



Code Green Energy Innovation Lab

Proposal for a Real World Laboratory for Systemic Experimentation

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Points of Contact:

Saul Kaplan, BIF
401-270-5943
skap@businessinnovationfactory.com

David Breecker, SFIP
505-685-4891
David@BreeckerAssociates.com

Introduction & Overview

A confluence of factors, including climate change, energy security, and job creation and economics, are driving radical shifts in U.S. energy policy, technology, and infrastructure. It is a national imperative to support transformative initiatives, resulting in a more cost effective and sustainable energy system that increases the country's use of renewable energy sources and energy efficiency at all levels.

Over half of the country's energy use is by citizens in their homes. It is therefore essential to understand energy utilization and management from the perspective of the residential user, and to design new systems solutions that provide consumers with the tools to better manage energy usage at home.

Code Green

The Business Innovation Factory (BIF) and the Santa Fe Innovation Park (SFIP) have initiated efforts, and are seeking partners and funders, to create a real world Laboratory to accelerate the development of new alternative energy and energy conservation solutions for the home. The **Code Green Energy Innovation Lab** will include a network of homes and provide stakeholders with a better understanding of how citizens utilize and manage energy in the home. Within this real world environment, the Lab will develop and test new solutions, services, and business models that increase energy conservation, advance the use of alternative energy solutions, and decrease the country's overall energy costs and carbon footprint. Estimated costs for the project are \$275,000 with a one-year schedule to completion.

Goals

BIF/SFIP's Code Green Energy Innovation Lab will:

- Create a real world Laboratory for systemic experimentation, where solutions, services, and business models can be developed and tested within an integrated, and functional home energy system.
- Explore and test new solutions for improving the energy efficiency and energy management experience of residential customers.
- Understand the human factors most relevant to the purchase, installation, and use of energy efficiency and energy management solutions and systems.
- Leverage the Lab as a mechanism for exploring new collaborations across both the public and private sector.
- Establish an ongoing platform for experimentation that reflects evolving customer needs and emerging market opportunities.
- Mobilize systems change with aggressive multi-channel storytelling and network building, leveraging BIF's open innovation platform and SFIP's network of cross-sector collaborators and partners.

Methodology

The Business Innovation Factory (www.BusinessInnovationFactory.org) is an independent non-profit organization founded to enable collaborative innovation and systems change. With its unique open innovation platform, BIF has created a neutral place for partners to work on problems in areas of high social impact, including healthcare, education, and energy management and conservation. Since its launch in 2004, BIF has built a national network of innovators, across the private and public sectors, who are committed to solving problems that require transformative new business models and new ways of delivering value to citizens, students, patients and consumers. In the BIF Experience Labs, BIF runs projects that bring partners together to better understand user experiences and create real-world environments to design and test new solutions.

The Santa Fe Innovation Park (www.SantaFeInnovate.org) is an applied solutions Laboratory, focusing on complex systemic problems. SFIP relies on trans-disciplinary collaborative teams, drawn from the arts, design, and creative sector; science, technology, and engineering; private industry and finance; and the public and social sectors, to drive new approaches to important, practical challenges. In addition, the state of New Mexico has proposed a major “Green Grid” initiative, which will ultimately include several demonstration sites and residential areas along with next-generation storage, distribution, and transmission infrastructure. The Green Grid partners include Los Alamos and Sandia National Laboratories, Public Service Corporation of New Mexico (aka PNM), the state’s research universities, community colleges, and several municipalities.

BIF and SFIP see an immediate opportunity to use their innovation approaches in partnership, so as to establish an experience Lab in the energy management and green energy space. BIF/SFIP is therefore seeking partners and investors to build a real world test bed to design and develop new energy utilization/management solutions, services, and business models.

Lab Development

To launch the Code Green Energy Innovation Lab, BIF/SFIP proposes an initial phase of work that will 1) establish a strong foundation of knowledge around user experience and attitudes about energy management solutions in residential environments, 2) create a functional Laboratory environment, 3) generate a prioritized list of innovation opportunities to be further developed and tested within the Lab, and 4) build broad visibility for the Lab and its partners in the energy utilization/management market to enable systems change.

These objectives, and strategies and methods for achieving them in the initial phase, are discussed in detail below:

1. Establish a foundation of deep insight into how residential users understand, utilize, and respond to energy utilization and management solutions, situations, and environments. Detail physical patterns, attitudes, compensating behaviors, and impacts (personal and institutional). Uncover user needs and ideas for solution, service, and system redesign.

Strategy: Observational and ethnographic research of residential user behaviors in energy management environments, across representative user personas and demographics.

Methods:

- Persona profiling and categorization
- Direct observation of user experiences
- Attitudinal interviewing
- User ideation and design workshops
- Informational and attitudinal interviewing
- Small group facilitated conversations
- Photo and video documentation of activity
- Photo and video documentation of physical environments
- Compelling packaging of these outputs to attract interest and engagement

2. Establish the Code Green Energy Innovation Lab platform.

Strategy: Building on insights gleaned through user experience mapping, determine configuration of Lab environments and select and recruit Lab cohorts.

Methods:

- Geographic and demographic profiling of environments for Lab location
- Cohort recruitment sessions and interviewing
- Data review of experience mapping activity
- Protocol development
- Establish advisory group and pursue appropriate partnerships
- Establish web component that encourages broad participation in Lab activity
- Site selection and initiation of Lab environments
- Installation of Lab capacity to monitor base-line energy utilization patterns in selected Lab environments.

In addition, the Code Green Energy Innovation Lab team, with input from partners, will evaluate issues relevant to the Lab's launch and sustainability, including:

1. What are the ideal geographies for the Code Green Energy Innovation Lab (rural, suburban or urban)?
2. What physical environments for sustainable, insightful experimentation (new home, older home, a network of homes)?
3. What capacity for virtual engagement will most benefit Lab activity long-term?
4. How should protocols from other BIF Labs be modified to support experimentation in the Code Green Energy Innovation Lab?
5. What cohorts of subjects must the Lab include to yield useful, scalable insights that can be directly translated into new solution, service, and business models?
6. What extended community of advisors, supporters, and partners are necessary to facilitate deep experimentation?
7. How will collaborative relationships in the Lab be managed and what systems are in place to support the appropriate management and access to Lab intellectual property?

8. How can the Lab be configured to ensure sustainable operations long-term?
 9. What is the ideal starter set of experiments that the Lab team can conduct in the initial phases of Lab activity? What resources / partners are required to expedite these experiments?
3. Generate a prioritized list of innovation opportunities to be further developed and tested within the Lab.

Strategy: Building on work in steps 1 and 2, use BIF’s Experience Lab ideation and SFIP’s trans-disciplinary design processes to create a clear articulation and visualization of opportunities for the development of new solutions, services, and business models to deliver value to the residential customer that can be evaluated and improved within the Lab’s real world test bed environment.

Methods:

- Identify and prioritize a list of opportunities for new solutions, services, and business models in the residential energy utilization and management space.
 - Use both narrative and graphic techniques to make high priority opportunities visible.
 - Deploy a web-based “opportunity map” and supporting data and assets.
 - Engage partners and innovation networks in an iterative opportunity identification process.
 - Demonstrate scenarios for how opportunities can be tested in the Code Green Energy Innovation Lab.
4. Build broad visibility for the Lab and its partners in the energy utilization/management market to enable systems change.

Strategy: Organize Lab outputs in a manner that is clear and easily transferable across multiple channels, and leverage BIF’s non-profit platform, SFIP’s cross-sector network, and their commitment to open innovation to elevate Lab profile.

Methods:

- Accessible video and photographic approach to data capture
- Web-based Laboratory viewing area for virtual visibility into Lab activities
- Monthly reports from the Lab and early visibility into outputs for Lab partners
- Direct access to BIF/SFIP project team via teleconference and in-person meetings
- Active communication of Lab activity through traditional and non-traditional outreach
- Outreach collaboration with innovation network, advisors, and Lab partners

Methodology in Action and Proven Expertise

The Business Innovation Factory has proven experience building neutral platforms for experimentation that bring partners together to design and test new solutions. One important example of this activity is BIF's Elder Experience Laboratory.

With the Elder Experience Laboratory, the Business Innovation Factory has built a neutral platform for experimentation where partners can design and test new elder care solutions in a real world environment alongside a skilled team of designers, clinicians, business model innovation experts, and elder care practitioners.

BIF created the Elder Experience Lab in 2008 to create a platform for experimentation where partners can design and test new solutions to improve the elder experience. In our quest to build a living laboratory for transforming elder care in America, we began with one simple premise: put the elder experience at the center. Our methodology and unique non-profit positioning has enabled BIF to create a laboratory where elders are directly engaged in an ongoing effort to better understand the elder experience and R&D work aimed at improving it. The BIF Elder Experience Lab works with elder volunteers to conduct deep research into elders every day experience. We use these insights to illuminate opportunities for transforming the elder care system, and with help from the Lab's elder participants, put new ideas to the test in a real-world environment.

Working with elders who open their lives to us, the BIF team uses an observational and ethnographic approach to understand how elders interact with their environments, utilize shared and private spaces, care for body and mind, and stay connected with their friends and with the world.

From simple things like eating and dressing to the challenges elders often face staying connected to the community, the BIF team has chronicled the current elder experience, using narrative, video and photography to reveal insights into the experience and illuminate opportunities for transformative innovation.

BIF's non-profit platform and embedded storytelling capability enable us to openly share lab outputs. With this unique positioning, BIF can deliver strategic benefits to our Partners while broadly sharing outputs from lab activity with the public. BIF is committed to using this platform to accelerate the design and development of transformative solutions in elder care that cut across the entire elder care system and integrate insights and capabilities from across traditional industry and sector boundaries.

In 2009, the team began a series of experiments in the personal care space, focusing on major impact areas such as showering and toileting. Using a combination of ethnographic and observational design work, the team led a set of elder workshops wherein elders participated directly in design exercises aimed at soliciting feedback on existing personal care environments and insights into where design and / or product improvements would deliver the most value.

Most recently, the team launched a module of activity in medication management to explore how elders at all stages of their lives and those living at varying degrees of full independence acquire, store, consume, order, understand and talk about medication. This activity includes focus groups with caretakers who assist elders, workshops with elders about their experience with medications, and design sessions where elders can share their ideas for improving the current system. The team is also working with staff from assisted living and nursing home environments to understand medication management from the perspective of those who support elders day-to-day.

The lab has expanded to include five major user groups: elders aging in skilled nursing care, elders aging in assisted living environments, elders aging in place, elder caregivers, and baby boomers living independently.

In summer of 2009, Lab expanded to include a virtual component that allows participants to engage remotely, with special focus on baby boomer engagement.

The BIF Elder Experience Lab has also expanded to enable experimentation around delivering at-home care and new, collaborative business models for health and wellness services that enable boomers to stay in their homes or in community-based care longer.

Outputs from this activity can be viewed at <http://www.businessinnovationfactory.com/projects/exl>

BIF brought a second Experience Lab—the BIF Student Experience Lab—on line in Spring 2009. The Business Innovation Factory's Student Experience Lab was launched to create a place where innovators can understand the student experience and experiment with new solutions. The Lab launched with an initial effort to map the current experience of college students and to identify opportunities for significantly enhancing the student experience. BIF's unique non-profit platform and approach to building real world labs offers education innovators a collaborative environment where new ideas for improving the student experience be designed, tested and refined in a real-world laboratory with direct student engagement.

In October 2009, the Lab team released a first draft map of the current college student experience. This interactive "experience map" is based on research and interviews with students from all walks of life and at different stages of their academic career. The team captured their story using video, audio, photography and narrative as a first step towards revealing the human, environmental and systems-level factors that have the most significant impact on student success.

After speaking with students at more than 40 schools from across the country, the team gathered thousands of data points related to student's experience with academic, personal and financial components of the higher education system. While every student experience is in many ways unique, the Lab identified nine experiential themes that tracked across demographics, geography and school and student-type. More at: <http://www.businessinnovationfactory.com/sxl/>

BIF will leverage the know-how created through this and other projects to launch the Code Green Experience Lab. We fully expect that Lab protocols developed for other project work will be transferrable to the Code Green Experience Lab, particularly relating to data capture, partner management, communications and cohort recruitment.

Budget and Timing

The budget required for the effort outlined in this proposal is \$275,000. This budget assumes minimal capital costs for installing initial technology and capacity for monitoring of energy utilization patterns. If significant capital investments in infrastructure are required for this phase of work it will require additional partnerships and revenue sources and would be outside the scope of this proposal. The necessary technology for this phase could also be donated to the Code Green Energy Innovation Lab.

Upon full funding, and based on prior experience, we estimate that approximately three months will be required to achieve each of the four key steps outlined above, for a total initial phase schedule of approximately one year.

Follow-on Activity

Upon completion of this initial phase of work, the Code Green Energy Innovation Lab will be activated to support specific design studios, wherein Lab staff can work with partners on specific solutions, services, and business model development opportunities. Within this environment, the Lab team will capture and document user behaviors and feedback with prototyped solutions in an iterative, flexible real-world environment.