

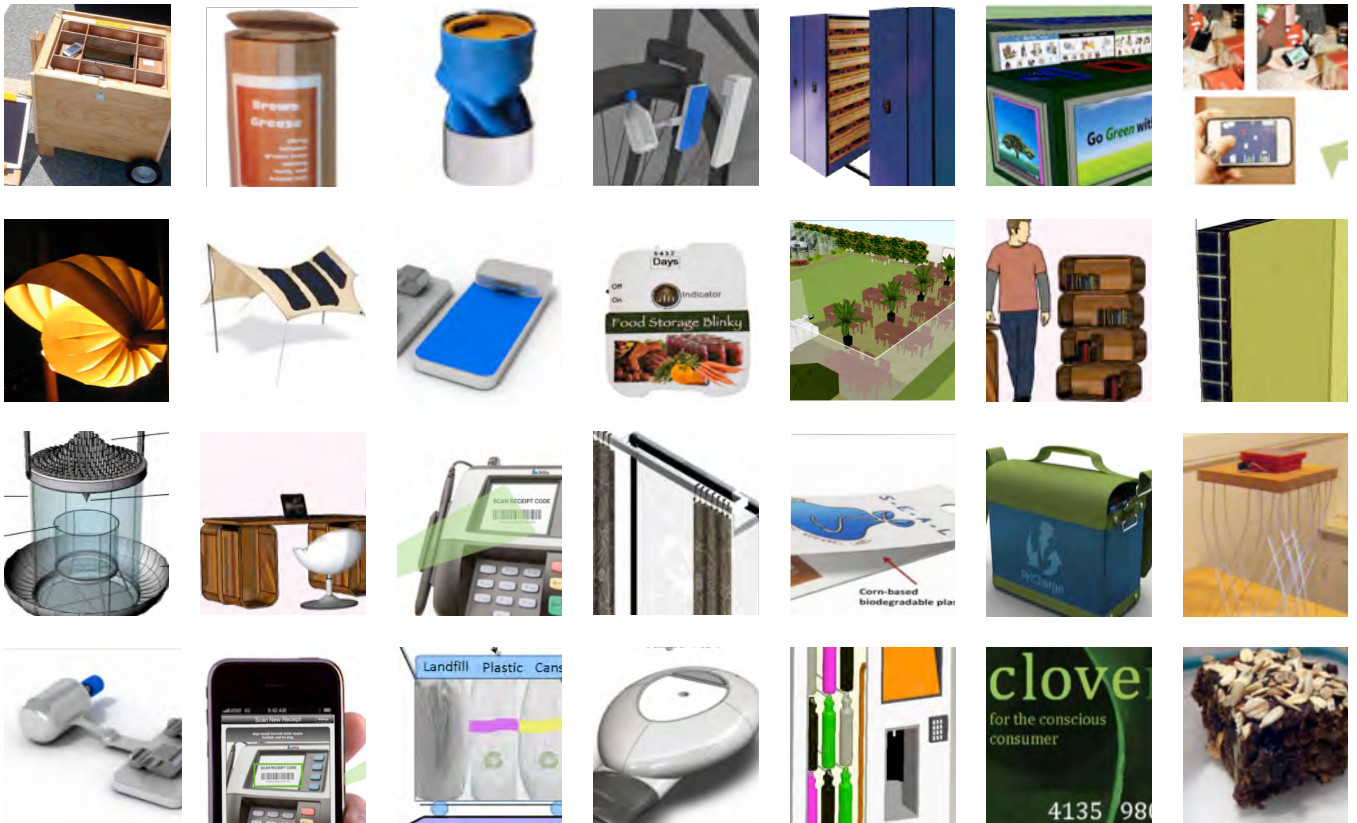


**PRESIDIO**  
GRADUATE SCHOOL

# Innovation for a Sustainable Future:

## A Catalog of Purpose-Driven Products & Services by Presidio Graduate School Students

Dr. Dariush Rafinejad  
Sharmila Singh  
Basak Altan



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## Dr. Dariush Rafinejad

Dariush Rafinejad is a Core Faculty at Presidio Graduate School and a Consulting Associate Professor at Stanford University. Dariush teaches and conducts research on sustainable product development and manufacturing, and on sustainable energy systems. He has authored or co-authored a number of papers and case studies in the sustainability field. In 2007, he published a book on Innovation, Product Development and Commercialization. Dariush has over 30 years of product innovation experience as a senior executive in the semiconductor and solar energy industries and he was corporate vice president at Applied Materials and Lam Research Corporations.

Dariush has served on the boards or invested in several startup companies in solar, semiconductor and medical fields. He is also the founding principal of Blue Dome Consulting Company which partners with technology executives for product and business leadership. Dariush received his Ph.D. in mechanical engineering from UC Berkeley.



## Sharmila Singh

Sharmila Singh is an entrepreneur and marketing strategist with a passion for engaging communities in social change. With a focus on marketing and business development, she specializes in identifying strategic, revenue-bearing relationships for entrepreneurial companies in new markets. Sharmila has experience in both the corporate and non-profit sectors defining product value points, and identifying potential customer bases for successful market entry. Sharmila is most inspired when working with innovative organizations, especially those committed to environmental issues. Sharmila is a teaching assistant for the Sustainable Products and Design course at the Presidio Graduate School and is the co-founder of Project5 SF, an entrepreneurial support agency. Sharmila's clients have included Google Sustainability, B Corp, Goodwill Industries, SIGG USA, HUB Amsterdam, and the San Francisco Bay Area Green Chamber of Commerce.



## Basak Altan

For over 16 years, Basak has been providing strategy services in a variety of roles, her approach rooted in the philosophy that successful product and service design must be linked to a client's core business strategy. As an independent consultant she advises on product and design strategy. Basak has worked on a variety of projects with a diverse client base, from creating sustainability initiatives for Oakland's mayor Jerry Brown, to providing strategic research for IDEO, assessing life cycle analysis for Hewlett-Packard, and designing value driving opportunities for retail clients such as Williams Sonoma, Pottery Barn, Red Envelope, Nautica, LizClaiborne, Bed Bath & Beyond, Walmart, & Macy's.

Basak holds a Bachelor's of Industrial Design from Syracuse University, and a green MBA from Presidio Graduate School. Her work has been published and presented in TED, Architects Journal, Architecture Magazine, Architectural Record, Daily News, Metropolis, Van Alen Report, Surface Magazine, New York Times, Van Alen Institute in New York City, Royal Institute of British Architects in London, The French Institute of Architects in Paris, USAID Head Quarters in Washington, DC, ICFF in New York City.

# Introduction

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This book is the compilation of selected product concepts developed by the MBA students at Presidio Graduate School (PGS) from 2009 to 2014.

PGS' curriculum for master degrees in business and public administration incorporates sustainability concepts and competencies into every course. One of the required MBA courses is Sustainable Products and Services (SP&S) which focuses on the entrepreneurial process of innovation, development and commercialization of new products that contribute to sustainable development. The term “product” is treated in its most general sense including tangible products, service, software, manufacturing process, or a combination. The products depicted in this book were developed by the students in this course. The students work in teams of 3 to 5 members to identify a market opportunity, to develop a concept for a “sustainable” product in the market, and to plan the full design development and commercialization tasks of the product. This project allows the student teams to create the conceptual design and bench prototypes of a new product/service and demonstrate its feasibility for commercial success. This project is also an opportunity to hone the core competency of working collaboratively within a team.

We hope you enjoy this book, not only because it illustrates many interesting product concepts of high market potential, but also because it demonstrates innovations that aim for a sustainable future—in alignment with the PGS educational vision. The MBA students demonstrate their entrepreneurial and product development skills by creating products that can be commercially successful and improve human wellbeing without harming the environment. The purpose-driven innovation at the heart of the PGS program is one of the reasons PGS was ranked the #1 MBA for sustainability by Net Impact's Business as UNusual survey this past year.

## **What is a sustainable product and why is it important?**

Global demand for natural resources and ecological services is exceeding the earth's carrying-capacity, and environmental problems such as climate change and pollution are causing adverse impact on human wellbeing and biodiversity. Under these conditions, environmental and social sustainability is the imperative management undertaking for business sustainability in the 21st century. The Sustainable Products and Services course prepares future business leaders



to respond to this challenge through development and commercialization of sustainable products.

In this course, students learn why and how to develop products that meet multiple economic, social and environmental objectives. Products that are commercially successful, contribute to societal well-being, and have minimal adverse impact (or regenerative value) on the environment – now and in the future.

We take a holistic and system view of product development and manufacturing in a firm and examine the firm's competitive advantage and operational efficiency within the constraints of environmental resilience and compliance with governmental regulations. We examine the best practices at leading corporations through case studies and guest lectures by industrial leaders. And finally, we examine how to integrate the industrial ecology principles and lifecycle assessment ("LCA") tools into traditional product development methodologies.

Since the industrial revolution and through multiple business cycles, the invention of new products has improved human life by improving: productivity (with new energy sources and automation), access to new materials (with textiles, steel, and petrochemicals), mobility (with cars and airplanes), and communication (with phone and the Internet). However, products consume resources (materials, energy and water) and create waste throughout their lifecycle of production, transportation, use and end-of-life; and hence impact our living environment – the earth. The earth and its ecosystems supply the renewable and non-renewable resources and waste processing sinks for sustaining life and our economic activities.

The exponential growth in human population over the last century (from 1.8 billion in 1900 to over 7.2 billion in 2014), the inefficiencies in product and process design, and human consumption intensity have caused the cumulative impact of human products and services exceed most planetary boundaries for sustaining life. Furthermore, the uneven distribution of the benefits and harm of our products has created severe trans-boundary and inter-generational environmental injustice and economic inequity.

Today, sustainable product development is not prevalent in the industry and

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businesses optimize their product strategies without considering their aggregated environmental impact on the global scale. PGS believes scarcity in sources and sinks is partially resolvable by technological innovation and the market price mechanism, and adverse sustainability impacts create entrepreneurial market opportunities every day.

In response to the sustainability challenge, our course at PGS is about strategies and techniques for development and commercialization of Sustainable Products & Services. Sustainable products support people's well-being here and now, without adversely impacting the well-being of people elsewhere and without limiting choices of future being. In other words, sustainable products contribute to and/or enable sustainable development by design.

PGS students develop sustainable products and services, as illustrated in the following chapters of this book, heeding the following design-for-sustainability (DfS) criteria for a sustainable product. A sustainable product:

1. Efficiently incorporates environmentally preferred materials and finishes.
2. Requires minimal consumption of resources in various stages of the product-life-cycle, including: manufacturing (energy, water, etc.), use (consumables) and end-of-life (land for disposal).
3. Causes minimal solid, liquid and gaseous discharge into the air, water and land in manufacturing and in use.
4. Has a long life, is repairable and is efficient in use (energy, consumables, and emissions).
5. Can be upgraded to extend the product life.
6. Has high reliability and maintainability with low cost of repair.
7. At the end of life, its components can be reused and its material-of-construction can be separated and recycled.
8. It is in harmony with people and nature at the point of use.

9. Both sustainability and commercial feasibility criteria are used in product development decisions: optimized over time and space and Lifecycle Assessment (LCA) is used to assess the impact and to prioritize design decisions.

In addition to the DfS requirements – which establish the rules for how to develop a sustainable product, sustainability depends on WHAT the function of a product is, i.e. its purpose and its social impact. Hence, sustainable product development is about social value-driven innovation. The following is a list of the opportunities for product innovation that our students select for their projects:

- Inventions that enhance human development and are in harmony with nature’s bio-evolution, in food, water and energy fields.
- Green chemistry in materials and pharmaceutical products.
- Entertainment products that promote community, peace, love, diversity, harmony versus aggression, violence, and domination.
- Technologies of prevention are prioritized over mitigation and management in order to prevent health and environmental degradation.
- Refraining from products for violence, war and destruction.
- Consideration of not just the “sustainability” of a product, but the proposed product’s potential to be regenerative or restorative of social or environmental capital.

As Alan Kay once said: “The best way to predict the future is to invent it.” PGS students invent the sustainable future by developing sustainable products and services like those in this book.

In developing their products, the students in the SP&S course follow a disciplined process of innovation that goes through multiple divergence and convergence cycles and is inspired by a customer-discovery process. The sample guidelines in the new product development process are listed below:

1. There should be a demonstrable market for the product. Identify an unmet need to fulfill and assess the competitive landscape.
2. The product should have a reasonable economic potential and represent

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an attractive investment opportunity for a firm, non-profit organization, an investor or a government agency.

3. Build a prototype, either a working prototype designed to demonstrate an intended function, or a mock-up prototype designed to convey accurately what the offering might look like. The prototype for a service should depict the service experience; for example, a flow diagram of materials, information and payments. For a web-based product, you should develop a prototype of the user-interface pages and key functions.

4. Demonstrate the technical and commercial feasibility of the design. You should make a reasonable estimate of the level of investment required for full design development and commercialization of the product.

5. Access more than five potential users (customers) of the product. Talk with them or observe them frequently from the onset of the process and visit them with your product prototypes.

6. Safeguard of your proprietary ideas are your responsibility. Class discussions are public forums.

7. Recognize the multi-disciplinary nature of most product development endeavors and the need for team members with complementary functional expertise in marketing, design/technology, project management, manufacturing and finance. Diversity in the team make-up enables innovation.

8. Explore for the white-space of innovation in any product category of your choice including: Consumer products and services; Industrial and Business-to-Business (B2B) products and services; other products & services for governments and non-profit organizations.

9. Review the catalogue of past products in our course. They might inspire you and/or provide opportunities for new and improved products based on the earlier concepts.

10. Seek-out a mentor who has experience in product design development. A networked mentor with experience in the industry, market, or with your target

customers will be very beneficial. The sooner you start working with your mentor, the more value they can be to you.

11. Successful product development requires frequent project and design reviews by experienced managers and functional experts. Project/design reviews should be scheduled at the end and beginning of various phases of product development process or when a critical decision must be made. Effective project/design reviews require a lot of preparation.

12. The scheduled team presentations in class should be viewed as a project/design review by the teaching team and the entire class. Use this excellent opportunity to gather valuable feedback for improving your work.

13. Working in a team environment requires collaboration skills, including team organization, decision making, managing team dynamics and behavioral challenges. Make sure you have a project manager who would coordinate all project activities and drive action items. Different team members can assume the project manager role during different phases of the project.

14. Have fun!

In perusing the innovations in this book, we hope you, too will have fun and be inspired to create new products for a more just, prosperous and sustainable world.

# Bike Keeper

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Jacob Park  
Greg Proefrock  
Matt Ryder-Smith  
Matthew Homyak

Bike Keeper represents the next generation in bicycle security. Bike Keeper is a security device that the user conceals in the stem of a bike. When a user locks up their bike and arms the device an accelerometer is activated that will send a Bluetooth message to the user's mobile device if it detects unauthorized movement of their bike. If close enough, the user can intervene and thereby prevent the theft from occurring.

The unique value of Bike Keeper lies in its capacity to notify a user remotely when their bicycle is moved without permission. Such motion is often a precursor to theft or tampering, which may be prevented if the user responds in time. The product can be adopted by users who might otherwise buy very robust physical restraints at above average cost or choose to not ride due to security concerns.

Bike Keeper uses a sensor-transceiver device (ST) in/on a bike and a control-transceiver device (CT) that is controlled by a software application in the user's cell phone. The ST has components that detect movement of the bike, send information to and receive directions from the CT, control those functions electronically via embedded software, supply power, and enclose the component set.

The user can remotely activate an audio alarm that is integrated into the bike if the user receives information that their bike is being tampered with. This would serve as a deterrent and allow the user to avoid a face-to-face confrontation with a criminal.

David Bennett  
Will Hutchinson  
James Rogers

The manufacturing of home furnishings derived from virgin timber and petroleum-based plastics contributes to the degradation of limited natural resources. However, opportunities exist for manufacturers who can leverage existing waste streams to supply the raw inputs required to design and develop sustainable home furnishings that offset the impact of manufacturing from virgin materials.

For consumers who seek reasonably priced, wood-based products, FIND Wood offers sustainable alternatives to home goods commonly derived from plastics and virgin timber that are often shipped from overseas. There is currently a price gap in the market for reclaimed wood products. Unlike other manufacturers of reclaimed wood products who charge premium prices, FIND Wood stands out by using an innovative business model that allows for high quality mid-priced furnishings.

FIND Wood products are affordable, locally-reclaimed wood items such as tables, chairs, cutting boards and children's toys. The FIND Wood product line uses readily available waste wood as the core input. FIND Wood is recovered from construction sites, delivered from building contractors and homeowners and acquired through a pick-up system that relies on crowd-sourced information from the general public. Through informing customers about the philosophy and design approach behind the FINE brand, sustainability education will be a by-product of the product line.

# Green Washing Machine

Boog Bookey  
Jake Blackshear  
Kate Drane  
Lindsey Herrema  
Timothy Terry

The Green Washing Machine tackles an issue that plagues people across diverse demographic segments: doing laundry. The average two-person American household emits over 3,657 tons of carbon dioxide per year and uses an estimated 6,240 gallons of clean drinking water a year to wash their clothes. The Green Washing Machine is a convenient, at-home, economical, manual, and environmentally sensitive machine to do laundry.

The design of the GreenWashing Machine consists of two main parts: the outer walls and support structure with the pedals attached, and an internal washing drum which doubles as a laundry hamper. The first part, the outer structure and pedals, is collapsible for easy storage. The hamper can be stored in the closet and used as a normal clothing hamper. When the hamper is full, soap is added and the lid is put on. The rest of the washing machine is unfolded and the hamper is placed inside it. Water is added to the machine through a tube that can be attached to a sink or bathtub spout. The user sits on a chair and pedals back and forth, spinning the inner drum for the wash cycle. The water is then drained through a tube at the bottom of the machine, followed by rapid pedaling that spins the clothes, extracting excess water so they are dry enough to hang without dripping and will dry rapidly.





# Housemeister

CONSUMER

Laurie Bernstein  
Leslie Brown  
Greg Long  
Graeme MacDonald

HouseMeister addresses a significant unmet need in the marketplace: helping people get organized about their homes. It provides an online, interactive solution, allowing users to keep track of everything from roof repairs to warranties. One of the primary value-add services that the site provides is to track maintenance and remind the user when it is time to schedule service. Maintenance may include: roof and foundation repair, driveway and sidewalk maintenance, information on fruiting or flowering plants in the yard or indoors, changing of filters in furnaces or water heaters, etc.

The user can receive reminders on the site, through e-mail or their mobile phone. The user is able to customize the reminders by frequency, the amount of advance notice, etc. A risk-taking user who prefers to save money may modify his or her reminders to take 20% longer between reminders than experts would recommend (replace roof every 12 years instead of every 10). Secondary features will include tips on energy efficiency, links to vendor reviews, and blogs and other content.

An additional value-add service is an analysis of the current items the user owns coupled with recommendations for replacements. These recommendations are skewed toward finding healthier, more energy-efficient, sustainable options. For example, a user may have an old refrigerator. The site would provide a brief analysis and suggest newer alternatives that are roughly the same general level of quality and cost, but are much more energy efficient.

# iStar

Jason Walter  
Cristina Soeiro  
Dilnaz Kain

The collaborative media movement shows us that many minds are better than one. iSTAR provides a collaborative publishing platform on which everyone—really, everyone—can share their passion and knowledge for storytelling.

iSTAR is less a product than a platform. A platform for parents, educators, authors, and illustrators who seek to deepen the relationship of storytelling with kids, iSTAR is a new form of living literature that puts children at the center of each creatively unique story. iSTAR's collaborative platform uniquely crowdsources content generation, offering each user a perfectly personalized story.

The leading iSTAR differentiator is the unique personalization of each story. By giving ownership to the audience, each reader becomes the star of their own story. By making personalization as realistic as possible with the dynamic use of actual photos and names, iSTAR stories truly come to life. Secondly, iSTAR is a collaborative platform that uniquely crowd-sources content and shares revenue with authors, illustrators and animators around the world. iSTAR is also device agnostic, offering universal support and a modular approach to story building that fits the needs of parents, educators, authors and children themselves. Thirdly, iSTAR distinguishes itself from competitors (e.g. Snapfish, JibJab StoryBots, Story Panda, I'm In It, Marble Spark, Me Books, and others) by integrating the pre-existing features that each of those offers separately. Fourth, in ranking competitors features along with iSTAR's, iSTAR places highest not only in customizability, but in content quality and in accessible price.



Bettina Baylis  
Jana Marquardt  
Paula Angela  
Escuadra

With California's current drought being billed as the driest in the state's recorded history, water officials statewide are increasing regulations and rates. Millions of residents are trying to find ways to conserve resources, lower their water bill, and deepen their understanding of this crisis. This can be particularly difficult for multiplex apartment and condominium dwellers that lack sub-metering in their units and have no way to measure their water consumption.

Enter Mazu: an affordable personal smart water meter that measures water and energy use in the shower, and through gamification increases water and energy awareness and conservation. The Mazu device attaches easily behind the showerhead and communicates to an app on a Smartphone, alerting the user when a shower is hot enough, the amount of energy required to heat the water, and how many gallons have been used over time. Users can track use and costs and compare them to other households, friends, and – as the user base grows – the rest of the world.

Mazu hardware is coupled with the Android smartphone app via Bluetooth transmission. The primary purpose of the mobile app is to provide an easy-to-access dashboard through which Mazu users are able to access their behavioral data, empower themselves to change their water usage behavior, be rewarded for their water use optimization efforts, and compare their behavior to that of their network and community. The visual design of the mobile app creates a light-hearted, user-friendly and metrics-driven experience.



# Make It Better

Megan Crocker  
Darcy Heppenstall  
Lily Laurence  
Renée Shade

The Make It Better kit was inspired by the gap in primary education for science-based sustainability curriculum.

Make It Better is a hands-on educational product that combines traditional science curriculum with lessons in sustainability for 4th - 6th grade students. The Make It Better kit is a Grow-It-Yourself science kit, using mycelium, or mushroom material, from Ecovative Designs. The lessons and activities teach students a new way of creating materials with non-toxic, sustainable materials that are key to creating a future where we are living in harmony with nature.

The kit contains all of the necessary materials for teachers to conduct two rounds of experiments with their students. “Make It Better’s” four primary goals are to:

1. Teach sustainability lessons
2. Engage students in a tactile process
3. Encourage success
4. Make learning fun

For the initial prototype the team developed a sequence of lessons paired with hands-on experiments, and an outline of two lesson plans. Sample lessons offer the core of the sustainability curriculum, inspired by Cradle to Cradle, Biomimicry, and other sustainability concepts, but simplified to language kids can understand. This kit can be used to teach to a variety of curriculum, some of which already exists in schools, and some of which anticipates a growing demand for more sustainability and material science education.



# Nomadic Essentials

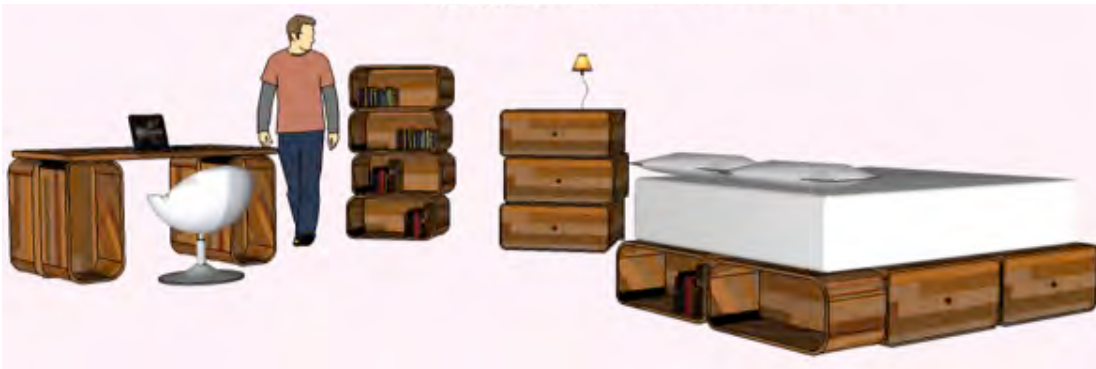
CONSUMER

Ali Hart  
David Jay  
Erika Kimball  
Katie McCann

Inspired by the image of used cardboard moving boxes piled outside on the sidewalk, this team sought out to address a sustainable moving solution. Nomadic Essentials is designed to be lightweight and contains handholds and straps, making it easy to carry. Furniture can be disassembled and “closed” without removing contents. The furniture is composed of individual units small enough for one person to easily transport during a move. These units are flexible enough to form the essential furniture items such as: dressers, desks, and beds. Sustainability is a vital component of Nomadic’s culture and brand positioning. Nomadic products are designed to minimize waste of material and energy in the manufacturing process. Hence, Nomadic uses materials that are biodegradable or recyclable and nontoxic.

Nomadic units physically interlock in order to function as stable furniture. During a move units can be unlocked by holding grabbing the handles and lifting upward. Because furniture can be easily assembled and disassembled by end users, damaged panels can be replaced without replacing the entire unit. Nontoxic biodegradable wooden panels can be reused, while the consumer can easily recycle aluminum corners.

A cloth cover attached in the back with a zipper fits around the unit to enclose its contents and provide protection during the moving process. These cloth covers will be sold as accessories and can be manufactured from biodegradable hemp canvas.



# S.E.A.L.

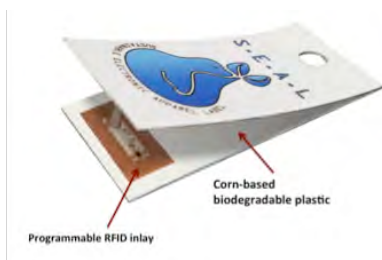
Jessica Belcher  
Sara Brown  
Meghan French  
Arif Hasyim

S.E.A.L was developed to find a more sustainable substitute for wasteful retail tags. Today, most retail tags are created from virgin paper, affixed to a garment, and immediately disposed of by the consumer when the garment is purchased. This process is a highly resource intensive, inefficient, and unsustainable cycle. Through extensive investigation, including interviews, observation and, external research, this team was able to develop a sustainable substitute for the current paper retail tag.

The Sustainable Electronic Apparel Label (S.E.A.L.) will be made of Ingeo™, a 100% biodegradable corn-based plastic with a reprogrammable RFID inlay. Ingeo™ is a unique bio-based material made from plants instead of oil. The durable and biodegradable corn-based plastic will maintain structural and software integrity throughout multiple uses.

S.E.A.L utilizes Radio Frequency Identification (RFID) technology embedded into a reusable environmentally conscious plastic tag. The RFID technology provides the same functions as the existing tags by displaying size and price while providing security and brand marketing

The S.E.A.L. tag (see Image) allows for an interactive customer experience by communicating with in-store displays and other applications. The tag can visibly demonstrate to customers that the store is working toward its sustainability goals, thus enhancing brand reputation, as well as improve the store employees' ability to track inventory. The tags' reusability makes it a sustainable option and cuts costs for the store. This added value for the store, the customer, and the environment makes the S.E.A.L. a truly sustainable product.



# SolShine: Wire Hanger Solar Lamp

CONSUMER

Gretchen Cummings  
Elizabeth Hoster  
Surabi Menon  
SeMe Sung

The SolShine wire hanger solar lamp stemmed from the need to create a product that follows the Cradle to Cradle design guidelines of diverting materials from landfills by drawing from waste streams. This team identified wire hangers as a viable opportunity and decided to design a table lamp, incorporating renewable energy into this everyday household item.

The motivation to work with wire hangers originated from our team's Experiential Learning project with The Kimpton Hotel & Restaurant Group. At the suggestion of a hotel guest, Kimpton recycles metal hangers and has returned 52,000 hangers for reuse and recycle to date. This was an opportunity for an unintended reuse project using wire hangers. With Kimpton in mind, this team decided to design a solar powered table lamp that could be used in a hotel guest room as well as a private residence. The lamp serves as a functioning light and provides a subtle communication of Kimpton's commitment to the environment.

The size of solar panel required to generate enough power to light a lamp for 8-10 hours is small. The panel can be attached to a lamp or made to fit into the design without being obtrusive or overwhelming the aesthetics of the lamp. Solar power has the environmental benefit of reducing energy consumption from traditional methods of electric power in a home or a hotel room. SolShine, uses light emitting diodes (LED) that emit 300-900 lumens, equivalent to a 40-watt incandescent bulb, and is powered by 1.2V batteries charged by a 0.15W solar panel.



## Sun Blox: Solar Powered Toys

---

How do you make sustainability fun? To answer this question, this group conducted research that brought parents, teachers, and children to the table to develop an interactive toy that teaches sustainability while reducing children's impact on the earth.

SunBlox is a set of colorful, connectable panels with built-in photovoltaic cells that teaches children about renewable energy. More than simply an engaging set of building blocks, this toy also serves a practical purpose. SunBlox allows children to recharge handheld games, cell phones, and rechargeable batteries off the grid. In effect, SunBlox is the toy that powers other toys, using the most reliable renewable energy resource, the sun.

SunBlox panels are made from colorful translucent ABS plastic and constructed so that they can be returned to the company for disassembly and reclamation/recycling. Each kit includes instructions on how to return the product with a pre-paid shipping label. Each panel will use color-coded rotating clip-joints. SunBlox rotating clip-joints consist of elongated hinge-type ball-and-socket joints which provide contact points for electrical wiring within each panel. A unique aspect of this connection design is that it introduces a puzzle aspect to the toy, requiring children to match the color-coded clip-joint on each panel to another of the same color on another panel. This allows energy from the solar panels to flow to the battery in the base panel so that it can be successfully charged.



*“How do you make sustainability fun?”*

Jared Bhatti  
Stowe Hartridge-Beam  
James Ince-Scott  
Justin Semion  
Olivia Skance



# The TakeMe! Mug

Rachel Balsley  
Susan Donaldson  
Miriam Kronberg  
Jeanie Linam

The TakeMe! Mug provides users with an environmental, sustainable way to enjoy beverages on the go—in the car, on the bus, or walking down the street. The TakeMe!Mug collapses to a small container that you can easily fit into your bag or jacket pocket so it is handy for reuse. This high quality, beautiful, convenient mug is designed to change people’s behavior by encouraging them to always use a reusable mug in place of a single-use paper cup.

The key design differentiator of the TakeMe! Mug is its collapsibility. It is compact, easy to carry, and easy to remember. No other mug in the market can be so easily stowed in a purse, bag, or pocket. The unique BPA- and petroleum-free silicone body combined with the stainless steel components creates an upscale, recyclable, incredibly durable mug. There are no messy, complicated parts that can break or are difficult to clean; just a simple, sturdy, innovative design. It’s “a travel mug with a twist.”

With Design for Excellence as its guide, The TakeMe! Mug has a simple, elegant design with no complicated moving parts that may break and shorten the life span of the product. Using the flexibility of silicone and rigidity of steel, the mug has an effortless sealing design for the cap. The silicone body of the mug has a raised sealing ring that allows for the top to slide on and off, but also creates a leak-proof seal. All components of the mug are simple to clean with no nooks and crannies or hard-to-reach places.



Devon Bertram  
Scott Bright  
Clay Carlson  
Daniel Heras  
Carley Klekas

Wild Arrow deodorant was developed to disrupt the current marketplace and respond to current trends, as well as the user needs and market demands. A deodorant specifically designed for the 'everyday man', placing an emphasis on health, affordability, performance, and most importantly, masculinity. This team recognized that body care and skincare products are gaining traction in the sustainability realm as their impacts on health and environment are becoming increasingly apparent. Additionally, the men's grooming products and the natural products industries are both increasing annually. This knowledge and awareness, along with personal interests and professional experience, provided a foundation to explore a business opportunity that would fit these unmet needs.

Wild Arrow deodorant targets the male millennial consumer who lives in an urban environment and has a white-collar job, is active and outdoorsy and values the environment. The product provides him a deodorant that is effective and nontoxic, competitively priced, and masculine by design - simple yet sleek, classic yet rugged.

Packaging design for Wild Arrow products focuses on appealing to target customer groups while also incorporating sustainable business elements. The selected packaging supplier, SKS Bottle, is a New York based company that uses materials that are biodegradable, eco-friendly, and promote minimal waste. Labels for our product will use non-toxic inks and will be adhered to cardboard with non-toxic glues. Information represented on the label will include brand name, product name, ingredients, certifications, net weight, and directions for use.



## Talk'n Trash

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With a mandate in certain American cities to recycle and compost, there is an opportunity to increase education about what can be recycled or composted, to boost recycling and compost rates, and for businesses to benefit. The Talk'n Trash game was developed to answer this call. When consumers purchase food or beverages from chain stores such as Starbucks, they can virtually sort their recyclable and compostable items on the Talk'n Trash app for mobile phones, and in return gain loyalty rewards points from the retailer. Consumers can then use these points towards their next purchase, resulting in repeat business for those partner companies.

Talk'n Trash is a mobile game application and website package designed to engage and educate consumers about waste streams and resource optimization. The model enables participating partner companies to develop an ongoing interaction with their consumers through gamification, and generate repeat business through loyalty rewards. End users can engage with the game platform via an application on a smart phone or tablet, or through the Talk'n Trash website. When end users play a game, they have the opportunity to Talk'n Trash on their social media networks, resulting in increased visibility for our partner companies.

*“An educational game that encourages consumers to recycle.”*

Burke Pemberton  
Liz Vyas  
Morgan Matthews,  
Nicole Busto



Image Above: Day in the Life of a Talk'n Trash End User

1. Morgan goes to one of our partner establishments, in this case Starbucks, and purchases a coffee.
2. When she purchases the coffee, she taps the Talk'n Trash NFC transmitter with her phone.
3. Tapping her phone (known as a 'bump') automatically banks her coffee in her Talk'n Trash application and loads it into the Trash Tetris game for the next time she plays.
4. Morgan decides to play Trash Tetris and earn points and discounts towards her next purchase at Starbucks.
5. Morgan begins to play Trash Tetris, a sorting game that teaches users how to appropriately sort the trash that they have. Morgan sorts the waste correctly and earns two points for her Starbucks bank.
6. Morgan is super excited about her discount, and decides to brag about it to all her twitter buddies. "Just earned \$1 off my next Starbucks coffee for #Talk'n Trash!"
7. Morgan returns to Starbucks the next day to redeem her \$1 coffee.

## Unveiling the curtain

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Unveiling the Curtain is an insulating blind system derived from rethinking the traditional curtain systems. The system provides the flexibility of a simple rolldown sheer shade that seals the draft from a cool window, while offering the option of hanging opaque curtains from an elegant hardware. It fulfills the need of providing privacy in combination with elegance, without blocking the natural light.

This insulating blind system addresses traditional decorating needs and provides the added benefit of energy efficiency. It provides the flexibility of a simple roll-down sheer shade that seals the draft from a cool window, while offering the option of hanging opaque curtains from an elegant hardware. It fulfills the need of providing privacy in combination with elegance, without blocking the natural light. Different finished metals as well as other decorative options for the hanging bracket will be offered to suit the varying aesthetic sensibilities amongst customers. The system also accommodates an option without the extending hardware for the opaque curtains.

The main differentiation of this curtain from other products in the market is the fact that it is the only sheer curtain that offers insulating properties, with an aesthetically pleasing simple construction. The second point of differentiation is the meaningful story that is behind its production. The materials are sustainably sourced and assembled overseas. This product is designed to employ a cradle-to-cradle approach in manufacturing that will encourage product take-back programs, and use the materials for recycling after use to eliminate waste.

*“An aesthetically pleasing curtain system solution, which offers energy efficiency as an added value.”*

Natalie Musick  
Hugo Jurado  
Mat Rick  
Basak Altan



# 100% Compostable Toothbrush

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This team designed and prototyped a 100% compostable toothbrush to address the need for an elegant and sustainable alternative to a product used by millions of people everyday. The compostable toothbrush is designed to provide the same oral care properties as traditional toothbrushes in the marketplace, but unlike competitive products, it also delivers 100% compostability in municipal composting facilities. In California, commercial composting is growing rapidly in popularity as larger populations realize the positive benefits of reducing landfill burden and producing healthy soil for local farms. This growth in awareness sets the stage for a product like the 100% compostable toothbrush.

The primary design consideration for the 100% compostable toothbrush is that all materials used, including any adhesives or binding materials, be industrially compostable. PLA (polylactic acid) bioplastic is a main component used as it is a certified compostable material and is readily available, even for prototyping. Nylon 4 for the bristles have been chosen for similar reasons. The team has also researched alternative methods to attaching the bristles to the handle without using a metal staple.

An initial market push will focus on the San Francisco and Los Angeles metropolitan areas with prospects to distribute to stores nationwide. Since LOHAS individuals are more likely to shop at natural and organic food stores, the team determined the initial commercialization strategy should focus on selling the product in specific California Whole Foods Market stores located near commercial composting facilities..



*“A 100% compostable toothbrush to address the need for an elegant and sustainable alternative.”*

Bart Agapinan  
Martina Doleshal  
Laura Erickson  
Elayne Wesley



# Clover Card

Erik Hansen  
Kyle Gillis  
Krystal Kavney  
Eric Raymond  
Rachel Roberts

The Clover Card links retailers, manufacturers, and consumers to provide key insights specific to high value eco-conscience purchasing habits. For retailers and manufacturers, it provides a robust customer loyalty program centered on the growing trend for sustainable purchasing options. Key drivers for this program include the ability to track product purchases, follow coupon redemption activity, establish data and trends, build brand awareness, and acquire and retain new customers.

Retailers and manufacturers can use this information to identify better strategies to serve the growing LOHAS market segment. Retailers and manufacturers will pay in order to gain access to this information and will be targeted for advertising space on the website.

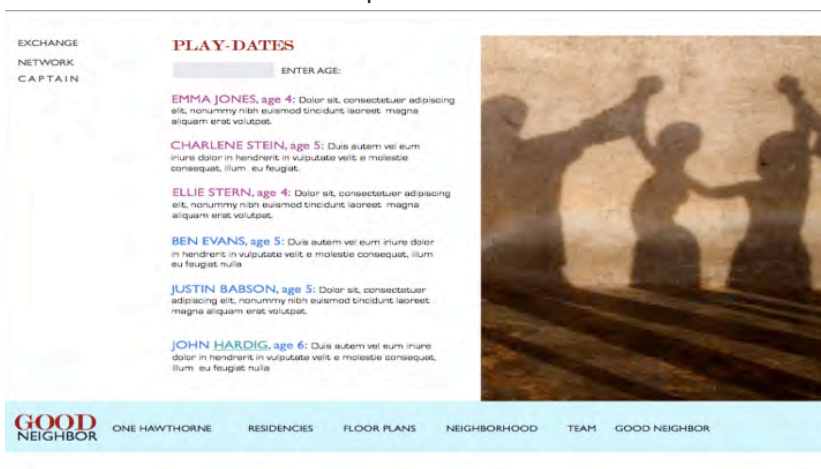
Through an alliance with GoodGuide, the leading and most trusted consumer product sustainability rating database, the Clover Card will provide consumers with the only point of sale rewards program integrated with a name-brand sustainability rating database. The product will rely on POS software and specific application programming interfaces (API) currently in use by retailers and manufacturers. The success of the Clover Card is closely linked to the ability to integrate these systems. The Clover Card will contribute to an increase in sustainable purchasing habits to help change in the landscape of consumer purchases, shepherding a shift from conventional goods towards those that are more sustainable.



Cindi Darling  
Jenine DeGuzman  
Christie Diedrick

Good Neighbor community program materials and software are designed to restore one of the most fundamental of human needs—community support. Good Neighbor provides a service for urban and suburban neighbors who can benefit from day-to-day sharing. The program facilitates exchanges through a system of captain-led social connections and a fun, graphic website interface which dynamically assists in allowing neighborhoods to return to what they once were. The Good Neighbor operating feature offers personalized attributes that encourage human engagement from the moment the user creates their profile. These features include a member user locator feature, a connections mapping tool, notifiers and blog pages. Good Neighbor can be used to help organize existing communities of like-minded people, support the sharing of time and skills in an equitable manner, and assist with trade and barter.

The business will be a supplier to those who provide services to individuals living in a general location, such as building managers and neighborhood associations, and to individuals who wish to create a more interactive neighborhood. Good Neighbor will be a for-profit organization. Good Neighbor will offer building managers the ability to sell their units as something more than “just a place to live.” For downtown high-rises claiming to offer community but with no systems to facilitate neighborly interactions, this service provides a way to distinguish themselves from their competitors.



# Engage2Thrive

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Engage2Thrive is a product designed for organizations with interest in maintaining strong company culture, organizations going through merger and acquisition, HCM consultants and HCM software providers.

Engage2Thrive is a software platform focused on measuring and growing a thriving workforce within a professional workplace. The platform combines employee engagement and gamification to collect information regarding employee culture. This information is tracked and reported to managers to improve company decision-making and to develop a thriving workforce environment that enables employee productivity. In addition, the platform lends itself to greater expansion in the future to track the implementation of other needs like environmental initiatives.

Engage2Thrive will need to address all user needs, from encouraging employee feedback, to measuring workforce engagement, to meeting the needs of management. Therefore, this product will also create an online community to facilitate goal sharing and co-construction, problem-solving, and collaborative experiences to achieve organizational goals.

The Engage2Thrive platform will consist of two major components. A Software as a Service (SaaS) desktop application that will allow users to respond pulse surveys at login or at some other pre-determined point. The goal is to allow users to give their feedback in a fast and engaging way. Along with the desktop application, Engage2Thrive will be offered as a mobile application.

*“A software platform focusing on measuring and growing a workforce.”*

Javier Cabra  
Martin Kuepker  
Kristin Mancini  
Ron Shalhoup  
Eric Waldspurger



Image Above: Website Landing Page

## Set Up Shop

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This team set out to create a service that would embody the values of sharing, local community building, and scalability. Set Up Shop is a sharing economy solution that addresses this opportunity. The Set Up Shop website facilitates a connection between local artisans and retailers, linking user with shared desires to help facilitate the creation of pop-up shopping events. These events take advantage of idle or unused spaces, creating new opportunities for increased exposure and revenues. Revenues are shared between all three parties, providing an incentive for artisans, and retailers to work together to create successful pop-ups.

Set Up Shop's business utilizes an online platform, which will be accessible at [www.setupshop.com](http://www.setupshop.com). Online, visitors can peruse photo galleries of all the artisans' products and retail spaces in our network. Artisans can book a space for a retail event while community members can learn about upcoming Set Up Shop events they can attend. When artisans and retailers fill out their online profiles, the database will automatically match them with compatible Set Up Shop opportunities. This feature is especially important because it minimizes staff requirements and overhead costs.

Set Up Shop is proposed to launch initially in the San Francisco Bay Area. Once proven successful in the Bay Area, Set Up Shop will be introduced to other communities around the country.

*“A service that embodies the values of sharing, local community building, and scalability.”*

Ayaka Emoto  
Spike Lomibao  
Bret Mueller  
Sunya Ojure  
Vanessa Roscoe



Image Above: Website Landing Page

# Sprout

Taj Chibnik  
Tim McLaughlin  
Mark Sutton  
Stacey Waldspurger  
Jake Wise

Sprout Peer-to-Peer Lending is a web-based platform for connecting individual lenders with small business borrowers in the United States. With a minimum of \$100 to open an account, Sprout offers lenders a spectrum of choices for how to define return on investment. Lenders are offered a fixed-income investment with attractive financial returns, and in addition are offered free goods and services as part of the ROI+ model.

Sprout allows lenders to select investments based on social and environmental criteria, as well as traditional financial risk. Two tools on the site are the Sprout Sustainability Rating, which grades borrowers based on sustainability criteria, and a Sprout Credit Rating, calculated in part using borrowers' credit score.

A unique Sprout feature is the ROI+ program, where lenders can receive free goods or services and borrowers have the opportunity to promote their business to a targeted audience. Lenders select loans based on credit risk, social impact, environmental criteria, receiving free goods and services, and location. The size of the loan is between \$1,000 and \$25,000.

Sprout offers a secure and seamless experience for both borrowers and lenders. Sprout creates the feeling that the lender is making money and doing something good at the same time. For the borrower, the loan application process is quick, simple, and convenient.



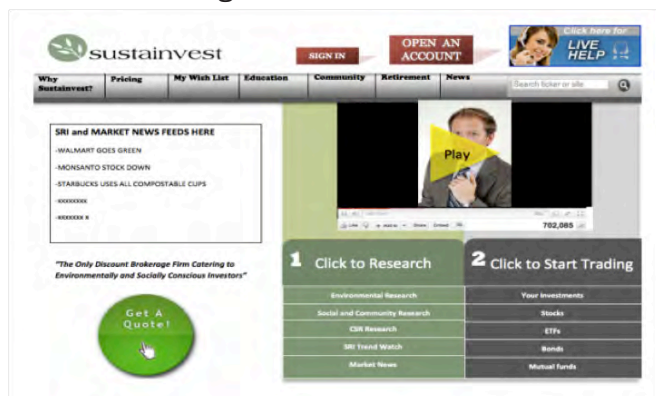


Ian Bevan  
Valeria Miranda  
Greg Romey  
Tania Varga  
Dale Wannan

Sustainvest is an innovative way to supply today's investor with research on corporate sustainability practices along with a trading platform to buy or sell publicly traded securities and maintain a financial plan. Due to the exponential growth in the socially responsible investing sector, Sustainvest will be able to benefit from a market that is still in an early growth stage and according to the data, should see even larger double-digit growth in years ahead.

It is clear that there are a growing number of potential consumers that are now purchasing more local and green products. They are questioning where the products come from, what their environmental effects are and whether or not the company that produced them is acting in a sustainable manner. This eco-conscious mindset is now being expanded into investment accounts. People are now demanding data on corporations, which Sustainvest will supply in conjunction with other features commonly found on a trading platform. By creating a one-stop website that has the accessibility to social and environmental research screening along with a trading platform, investors will find the process both morally and fiscally satisfying.

Sustainvest's homepage is designed to introduce new users to Sustainvest as well as to serve as an interface for existing customers to conduct SRI research and engage in trading activities. The design aspects of this website reflect survey results, research on SRI databases as well as online trading platforms, and interview findings.



# Tunza Digital Receipt System

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In today's digital age of smartphones, electronic money transactions, cloud-computing and mobile web apps, it is outdated to keep track of retail purchase data on paper receipts. Not only does a paper receipt-system miss critical opportunities to optimize purchase data with information technology, but also the production, one-time use and disposal of millions of receipts leave behind a significant environmental footprint. Every year 9.6 million trees are cut down to fulfill U.S. demand for paper receipts, and 750,000 tons of trash results from receipt paper production. In addition, nearly 50% of receipts are printed on non-recyclable thermal paper, which is coated with Biphenyl-A (BPA), a chemical linked to various health risks including endocrine disruption, reproductive issues, and cancer.

The proposed solution is to develop a digital receipt system called Tunza that offers retailers and consumers with an alternative way to track of purchase data without the use of paper receipts. The way it works is at a point-of-purchase users are given the option to get a digital copy of their receipt data using a mobile application on their smartphone. The receipt data is then transmitted to our data servers, which enables the storage, easy access and management of purchase data through cloud computing. Users can check a digital version of their receipt immediately on their smartphone, or they can wait to review the transaction data at home through their personal online account. By moving receipts to a digital platform, Tunza brings new functionality to the basic receipt.

These features include the ability to manage itemized transaction data, set calendar reminders for when a return period expires, track digital receipts for business expenses, and reach consumers with targeted coupons based on purchase behavior, location and user preferences. Not only does our product minimize the environmental and health impacts of using paper receipts, but it also provides a superior, clutter-free way of managing transaction records.

*“An alternative way to track of purchases.”*

Shreen Johnson  
Jenny Huang  
Aaron Greene  
Rudi Anthony



scan receipt

## AirQ Kid

Frederico de Silva  
Leon  
Esther Spanjer  
Hans Eberle

A study conducted by the National Health Survey in 2009 found that there are approximately 2.9 million children with asthma between the ages of 5 and 11. For parents of young children with asthma and their doctors, there is often a long learning curve before environmental triggers can be identified and correlated with asthma attacks. Among the primary triggers are air pollution (such as ozone), molds, dust mites and other common air-borne particles. This report describes the development of the AirQ Kid, a monitoring device designed to correlate a young child's asthma symptoms with its environment.

The primary purpose of the AirQ Kid offering is to correlate the child's asthma symptoms with its environment, thereby reducing the learning curve and helping parents and medical professionals with insights into the root causes of a child's asthma. The product combines a hardware monitoring device that tracks location and measures air quality and lung capacity with a web portal to log the device's readings and provide diagnostic capabilities. Air quality is measured at regular intervals; lung capacity is measured when the child blows into the peak flow meter. All measurements are archived together with the location the measurement was taken. The product is similar in size to a medium-sized mobile phone, and is light enough to be carried by the patient either attached to a belt or a backpack.



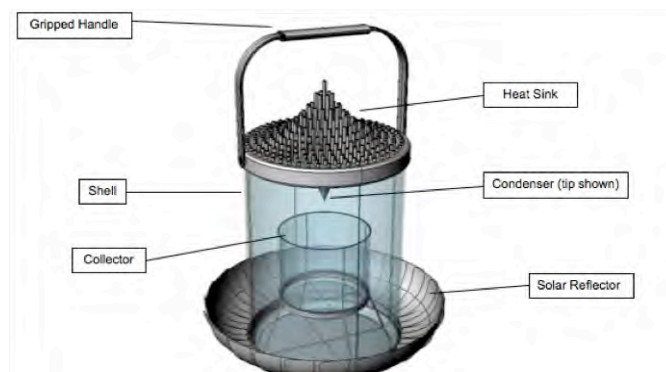
Adrian Assassi  
John Brydon  
Jonathan Gibson  
Dustin Haggett

HydraSol is a personal-sized solar water purification device intended for people in disaster situations where access to potable drinking water has been compromised. HydraSol's target customers are international Aid organizations whose purpose is to help disaster victims. HydraSol is non-electric, non-chemical, and filter-less. The device relies upon the process of distillation to purify contaminated water, which according to the Center for Disease Control, is the best method for water purification.

HydraSol is a water purification device that operates using a combination of simple physical principles to change contaminated water into potable water. These principles are:

- Solar concentration: solar energy is concentrated to a focal point using reflective material
- Water vapor point: the temperature (and pressure) point where water vaporizes and becomes a gas
- Temperature conduction: the process of one material transmitting its higher temperature to another material of lower temperature
- Condensation: the process of a gas or vapor

A metallic handle and grip increases the device's ergonomics and also provides leverage for the screw-top style opening. The collector, a glass (or plastic) open topped container which rests in a stand within the device catches the condensed purified water and is removable so the user can access the clean water.



## Tribe25

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Tribe25 is a weight loss incentive game modeled after a cap and trade system. Users commit to a 12-week program in which they make a \$25 per week commitment to meet weekly weight loss goals. Each week, participants that do not meet their goal lose their commitment fee, which then gets distributed amongst the participants that did meet their weekly goal. In addition to the cap and trade game, users have online access to a variety of tools to support them as they navigate losing weight. A signature service is being matched with a personal “tribe” – a small group of people who have common interests, barriers and goals to weight loss – and become the support network to help participants succeed.

Managed online and verified by 3rd parties within 10 miles of the customer’s home, Tribe25 connects a user’s weight loss with other people, the planet, and “profit,” ultimately supporting long-term behavior change. Tribe 25’s service is delivered primarily through a website, [www.Tribe25.com](http://www.Tribe25.com).

Users will manage their participation in the game through their online profile page. This page will display key statistics for game play, including the weekly weight loss goal, account balance, long-term weight loss goal, trends, and tribe status and stats. The online profile page also makes available a wide array of weight loss tools, including exercise and, blog tools, habit-forming SMS/text reminders, exercise information, nutritional information, and weight-related psychological information.

*“A weight loss incentive game modeled after a cap and trade system.”*

Achai Broner  
Adam Feldman  
Aileen Sweeney  
Margaret Hartwell  
Ryan Cabinte



Image Above: Tribe25 home page

## Distill Energy

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Trevor Blythe  
Lindsey Kugel  
David Stripling  
Sonia Weiss

Distill Energy is a district-scale biodigester that emulates natural systems to convert residential and commercial organic waste into electricity, compressed natural gas, and high-quality soil amendments. The facility is designed to be located close to organic waste generators, reducing transportation costs, traffic congestion on public streets, and greenhouse gas emissions. Distill Power lies at the nexus between waste and energy.

This product uses residential and commercial organic waste as a feedstock to generate clean and renewable electricity as well as a high-quality soil amendment through anaerobic digestion. The digestion process is designed completely enclosed and odorless, so it can be sited close to urban areas where organic waste is generated, thus reducing hauling costs and transportation externalities. The technology is scalable and offers cost-effective organics landfill diversion solutions to municipalities that have an existing organics diversion program or are striving to implement one.

California has passed legislation that requires municipalities to divert 75% of their waste and there is additional pending legislation that would ban organics from the landfill. Similarly, senate bill SB 1122 tasked the California Public Utilities Commission with developing incentives for anaerobic digestion plants through feed-in tariffs, or guaranteed wholesale electricity rates. These regulatory factors, combined with the growing amount of food waste generated by a rapidly increasing population of Californians, uniquely positions Distill Energy to capitalize on this exciting new market.



Max Dunn  
Rudi Halbright  
Mike Weislik

While peak oil is a major sustainability concern, it also presents significant business opportunities. The electric vehicle market is estimated to grow at a rate of 32% reaching \$480 million annually in North American by 2015. One disadvantage of the current standard with EV charging stations is that they have to be plugged into the car each time it is used. While this might not be bothersome to lead users of EVs, it will present an unmet need when moving into the early adopter market and beyond. The EasyCharge is a wireless EV charging unit that is designed to meet this need.

The product performance requirements for the EasyCharge are as follows:

- Safe: Cannot pose danger to humans, pets or property
- Rugged: Needs to survive 150,000 miles of normal driving as well as hitting a curb once a month for 10 years.
- Environmentally friendly: Cannot contain harmful materials and needs to comply with RoHS and WEEE.
- Efficient: Can only require 20% more power than a manual plug-in charger
- Easy to use: Drivers need to be able to park the car in the correct charging position with no training and only a simple explanation of the parking requirements.
- The compelling reason for the customer to buy an EasyCharge unit is for convenience and assurance that their vehicle will be charged when parked.
- Enlisting car dealer to explain the advantages at the point of purchase and motivate the dealer to do so by providing a large commission.



Receiver Coil



Underside of R/C Car



Receiver PCB



EnergiZer Inductive Charger



R/C Car With Coil and PCB installed



Prototype garage with Charger & Car

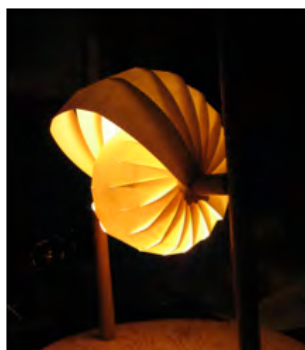
# Light Brigade

Jenny Hoang  
John Talbott  
Kartika Tulusan  
Elze Van Hamelen

Traditional incandescent light bulbs used in 75% of homes worldwide are very energy inefficient. Though efficient Light Emitting Diode (LED) alternatives are available, household adoption has been slow because of the color and locality of the light.

This team addressed these issues and developed a sustainable and energy-efficient light product called “Janus.” The Biomimicry-inspired Janus Lamp uses natural materials to produce an aesthetically pleasing shape and modern LED’s to produce comfortable and gentle illumination. The Janus Lamp is beautiful like other luxury lamps in the market, and includes the added benefit of energy efficiency. By using less energy, this light is environmentally friendly and contributes to a sense of well being reinforced by a reduced energy bill.

The lampshade is designed to be beautiful, comfortable and flexible. Since LEDs are direct and bright, the lampshade is used to diffuse the light to create a pleasant ambiance. When the lampshade is adjusted, the orientation of the shade and light source will change, making the lamp a task light. The lamp concept is a snail shell inspired piece that rotates on the stand. It emits a warm glow in its ambient light position and becomes direct light when changed to its task light position.



Ambient mode



Task mode

# PriCharger

## ENERGY

Allan Enemark  
Julien Gervreau  
Aaron Israel  
James Parle  
Chad Reese

In the nearly eleven years that Toyota has been selling the Prius hybrid electric vehicle, over one million cars have been sold in the US and over three million have been sold globally. What happens to these batteries at the end of their usable lifespan?

This team discovered that most of these hybrid car batteries still have a useful life when returned for recycling and can usually power less energy-intensive products. The “PriCharge,” turns this expanding waste stream into a sustainable power source to support the ever-growing enjoyment of electronic gadgetry. The PriCharge energy storage system provides a highly functional, car camping tailored and sustainable product design that addresses the power needs of today’s car camping community.

The PriCharge design utilizes a linen canvas flap to protect against dirt and moisture, a handle and strap to aid in mobility, accessory clips, and pockets to store personal electronics and peripherals during transport and recharges. As simple value-add components, an auxiliary port lighter and a bottle opener are also included. For consistency with the utilization of waste streams, an ammunition box is repurposed as the protective container for the batteries and electronics. A molded, 100% post consumer acrylonitrile butadiene styrene (ABS) cover is designed to fit on top of the box as the primary device interface and is sealed with a water resistant cap and gasket.



# Saveearthome.com

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Noriko Tong  
R. Carter McRee  
Kima Hayuk

The Saveearthome service combines social networking and resource conservation to drive greater efficiency among communities of resource consumers. The Saverthome website will provide a community-based social networking site, focused specifically on “resource efficiency.” In addition to energy (carbon emissions), the service will also address water and gas as part of the “resource.”

Saveearthome will partner with smart meter companies as well as utility customers, and establish seamless integration of household resource usage data with the website. The users will also have the option to upload data manually if they choose to do so.

A feature rich profile page encourages people to participate in the community using their own names, rather than alias. This helps the community to develop with a greater sense of ownership among the members, and creates a connection to their real life interactions. Because of the emergent nature of smart meter technology, our service will focus on providing an API to allow the development of plug-ins for whichever metering technologies become dominant.

Members can see how their resource usage is comparable to other members. Filtering will also allow for comparison within multi-dimensional user defined cohorts. Product and Service Reviews allow members as well as experts to post reviews of resource conservation related products, such as smart meters and energy efficient appliances. Reviews of services, such as home resource auditors, contractors, and renewable energy installers will also be shared.

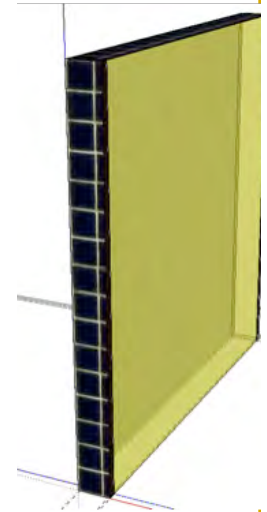
Emily Alt  
David Groves  
Ilana Lipsett  
Margy Titus

SoLite systems addresses the excessive use of lighting for decorative purposes on building exteriors. This product integrates photovoltaic cells with LEDs in a unique way to create attractive lighting fixtures with zero net energy. The product is cost competitive with similar products and is expected to be popular in cities like Las Vegas and Reno, NV.

The SoLite design integrates PV cells with glass/acrylic faces. LEDs are positioned against the edge of the glass/acrylic panes and used to light up the product's entire facade. Software can be used to change the color and timing of the lights to create a sense of animation. The product is then positioned on the side of buildings to create operationally carbon neutral decorative units.

While the electrical components of the product will be mass-produced, the faces will be custom made according to client specifications. This will allow for a high degree of creativity and variability in the product's appearance while not significantly increasing its price over other custom decorative building elements. SoLite signs are designed to be aesthetically appealing during the day, when all of its components will be entirely visible.

SoLite signs will be designed to plug into the grid with a meter that measures energy flow and direction. These signs will be a net energy producer during the day and in the summer months and a net energy consumer at night and during the winter months. Over the course of the year, the sign will be operationally carbon neutral.



Side view of a  
SoLite panel

## SolWing

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SolWing is a solar powered tarp that provides shelter while powering small consumer electronics. Due to growing consumer interest in the outdoors, the SolWing is targeted at the outdoor recreation market.

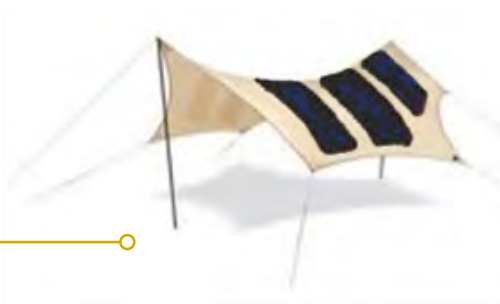
The major factors that differentiate the SolWing from competing portable solar solutions are its unique design, combination of multiple functionalities, and a power output of 108W, providing continuous power for electronics such as laptops.

The SolWing combines several user benefits and cut the energy production to a level that is appropriate for an individual or small group's needs. This scaling-back of electrical production drastically reduces the cost as well, making it accessible to the camping and outdoor consumer market.

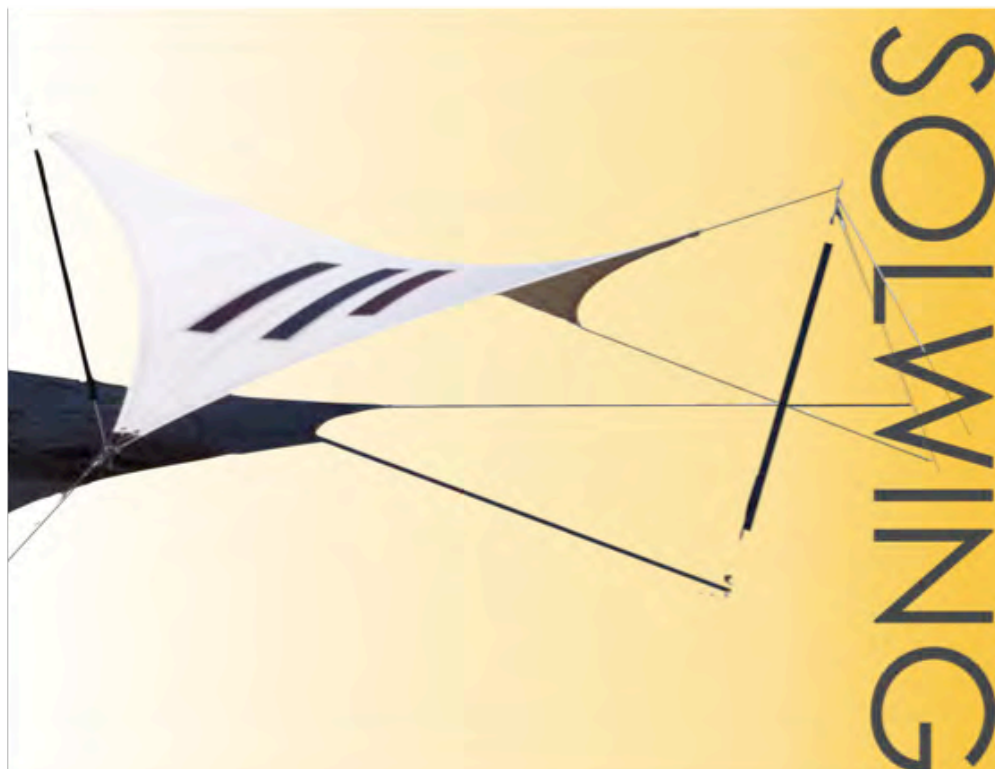
Additionally, the SolWing is easy to use, portable, and designed to be rugged and durable. This durability will be tested rigorously during the beta testing phase. An attractive, edgy design will also give the SolWing a competitive advantage, as many competing products are not designed for visual appeal.

The SolWing is a solar tarp to be used as makeshift shelter while camping. It will have a simple tarp-like wing design and will provide electricity using 6, 18-watt flexible thin-film solar panels, for a system total of 108 watts. This electricity can be used to charge a variety of devices, such as laptops and satellite phones. The structure of the tarp will be collapsible and lightweight, making the Sol Wing easy to transport and set up.

*“Solar powered tarp that provides shelter while powering small consumer electronics.”*



Katie Athavale  
Justin Bean  
Obrie Hostetter  
Tané Minnick



## The Wala Project

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The inability to recharge cell phones is an acute problem in developing countries. In off-grid areas, power for charging services is often provided by automotive batteries charged elsewhere or dirty and noisy diesel generators that generate greenhouse gases. The Wala taps into solar energy, the ultimate free, clean and distributed energy source. This translates into very low operating costs for the vendor that gives the product a very competitive total cost-of-ownership, despite the initially higher price due largely to the solar panels.

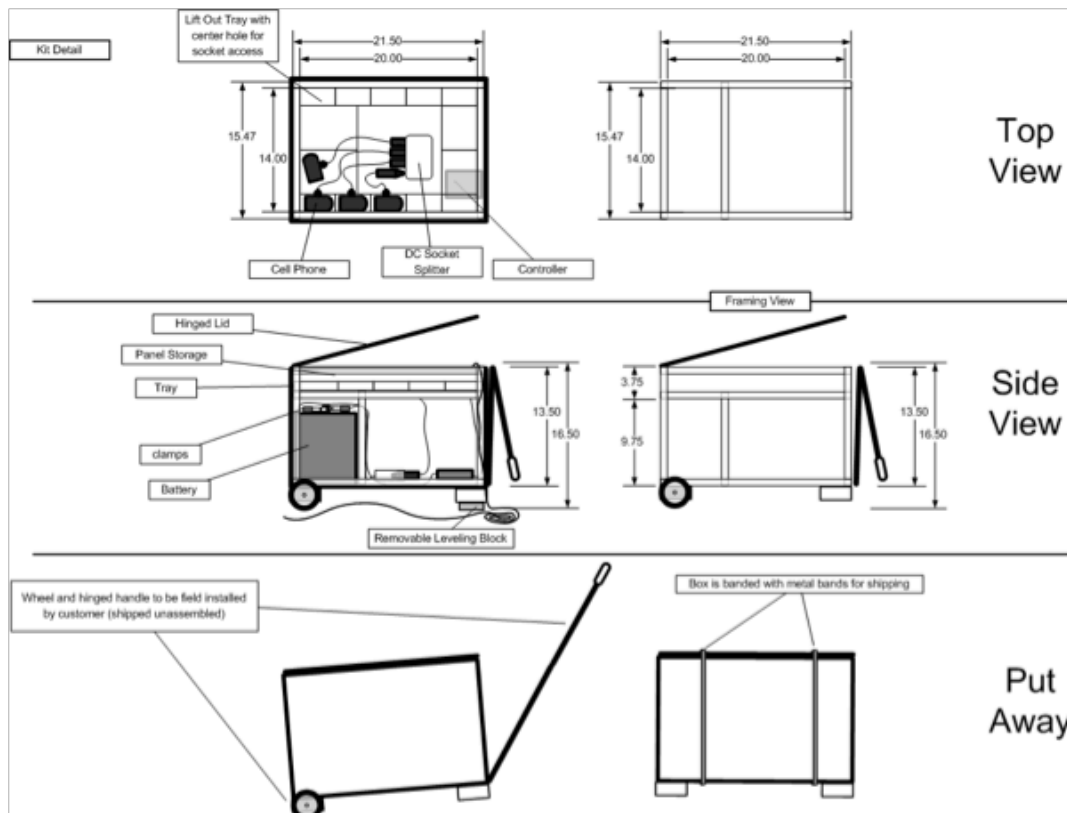
The Wala provides a plug-and-play “business in a box” solution that is compact, movable and can be rapidly deployed where the need for the service is greatest. The Recharger station will be deployed in a market place, a transportation hub or a storefront, where there is high demand for cell phone recharging and unreliable access to electrical power.

The Wala unit is mounted on wheels and can be rolled short distances to a desired location for deployment. The solar panels and their support frames are stored within the unit until ready for deployment. At that time they are taken out, unfolded and oriented towards the sun. When a customer arrives, the service provider will select the appropriate adapter for the customer’s phone, connect the phone to the 12 V manifold and begin charging. The estimated average charging time will be 2 hours. The Wala will have the capacity to charge 12 phones at once with a maximum of 50 phones/day, and an average throughput of 25/day.



*“Business in a box solution.”*

Eugenio de Hostos  
 Julie Allingham  
 David Bruce  
 Katie Excoffier  
 Stuart Fishman



# Terragen

Bethany Baugh  
Philip Covington  
Adrian Fogg  
Carlos Riemer  
George Velarde

Terragen is a Commercial Building Energy Monitoring System (CBEMS) that is designed to provide real-time energy usage data in specific areas of a commercial building. The implementation of CBEMS in a building is designed to ensure real time awareness of energy consumption for all building occupants, allowing LEED buildings to achieve enhanced energy savings over those inherently derived from their design alone.

Terragen's original concept evolved from the idea of capturing energy usage data directly from a utility smart meter, to focusing instead upon gathering data from a building's main service or sub-panel. This approach allows the monitoring of a specific area of a building and enables the system to work with or without a smart meter. The schematic diagram below details the system solution ultimately decided upon:

Stage 1: Energy data is captured using CT/MTU technology as shown. CT's or "current transformers" are wired across the electrical panel for each individual circuit, and pick up changes in current draw. This is the sensing part of CBEMS. MTU's or "measuring transmitting units," send that data wirelessly to the stage 2 components.

Stage 2: A signal capture device first receives and then translates the signal from the MTU into a form that can be re-sent to a networked wireless router for PC dashboard output (data processing).

Stage 3: Concurrently, the wireless signal is sent directly to the Ambient Displays. The Ambient displays thus do not require being run through a PC controlled program and are "standalone" complements to the dashboard.

# The Pedal Pak

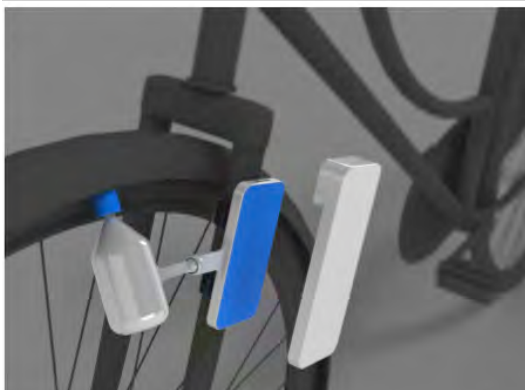
## ENERGY

Larry Halpern  
Eric Irvine  
Lara Perlof  
Lindsay Saxby  
Katie Schou

The PedalPak, a lightweight, modular, wire-free device that charges the iPhone, iPad, and iPod, through harnessing the kinetic energy created through riding a bike. The PedalPak will provide a full charge to a 1470 mAh battery after approximately 35 minutes of ride time.

The PedalPak is durable to withstand the tremendous amount of stress that comes with bumpy rides, extreme temperatures, and the possibility of heavy impact. A key competitive advantage of the PedalPak is its functionality with no wires or cables, and ability to be easily removed. The device can be easily installed on a bicycle, and broken down into several components, which allows for ease of transport and recyclability at the end of life.

The device utilizes the kinetic energy generated from a standard dynamo. A dynamo is a small electrical generator that connects to a bicycle wheel, and generates power through the friction created from the spinning of the wheel. The dynamo is then connected to a charger dock by way of an adjustable arm, so it can be manipulated to meet the side of the tire on bicycles of all sizes. The charger dock, which converts the energy created into usable current, connects to a power reservoir while the bicycle is ridden, which then stores the energy created through the dynamo and dock. The size of the reservoir will be slightly larger than an iPhone and clips onto the bike forks to ensure stability.



## Wind mAPP

---

Matt Allan  
Tim Braun  
John Garnett  
Will Lebherz  
William Otis

Wind mAPP is a microclimate wind mapping system that measures the energy generating potential of wind blowing across a small site, such as over a rooftop. The purpose of the system is to provide customers of small wind turbine systems (e.g., 3 to 5 kilowatts) with accurate information concerning their wind resource before deciding whether to purchase turbines and before deciding where best to install them. This is crucial information as turbine systems can cost as much as \$50,000 to \$100,000, depending on the number and type purchased.

The mapping system consists of off-the-shelf anemometers and wind vanes coupled with customized hardware and software. The system measures wind speed and direction and estimates energy generating potential. After a period of time “mapping” the site (usually 2 to 5 mos.), a report is provided to the customer for a fee. The report describes the energy potential of the site and the optimal number and positioning of turbines.

While anemometers and weathervanes are widely available and relatively inexpensive, the Wind mAPP mapping service offers target customers an entirely different value proposition—one that is much broader and more integrated. anemometer and weather vane suppliers do not also supply wind power systems. The Wind mAPP system integrates readings from an array of devices positioned across a rooftop, or elsewhere, and thus can map a wind resource over an extended area.

In order to use anemometers and weather vanes to measure a wind resource, a user must be familiar with their operation and installation. The Wind mAPP service does not require that a user have any capacity to operate wind measurement devices or any knowledge concerning the power generating capacity of different wind conditions.



## Bug Bars

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The concept of a bug based energy bar originated when John Heylin, an excited and active rower, learned about the value that insects could provide to humans, both nutritionally and environmentally. Believing that athletes and other active people could benefit from this efficient food, he set out to build a superior energy bar.

Bug Bar, LLC is a company that aims to produce high-protein energy bars made with insects for athletes who need that extra boost of nutrients to perform at their best. Bug Bars provide more protein per ounce and serve as a sustainable alternative to traditional protein bars. A majority of protein bars in the marketplace are fortified with whey or soy protein to boost the protein content of the bar. Whey protein, a derivative of milk, comes from dairy cows responsible for 24% of agricultural greenhouse gas emissions.

The “ultimate” energy bar contains flaxseed, dried fruit, oats, sunflower seeds, crisped rice, nut butter, brown rice syrup, and hints of vanilla and cinnamon. Designed as a meal-replacement, the Ultimate contains over 20 grams of protein from the crickets alone. It is dense to appeal to people looking for good texture and mouth-feel, while also tasting great. The crickets are dried and ground into a flour and added to the rest of the ingredients.

*“A high-protein energy bar  
made with insects.”*

Michael Schimaneck  
Fergus McGrath  
John Heylin  
Zach Sharpe



## Door-to-Door Dinners

---

Charles Bowes  
Megan Burritt  
Isabelle Reining  
Matt Sonefeldt

The Door-to-Door Dinners (DDD) concept began with the desire to reduce waste in the restaurant industry. By replacing disposable take-out containers with a reusable container, this team believed a closed loop system could be created, thereby substantially minimizing a restaurant's packaging waste. DDD's service contains several key components, from collecting partner restaurant meals to meal ordering and distribution to the reusable containers themselves

Partner restaurants prepare the heat-at-home foods and package them in reusable containers provided by DDD. Twice per week, these local restaurants deliver their heat-at-home meals to DDD's commissary. The commissary's system is comparable to a grocery store's hybrid model of delivery, inventory, and preparation of foods. Upon delivery to the commissary, restaurants will pick up reusable containers for the next week's meals. Restaurants will then fill these containers and deliver the new meals to DDD at the next scheduled drop-off time.

Ordering takes place on DDD's easy-to-use website, where customers can select meals from all available partner restaurant options. DDD will also prepare its own salads and desserts to complement the partner restaurants' heat-at-home meals. Through the website, DDD subscribers will have the ability to choose the day and time for meal delivery. DDD views the use of reusable containers as core to the value offering. Upon delivery of new meals, the DDD van will pick up any used containers from customers used in previous delivered meals. The containers will then be taken back to the commissary for sanitization before restaurant pickup.



# GOODTable

Eric Cetnarski  
Ryn Longmaid  
Jeffrey Rangel  
Judith Prejean  
Inna Volynskaya

GOODTable is a web-based platform that serves as a matchmaker between the socially and ecologically conscious diner and the restaurateur. The result is a dining room management system that will provide consumers with a channel to affect change.

GOODTable is an online reservation service that meets the unmet needs of three user groups. It will offer the restaurateur both an affordable reservation service and tools collect objective market/user data. GOODTable will also provide diners a means to communicate their food/sustainability preferences to restaurant owners and managers. Lastly, GOODTable will provide a marketplace for service industry vendors.

One of the more robust features of the product platform is the central algorithm that provides both the restaurateur and diner with sophisticated data analysis. The system's algorithms will also monitor users' behavior and provide suggestions accordingly. For example, for the restaurateur, the site may say, "Over the past three months, diners preferences for organics has grown by 40 percent. Do you want to find more organic farmers in the area?" Or for the diner the site may say, "Here are more organic restaurants in your neighborhood that usually have open tables around [your preferred time] of 8:00."

GOODTable blends the 'best' features of products such as OpenTable, Yelp and Good Guide into an affordable, comprehensive, and scalable solution. GOODTable removes barriers that limit transparency and access. Through GOODTable, restaurants will collect useful data that inform their business model; diners search for restaurants that align with their sustainability preferences.



## Eco-Roof Workspace

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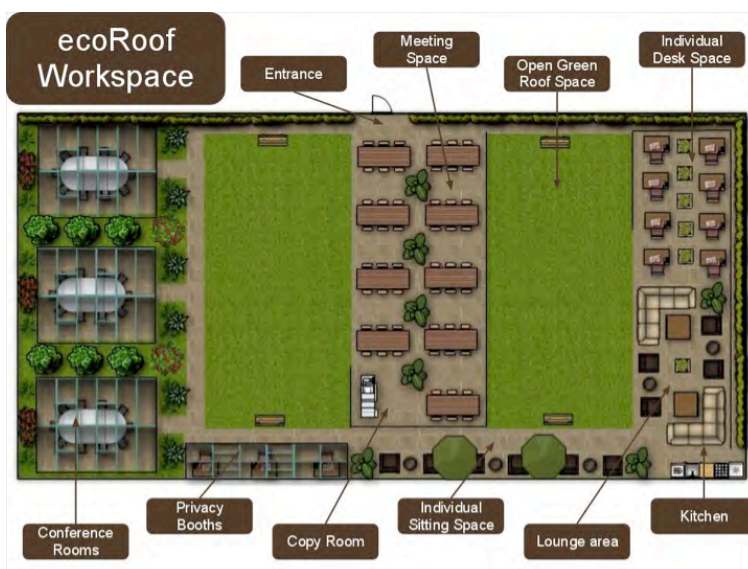
The Eco-Roof Workspace is a hybrid conference and co-working space atop a commercial living roof. The goal of this offering is to fulfill the needs of city dwellers that are typically unmet by being so far removed from the natural environment. The target users of this space are working residents of San Francisco who would like to enjoy a connectedness with nature but find themselves short on time. The space serves the purpose of allowing users to perform their work and engage in meetings while also enjoying the natural environment.

With the integration of the living roof, this product fulfills the objectives of 1) Increasing city residents' access to nature, 2) Encouraging community connectivity, and 3) Mitigating the negative environmental effects of urbanization. Additionally, the Eco-Roof Workspace integrates into the daily lives of target users in a manner that suits their needs, while taking advantage of underutilized and high-value real estate in the city.

A portion of the ecoRoof Workspace would feature enclosed glass conference rooms for formal meetings, each equipped with a projector and other standard conference room technology. The remaining areas function as co-working space, and these will be enclosed in flexible and modular glass structures, which can be opened or closed depending on weather.

*“A hybrid conference and co-working space atop a commercial living roof.”*

Tia Ferguson  
Cyndie Hoffman  
Lindsey Wedewer



# LetzEat

Pam Grey  
Connie Kwan  
Norman Rossman

LetzEat is a menu, recipe, and shopping list creation online platform. It provides simple and easy to use tools to allow anyone to create healthy and wholesome meals. End users connect to their household LetzEat accounts using either the LetzEat web page or the LetzEat smart phone app. LetzEat differentiates its offering from competitors through its business model, which targets CSA's as the market entry point.

LetzEat provides an integrated Plan, Shop, Cook experience to the novice and intermediate cook. The customer will select options in advance relating to diet restrictions, level of cooking experience, amount of time for cooking and allergies. These options will allow LetzEat to offer the customer custom menus that fit within the parameters of their selected options.

End users can use LetzEat as a fun, easy way to nourish and entertain their families and friends. LocalHarvest states that, "Feeling bad about wasting food is one of the top reasons former CSA members site for not renewing". Through LetzEat, CSA's give end users much more robust and varied possibilities for the wholesome foods they provide, thus further engaging end users, reducing food waste, and reducing customer loss. CSA's and Grocery chains will use LetzEat to improve the enjoyment and engagement of customers, thereby enhancing customer satisfaction and loyalty.

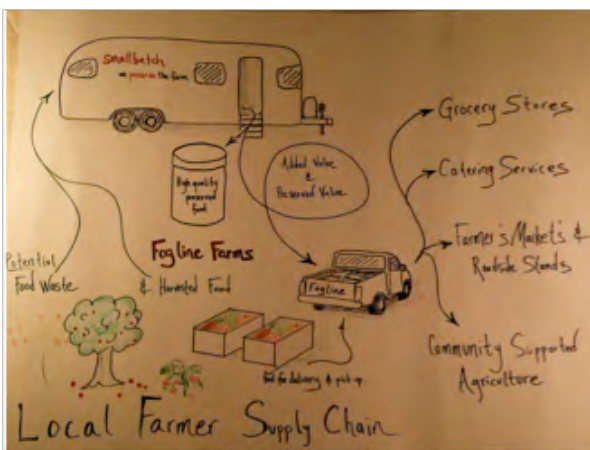


## Small Batch

Sarah Cabell  
Edgardo LeBlond  
Megan McDonald  
Mayacamas Olds  
Mara Slade

Small Batch is a nimble and modular turnkey solution designed to help small to mid-sized farmers (those earning \$50,000-\$250,000 in gross annual sales) increase revenue streams and obtain new markets for surplus produce currently left behind as “waste.” A challenge among these farmers is to find an efficient and economically viable sales outlet for small volumes of produce. Bumper crops and short harvest windows saturate end markets and drive down prices for farmers. Food retailers refuse safe and nutritious produce because of slight size variations or blemishes not considered “desirable” by consumers. The result is waste in the food chain, and a threat to the viability of small farms.

Small Batch addresses this need by coming direct to the farm with a mobile food-processing unit to preserve surplus produce at the peak of ripeness. This former “waste” stream (i.e. produce) is turned into value-added, locally produced goods such as jams, chutneys, pickles, and sauces, ensuring healthy, fresh foods are available year round. These products have higher margins than whole produce and address the growing demand for fresh, local foods among consumers, upscale retailers, and restaurants – a market opportunity worth over \$5 billion in the US (USDA, 2011). Small Batch will launch in Northern California by partnering with local farms to test feasibility of the mobile processing unit and distribute products through existing Community Supported Agriculture (CSA) channels.



## SustainaBullz

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SustainaBullz is a vending machine product/service that utilizes municipal sources to deliver reliable, tasty water with the option to buy a reusable container in airport terminals.

Product characteristics include low impact materials, efficient energy use, filtering, chilling and dispense systems, end of life considerations and an educational platform. The goal of the SustainaBullz vending machine is to offer travelers a convenient alternative to bottled water, reduce waste, entice consumers to embrace reusable containers and educate travelers on the environmental benefits.

The proposed vending machine dispenses reliable water as well as complimentary products. SustainaBullz offers chilled, clean water quickly, triggered by the recognition of a reusable container. The price of the water service will be less than the equivalent amount of bottled water and reusable containers should be priced reasonably. The machine accepts universal tender and provides quick and easy access with few mechanical errors or breakdowns. An instructional video component offers instruction on use and offer space for advertising and messaging around the impact and benefits of purchase.

The goal of the SustainaBullz vending machine is to entice consumers to embrace reusable containers and educate travelers on the convenient and educational benefits. The vending machine will utilize municipal water sources and manufactured from a majority of recycled materials. The machine is high quality with a long operating life and will be potentially reused or reclaimed and recycled in post life. It will be energy efficient and meet health regulations.

*“A reliable vending machine that provides tasty water with the option to buy a reusable container.”*

Brahm Ahmadi  
Liesl Holtz  
Kathleen Phillips  
Michele Thorn  
Nicole Woodward

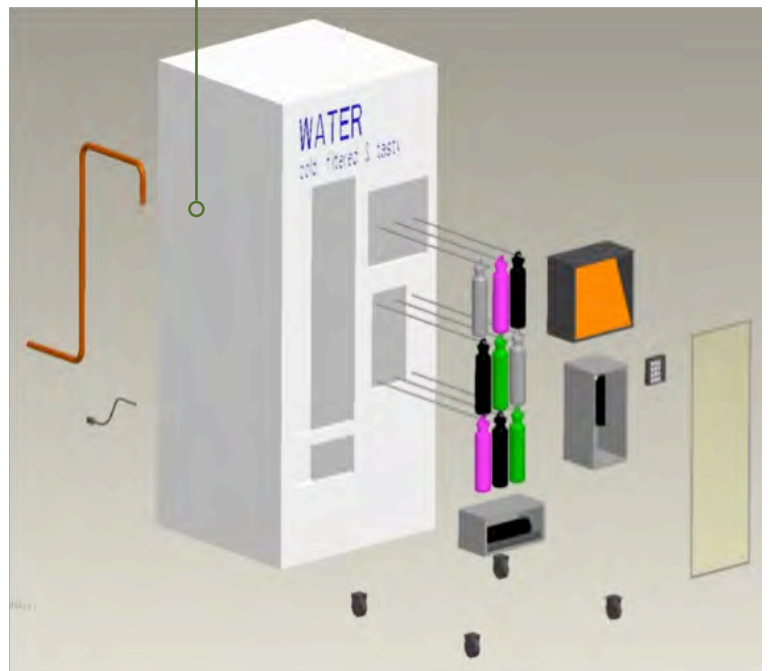


Image Above: SustainaBullz vending machine components

# Urban GrowSpace

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As urban populations increase and the current agricultural system's considerable resource requirements prove unsustainable, the Urban GrowSpace has the potential to be a steward in the commercial urban agriculture space. The Urban GrowSpace will supply Chicago residents with a year-round source of local, organic, fresh, and nutritious lettuces, herbs and micro greens using an innovative methodology for urban growing.

The initial Urban GrowSpace Prototype is designed to maximize efficiency in a 1,500 square foot leased space in a typical strip mall.

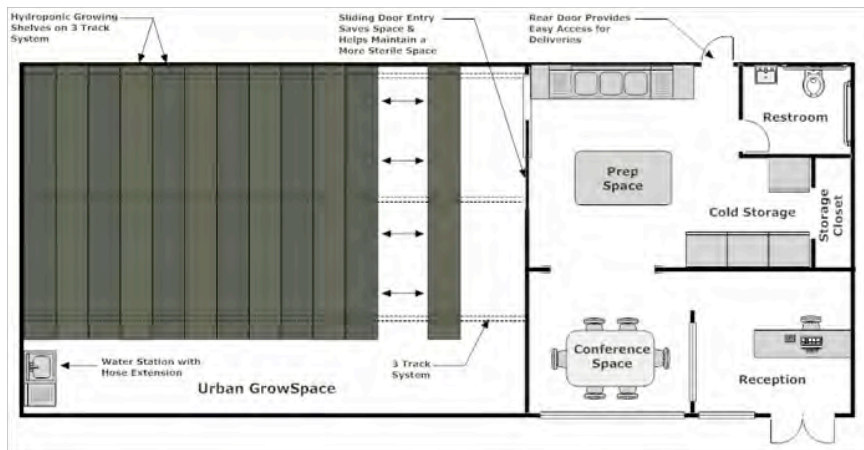
In the actual GrowSpace, a minimum of twelve 20-foot long custom shelves for growing will be constructed on a track system, similar to large filing systems as seen below. A wall mounted water station with sink and attachable hose extension designed for easier maintenance of the produce. A section view of one of the custom grow shelves can be seen below. Each of the rolling shelves contains the following:

- A reservoir at the bottom to hold the primary source of water for all plants and seedlings.
- The bottom level of plants containing no grow lights will be used to start seedlings.
- The second and third row of shelves will be used primarily for herbs and micro greens.
- Larger plants will be grown on the upper level.
- Grow lights on the top three levels can be easily changed to provide the best spectrum for production depending on the type of product being grown.



*“An innovative methodology for urban growing.”*

Crystal Arvigo  
Griff Foxley  
Evelyn Lee  
Miranda Leonard



## Composterator

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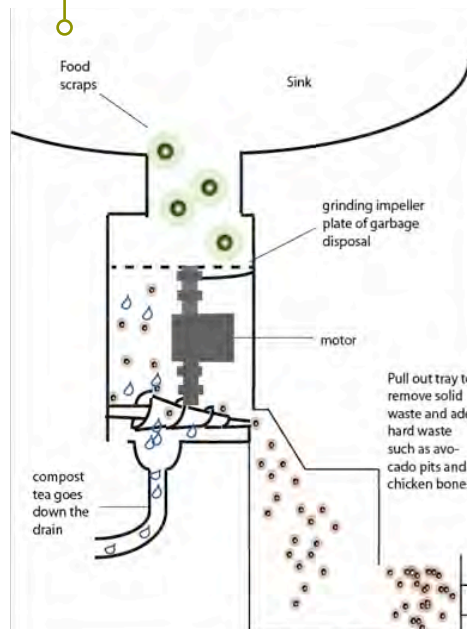
Up to 20% of U.S. household waste is comprised of food scraps. Once this organic waste reaches landfills it undergoes anaerobic decomposition, producing significant quantities of methane, a potent greenhouse gas. Alternatively, composting this material involves a fundamentally aerobic process, producing zero methane. Composting also closes the food production loop by bringing vital nutrients and soil fertility back to local farms.

The Composterator, tackles these issues by diverting organic waste from landfills in a way that requires minimal behavioral change for the average consumer. Utilizing an innovative design that addresses the most common pain points, it increases home compost adoption by improving the experience. The Composterator operates much like a standard garbage disposal, but incorporates elements of a masticating juicer to separate compostable solids from liquids. Instead of food waste simply going down the drain, the Composterator diverts solids into a collection bin under the sink, while only the liquids are sent down the drain. As water comprises 75% of the weight and volume of food scraps, removing this liquid in the home produces lighter, more compact compost, relatively free of mold, bacteria and odors. The resulting organic matter can then be easily handled without many of the negative factors that home composting typically entails.

Widespread residential compost collection drastically increases landfill diversion rates by removing a large proportion of waste from the municipal stream. Additionally, compost weight and volume reductions decrease the frequency of home pickups, as well as the infrastructure needed to support compost collection. These benefits provide considerable savings to municipalities.

*“Diverting organic waste from landfills in a way that requires minimal behavioral change for consumers.”*

Jenn Coyle  
Joss Hill  
Peter Monteleone  
Chelsea Souter



## The FOGgetter Service

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The FOGgetter Service provides a solution for the growing problem of improper FOG (Fats, Oil and Grease) disposal, while also providing for the collection of residential grease for biofuel processors.

The FOGgetter Service is a residential FOG collection system, with collection points set up in areas that are frequented by local residents to stimulate participation and to provide for an easy and accessible drop off location. These collection points then serve as a recovery points for FOG Haulers who pick up grease and deliver it to renderers to produce biofuel. Gas stations are an ideal test location to place the FOG collection units, as they are highly frequented places that allow for the collection of flammable materials and have the space to accommodate haulers' trucks.

The FOGgetter service will have an online presence with detailed information about the program and container pick-up locations. Residents can lookup where to find the collection containers and search for the most convenient drop off locations. The online site will offer a special section for residents who do not have the service in their city but wish to sign up. One can register via the "I Want FOGgetter" site and request to have the service implemented in their city. As the FOGgetter Service expands to other cities in the later phases of market penetration, the online site will be a valuable tool in determining areas with the most interest and will help to determine where to place pick up and drop off locations.

*“A service for neighbors who can benefit from sharing.”*

Monica Alderett  
Chirag Amin  
Marion Guyer  
Susan Hopp  
Sharmila Singh



# The Short Stop: Airline Recycling

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The commercial airline industry has struggled to effectively manage both their collection of recyclable waste in flight, as well as ensuring this waste actually reaches a recycling facility. In the U.S. alone, airlines could recycle 500 million more tons of waste than they currently do, which is up to 75% of the total waste generated.

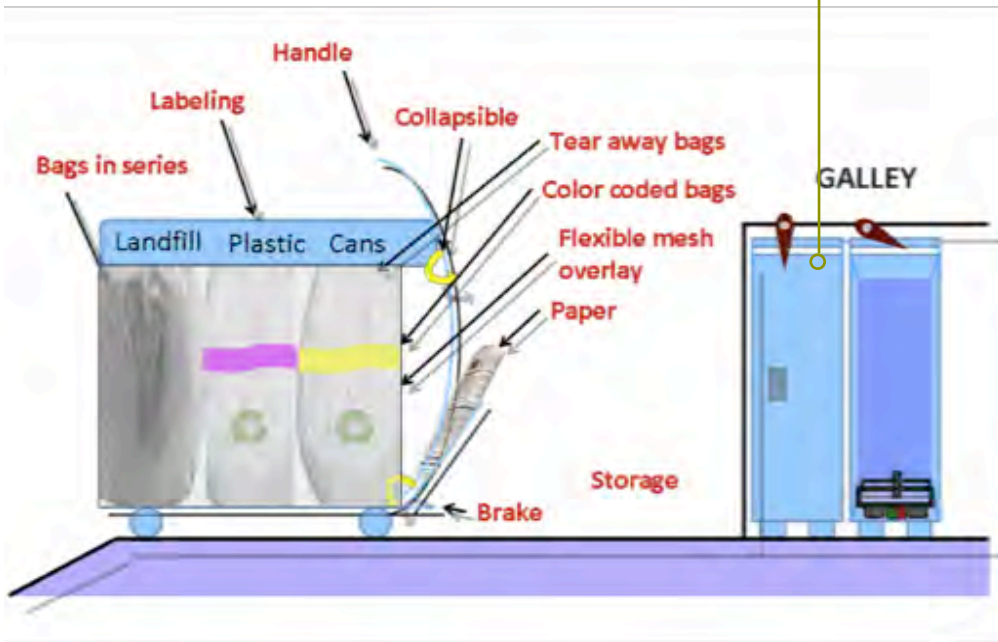
The Short Stop is a mobile waste collection and separation device designed to simplify the in-flight waste collection process, promote behavior change among flight attendants, and enhance the airline industry image by demonstrating a clear commitment to sustainable practices. It meets a wide range of user needs by being lightweight, easy to use, compactable, and ergonomic.

The Short Stop mobile collection device is designed with the following operating features:

- Collapsible to fit with infrastructure on any plane, regardless of type or size
- Made of lightweight recycled aluminum to minimize airplane load and support recyclability at the end-of-life
- Enables collection and sorting of up to four different types of waste
- Ergonomic handle on both sides of the cart, multi-directional wheels, and a reliable breaking system supports ease of operation and safety
- Sheer mesh walls provide transparency for passengers and flight attendants to promote behavior change both on and off the plane
- Tear-away, color-coded bags save flight attendants time and assist in downstream waste diversion, while providing a recurring revenue stream
- Airport coding system informs flight attendants of airport practices and empower attendants to make decisions that will maximize recycling

*“A mobile collection device.”*

David Pope  
Peter Rose  
Jennifer Wagner  
Joseph Wilzbacher



# RePurpose

---

Emily Busch  
Jasmine Fallstich  
Briana Krompfer  
Rachel Newman  
Josephine Penaga

RePurpose is a waste diversion system with an integrated set of sustainability values. The modern and attractive waste bins are designed for municipal application in public spaces to provide separate receptacles for garbage, recycling and compost. Advertisements, limited to sustainability content, on approximately 75% of the exterior of the bins will generate an ongoing source of revenue. This allows for the bin to be provided free of charge.

The exterior of the waste bin is constructed out of galvanized steel sheet metal with a solid supportive structural frame. Three existing 32-gallon Recology carts (without the lids) roll in and out of this exterior shell via a street-side two-door locked opening, allowing for easy servicing access.

Clear UV-resistant bubbles of high-impact polycarbonate resin encase the solar cell on top of the bin, the illuminated ad panels on the sides, and the instruction panels, fully protecting the panels and solar array from potential damage. The solar cell technology powers the illuminated ads and disposal instructions, as well as the RFID (Radio Frequency Identification) monitoring system that alerts waste collectors when the carts need to be serviced.

The waste bin opening is located to the top maximizing advertising space. The openings come in different shapes and colors to clearly distinguish recycling, compost and landfill wastes. A provision for separate paper and bottle recycling is also included. An overhang on top of the bin is added to serve as a base for the solar panel, as well to protect the contents from weather.



**RECYCLING**



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