This entails that solutions can have a wider and lasting impact beyond their present location and circumstances. Scalable solutions are characterized by being backed by strong partners, quality management, and having a sound business model.

The Sustainia100 Advisory Board

Our Advisory Board consists of experts with whom Sustainia has a non-financial relationship. Sustainia has been in close dialogue with the advisors, who have been encouraged to disclose any biases, such as technology preferences, personal interests, and/or policies of organizations they represent. Some members of the Advisory Board have asked to remain unaccredited due to internal policies of the organizations they represent.

WWF CLIMATE SOLVER

Stefan Henningsson,
Senior Adviser Climate Innovation,
WWF International

Stephan Singer,
Director Global Energy Policy,
WWF International

Jean-Philippe Denruyter,
Manager, Global Renewable
Energy Policy, WWF International

Sabina Andrén,
Project Manager,
Sustainable Cities, WWF Sweden

Subhro Sen,
Senior Programme Officer,
WWF India

AARHUS UNIVERSITY

Martin Brynskov,
Associate Professor,
Center for Digital Urban Living

RAMBOLL

Lars Ostenfeld Riemann,
Group Director, Buildings

Søren Hansen,
Project Director,
Urban Development and
Transportation

Lisbet Poll Hansen,
Senior Project Manager,
Sustainability and Environment

Anders Dyrelund,
Senior Market Manager, Energy
and Climate

Hanne Tine Ring Hansen,
Chief Consultant,
Buildings and Sustainable
Building Design Consultancy

PEGASUS CAPITAL ADVISORS

Jennifer Hickman,
Operating Partner

SUSTAINABLE APPAREL COALITION

Ryan Young,
Index Manager

FOUNDATION FOR ENVIRONMENTAL EDUCATION

Sarah Pickering,
Program and Communications
Director

INDEPENDENT EXPERTS

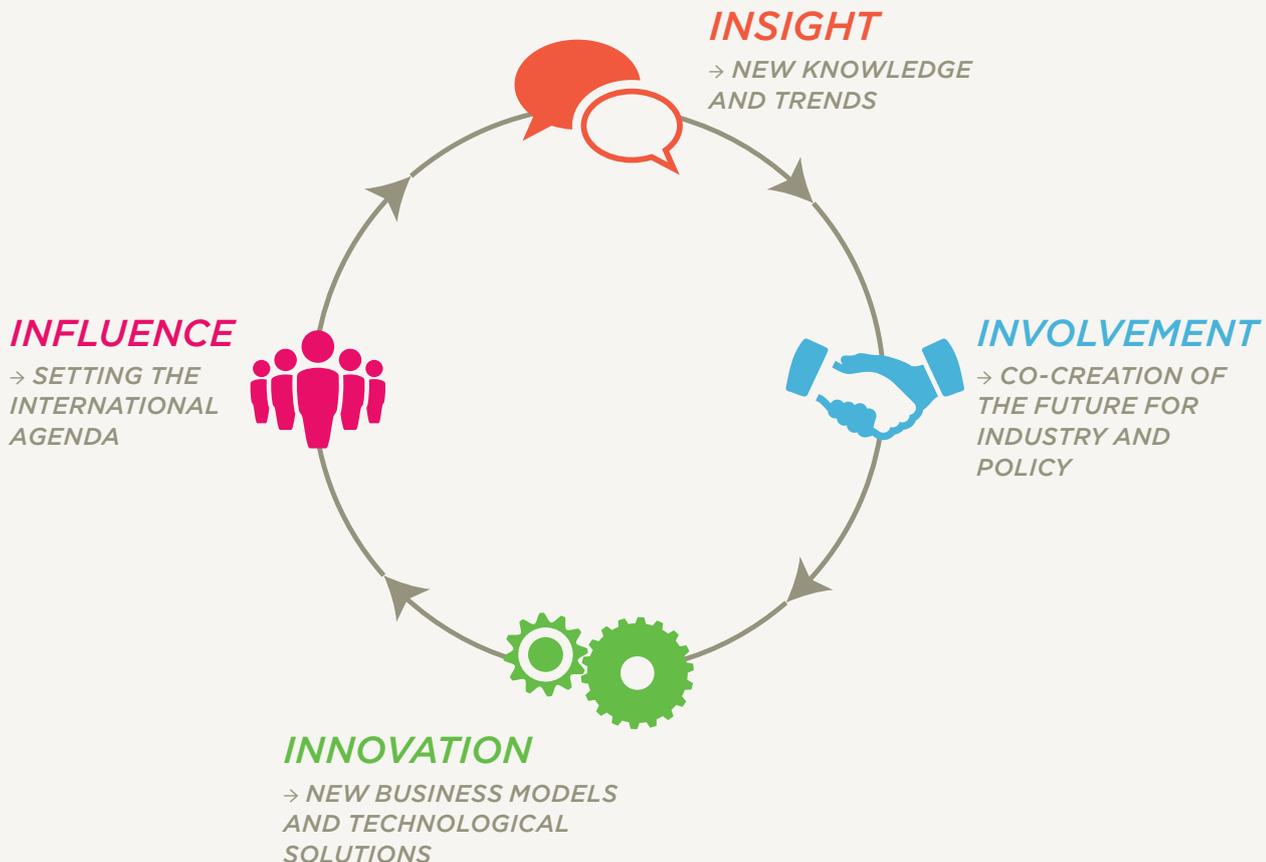
Graham Vickery,
Ph.D., Information Economics,
former Head of the Information
Economy Group, OECD

Brian Edwards,
Emeritus Professor of Architecture
(ECA - Edinburgh University)

The 4 Key Pillars of Sustainia

We hope you have been inspired and gained insight into the Sustainia100 solutions as well as the exciting trends and developments represented within our 10 sectors. We believe these readily available solutions are showcase examples of how we can make our societies more sustainable today.

Sustainia serves the community, industry leaders, and policy-makers by providing *insight*, *involvement*, *innovation*, and *influence* as a platform for a sustainable future.



INSIGHT

→ NEW KNOWLEDGE AND TRENDS

Sustainia's research actively develops **new knowledge** and uncovers **emerging trends** in the marketplace. These insights deliver inspiration and the benefits of sustainability with concrete reference points.

INVOLVEMENT

→ CO-CREATION AND DEVELOPMENT

Sustainia brings together **key stakeholders** to co-create and develop action steps to help drive a **transformational agenda** within their respective industries and across multiple sectors. Sustainia's approach to our 10 sectors enables stakeholders to be specifically involved in one or more of the sectors in respect to their business activities.

Cross-sector stakeholder involvement provides real-time marketplace development intelligence which ensures that our insight and trends are on the cutting edge. These stakeholders can then **learn from each other**, as well as implement actual projects shaping sustainability within their respective value chains.

INNOVATION

→ BUSINESS MODELS AND TECHNOLOGICAL SOLUTIONS

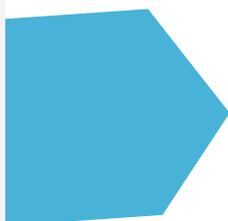
In collaboration with our network, partners, and social outreach programs, Sustainia has been able to proactively pursue **unique** and **innovative** sustainable solutions. These solutions provide tangible, practical examples of sustainability outperforming previously perceived expectations.

These solutions **stress the benefits** that come with overcoming barriers and taking the next step.

INFLUENCE

→ SETTING THE INTERNATIONAL AGENDA, THE FUTURE OF INDUSTRY AND POLICY

Through **market insight**, **stakeholder involvement**, and **sustainable innovations**, Sustainia develops a platform capable of influencing and **shaping the global agenda**. The platform builds momentum decision-makers can leverage, driving change and the future of industry and policy. Our most important stakeholder is society as a whole, showing how a movement of the few can inspire the masses.



Our Partners and How You Might Get Involved

Sustainia is always looking to work with **companies** and **organizations** dedicated to move their **industries, cities** and **communities** forward. We welcome new ideas and partners. Please do get in touch with our management to learn more.

Our Founding Partners help set the overall direction for our work

The Founding Partners are forward thinking companies looking to drive the global adoption of readily available sustainable solutions. Innovators in their own regard, they whole heartedly believe in Sustainia's vision and mission and have put their full support behind our initiative. Serving as the Steering Committee of Sustainia they are involved in our strategic developments.

Our Strategic Partners are like-minded organizations and institutions

The Strategic Partners share a common mission and ambitious goals of Sustainia where we provide each other mutual benefit of our individual global platforms and knowledge resource base. As Strategic Partners we seek to collaborate and enhance each other's platforms so that we may together reach our goals and objectives.

Our Sector Partners truly influence their industry and set a new sustainable agenda

Sustainia is actively expanding our in-depth sector tracks and is bringing in key Sector Partners to play a crucial role within their industries in an effort to accelerate change and drive adoption. These partners are on the forefront of sustainable practice or looking for innovation and inspiration across their value-chain operations to improve their market position.

Our Knowledge Partners provide resources and intelligence to all of our activities

The Knowledge Partners consist of organizations that help provide Sustainia with ideas, market solutions and R&D to enhance our insight to new trends and marketplace developments. Each partner brings different values to the Sustainia platform having unique perspectives into different sectors.

Explore more from Sustainia

Sustainia has a number of activities, events and publications that bring together the bigger picture for our key stakeholders.

We start from our overall vision of a sustainable society, zoom in on a city focus, complete a full sector analysis, and then identify and evaluate market solutions as shown in this publication.



THE BOOK “GUIDE TO SUSTAINIA”

→ *THE FULL VISION AND
INTEGRATED STORYTELLING*

Guide to Sustainia describes the **overall vision** and model of Sustainia and demonstrates **a new way of communicating** about sustainability. By using clear and simple language along with easily read illustrations, it draws a tangible picture of what the sustainable society could look like ten years from now based on solutions available today.



SUSTAINIA CITY GUIDES

→ *EXPLORING THE SUSTAINABLE CITIES
AND REGIONS OF TOMORROW*

Sustainia City Guides zooms in on real existing cities to showcase how life in sustainable cities will be better. Sustainia City Guides provide **insight into new ways of urban planning**, understanding of what drives innovation towards sustainability in the built environment, and **tools for communicating visions** to city stakeholders.

SUSTAINIA SECTOR GUIDES

→ *STIMULATING THE MARKET SECTORS
FOR SUSTAINABLE SOLUTIONS*

The Sector Guides aim to **stimulate the marketplace** for each of our 10 sectors. In 2012 we launched the **Buildings Sector** Guide and in 2013 we are launching both the **Fashion and Health Sectors**. Each sector takes a unique approach and builds around key stakeholders to ascertain real-time challenges within. The Building Sector focused on the socio-economic benefits of retrofitting and building sustainably, gathering the arguments for a big push towards sustainability. This included healthy indoor climate, productivity and quality of life as well as energy and resource efficiency. The Health Sector will focus on lifestyle and the world we live in whereas the Fashion Sector focuses on co-creating a sustainable value chain for the fashion industry.



SUSTAINIA100

→ *100 SUSTAINABLE SOLUTIONS
DELIVERED EVERY YEAR*

Sustainia is working continuously to identify, and analyze solutions for this annual catalogue of **trends and developments** across our **ten sectors**. It is part of our ongoing effort to stress the benefits of sustainability, demonstrate the possibilities and inspire communities, businesses and policy makers. The Sustainia100 also acts as a list of nominees for the Sustainia Award.



SUSTAINIA ACTION FORUM

→ *KEY DECISION MAKERS COMMITTING
TO CONCRETE ACTIONS*

Our annual Action Forum brings together key stakeholders from **top level executives, policy makers**, through to inspiring **thought leaders**. This provides an open platform where they may engage, learn from, and **collaborate on implementing sustainable solutions** within their respective activities. As a result, we see real decisions being made by those who can implement change on various levels and scale.



SUSTAINIA STRATEGY AND ADVICE

→ *TAILOR MADE, SOLUTION ORIENTED
SUSTAINABILITY STRATEGIES*

We believe in **innovating sustainability** to increase value creation. Having worked with some of the world's leading companies when it comes to **uniting sustainability and profitability**, and with an experienced and highly-creative staff, Sustainia is able to offer advisory and tailor made insights to support the sustainability strategies and communication efforts of our partners and our network.



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Founding partners



Mondaymorning

Strategic partners



Knowledge partners



Sustainia100 is a testament to the power of innovation. It is Sustainia's annual guide to **100 innovative solutions** from around the world that 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. With the Sustainia100, Sustainia gives investors, business leaders, politicians, and consumers **in-depth insights** into the most promising projects and solutions across our 10 sectors.

The solutions in the Sustainia100 are **efficient, innovative,** and **fascinating.**

We hope you will be inspired!



BUILDING THE WORLD
OF TOMORROW

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