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CASE STUDIES OF FOSTERING GREEN BUSINESSES

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About NRDC

The Natural Resources Defense Council is an international nonprofit environmental organization with more than 1.4 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC has offices in New York City, Washington, D.C., Los Angeles, San Francisco, Chicago, Montana, and Beijing. Visit us at nrdc.org.

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I. Introduction

The Philadelphia Water Department (PWD) is currently implementing a major green infrastructure initiative known as the Green City, Clean Waters Plan. PWD's green infrastructure plan addresses combined sewer overflows (CSOs) in Philadelphia and is part of a consent order between the U.S. Environmental Protection Agency and the city.

The initiative will remove stormwater runoff from the combined sewer system and mitigate CSOs by reducing stormwater volumes from directly connected impervious areas. It will use measures that retain or infiltrate precipitation into the ground as close to where it falls as possible. A wide variety of green stormwater infrastructure (GSI) measures—examples include rain gardens, swales, infiltration trenches, porous pavements, and green roofs—will be used to create "greened acres" that count toward achievement of the consent order's requirements. PWD must create or foster the creation of 10,000 greened acres over the next 25 years. This represents about one-third of the impervious area in its combined sewershed. To implement this plan, PWD has budgeted at least $1.67 billion on an inflation-adjusted basis over a 25-year period, to be financed through debt issuance.[1]

PWD is now seeking ways to leverage its major investment in green infrastructure to build green economic activity in Philadelphia. Goals include:

- Ensuring that there is a healthy local supply of companies able to implement GSI measures
- Reducing the cost of GSI by ensuring a sufficient local GSI supply and by fostering technology and service innovation within the Philadelphia business community
- Minimizing the risk of not meeting compliance goals
- Supporting small businesses and minority-owned, women-owned, and other historically disadvantaged businesses

The Natural Resources Defense Council (NRDC) contracted Booz Allen Hamilton (Booz Allen) to research and develop case studies of other communities that have successfully fostered creation of green businesses or otherwise helped innovative businesses start and grow. The purposes of this study are to:

- Identify strategies used by other cities or organizations to foster development of local green or innovative businesses.
- Characterize the evolution and essential characteristics of those efforts and strategies.
- Draw implications and lessons learned that should be useful to Philadelphia and other cities wishing to build economic activity around green infrastructure investments.

Booz Allen used the following methodology for this project:

- Networked with sustainability and economic development professionals to identify candidate case studies. Candidates were drawn from many sectors, not just green infrastructure.
- Obtained high-level information regarding each candidate case study from websites, books, and other sources.
- Selected six candidates for development as case studies. NRDC and PWD provided input into the case study selection.
- Conducted further research using published sources and interviews.
- Developed the case study write-ups.
- Synthesized findings and recommendations.

The next section of this document presents the six case studies. The final section presents high-level findings and recommendations. Naturally, six case studies do not cover the complete landscape of strategies to incubate, accelerate, and support businesses when making public infrastructure investments. Additional literature in the field provides further cases and strategies.[2] However, these six case studies do present a range of strategies and some novel approaches. Booz Allen hopes these cases will spark and augment discussions in Philadelphia and other communities about ways to leverage public green infrastructure investments to support local economic development.

II. Case Studies

The six cases studies below represent a range of approaches to incubating new businesses and supporting existing businesses. They include different organizational forms and different topical and strategic emphases. The cases are:

- The Water Council and the Milwaukee Metropolitan Sewerage District—A Milwaukee-based nonprofit runs a water-focused business accelerator, supports other businesses with multiple programs, and is helping the regional clean water utility grow the green infrastructure industry.
- Clean Energy Works—Begun as a City of Portland, Oregon program and transitioned to a statewide nonprofit, this organization built and maintains a healthy supply of contractors who provide deep residential energy efficiency retrofits.
- AdvantageWest—This regional nonprofit was created by the North Carolina legislature and runs programs providing funding, entrepreneur networking and support, and business incubation across a wide range of business sectors.
- San Jose Clean Tech—The City of San Jose focuses on clean tech by fostering demonstration partnerships, sponsoring a business incubator, and partnering with a major competitive business accelerator program.
- Portland Development Commission—This quasi-governmental agency is the economic development arm of the City of Portland, Oregon. In this role it develops and sponsors multiple business incubators, supports exports of the sustainability expertise of area businesses, and facilitates a new way of linking city bureaus and start-ups to solve city problems.
- Philadelphia's Sustainable Business Network—This nonprofit membership organization uses advocacy, relationship building, and education to help grow sustainably-focused businesses in the Philadelphia area.

Case Study

The Water Council and the Milwaukee Metropolitan Sewerage District

Regional Collaboration for Water-Focused Economic Development

The nonprofit Water Council has catalyzed regional water utilities, universities, and water technology businesses to develop the Milwaukee region as a center for water research and business. Organizations such as the Milwaukee Metropolitan Sewerage District provide technology test beds, and the Water Council accelerates business development through multiple programs.

THE WATER COUNCIL—MISSION AND HISTORY

The Water Council is a nonprofit organization whose mission is "to align the regional fresh water research community and water-related industries to establish the Milwaukee region as the World Water Hub for water research, economic development, and education."[3] It was formed in 2007–2008 by multiple private parties as an economic development initiative. The founders included the chief executive officers of well-established local companies such as A.O. Smith Corporation (manufacturer of residential and commercial water heaters, boilers, and water purification equipment) and Badger Meter (maker of flow measurement and control technologies), the chancellors of Marquette University and the University of Wisconsin–Milwaukee, The Milwaukee 7 (an economic development organization of seven southeastern Wisconsin counties), and other prominent local organizations. These participants recognized the strong regional concentration of water expertise in industry, academia, and utilities such as the Milwaukee Metropolitan Sewerage District and the Milwaukee Water Works. The objective, according to Dean Amhaus, president and CEO of the Water Council, was to "coalesce a cohesive ecosystem" of collaboration around water technology and services, forming an economic development cluster.[4]

From 2007 to today, the Water Council has grown from a few leaders interested in organizing Milwaukee's water technology businesses into an internationally recognized center of water research, business development, and technology innovation.[5] For example, Milwaukee is a United Nations Global Compact City, one of 18 innovating cities around the world selected for their concentration of expertise in a specific topic related to global health and development.[6] There are more than 160 water technology companies in the Milwaukee region, representing $10.5 billion of revenue in the global water market.[7] The Water Council is a winner of the United States Water Prize from the U.S. Water Alliance for leadership in advancing U.S. water sustainability.[8]

The Water Council is funded by a combination of grants, contributions, membership fees, program income, and revenue from operation of its Global Water Center. The center is a 98,000-square-foot water business and research facility that hosts multiple established water-related companies as tenants and provides low-cost space as an accelerator for emerging companies.[9] Currently 41 companies and organizations have space at the center.[10] The Water Council has more than 160 members, spanning industry, academia, government, utilities, and the nonprofit sector.[11]

THE BREW BUSINESS ACCELERATOR

The BREW (Business. Research. Entrepreneurship. In Wisconsin) is a Water Council flagship program to grow water technology businesses. It is a unique, place-based accelerator that is mentor driven and strictly focused on addressing global freshwater challenges. The competitive program is currently in its third round of applicant solicitation. A jury selects six to eight participants each

year. Applicants are not limited to local companies, but participants must reside in the Milwaukee area for the duration of the 12-month program. Each receives the following benefits:[12]

- A $50,000 investment in exchange for a nominal equity position (funded by a grant from the state; equity is a new component of the program for the 2015–2016 class)
- Access to investment capital funding sources
- A subsidized suite in the Global Water Center
- "Boot camp"-style business training using concepts such as Lean Start-up, Growth Wheel, and Business Model Canvas
- Business model and operations training through the Water Council and University of Wisconsin–Whitewater Institute for Water Business
- Mentorship from dozens of area water technology experts, plus direct access to BREW Preferred Partners, including: Wipfli (a large accounting and consulting firm), Michael Best & Friedrich LLP (a large law firm), University of Wisconsin–Madison Law & Entrepreneurship Clinic, and Global Water Center Executive in Residence
- Pitch coaching sessions with the Water Council
- Access to faculty and students from the University of Wisconsin–Milwaukee School of Freshwater Sciences and Marquette University
- Access to the Global Water Center's Flow Lab
- Access to pilot project funding
- Access to pilot sites via the Milwaukee Metropolitan Sewerage District
- Access to Global Trade missions—inbound and outbound
- Admission to conferences
- Participation in the Wisconsin Innovation Pavilion at the Water Environment Federation's WEFTEC annual conference
- One-year membership in the Water Council, providing access to its network and other programs
- Low-cost housing through the Mandel Group and other partners

OTHER WATER COUNCIL BUSINESS DEVELOPMENT PROGRAMS

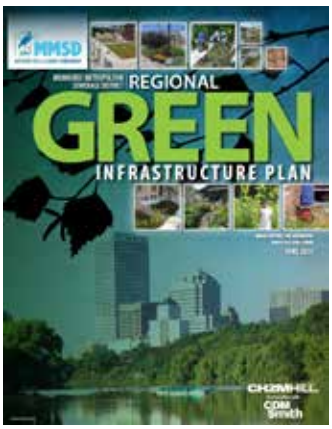
The Water Council has a number of other programs aimed at growing water businesses in the Milwaukee region and beyond. These include:

Center of Excellence (CoE) for Water Innovation & Small Business Development—In September 2014, the Water Council was awarded a Regional Innovation Cluster contract by the U.S. Small Business Administration (SBA). Under the SBA contract, the Water Council has developed the CoE to promote the growth and development of businesses operating in the water technology sector—first in the Midwest and then across the United States. The CoE serves as a mechanism for connecting small and medium-size water technology businesses to each other and to critical resources such as capital, networks, trained workers, supply chains, and facilities needed to catalyze and sustain growth. The CoE is developing systems that will help increase access to these critical resources, so businesses will grow faster, employ more people, and have a larger economic impact on their surrounding communities. By enabling small water technology businesses to shift from working in isolation to connectivity with the larger water technology industry while participating in a menu of CoE services, the program allows participants to significantly enhance their credibility and network, resulting in growth and profitability. Services include matchmaking with large and small businesses, connections to capital resources, training and workshop opportunities, export and procurement resources, mentoring, and an online Water Collaborative Innovation Platform (available in September 2015). There is no fee to be part of the CoE.[13]

- Small Business Forward—In 2014 the Water Council was selected as one of 10 participants in the JPMorgan Chase & Co. Small Business Forward program, a national, five-year, $30 million grant program designed to boost small business support networks that help growing enterprises in specific industries. This partnership will match the investment community with water technology entrepreneurs in order to increase the amount of capital in water innovation.[14]
- Water Summit—Held in Milwaukee, this event organized by the Water Council has expanded to a global agenda. With the June 2015 conference as its eighth year, the Summit attracts more than 400 water experts and a lineup of international speakers.[15] It is an important networking and branding event for water businesses.

MILWAUKEE METROPOLITAN SEWERAGE DISTRICT—PURSUING GREEN INFRASTRUCTURE SOLUTIONS

The Milwaukee Metropolitan Sewerage District (MMSD) is a regional government agency that provides water reclamation and flood management services for about 1.1 million people in 28 communities in the greater Milwaukee area. It serves 411 square miles that cover all, or segments of, six watersheds. Established by state law, MMSD is governed by 11 commissioners and has taxing authority.[16]



In 2013 MMSD created a systematic Regional Green Infrastructure Plan.[17] The plan outlines strategies and sets 2035 goals for significantly increased green infrastructure. While this program is relatively recent, MMSD had a preexisting stormwater best management practice and partnerships program dating to 2003.[18] The overall green infrastructure effort is known as Fresh Coast 740, which refers to the plan's objective to create enough green infrastructure in the region to capture 740 million gallons of water every time it rains.[19]

MMSD has multiple programs and efforts under way to promote implementation of green stormwater infrastructure measures within the built environment. In addition, the agency is working to support and grow the businesses that provide green infrastructure technologies and services. These implementation and business support efforts include:

- Funding programs that directly result in green infrastructure implementation and create demand for the services of green infrastructure providers
- Promotional efforts on behalf of green infrastructure technology and service vendors
- Development of tools to facilitate green infrastructure projects
- Support of new technologies
- Collaboration with local businesses and universities, including support of local entrepreneurs, much of which is catalyzed through the Water Council

Funding Programs

MMSD has engaged with public and private partners to install green infrastructure throughout the MMSD service area for the past 10 years. Projects are implemented by private companies; MMSD provides financial assistance. Currently, MMSD sponsors the following programs (for the purposes of this report, the details of these programs are not the focus; they are listed to show that MMSD provides many incentives that help stimulate demand for green infrastructure products and services):

- Signature Series Program—This is a cost-reimbursement program for eligible green infrastructure expenses for chosen applicants. Partners receive incentive funding for up to 50 percent of total project costs. These projects provide MMSD with information related to effectiveness, costs, and maintenance and help to meet stormwater capture goals.
- Green Roof Program—The Regional Green Roof Initiative is a cost-reimbursement program for eligible green roof expenses for chosen applicants. Partners receive incentive funding of up to $5 per square foot. These projects provide benefits to MMSD similar to those of the Signature Series Program.
- Rain Gardens Program—Plants are provided at a reduced price for rain gardens planted by homeowners, nonprofit groups, or businesses. Plants are sold in bundles of four 2.5-inch seedling pots for $7.20, about a 50 percent discount compared with retail prices.
- Rain Barrel Sales—MMSD works with local retailers to distribute MMSD rain barrels to citizens.[20]

MMSD believes that these programs have helped stimulate business growth. Since MMSD has been promoting green infrastructure for many years—longer than many other cities—Milwaukee has become known as a place that understands and buys green infrastructure technologies. Some green infrastructure companies have located in the area as result, and more appear to be coming; for instance, many of the companies in the Water Council's BREW program are focused on green infrastructure.[21]

Promotional Efforts

MMSD maintains a Green Vendor Resource List to further promote the use of green infrastructure (GI) and to serve as a resource for participants in MMSD green infrastructure funding programs and others with an interest in GI. MMSD's legal department determined that maintaining this list is legally acceptable because it offers no recommendations or endorsements.[22] MMSD has also implemented sustainable purchasing and workforce development policies to promote local businesses and workers. Programs include pre-apprentice training, internships, business capacity building seminars, and engineering and construction management training. Policies include minority- and women-owned business procurement targets. MMSD's website details these policies and programs.[23]

Support of Tools and Technologies

MMSD also developed an online green infrastructure GIS planning tool in collaboration with the Milwaukee Office of Environmental Sustainability. The tool is geared toward stormwater professionals and students engaged in community planning. MMSD hopes the tool will advance green infrastructure planning through open data sharing. The tool probably benefits consulting firms primarily.[24] Another interactive Web tool allows anyone to see the locations of currently installed green infrastructure measures in the region and is filterable on 11 technologies.[25]

Further, MMSD makes its facilities available for demonstrations of green stormwater infrastructure measures and has supported pilot studies with grants, as shown in the section below, "An Innovation and Collaboration Example." These grants are made from the agency's research and development budget.[26]

WATER COUNCIL/MMSD RELATIONSHIPS

When the Water Council was formed, MMSD immediately saw the potential benefits to its own mission. MMSD approached the Water Council to offer its facilities as a test bed for participants in Water Council programs, particularly for green infrastructure technologies, and in 2008 MMSD adopted a resolution officially allowing for such uses. MMSD appreciates the ability of Water Council–supported entrepreneurs to approach water management in different ways. When the companies use MMSD facilities, MMSD gets to see new technologies in action without making a large purchase. The companies obtain access to test bed facilities, branding that comes from having worked with MMSD, and eventually—if successful—purchases of products or services from MMSD.[27]

MMSD is currently developing a memorandum of understanding (MOU) with the Water Council and the nonprofit Fund for Lake Michigan. Under the MOU, MMSD and the Fund for Lake Michigan will provide funding, and Water Council participants will apply for grants, mainly for green infrastructure innovations.[28]

AN INNOVATION AND COLLABORATION EXAMPLE

Vegetal i.D. is a green roof technology company that participated in the first round of the BREW program. Headquartered in France and in operation since 1993, the company moved into the U.S. market in 2011 with an office in New York. Seeking a leg up in the market, it applied to the BREW program in early 2013. The firm's product and development manager, Gaelle Wormus, moved from New York to Wisconsin to take part in the program. The $50,000 seed funding for BREW participants was critical to making the move and contributed to the hiring of a sales project coordinator, Brennon Garthwait, who also participated in BREW.[29]

Through the BREW program, the Water Council introduced these staff members to MMSD and the nonprofit Fund for Lake Michigan. This led to development of a pilot study of Vegetal i.D. technology. The study is taking place on the roof of MMSD's headquarters building and is partially funded by a $53,000 research grant from MMSD and a $25,000 grant from the Fund for Lake Michigan. The University of Wisconsin–Milwaukee and University of Wisconsin–Whitewater are collaborators. The parties planned the project while Vegetal i.D. was in the BREW program. The technologies are now in place and are being monitored from spring through autumn of 2015. The pilot will evaluate the company's Hydropack modular green

roof tray and two versions of its Stock and Flow product, which provides quantifiable and controllable on-roof water storage capacity (typical green roof technologies have less predictable hydrologic effects). University of Wisconsin–Milwaukee students will monitor rainfall, water retention, water uptake by plants, ambient temperatures, and other factors to assess impacts on runoff hydrology, runoff water quality, urban heat island effect, and other potential effects of green roofs. In early 2016, economists from the University of Wisconsin–Whitewater will incorporate the physical results into benefit-cost analyses from building owner and utility/societal perspectives under scenarios of broader implementation. Among other questions, this analysis will address whether MMSD would benefit by changing its incentives for green roof implementation.[30]

Garthwait says that for his company, the most helpful aspect of the BREW program was the exposure and networking opportunities it provided. The introductions to MMSD and the Fund for Lake Michigan were critical to the pilot project. Further, he got to meet government officials and representatives of companies from across the United States and beyond who were visiting the Water Center. Also, Garthwait valued the opportunities for collaboration afforded by being in proximity to other water-sector companies with complementary objectives. He notes that this can lead to business deals. For instance, Hanging Gardens, a green roof supplier and design firm, was a lessee at the Water Center. The company now carries Vegetal i.D.'s products in its catalogs and incorporates them in its green roof designs. Vegetal i.D. is currently working on a business agreement with another Water Center tenant.[31]

At a broader level, Garthwait says the "community of support with other companies" was very valuable. The BREW participants met formally twice per week, and informally more often—whether during lunch breaks or hallway encounters. The ability to discuss ideas with others and obtain different perspectives was greatly facilitated by the many opportunities that shared space provides. For all these reasons, Vegetal i.D. chose to remain at the Water Center after completing the BREW program. The company might have been able to find cheaper space, but the benefits of being at the center were too important to give up. Garthwait also found the BREW program's use of outside experts—such as from the University of Wisconsin–Whitewater's Institute for Water Business—for classes and mentoring on business models, legal matters, accounting, market research, and other topics to be very helpful, and especially for the less-established companies in the program.[32]

COLLABORATION BETWEEN UNIVERSITIES AND UTILITIES

Another linkage within the Milwaukee-area water cluster occurs when local water organizations find and hire well-trained employees from local educational institutions. For instance, MMSD has hired and been very satisfied with students emerging with graduate degrees from the School of Freshwater Sciences at the University of Wisconsin–Milwaukee. As they gain a foothold, local start-ups supported by the Water Council are creating demand for qualified staff, and local universities are providing a pool of potential employees.[33] The Institute for Water Business program at the University of Wisconsin–Whitewater is another local source of talent.

Local water utilities also avail themselves of the analytical resources of local academics. In January 2012, MMSD contracted with the Center for Economic Development at the University of Wisconsin–Milwaukee to analyze the financial impacts of MMSD's green infrastructure strategies on property values for four selected study areas within the MMSD service region. The study included two residential, one commercial, and one industrial area. The focus was to measure the impact that the green infrastructure project had on either total assessment values or sale prices of the properties within the study areas. One of the study's main findings was that green infrastructure is positively correlated with higher property values.[34]

CHALLENGES AND KEYS TO SUCCESS

The Water Council has not focused on tracking jobs in the local water sector, although it does have a study on this topic now under way. According to Amhaus, the CEO, the Council's focus has been the general level of activity in the regional water-related business sector. There are several measures of the health of this sector. First, the Council has grown from 120 to 160 members in the past five years. Some of this growth is probably due to existing companies' joining, and some is probably due to new companies that the Council has helped develop. Second, the Global Water Center is fully leased, and demand has been deemed sufficient for the Council to embark on a new building, Global Water Center 2. Third, the University of Wisconsin chose to develop its own water technology center across the street from the original Global Water Center. Finally, the Water Council expects to announce soon that several major water businesses will be establishing facilities in the Milwaukee area.[35]

Kevin Shafer, executive director of MMSD, says that involving home-grown businesses and building on regional strengths were key to the success of the Water Council in organizing Milwaukee as a water hub.[36] Amhaus agrees

but notes that many people don't understand the idea of an economic development cluster. The focus of a cluster must be ingrained in the local DNA, he says. In this case, the Water Council brought together companies with local roots dating back over 100 years, and university programs established 40 years ago. Amhaus likes to quote the president of Badger Meter, who has said that "Milwaukee will not be the country music capital of the world." In other words, says Amhaus, "An economic development cluster is not something you create; it's something you discover and bring together."[37]

Another success factor was the Council's formation as a private nonprofit rather than a local government entity. This allowed it to move more quickly and take more risks. The Water Council's board of directors is mostly composed of leaders from the business sector; they run the Council like a business. There is no need for multiple layers of approval, as is typical of local government. The best example of risk-taking by the Council was its decision to proceed with development of the Global Water Center, a $22 million project. This decision was made when the Council was only 10 months old and had little financial history, and it was made in the midst of the Great Recession. The center is now fully leased, and the Council has a project under way to develop a second, similar building.[38]

Challenges faced by the Water Council have included limits on money and time and the need to match the demand and supply of participants. The council's original funds came from well-established local member companies, a local foundation, and a federal grant from the Workforce Innovation in Regional Economic Development (WIRED) program of the Bush administration (these grants are no longer available). Given the Council's successes, Amhaus says the organization's staff doesn't have time to respond to all the opportunities and possibilities that arise. For instance, the Council has been approached by investors of all types—angel investors, venture capital firms, private equity firms—who are interested in the water technology sector. Often there haven't been enough start-ups to match the interest of investors. Creating investment opportunities was one reason for development of the BREW program. Furthering connections between companies and investors was a major reason for the Council to become a participant in the JPMorgan Chase & Co. Small Business Forward program.[39]

The Council also had to overcome the skepticism of many in the region about organizing economic development around a water cluster. It had to make the case that the water sector is a significant component of the region's economy, that innovations in the sector create growth, and that demand from outside the region for water innovations will only grow as water becomes an ever more valuable resource globally. It also had to counter the idea that the Council was little more than a group of companies trying to sell their wares. The Council has that aspect but has shown it is much more; it is a network of many entities trying to build on the successes of one another.[40]

Challenges for MMSD included procurement regulations and practices, which affect contracts and also MMSD's ability to direct grants toward local small businesses involved with the Council. The forthcoming MOU with the Water Council and the Fund for Lake Michigan will help. It will leverage MMSD funds with other funds, and once approved by the MMSD Commission, it will provide a defensible rationale for targeting grant funds to Water Council program participants.[41]

Case Study

Clean Energy Works

From City Pilot Project to Statewide Success Through Contractor Engagement

Clean Energy Works (CEW) facilitates home energy and home safety retrofits. It began as a pilot project run by the City of Portland, Oregon, and is now the Northwest region's largest nonprofit facilitator of residential home performance upgrades.

THE CLEAN ENERGY WORKS BUSINESS MODEL

Energy efficiency improvements are at the heart of CEW's service offerings. CEW connects residential customers to a certified contractor who conducts a "100 Point Performance Check" and then recommends measures that may include heating and air conditioning improvements, air sealing and insulation, duct sealing, high-tech water heating systems, and energy-efficient windows. Additional services include solar energy system evaluations and assessments of indoor air quality and earthquake readiness.[42]

CEW's value proposition to its customers—homeowners—is the quality control and convenience it provides; it is a one-stop shop for home performance upgrades. CEW links customers to skilled contractors, provides quality control and oversight, brings lenders to the table to help finance each home upgrade, works with utilities and the Energy Trust of Oregon to package all available rebates, and in some cases can arrange on-bill financing that allows customers to pay back their loan on a utility bill.[43]

CEW carefully selects and certifies its participating contractors and ensures they meet stringent labor standards and demonstrate the highest integrity. All CEW contractors must:

- Employ key staff that are certified by the Building Performance Institute (BPI)
- Commit to pay a family-supporting wage
- Pledge to employ highly qualified minority and historically underrepresented tradespeople
- Agree to provide reasonable employee health care
- Provide quality service and complete jobs to the highest standards, as determined by a CEW Home Performance Advisor who works with the customer and contractor throughout the project and conducts a post-installation on-site quality review[44]

In return for meeting these standards, CEW supports its contractors (small businesses) in many ways. A key benefit is providing quality sales leads.[45] Potential customers complete applications on CEW's website, and CEW matches each one to a contractor who is well suited to the particular customer's needs. And by providing a one-stop-shop approach and start-to-finish quality assurance and advice from a Home Performance Advisor, CEW increases the chances a customer will engage the contractor.

CEW also supports contractors by ensuring they have the skills, knowledge, and capacity to complete sales and perform quality installations; by providing direct incentives for sales; and by building demand for home performance services through lender and consumer subsidies.

More specifically, these supports, which have changed over time as discussed below, have included:[46]

- Paying contractors for each audit (performance check)
- Paying contractors for each sale conversion
- Subsidizing loan interest rates
- Paying lender loan origination fees
- Providing additional rebates to consumers
- Paying for key contractor staff to obtain BPI certification
- Hosting a monthly breakfast meeting for contractor line and sales staff to discuss the latest technical developments, sales methods, and home performance industry best practices
- Providing annual sales training for contractor staff, using a third-party trainer

- Providing an external business expert for one-to-one consultations
- Connecting contractors to other business management resources such as Small Business Administration programs
- Setting up peer mentoring for newer contractors
- Providing a contractor development scholarship program to help minority- and women-owned firms qualify as CEW contractors
- Providing other, individualized support for minority- and women-owned firms
- Maintaining a regularly updated list of qualified minority- and women-owned firms that are available for subcontracting opportunities
- Organizing networking and home performance events where new minority- and women-owned firms can learn about home performance and CEW, and CEW contractors can meet available and qualified minority- and women-owned contractors and find ways to work as partners

ORIGINS: CLEAN ENERGY WORKS PORTLAND

The standards and general approach of CEW reflect its origins as a City of Portland program that began in 2009. Clean Energy Works Portland (CEWP) was a pilot program for saving energy, improving homes' comfort and value, and reducing carbon emissions while creating high-quality jobs for Portland residents. Portland's mayor was particularly committed to creating new jobs and making sure that economic opportunity would flow toward historically underserved populations: low-income people, women, and people of color. A document called a Community Workforce Agreement spelled out expectations. The program had a number of accomplishments, exceeding goals for trade/technical hours worked by people of color, doubling participation by women in construction compared with state and national rates, and achieving more extensive home retrofits than similar local programs elsewhere.[47]

The Portland Bureau of Planning and Sustainability (BPS) developed and funded CEWP with funds from the American Recovery and Reinvestment Act of 2009 (ARRA) Energy Efficiency and Conservation Block Grant program.[48] This original ARRA allocation was relatively unrestricted, and BPS chose to create a fund for consumer home performance loans, to help build demand for home performance services.[49] Using $1.1 million in ARRA funds and city resources, BPS capitalized a revolving loan fund to offer pilot participants low-interest, long-term financing for home energy efficiency remodels. The bureau also worked with a community development financial institution (CDFI), Enterprise Cascadia (now called Craft3), to attract additional public and private investment. A CDFI is a specialized financial institution, certified by the U.S. Department of the Treasury, that works in economically distressed target markets and other market niches that are underserved by traditional financial institutions. It often does so by gathering financial resources from below-market-rate sources. Enterprise Cascadia obtained $2 million from private investors. CEWP's funding support also included program-related investments from foundations as well as contributions from banks such as Chase and Wells Fargo. In the end, the total loan portfolio amounted to nearly $7 million. The pilot launched in the summer of 2009. CEWP made its 500th loan in late February 2011, bringing the pilot to a conclusion.[50]

The pilot tested whether people would install comprehensive energy efficiency upgrades in their homes within a short time frame if they were offered a comprehensive package of services and benefits, including:

- Easy access to long-term financing to cover the upfront costs (at the time, 20-year loans at 5.99 percent)
- The services of an independent building science advisor, called an energy advocate
- The convenience of repaying the monthly loan obligation via the heating utility bill[51]

Results from the 500-home pilot project suggested that this approach to selling energy efficiency was compelling to consumers. Not only did CEWP participants undertake more extensive home retrofits than their counterparts in other local efficiency programs, but they made the decision to do so in a much shorter time frame. Ninety-four percent of participants surveyed said they would recommend the program to friends or family.[52]

In addition to stimulating the local energy efficiency economy, key CEWP goals included providing qualified contractors to program customers and ensuring that employers were hiring locally for quality positions. BPS and multiple stakeholders crafted an agreement on "high road" goals and pilot program strategies, originally called the Community Workforce Agreement (CWA).[53] The CWA spelled out CEWP program goals and targets, individual contractor qualifications and requirements, methods for establishing a CEWP contractor pool, requirements for qualified training programs, types of assistance to be provided to contractors and training programs, accountability standards for the program's Evaluation and Implementation Committee, and roles and expectations of the agreement's signers.[54]

Requirements placed on participating contractors and their subcontractors included paying wages that were at least 180 percent of the Oregon state minimum wage, hiring new workers from designated training programs, demonstrating certain qualifications, signing a labor peace agreement, and agreeing to various reporting requirements. In addition, the CWA spelled out a "best value contracting" approach to selecting contractors for the CEWP pool during the solicitation for participating contractors. The approach allowed for the weighting of applicants based on such attributes as being an Oregon-based company; hiring at least 80 percent of employees from the Portland metro region; providing health insurance to employees; having track records of hiring and retaining historically disadvantaged or underrepresented people, and of exemplary customer service; and having well-described plans for establishing subcontracting relationships and "mentor-sub" relationships with businesses owned by historically disadvantaged or underrepresented people. The CWA also allowed for a separate solicitation to "seek contractors that employ social enterprise models and/or partner with nonprofit, community-based organizations that provide support and training services for low-income individuals embarking on a career pathway to economic self-sufficiency in the building and construction trades."[55]

While other communities have experienced procurement issues regarding the targeting of work to certain types of firms (for instance, local businesses), Portland did not. The mayor asked the city attorney to use equity as a lens through which to apply procurement laws, and the community was behind this notion. Further, home performance was a budding business sector populated mostly by small, local firms rather than large and nonlocal businesses. Thus, no procurement difficulties arose in drawing up and applying the CWA.[56]

The CWA itemized the types of support that the pilot program would provide participating contractors (contracting firms), as follows:

1. "Cultural competency and inclusive and harassment-free workplace training
2. Assistance for contractors to find subcontractors that are historically disadvantaged or underrepresented, including people of color- and women-owned businesses
3. Assessment to ensure support is directed as needed to succeed. For example, the Evaluation and Implementation Committee can assist Primes [primary contractors] in assessing Mentor-subs [firms working under subcontract to an approved CEWP contractor] so that Mentor-subs can be prepared to bid as a Prime in following rounds of contracting
4. Increased capacity to provide on the job training
5. Technical assistance developing mentoring programs for underrepresented employees
6. Technical assistance providing health insurance to employees
7. Scholarships for BPI certification for businesses owned by historically disadvantaged or underrepresented people, including people of color- and women-owned businesses
8. Technical assistance with bonding and allaying homeowner fears while hiring formerly incarcerated individuals"[57]

The CWA also listed the following types of support that training programs would receive:

1. "Funding for qualified training programs that focus on training for weatherization
2. Funding for Pre-Apprenticeship programs and other programs that focus on connecting disadvantaged populations to jobs and careers in weatherization and construction
3. Scholarships to provide opportunities for individual weatherization workers to participate in an advanced occupational training as part of an articulated Green Job Pathway"[58]

In March 2011, Green for All issued a report that documented implementation of CEWP and CWA. It summarized indicators of program success to date (based on completion of 434 of the 500 home energy upgrade projects) in terms of energy savings, numbers of participating contractors and workers (15 primes, 51 subs, 381 workers including 29 new hires), job quality, and diversity of contractor firms and workers. The report stated, "With a clear-eyed commitment to high-road outcomes, Portland has leveraged the collective expertise of its community to produce results." It lauded the program for moving the high-road approach from concept to practice and noted that the program had blazed a path toward scale-up.[59]

THE CHALLENGE OF TRANSITION

The success of the pilot program led to statewide implementation. In June 2010, Portland received a $20 million grant from the U.S. Department of Energy's Better Buildings Neighborhood Program to expand Clean Energy Works Portland to other parts of Oregon. To facilitate this expansion, BPS created the nonprofit organization Clean Energy Works Oregon Inc. (CEWO) to deliver energy efficiency services to homeowners throughout the state.[60] CEWO now goes by the name Clean Energy Works (CEW).

From CEWP's start, the City of Portland and its partners had envisioned scaling-up the program.[61] The Department

of Energy grant, and some additional state funding, gave the new nonprofit's sponsors and management a multiyear window to expand the program and achieve financial self-sufficiency. CEW is now in the final stages of the transition process and will break even in 2015. According to Derek Smith, who developed CEWP at the Portland BPS and became CEW's first and current CEO, continued success will depend on achieving sufficient volume. Toward that end, CEW is working to bring in new "channel partners" for development of sales leads, such as real estate agents.[62]

CEW's origins and objectives have made for a challenging transition to financial self-sufficiency. CEWP sought to create a new sector of the local economy focused on home energy performance. This required CEWP to provide many types of support including direct and indirect subsidies to contractors. Today, for CEW to remain self-supporting and financially viable, it has had to reduce or eliminate subsidies and begin earning revenue by charging contractors for services—while still providing them with sufficient value to keep them participating and in business.[63]

As one example of these changes, the program originally supported the sector by subsidizing lenders' loan origination fees to homeowners. It no longer does so. As another example, it began charging contractors for each sales lead it provides, albeit at a below-market rate. Then it instituted a contractor charge of 4.5 percent of the value of each home improvement project closed by the contractor. Multiple other changes have occurred in the past several years. The final change, occurring this year, will be to no longer pay contractors for each audit (performance check) they perform.[64] To date, these changes have not significantly affected consumer or contractor participation. The new charges to the contractors are invisible to homeowners. Contractors are largely absorbing these costs because in the open market such fees would be similar or greater, and because CEW provides additional value that more than offsets the new costs. This value includes CEW's level of service to customers (homeowners) and support of the contractors' sales processes.[65]

Throughout, the high-road approach has remained a guiding principle for CEW.[66] This places requirements and expectations on contractors beyond those of the market.

As the program and the economy have changed, so too has contractor participation. At its peak, the program had 50 approved contractors. It now has 27. However, much of this attrition has been due to improvements in the economy. When the program started during the economic recession, many contractors sought new ways to drum up business and saw home energy performance as one opportunity. As the economy has improved, many have gone back to their former specialties. The contractor firms remaining with CEW are more focused, and many are mission-driven believers in energy efficiency and building science.[67]

KEYS TO SUCCESS

Despite the program changes and their cost implications to contractors, CEW continues to provide value to participating contractors, particularly by offering quality sales leads and a consumer support framework that helps contractors close sales. CEW also will continue to offer certain types of support such as contractor training.

One key to success has been to stimulate consumer demand. This takes multiple levels of consumer education.[68] Approaches include working with the Energy Trust of Oregon and other organizations, developing a highly polished CEW website, and providing each customer with a Home Performance Advisor. Loan subsidies and additional rebates for consumers were also important to early and mid-term success.

At this time, the program supports approximately 1,000 home retrofits per year. This demand is clearly critical to many of CEW's contractor firms. CEW management says it's hard to know how much of this volume to attribute to "early adopters" who are predisposed to undertake energy efficiency projects, and how much to the financial incentives that have been offered. Going forward, CEW will continue to promote and improve the value proposition to homeowners. One financial component of this, besides reduced utility bills, is the potential positive impact on property value. A home that uses less energy (and thus has lower operating costs) and is more comfortable (for example, compared with a drafty pre-retrofit home) should be more valuable. This benefit should drive additional participation, but many consumers are not aware of it. CEW is working with appraisers, real estate agents, local government, and others to make this benefit visible. One objective is to incorporate energy performance scores into the Master Listing Service used by real estate agents and into property data used for property taxes. CEW now calculates pre- and post-retrofit energy performance scores for each of its customers. Ultimately, policy initiatives such as requiring disclosure of scores when homes go on the market would spur additional demand.[69]

Another key has been to align incentives. Specifically, the program was designed for contractors to make the sales calls, not program staff. Local energy efficiency programs that have used nonprofit staff to make sales calls have had much lower sales conversion rates.[70]

Probably the major key to success with the transition has been the extensive engagement of CEW, and CEWP before it, with contractors. According to Derek Smith, CEW was completely transparent with contractors, lenders,

utilities, and the general public about upcoming program changes—withdrawal of subsidies and initiation of various charges—starting three years before those changes began to take place. Many of the changes were worked out in collaboration with the other parties. Smith says, "The most important thing is to sketch out a plan and a business model in open dialogue with contractor leaders and work toward that business model together. It's a public process of negotiating to that outcome."[71]

As one part of this engagement approach, in 2011 CEW, the City of Portland, Enterprise Cascadia, and the Energy Trust of Oregon helped a fledgling contractor association, the Home Performance Guild of Oregon, hire its first executive director.[72] According to Smith, CEW told the association about CEW's program, "If it doesn't work for the contractors, it doesn't work." Smith also inculcated this philosophy with the staff of CEW. In return for its support, CEW told the Guild it needed to be a transparent, statewide organization; to provide one voice for the contractor community; and to support the high-road approach.[73]

Together with the Guild, CEW has worked hard to keep communication channels open with the contractor community. Smith says the continuing question to the contractors is "How do we get the points of value right for you?" CEW staff members participate in trade association board and general meetings. Each month, CEW hosts an open contractor call using an online webinar platform. Additional communication occurs through the monthly and annual training sessions CEW provides. One step CEW took to ensure adequate dialogue with the contractors was to hire a director of contractor services and policy with tremendous credibility with the industry: the president of the Guild's board, Marshall Runkel, who was previously a contractor participant in CEWP and CEW.[74]

When CEW implemented charges for sales leads, some contractors questioned the quality of the leads they were getting. In turn, CEW asked about the quality of the sales efforts by contractors. Through dialogue, the parties realized that additional sales training for contractors would be helpful, and CEW developed and continues to offer such training.[75]

Another key to success has been to remove unnecessary burdens on contractors—in other words, to reduce contractor overhead and costs associated with participation in the program. Dialogue has been key here as well. For example, an issue that emerged through monthly training breakfasts was the reporting burden: documenting wages, achievement of quality standards, and so on. These concerns led to reporting changes and improvements in CEW's contractor-facing IT systems. CEW also amended the size of the home energy audit, reducing from 400 to 100 the number of data points contractors were required to collect. Says Smith, "It's a constant process of extracting negative value."

Runkel puts it this way: "We give the contractors lots of input on program design and policy. Program designers are not the program implementers. You have to put the two together." He adds, "The particulars are less important than the engagement, flexibility, and desire to work with contractors to come up with solutions that help them."[76]

Case Study

AdvantageWest

20 Years & Counting: A Proven Leader in Economic Development

AdvantageWest is a nonprofit whose primary focus is supporting business ventures in western North Carolina. It has expanded its programs to promote local business generation through an impressive array of start-up funding opportunities, entrepreneur networking and support programs, and business incubators.

MISSION AND BACKGROUND

Since its establishment in 1994 by the North Carolina General Assembly, AdvantageWest has focused on bringing businesses into its 23-county service area.[77] AdvantageWest's goals exhibit the triple bottom line of people, planet, and profits, which is reflected by its mission statement:

> "AdvantageWest shall promote and advocate the creation of improved economic opportunity in our region, while encouraging stewardship of the culture, heritage, and natural resources of Western North Carolina."[78]

ADVANTAGEWEST
Economic Development Group
NORTH CAROLINA'S MOUNTAINS

AdvantageWest's main areas of focus are advancing manufacturing, entrepreneurship, filmmaking, the green economy, and agribusiness.[79] AdvantageWest has multiple programs and efforts under way to promote and support entrepreneurship across the business life cycle. These efforts include:

- Funding programs to assist start-ups and businesses wishing to expand
- Networking and support programs to connect entrepreneurs to critical resources
- Business incubators to provide focused business development support and drive innovation

FUNDING FOR ENTREPRENEURS

AdvantageWest created the Blue Ridge Entrepreneurial Council (BREC) program in 2003 to assist entrepreneurs through an integrated approach, combining capital formation, mentoring and networking, and connection to critical resources.[80] Early-stage funding and business coaching is provided to entrepreneurs through two programs, the Advantage Opportunity Fund (AOF) and the Blue Ridge Angel Investment Network (BRAIN).

brec
BLUE RIDGE ENTREPRENEURIAL COUNCIL

The AOF program was established in 2007 and combines targeted early-stage business financing and entrepreneur development support. AOF operates as a revolving loan fund, and program participants pay back into the fund. Loans are provided to start-ups in two parts. To qualify for an initial, Phase I loan, applicants must:

- Own a formal company registered with the State of North Carolina and have the principal place of business located within the AdvantageWest region
- Have a minimum of one full-time employee dedicated to the business
- Have a business plan or general execution plan in place
- Sign a formal letter of engagement to participate in the TCC program
- Correctly and completely prepare a loan application
- Be willing to present to the AOF Investment Committee and the AdvantageWest Board of Directors

Phase II loans are available for companies meeting agreed-upon Phase I revenue or execution goals, set in the Phase I loan terms.[81]

In addition to loans, the AOF program provides a formal entrepreneurial training, coaching, and development program co-managed by BREC and the Blue Ridge Tech Ventures program at A-B Tech Community College.[82]

In the past seven years, AOF has grown its initial seed investment of $40,000 to a total of $1.2 million in loan funds through fund replenishment by successful loan recipients and strategic partnerships with organizations including the federal Small Business Administration and two nonprofits, the Sequoyah Fund and the Rural Center. To date AOF has provided 32 loans to 26 companies across the region, attracting additional investments of $11.1 million and creating 119 jobs.[83]

AdvantageWest also manages the BRAIN program, which connects entrepreneurs with individual and institutional investors interested in innovative companies. AdvantageWest utilizes two venues for these connections: BRAIN-Online, a web-based platform showcasing growth companies in the AdvantageWest region, and occasional BRAIN pitch and demonstration events.[84] Investors are required to be accredited by the Securities and Exchange Commission, have track records managing and building successful companies, lead the due diligence process, structure investments, coach entrepreneurs, and participate in a peer network of domain expertise and contacts for subsequent funding, talent, and technology.[85] Entrepreneurs interested in the BRAIN program must complete a self-assessment business profile, which is reviewed by a BRAIN steering committee.[86]

ENTREPRENEUR NETWORKING AND SUPPORT

AdvantageWest has a multifaceted approach to entrepreneur networking and support programs, which it delivers through business clusters, web-based tools, and personal consultations.

AdvantageWest has worked within industry sectors to develop these business networks. One interesting example has been the group's work with the outdoor gear manufacturing industry. After several years of gauging interest and developing stakeholders, AdvantageWest created the Outdoor Gear Builders (OGB) of Western North Carolina, a business cluster network that has grown from 3 companies to 26 and is financially sustained through modest membership dues. A senior manager with the program stated that it "has been really powerful for opening up opportunities for those companies through product development and innovation, marketing, and human resource talent perspectives. Through cluster association, these firms are innovating at above-average levels."[87]

AdvantageWest has developed web-based tools like eLaunch, its interactive directory to connect entrepreneurs with services ranging from prototyping to mentors. The directory of services is open to the public. Entrepreneurs can also create an account and receive additional functions, such as tailored service searches, the ability to save relevant resources to their account, and use of an online tool to contact services directly. AdvantageWest also has a Web page called "Getting Started 101" to provide entrepreneurs new to a business or the region with information on topics such as business planning and applicable regulations. These topics are linked to frequently visited business start-up articles provided by the North Carolina Department of Commerce.[88] AdvantageWest also offers business data to assist with site selection and business planning, including regional statistics, infrastructure information, cost estimates for doing business, workforce statistics, and county profiles and demographics.[89]

Additionally, AdvantageWest can provide custom consultations, which a manager describes as "one-on-one, zero-to-sixty sessions where we sit down with a new company and help them get plugged in to the region and oriented. We assist with everything from raising funding with our programs or external sources, to connecting with critical resources such as business advisors, to legal support."[90]

BUSINESS INCUBATORS

AdvantageWest has partnered with a number of organizations to create and support business incubator programs. One example is Blue Ridge Food Ventures, a facility built in 2005 that supports food entrepreneurs through product and process development, training programs, and branding consultation. This program has been highly successful in helping local entrepreneurs launch their companies and has recently incorporated third-party manufacturing capabilities, which have made it the first financially independent incubator of its kind.[91]

Another example is Accelerating Appalachia, which focuses on nature-based businesses. Started in 2013 in partnership with AdvantageWest, it works to attract and support new companies in sectors including sustainable food, farming, forests, fiber/textiles, clean energy, green building, craft brewing/distilling, and nutraceuticals/integrative medicine. The accelerator is based in Asheville, North Carolina, and is open to applicants from across the country. The program brings experienced mentors to coach new entrepreneurs on pitches for funding and expansion of their networks. Accelerating Appalachia aims for at least half of its participating businesses to raise $500,000 within 18 months of completing the program.[92]

Sara Evans, the program's founder, shared lessons learned so far:

> "Our curriculum appears to serve the earlier-stage businesses the best, with need for one-on-one consulting for the more mature businesses. We also learned that we need to introduce the financial/investment curriculum earlier and spend more time there—on the different types of investment (equity, lending, revenue share) and on the pros and cons of taking on each of these types of investment."[93]

ScaleUp WNC is AdvantageWest's newest partnered program and is geared toward accelerating existing businesses. Funded by a U.S. Small Business Administration grant, the program will provide intensive growth strategy development and implementation assistance to two cohorts of 15 small businesses annually for five years, from 2015 to 2020. Program elements include an entrepreneurship education curriculum, management assistance and support, access to capital through preparation of investor due-diligence backup documentation, matchmaking events, introductions to local lenders and investors, and structured networking with peer entrepreneurs, support resources, mentors, and potential supply chain partners.[94]

KEY PROGRAM ELEMENTS

AdvantageWest has learned that feasibility studies, business plans, and stakeholder buy-in are important to successful program development. One senior manager noted that "feasibility studies were critical to the success of programs such as Blue Ridge Food Ventures, as were setting up goals and operating models and identifying market needs." He also noted that it is important to engage stakeholders, such as businesses and local government officials, early and collaborate on fundamental program elements such as program definitions, and to make sure that "things align with the mission and visions of key stakeholders."[95]

AdvantageWest acts as a catalyst for business development and is always driving toward economic sustainability. For example, it worked on developing clean energy businesses, but now that western North Carolina is a leader in clean energy it has taken a step back. According to one source, "We did a lot of work a few years ago to help kick-start clean energy programs but haven't had as much ongoing programs and intervention in that space because of the hugely different funding atmosphere with federal and state funding programs."[96]

Looking to the future, AdvantageWest would like its programs to become financially self-sufficient and, in some instances, even become separate nonprofit ventures. Examples include setting up its venture capital funds to act as self-sustaining revolving funds, and creating revenue-generating manufacturing facilities with its Blue Ridge Food Ventures program.[97]

AdvantageWest programs showcase the benefits of combining funding support with open-source data, mentoring, and academic and nonprofit partnerships focusing on education and business incubation and acceleration. This integrated approach provides diverse avenues for financing entrepreneurs, as well as the support needed to achieve and maintain success across the business life cycle.

Case Study

San Jose Clean Tech

World Leader in Clean Tech Innovation

San Jose's Green Vision plan aims to transform the city into the world center of clean technology innovation; promote cutting-edge sustainable practices; and demonstrate that the goals of economic growth, environmental stewardship, and fiscal responsibility are inextricably linked.

MISSION AND BACKGROUND

On October 5, 2007, San Jose adopted a set of goals to encourage positive environmental change. The initiative emphasizes three major elements: clean technology (clean tech), sustainability, and green mobility. This case study focuses on the clean tech element.

San Jose is working to stimulate the local economy to create new markets and jobs by promoting the development of the clean tech industry.98 The specific goals of this program are to:

- Create 25,000 clean tech jobs by 2022, focusing on well-paying jobs that cannot be outsourced
- Position San Jose/Silicon Valley as the "World Center of Clean Technology Innovation," a place where entrepreneurs from around the world come together to solve the greatest challenges facing our planet
- Demonstrate to the world that the transition to a clean economy can spur economic growth, reduce operating expenses, and improve quality of life99

Critical components in achieving these goals include access to venture funding, worker training, research institutions, supportive government policies, and technology incubators and demonstration centers.[100] Three specific programs of interest are San Jose's demonstration partnerships, business incubators, and a competition-based business accelerator called the Cleantech Open.

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

DEMONSTRATION PARTNERSHIPS

San Jose has developed a Demonstration Partnership Agreement with the purpose of testing, evaluating, and/or demonstrating innovative solutions in partnerships that follow set goals and meet the requirements of established guiding principles. Demonstration partnerships fall into one of three categories:

PILOT PROJECT—An evaluation of a product, process, service, or information technology currently available in the U.S. marketplace that the city wants to explore as a means of improving city services

DEMONSTRATION/TESTING—A project initiated by an outside party that has asked the city to provide land, facilities, right-of-ways, equipment, and/or data for the purpose of testing, evaluating and/or demonstrating the outside party's innovative solution

MUTUAL DEVELOPMENT OPPORTUNITY—A demonstration or testing partnership that the city has identified as a potential candidate for a contribution toward economic development and/or has the potential for a benefit for use by the city

Demonstration Partnerships are evaluated and prioritized by the following criteria:

- Consistency of the goals of the proposed partnership with the city's mission and core services
- Consistency with existing laws, city policies, and practices
- Balance between the potential benefit of the partnership and the level of risk assumed by the city

- Potential for actual or perceived conflicts between demonstration partners' and the city's goals or business practices

Once demonstration partners are approved, San Jose provides them with access to city-owned land, facilities, equipment, rights-of-way, data, financial assistance, and requests to the City Council to exempt projects from specific policies.[101]

Initially, San Jose issued requests for proposals (RFPs) for demonstration partnerships to gain interest from the entrepreneurial community. Over time, the city's strategy has shifted to general marketing campaigns to entrepreneurs, who provide a steady stream of applications. According to a program official, "Early on, the RFP approach was the right way to go because it allowed us to reach a broader audience and demonstrate the seriousness of our intent." It also broadened San Jose's network of contacts within the entrepreneurial community, which facilitated the program's transition to direct engagement. Another early strategy was not including criteria for size, scope, or project type in the RFPs because San Jose was still figuring out its capacity for program support. As the program has matured, San Jose has clarified its evaluation criteria in terms of project size, commercialization plans, and benefit to the city and now focuses on clear definition of target demonstration partnership size and scope.[102]

BUSINESS INCUBATORS

San Jose has a number of business incubators, including the nation's first environmental business incubator, the San Jose Environmental Business Cluster (EBC), which was formed in 1994. The EBC has helped more than 145 companies and received the top ranking in the number of technologies successfully commercialized in a recent U.K. study of 110 clean energy commercialization centers around the world. The EBC also received the National Business Incubation Association's 2008 Randall M. Whaley Incubator of the Year award as the nation's top incubator.[103]

In a recent move, San Jose teamed with sponsors and a variety of private and public partners including Wells Fargo, BMW, Cisco, the U.S. Department of Energy, universities, and nonprofits to develop a clean tech innovation support program called Prospect Silicon Valley (ProspectSV).[104] ProspectSV is located at the San Jose Environmental Innovation Center and was created as an independent nonprofit organization that supports entrepreneurs, start-ups, and other companies demonstrating innovations in transportation and mobility, building technology, energy systems, and the environment. The goals of the ProspectSV program are to:

- Facilitate prototype development, testing and demonstration of emerging solar, clean transportation, energy efficiency, smart grid, storage, and other clean tech in Silicon Valley
- Increase commercialization of grant-funded applied research in clean tech through partnerships with universities, government agencies, and research labs in order to help meet city, state, and national environmental priorities
- Create a clean tech portal to foster better collaboration among academic partners, national laboratories, start-up companies, incubators, accelerators, business plan competitions, workforce training groups, financiers, and global partners in order to grow the clean tech industry
- Become the leading clean tech innovation and commercialization center for Silicon Valley and the world[105]

To support these goals, ProspectSV operates the San Jose Demonstration Center, which includes 22,500 square feet of exhibition space, research labs, vehicle lift and shop equipment, and a vehicle simulator facility. The center can accept new energy-efficient building technology including photovoltaic, energy storage, and electric vehicle charging.[106] ProspectSV also acts as scout and technology reviewer for San Jose's demonstration partnerships program.[107]

San Jose also operates a more broadly focused independent Entrepreneur Center (eCenter), which provides the following support to more than 10,000 entrepreneurs annually:

- Business management counseling for potential and existing small-business owners
- Technology consulting to facilitate and support the technology implementation process
- Financial assistance in the form of microloans, Small Business Administration financing, and commercial real estate financing
- Small-business management training, including managerial development, accounting principles, operations, market research, technology, and industry-specific needs
- Assistance in finding public and private procurement opportunities and certification programs to help businesses become government contractors
- International trade information, training, counseling, and consulting

- Immigrant business assistance programs that focus on immigrant business owners' special needs and provide guidance in their native language[108]

These services are provided by eCenter staff, as well as the following partners, which have representatives on site:

- AnewAmerica—A nonprofit whose mission is to promote the long-term economic empowerment of new citizens, immigrants, and refugees
- Hispanic Chamber of Commerce Silicon Valley—A nonprofit that promotes and maximizes economic development opportunities by providing business development planning, financial assistance, business referrals, marketing, and training
- Silicon Valley Small Business Development Center—A nonprofit that helps small businesses through counseling and training
- U.S. Small Business Administration (SBA)—An independent federal agency established by Congress to assist, counsel, support, and protect small-business interests and to assist in their start-up and growth
- TMC Development—A company certified by the SBA to provide funding for small businesses under the SBA 504 program[109]

CLEANTECH OPEN

San Jose also partnered with the Cleantech Open, a not-for-profit organization that runs the world's largest accelerator for clean tech start-ups. Since 2006 they have worked together to find, fund, and foster entrepreneurs who address energy, environmental, and economic challenges. The Cleantech Open has a large network to support its mission, including more than 1,500 professional volunteers, 600 alumni companies, sponsors, venture capitalists, mentors, and experts in business and clean tech, and strategic partnerships with government agencies, labs, universities, businesses, and media outlets.[110]

Among the fundamental aspects of the Cleantech Open are its competitive programs, such as the Accelerator Competition, in which entrepreneurs:

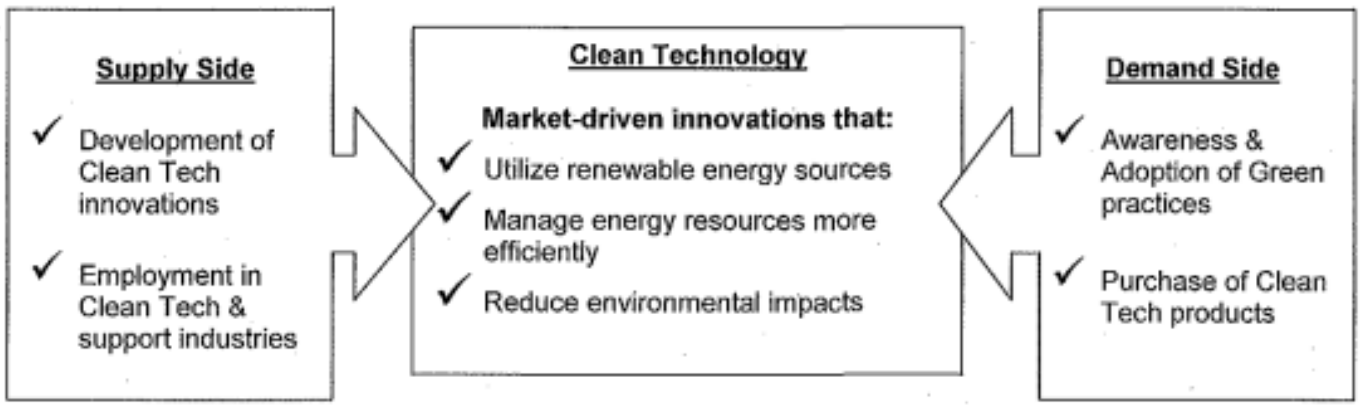
- Compete for prizes valued from $10,000 regionally to $200,000 nationally
- Attend intensive three-day workshops at the National West Coast or East Coast Academy, focusing on the best practices of clean tech entrepreneurship, refining a business model, product validation, sales and marketing, intellectual property, how to pitch, how to access capital, and more
- Engage subject matter experts in a 10-week series of Cleantech Open Training Webinars
- Gain access to mentor, investor, and sustainability programs
- Take advantage of showcasing opportunities at regional and national events
- Get passes to all regional and most national events for a company and its team members[111]
- The Cleantech Open has assisted 865 U.S. companies, and nearly half have gone on to raise external capital now totaling over $950 million.[112]

KEY PROGRAM ELEMENTS AND ACCOMPLISHMENTS

San Jose has adopted a holistic plan to achieve its goals, influencing both supply and demand factors to spur economic activity, as depicted in Figure 1.[113]

Early in program development, San Jose performed a cluster analysis, a process that involves grouping a set of objects in such a way that objects in the same group are more similar to each other than to those in other groups. This process is important when performing exploratory data mining and is a common technique for statistical data

Figure 1



analysis. The general framework shown below summarizes the cluster analysis San Jose used to identify specific target industries and determine that renewable energy, green building, and green transportation were the best subsectors of clean tech for the focus of its efforts (Figure 2).[114]

Clean tech is a capital-intensive, research-driven field, and businesses often require long incubation times. In recognition of this, San Jose developed an aggressive, expanded model for facilitating and supporting companies at every stage of their business processes, as depicted in Figure 3.[115]

Figure 2: Clean Technology Cluster Analysis

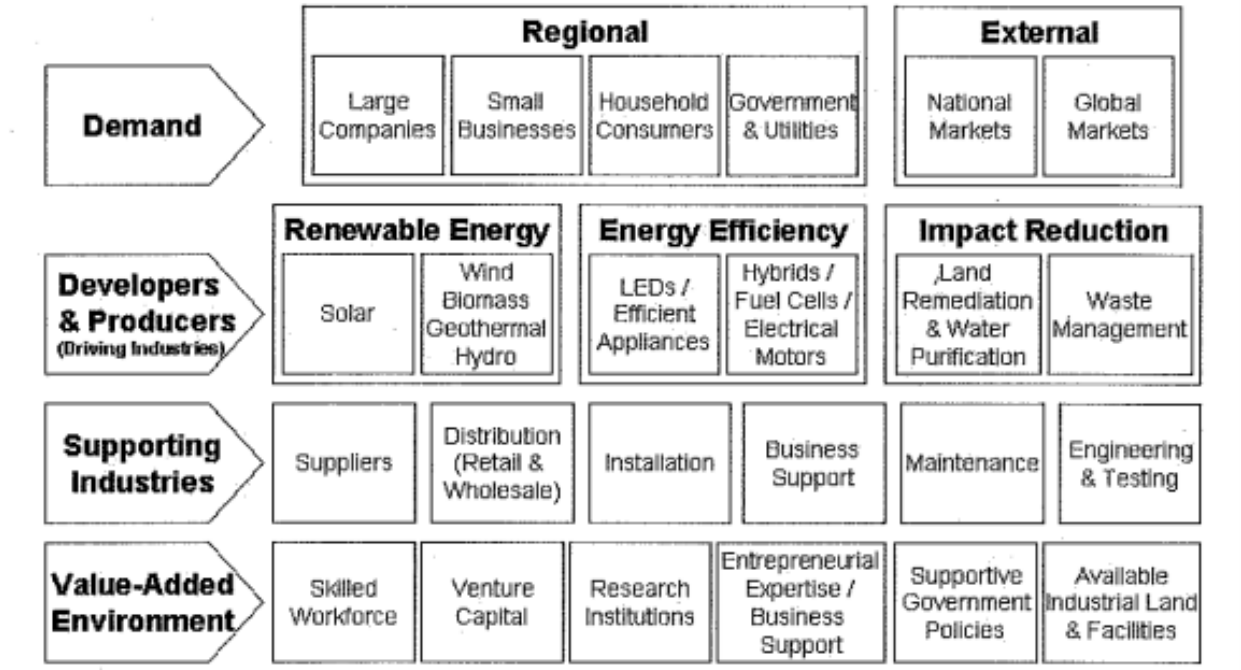
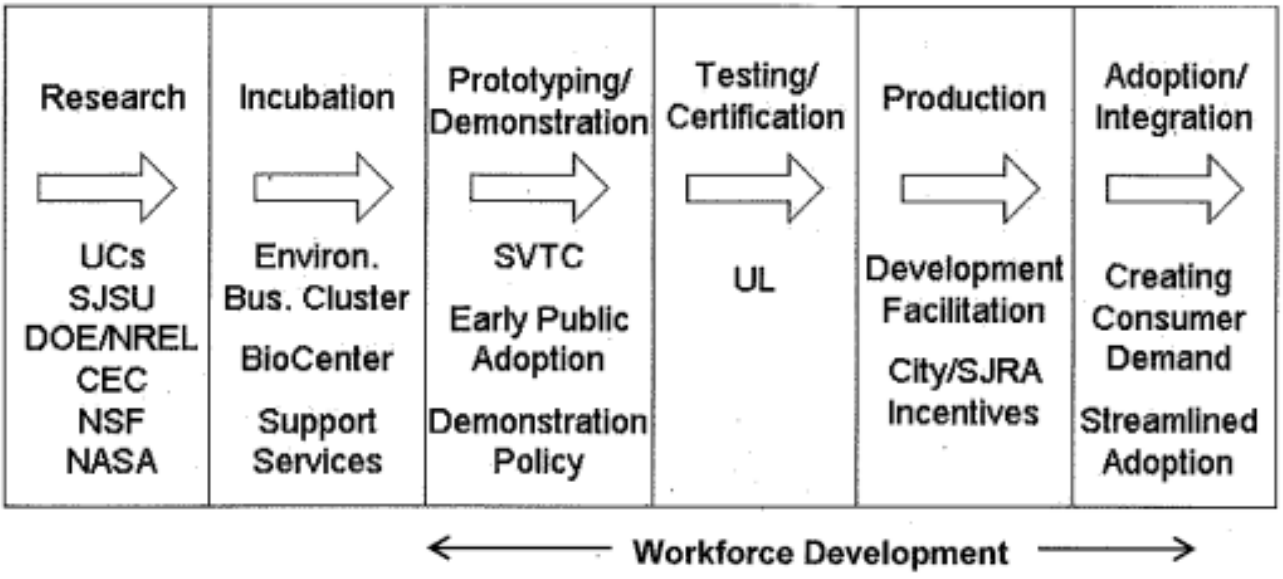
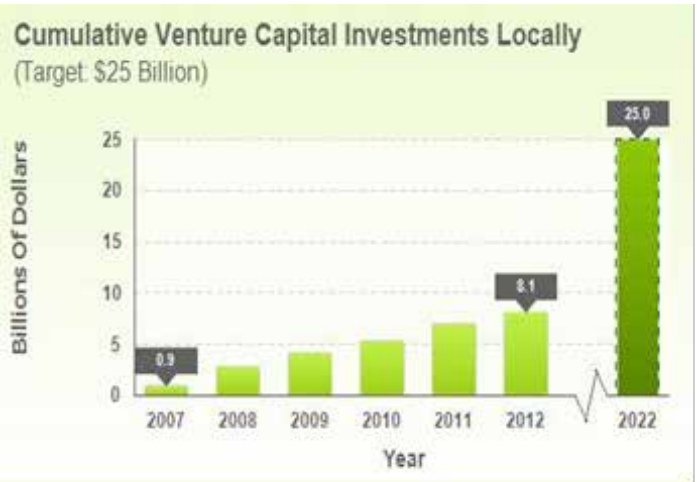
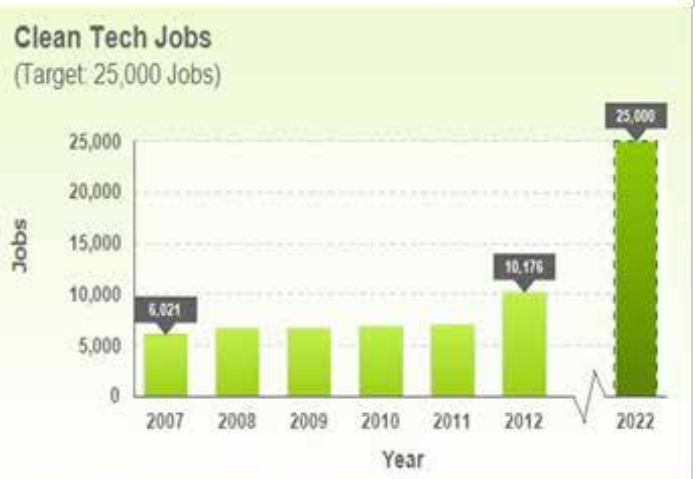


Figure 2: Integrated Model for Clean Tech Development







One of the main challenges in implementing these entrepreneur support programs has been staffing capacity at city agencies. For example, it takes the city attorney's office a great deal of time to prepare demonstration partnership documents because the diverse nature of the program does not lend itself to a standard contract template. Depending on the project, a customized lease, license, or general agreement may be more appropriate.[116]

Any entrepreneurial support program must recognize that entrepreneurs are highly concerned with protecting their intellectual property (IP). This impacts the city attorney's office because it requires a great deal of IP law expertise, something that city attorney offices generally do not have. Another challenge is working through acceptable-risk profiles with entrepreneurs during product deployment. Entrepreneurs understandably have very low risk tolerance with regard to their IP, but the city cannot always push risk down to zero; it would be cost prohibitive to, for example, post round-the-clock security guards at every product deployed in the city.[117]

As San Jose's clean tech support programs grow and mature, they continue to bring in more strategic partnerships and nonprofits and are always looking for new ways to innovate. One excellent example of this continuous improvement and innovation is current work to develop a designated transportation innovation zone. This will be an area in which companies can experiment with transportation-related clean tech, such as new technologies for traffic signals, new forms of pavement, and driverless vehicles.[118]

As a result of its efforts, San Jose was ranked as the number one clean tech city in 2013 in the U.S. and number two on the 2014 Clean Tech Leadership Index.[119] Key accomplishments so far include training more than 750 workers, raising and investing $8.1 billion in venture capital, and creating more than 10,000 clean tech jobs.[120] These accomplishments underscore the effectiveness of San Jose's integrated supply-side and demand-side side approach.

Case Study

Portland Development Commission

Economic Development Through Multifaceted Support of Portland Businesses

The Portland Development Commission (PDC) developed an Early Adopter Program as a new way to solve city problems and support start-ups. It has developed many other business incubation programs and a project aimed at supporting local businesses by exporting their expertise.

ROLES AND APPROACH OF THE PORTLAND DEVELOPMENT COMMISSION

The Portland Development Commission (PDC) is a dual-hatted quasi-governmental entity. It is both an urban redevelopment and economic development agency for the City of Portland. Funding for its redevelopment projects comes primarily from tax increment funding under the federal urban renewal program, while activities under the economic development umbrella are supported primarily by the City's general fund.[121]

PDC sees conventional economic development strategies, including the use of big incentives to lure businesses to the city, as missed opportunities to create more lasting partnerships between the City and industry. As a result, the agency developed a holistic approach rooted in public-private partnerships to foster a business environment that attracts new start-up firms while retaining the more seasoned companies that have contributed to Portland's overall brand. Strategies range from providing support for business accelerators to developing new markets locally and abroad.[122]

TWO EARLY EXAMPLES OF GOVERNMENT/ BUSINESS PARTNERSHIPS

PDC has a history of working with City bureaus and Portland businesses, including start-ups, to facilitate deals of mutual benefit. The following are two examples of a successful pairing between a start-up and a government entity.

In 2011, the Portland Water Bureau and a local start-up, Lucid Energy, signed a memorandum of understanding stating their intention to work together toward the installation of a hydroelectric turbine system in Portland. The Lucid Energy system would be installed in a section of large-diameter, gravity-fed water pipeline as part of a water distribution system upgrade and would generate an average of 1,000 megawatt hours of energy per year from the water flowing through the pipe, enough electricity to power some 150 homes.[123] The agreement led to a successful project that is now selling power back to the local utility. Lucid Energy did not require payment from the City; it was looking instead for a place to demonstrate and prove out its technology, and it covered many costs of the installation.[124]

In another case, TriMet, a regional transportation agency, wanted to offer online mobile ticketing. It found that available off-the-shelf software packages were expensive, did not meet its needs, and were not sufficiently adaptable. TriMet chose instead to work with a local start-up, GlobeSherpa. The company offered to develop the software at no charge, if TriMet would provide GlobeSherpa with its ticket sales data so the company could study customer purchasing habits, and if it would allow for branding and marketing should TriMet like the product. The eventual software roll-out was successful. The product provides convenience to TriMet riders and is expected to save the agency millions by reducing costs associated with printed and cash fares. Globe Sherpa's experience and branding gained from working with TriMet have since enabled it to land multiple contracts around the country.[125]

PDC'S EARLY ADOPTER PROGRAM— A NEW WAY TO SOLVE CITY PROBLEMS

Portland does not have a significant number of large corporations for small, start-up companies to sell their products to. However, it does have anchor institutions including the City itself, which has significant assets and is a purchaser of goods and services. Local businesses, particularly technology and professional services firms, have identified the City as a potential partner to support their growth by allowing them to use City assets to test or

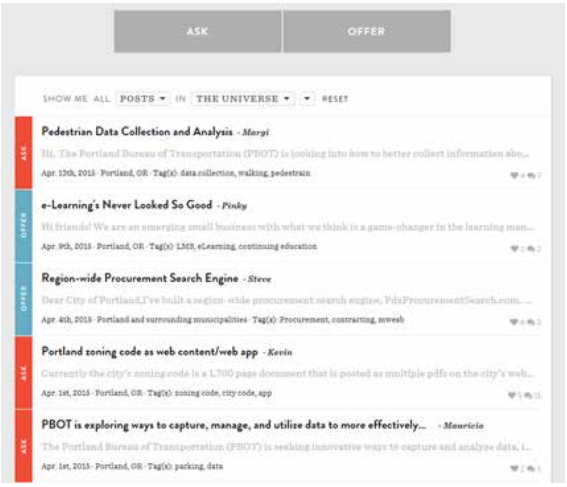
demonstrate a technology, or through pilot use of a service by a City bureau. In either case, the value to the business is twofold: It receives real-time feedback on the performance of its product or service, and it gains a partnership with the City of Portland. As Amy Nagy, PDC's business development coordinator, puts it, "These companies' first priority is not getting a contract, but developing a partnership."[126]

PDC developed the Early Adopter Program (EAP) to systematize the successful relationships described above. There was an earlier iteration of the effort: the City's Office of Procurement issued a broad request for information (RFI) soliciting ideas from the private sector to solve public sector challenges. Industry submitted approximately 65 responses. However, the procurement office lacked the expertise to evaluate the responses to determine which ones were ideas worthy of forwarding to specific City bureaus. Opportunities were probably missed, and the RFI and response evaluation was a lot of work for the procurement office. One result, however, was an increased willingness on the part of the procurement office to allow the bureaus to reach out to industry in nontraditional ways.[127]

Funding for development of the EAP came from the Mayor's Innovation Fund (now called the City of Portland Innovation Fund), a $1 million program created to ignite creative ideas within city government.[128] PDC applied for and received $80,000 in 2014 to encourage early adoption of technologies through public-private partnerships. An April 2014 PDC budget report described the program as follows:

> "PDC will partner with city bureaus to develop and pilot an early adopter program to illuminate tech solutions for city bureaus' operations and maintenance (O&M) and capital project needs, while giving local Portland companies greater access to a potential customer base. As a foundation, the program will:
>
> - Develop a platform by identifying current city innovation activities;
> - Convene the bureaus to discuss O&M and capital needs, opportunities and challenges, and best practices; and
> - Review known local tech products and services, ranging from software-based management solutions to integrated design approaches to hard infrastructure products.
>
> The bureaus will form an advisory committee to discuss opportunities for bureaus to work more closely with local industry product and service providers—which will include crafting a technology-based tool that will provide an interface between bureaus and industry to exchange needs and proposed solutions."[129]

PDC formally launched the EAP on March 17, 2015. The core of the launch event was a presentation and discussion in an "ask and offer" format. Representatives of nine different bureaus each presented a two- to three-minute "ask" of the private sector. Those representatives then fielded questions from and conducted conversations with the private-sector representatives in a roundtable format, in two separate 20-minute rounds. PDC deemed the event a success, stating that bureau representatives left with new perspectives and potential solutions to the "ask" they presented, and the private sector was equally pleased with the opportunities the event provided.[130]



PDC's Amy Nagy, one of the developers of the EAP, says that the program provides three avenues for public-private sector interaction:

- Additional "ask and offer" events like the launch event
- Single-point connections through Nagy and her colleague Jared Weiner, to provide names and faces to the program
- An online "ask and offer" tool, the Portland Switchboard (https://portland.switchboardhq.com).[131]

The Portland Switchboard is described as a "pared-down Craig's List" that allows City bureaus to state problems and needs that they would be interested in discussing with the private sector, and allows businesses to briefly describe existing and developing products and services as potential solutions. For instance, in an April 1, 2015 "ask," the Portland Bureau of Planning and Sustainability (BPS) stated its desire to learn about technologies and resources that could help it present the City's 1,700 page zoning code as interactive Web content with responsive features like discussion threads, Q&A, and more. As of April 12, 2015, 10 comments, some quite detailed, and one BPS response to comments had been posted.[132]

Compared with the traditional request-for-proposals approach, the EAP, says Nagy, engenders bureau interaction with a different set of businesses—start-ups—and at a different stage in the project/program development cycle. The program helps bureaus reach out to the business sector at the concept and scope stage, rather than at the

product- or service-acquisition stage, as is the case with an RFP. By presenting industry with a challenge, says Nagy, "companies think from a solution mind-set, rather than a sell or pitch mind-set, and start-ups are willing to do that." Further, interactions at this stage allow for relationship development, which also helps bureaus avoid feeling like they are "being pitched." Ultimately, says Nagy, "The EAP links bureaus with start-ups to source solutions and to approach and solve problems in a different way."[133]

According to Nagy, benefits of the EAP to the bureaus include:

- Providing new pathways for engagement with start-up companies, aside from the typical question "Can we work together?" That question immediately creates a sales-oriented relationship rather than an opportunity to begin a dialogue in which the two sides can mutually learn about needs and solutions.
- Gathering information on new technologies and other products and services to better inform the bureaus regarding their needs before putting out public procurements.
- Creating partnerships in which bureaus implement solutions that fulfill their specific obligations to citizens and businesses, with an added benefit of supporting the growth of local companies. The Water Bureau/Lucid Energy partnership ended up as a win-win as the bureau was able to complete its infrastructure upgrade while realizing a financial return on a project that otherwise would have been only a cost to the bureau. And Lucid now has a living demonstration project to promote to potential public and private sector clients. PDC acted as a middleman, facilitating the relationship in order to move the project forward.[134]

PDC believes that the EAP can help businesses:

- Find a City partner to help develop, test, or demonstrate a product or service; in other words, to move from bench tests to tests by a real customer. Lucid Energy is a good example.
- Obtain the promotion, recommendation, and branding benefits of successful work with a City partner. GlobeSherpa exemplifies this benefit.
- Eventually sell a product or service to the City.[135]

With respect to the last point, potential procurement regulation issues could arise. In some cases, however, sole-source procurements could be arranged. In other cases, the purchase order size would be below the thresholds requiring public bidding. In any event, the interactions would result in a better informed, more specific RFP. And as long as the bureaus did not give out nonpublic information, discussions at the concept stage should not disqualify participating businesses from a later procurement.[136]

OTHER BUSINESS ACCELERATOR PROGRAMS

The City of Portland, through PDC, has developed or sparked a number of other business support programs. These are in the form of somewhat more traditional business accelerators but include some notable aspects.

- The Startup PDX Challenge is a current PDC program that competitively selects 6 to 10 participants each year. Winners receive a package valued at $50,000, with a $15,000 working capital grant (no equity is taken), a full year of rent-free office space, free professional advice (legal, marketing, PR, hiring, and HR services), and free membership in and access to eight organizations and programs that focus on entrepreneurs.[137] Office space is provided in a private building; PDC paid for improvements to the building that benefited both the program participants and the building owner. The coming competition round will focus on minority- and women-owned businesses, in keeping with a major focus of PDC's new strategic plan.[138]
- The TiE Pearl Incubator is a recently launched space for start-ups in a building acquired by PDC as part of its redevelopment agency function. PDC does not offer services at this incubator, but does offer low rent. In addition, start-ups have access to the anchor tenant, ISITE Design, a leader in the design and development of digital experiences. TiE Pearl also gives start-ups access to TiE, a global community of more than 5,000 investors and start-ups.[139] According to TiE's website, the organization works to grow businesses through mentoring, networking, education, incubating, and funding; was founded in 1992 by a group of successful entrepreneurs; and is currently the world's largest entrepreneurial organization.[140]
- The Portland Seed Fund was initially supported by PDC, then spun off.[141] According to its website, it is now a privately managed investment fund and nonresident accelerator (it is Portland-based but offers no common incubator space). It pools money from accredited investors to provide working capital (typically $25,000 to $50,000) to selected companies. It focuses on "providing emerging companies the capital, mentoring, and connections to propel them to the next level." It offers a 90-day mentor-led program and claims a high degree of success in helping its participants raise outside capital.[142]

Although not connected with PDC, another notable Portland business accelerator is the Portland Incubator Experiment (PIE). It is an offshoot of Wieden+Kennedy, an advertising firm that started in Portland and is now global. According to Nagy, this is one of several large, Portland-based firms that have started their own business incubators.[143] PIE offers an incubator space (three months

in the accelerator program and six additional months rent-free), $20,000 in financing, mentors from Wieden+Kennedy and leading brands, access to investors and successful program alumni, and more.[144]

WE BUILD GREEN CITIES—SUPPORTING THE EXPORT POTENTIAL OF SUSTAINABILITY-FOCUSED BUSINESSES

PDC also works to leverage regional strengths into economic development by exporting Portland's expertise and capabilities in sustainable design and development. The We Build Green Cities (WBGC) program was developed in cooperation with Greater Portland Inc., a regional organization, and Business Oregon, a statewide group. These organizations recognized the national imperative to increase American exports, not just of products but of expertise as well. They realized that the Portland region receives many international visitors who see it as a model of sustainability, based on everything from its urban growth boundary and its multi-modal transit to its energy efficiency, green roof installations, and other green stormwater infrastructure measures. Frequently, Portland-based design and planning firms were hosting visitors and serving as docents for tours and discussions of Portland's sustainability initiatives and successes but were missing business development opportunities. WGBC started as an effort to relieve area firms of some of this burden and to develop a more targeted approach to these interactions. It provides coordinating functions and curates visits using the "living portfolio" of Portland's policies and best practices. The program demonstrates firsthand the public-private partnerships that produced each project and features the associated local companies, touting their assistance to local government in building the Portland story—thereby validating those firms to visitors. The aim is to help area firms win more business nationally and internationally doing what they have done in the Portland region.[145] The WBGC website tells the Portland story and introduces its visitors to the range of solutions demonstrated in Portland and the local companies working in the sustainability space. Website visitors can contact PDC representatives to learn more, or contact companies directly through the directory on the site.[146]

Case Study

Philadelphia's Sustainable Business Network

Good Environmental Policy Grows Strong Local Sustainable Economy

The Sustainable Business Network of Greater Philadelphia (SBN) is a nonprofit membership organization working to build a thriving sustainable economy in the greater Philadelphia region though advocacy, relationship-building, and education. SBN's members are locally owned businesses engaged in sustainability-focused enterprises. Through their products, services, and/or internal practices, SBN's members are profitable businesses that also have a positive social and environmental impact, exemplifying how business can be a force for good. SBN's funding comes from a mix of grants, contracts, membership, sponsorship, and events.

GREEN STORMWATER INFRASTRUCTURE PARTNERS (GSI PARTNERS)

SBN appreciates the strong connection that good environmental policy has with a strong local sustainable economy. In 2009, Green City Clean Waters (GCCW), Philadelphia's ambitious, innovative, and internationally recognized plan to improve local stormwater infrastructure through green strategies, was in its pilot phase. At that time, SBN created Green Stormwater Infrastructure (GSI) Partners as a means to amplify GCCW's local economic impact. GSI Partners now works to ensure that the public and private investment arising from GCCW remains as local as possible. GSI Partners is a unique and growing network of local industry professionals committed to the growth of the region's GSI industry and the advancement of innovation in GSI. Its 60 members (and counting) include local engineering and landscape architecture firms, landscape design-build-maintenance firms, and material suppliers. For some, GSI is all they do; for others, it is a piece of a larger portfolio. These businesses are perfectly set up and eager to support the success of Green City, Clean Waters, to work with the local water utility, and to see the local green stormwater infrastructure industry grow as a result.

SBN's GSI Partners is an internal and external resource for a variety of stakeholders. Developers, property owners, and prime contractors can use the organization's online searchable directory and attend its regular events to find members who can help meet their stormwater needs. Group members can connect with each other through these events, sharing best practices and staying informed of relevant policies and procedures. Members are also given regular opportunities to offer feedback and shape recommendations for policy and procedural improvements. GSI Partners creates a unified voice for the region's industry professionals that did not exist before. In addition to networking, promotional opportunities, and advocacy opportunities, members benefit from access to GSI Partners' Continuing Education Grants, which support members' ongoing learning and professional development in this rapidly evolving industry.

GRANTS AND CAPACITY-BUILDING

GSI Partners hosts quarterly meetings that offer programmatic updates and valuable networking time. Each meeting focuses on a different topic that provides meaningful content to members. Attendees have heard case studies from fellow members, received regulatory and procedural updates from the Philadelphia Water Department (PWD), heard about details in operation and maintenance agreements from PWD and practitioners, learned about financial incentives available for green approaches, and more. Within GSI Partners, members have also formed committees that allow members to directly inform GSI Partners' work as well as build stronger relationships with one another. Currently, GSI Partners has five working committees: a Business Engagement Committee supports staff in growing membership and

engaging members through content and networking; an Advocacy Committee is both proactive and reactive on policy that impacts the local GSI industry; a Plan Review Committee identifies procedural ways to better facilitate the approval of vegetated and innovative projects; a Monitoring Grant Committee is supporting the development of a pilot grant program for the private sector that will fund data collection on the performance of private GSI projects; and an Awards Ceremony Committee is helping to plan and execute the region's first GSI-specific awards ceremony intended to celebrate and elevate the triple-bottom-line benefits of GSI and the array of stakeholders behind the projects.

SBN's GSI Partners provides Continuing Education Grants to support the professional development of members and their staff in the rapidly evolving green stormwater industry. Members are eligible for up to $5,000 per business per year to go to conferences, take classes, and obtain certificates or certifications that help their business grow and remain competitive. To date, SBN has disbursed more than $75,000 to more than 30 local businesses.

TRAINING COURSES

GSI practices require regular maintenance to ensure that they continue to perform as intended, which in turn helps to ensure that the stormwater regulations driving GCCW are being met. As the number of installed best management practices (BMPs) increases on public and private property, and as operation and maintenance agreements begin to be enforced by the Philadelphia Water Department, the need for GSI maintenance increases. The growing demand creates a significant opportunity for local landscape professionals. In response, SBN's GSI Partners developed the region's first GSI Operations and Maintenance (O+M) Course targeted at landscape professionals to support their growth within, or transition to, the world of public and private GSI operations and maintenance, with an initial focus on the regulatory and urban context of Philadelphia. Students leave the three-day course with a basic understanding of the regulatory context of stormwater management, BMPs and their components, soil management, how to maintain the vegetation and above-ground components using adaptive and prescriptive management techniques, and how to diagnose and respond to safety and performance issues. Additionally, students get an introduction to subsurface inspections and maintenance as well as porous pavement maintenance.

GSI Partners pulled together consultants, practitioners from local businesses, faculty from Temple University and Villanova University, and staff from the state Department of Environmental Protection and the U.S. Environmental Protection Agency to build and deliver this course based on current best practices. Thirty-eight students registered for the first 40-seat class. Course material came from more than a dozen different local industry experts, and key staff from local public and private entities participated as guest speakers. SBN's GSI Partners intends to deliver this course annually and to pursue a recognized credential for graduates who successfully complete the course.

POLICY ADVOCACY

In a robust local GSI industry, vegetated practices are in high demand; developers, property owners, institutions, and government agencies hire local firms for their GSI design, build, maintenance, and material supply needs; and local businesses work with one another, innovate, and grow. SBN's GSI Partners believes that stakeholder-informed advocacy is necessary to achieve the goal of a robust local GSI industry. This core practice has allowed GSI Partners to discover the needs of its members as well as those of the property development community and the Philadelphia Water Department, identify common themes, and explore areas of advocacy that meet the intersection of all those needs.

A prime example of SBN's stakeholder-engagement practices in action is its Good Economy Challenge, a five-issue policy platform prepared for Philadelphia's 2015 elections. One of the items in that platform focuses on the advancement of Green City, Clean Waters. GSI Partners calls for the next mayor and city council to understand the reasons behind Green City, Clean Waters and support its success, including through the creation and expansion of incentives for the use of GSI, the alignment of related policy and code, and the fostering of innovation. These recommendations reflect several years of conversations among SBN members, property developers, organizational partners, and PWD, as well as the work of the GSI Partners Advocacy Committee. This piece of the Good Economy Challenge received endorsements from a diverse cohort of local, state, and national groups, including the Building Industry Association of Philadelphia, the Pennsylvania/Delaware chapter of the American Society of Landscape Architects, PennFuture, the Natural Resources Defense Council, Conservation Voters of Pennsylvania, the Tookany/Tacony-Frankford Watershed Partnership, the Philadelphia chapter of the Urban Land Institute, the Delaware Valley Green Building Council, and Clean Water Action.

SBN and member delegations met with city council candidates and mayoral candidates and hosted a Mayoral Forum around the full Good Economy Challenge. Candidates were friendly to several aspects of SBN's platform, and SBN continues to follow up with them as Philadelphia approaches the November 2015 elections. SBN will continue its advocacy efforts following the elections.

Another example of SBN's efforts to help shape policy is a report that GSI Partners completed in November 2014 in order to provide feedback to PWD regarding the approval

process for GSI projects. Over the course of three months, the GSI Partners Plan Review Committee developed interview questions, received input on these questions from key PWD staff, identified local engineers with experience interfacing with PWD's Stormwater Plan Review, conducted one-on-one phone interviews, and facilitated a focus group. Participating engineers shared their recommendations for changes to the Plan Review process based on their experiences over the years. For the report, all individual responses were distilled into themes, and recommendations fell into five categories: Communication, Resources and Website, Process, Code and Policy, and Internal and External Coordination. Subsequently, PWD overhauled its plan review website and its approval process (effective July 2015), implementing many of the recommendations outlined in the report. Additionally, PWD has expressed its commitment to implementing a recommendation in the Communication category: an annual plan review seminar targeted at firms with experience interfacing with PWD's Stormwater Plan Review along with firms that are new to the review process. This regular event would facilitate improved communication about additions or changes to available resources as well as policy and procedural updates as they relate to Stormwater Plan Review; it would also allow PWD Plan Review staff and the attending firms to engage with each other in new and important ways. SBN's GSI Partners continues to follow up with PWD on planning this event.

FACILITATING LOCAL PUBLIC-PRIVATE PARTNERSHIPS

Partnerships facilitate other areas of GSI Partners' work as well. For the past year, SBN has helped PWD and the Pennsylvania Horticultural Society (PHS) in the management of PWD's residential stormwater management program, Rain Check. Rain Check provides free and subsidized stormwater management tools to Philadelphia homeowners and contracts with small local businesses to install these tools. The program includes education and outreach to all ratepayers in the city regarding the importance of a green approach to stormwater management. It also supports the education and professional development of the local businesses contracted for the program and allows these small businesses to directly benefit from the city's investments in green stormwater infrastructure. PHS is the prime administrator of the contract, managing the budget, workshops, and installation schedules; providing customer service to Philadelphia residents interested and participating in the program; and more. SBN is helping to promote the program as a whole and to support and grow the contractor base. SBN gathers feedback from contractors, coordinates seminars and educational workshops, promotes professional development in the design and installation of rain gardens and porous paver projects, and facilitates communication among the contractors as well as between the contractors and PWD. As a partner in the management of this program, SBN is also a factor in the program's continued growth and improvement. In the past year SBN has supported the program's expansion from just the combined sewer area (roughly 70 percent of the city) to 100 percent of the city. It has also backed procedural changes that have improved the experience for both homeowners and contractors, changes that are showing early signs of increasing the number of tools installed as well as the rates of installation. Additionally, SBN has helped to strengthen and refine how the contractor network is supported and managed, backing a number of new policies and standards that have increased the efficiency and predictability of the program for the contractors.

III. Synthesis and Recommendations

STRATEGIES

The case studies in this report illustrate a broad range of strategies for encouraging business innovation and building a healthy supply of sustainability-sector businesses. One way to think about these strategies is to classify them according to whether they focus on business service supply, demand, or facilitation of the supply/demand relationship. Some strategies concentrate on building the capacity of businesses, thereby supporting supply in a particular sector. Some strategies help stimulate demand in that sector; without demand, the supply of businesses is irrelevant. And some strategies work to connect supply and demand—linking businesses and customers.

Supply-Based Strategies

There are many strategies to help businesses get started and to build their capacity so they thrive. These include:

BUSINESS INCUBATORS AND ACCELERATORS—These terms refer to intensive, all-in-one capacity-building programs. They are often used interchangeably, according to which term sounds best in a particular setting. But there is a difference. Technically, incubators focus on true start-ups—businesses in the childhood phase of development. Accelerators focus on somewhat more established companies—those in adolescence, one might say. Put another way, "incubators help companies stand and walk, accelerators teach companies to run." Incubators typically offer a supportive physical space, basic business lessons, and mentoring. Accelerator programs offer support that is more like management consulting, is often customized, and aims to position firms for rapid growth.[147]

Many variations on incubators and accelerators exist: They may admit businesses from a wide range of technical sectors, such as several of those featured in the Portland Development Commission case study. Or they may have a sectoral focus. Consider, for instance, the water technology focus of the BREW program of the Water Council or the clean tech focus of ProspectSV in San Jose. They may even concentrate on companies producing a particular type of product, like AdvantageWest's Blue Ridge Food Ventures. Additionally, they may provide a common office space for participants—or they may not. They may also vary considerably in the types of support they provide.

COMPETITIVE PROGRAMS—Usually business incubators and accelerators choose their participants through a competitive process. They help build a sector or sectors by selecting the fittest candidates, typically in terms of business idea viability, subject to some basic capacity qualifications. The competitive approach can be used in other ways as well—for instance, for awarding business development grants. In all cases, the nature of competition forces applicant businesses to sharpen their approach, which should improve their chances of success whether they are selected or not.

NETWORKS—Several cases illustrate the formation of collaborative networks. The Water Council is a prime example of a group that has established a broad network, in this case organized around the water sector and a fee-based membership model. The Council's Center of Excellence for Water Innovation & Small Business Development, and its Small Business Forward program, are additional network-centered offerings. Other industry-specific example of a network are AdvantageWest's Outdoor Gear Builders of Western North Carolina, and Philadelphia's Sustainable Business Network. Networks provide mutual support and typically offer events, classes, and programs that help participating companies learn and grow, and they often lead to business partnerships.

PEER MENTORING—Peer mentoring often occurs informally through networks. Incubator and accelerator programs often formally incorporate it. Another example of formal mentoring is Clean Energy Works' use of established, CEW-certified companies to mentor firms that are working to achieve full CEW certification.

SALES TRAINING—CEW puts considerable emphasis on sales training, through annual contractor training events and as a frequent component of monthly meetings. This is a focus because of the vital importance of closing sales to the viability of the contracting businesses and the overall program. Sales training may be offered by incubators, accelerators, and other types of programs.

FINANCIAL AND BUSINESS MANAGEMENT SERVICES AND TRAINING—Typically a key component of incubators and accelerators, this type of assistance may be offered in many other ways as well. Organizations can themselves provide consultations (as AdvantageWest does), offer outside experts to members or program participants, or provide connections to other financial and management services such as those of the U.S. Small Business Administration.

TECHNICAL ASSISTANCE AND TRAINING—This strategy may depend on a fairly narrow program focus in order to identify the specific technical matters that businesses need help with. For instance, the home performance focus of CEW means it can offer participating contractors training on the latest technical developments in home energy

efficiency. An alternative approach is to link businesses with local universities for customized technical assistance, as the Water Council has done for members running pilot studies.

DIRECT FINANCIAL ASSISTANCE—Some of the case studies include provision of working capital grants (e.g., the water council's BREW incubator, Philadelphia's SBN, and the Startup PDX Challenge in Portland). These grants may be offered with or without an equity share being given in return. The Cleantech Open (one of San Jose's partners) offers cash prizes to winners. AdvantageWest has a revolving loan fund. CEW has given subsidies to participating contractors for some of the services they provide.

ACCESS TO INVESTORS—Many of the case studies offer businesses access to potential investors. This may occur through membership (as with the Water Council), as a feature of an incubator or accelerator (as with the Water Council's BREW, AdvantageWest's Accelerating Appalachia, and the Portland Seed Fund), and through specific programs like AdvantageWest's Blue Ridge Angel Investment Network.

FOCUSED FACILITIES—Focused facilities support many of the strategies identified above. They are particularly good at fostering networking, mentoring, and technical assistance in the form of research and demonstration space. Examples include the Water Council's Global Water Center and the San Jose Demonstration Center. The former is an office building dedicated to water technology organizations; it also includes some test facilities. The latter is more focused on research, demonstration, and exhibition space.

Demand-Based Strategies

As important as supply-focused, capacity -building programs are, businesses will ultimately fail if demand for their services and products is weak. Thus, a few of the case studies have incorporated strategies to build demand for certain types of technologies and services. These strategies include:

COST INCENTIVES FOR CUSTOMERS—MMSD offers a cost-reimbursement program for certain green stormwater measures. These require specialized installation and/or design services, and the program supports local businesses that offer those services. MMSD also arranges for reduced retail prices on rain garden plants and rain barrels. MMSD believes that because it has been offering these programs for many years, Milwaukee has become known as a place where there is demand for green infrastructure products and services, and some green infrastructure companies have chosen to locate there as a result.[148]

FINANCIAL ASSISTANCE FOR CUSTOMERS—CEW and its predecessor program run by the City of Portland offered subsidies loans and underwrote some lender costs, such as loan origination fees.

CUSTOMER CONVENIENCE—CEW supports demand for home performance services by providing a one-stop-shop experience for customers, including assistance in working with contractors and lenders, help in selecting among project options, quality review of completed jobs, and troubleshooting. Similarly, SBN helps to grow the contractor base for Philadelphia's RainCheck rainbarrel program.

Supply and Demand Connection Strategies

These strategies focus on putting businesses and customers together. They include ad hoc approaches, more systematic programs, and various sales and marketing services.

INTRODUCTIONS—Programs can fill a "finder" or "broker" function by introducing parties and further supporting the relationship. An example is the introduction of Vegetal i.D. to MMSD by the Water Council. Another example is the middleman role that PDC played in the successful collaboration of Lucid Energy and the Portland Water Bureau.

PRE-PROCUREMENT LINKAGE PROGRAMS—While introductions are typically ad hoc, the linking function can also be systematized as a program. This is what PDC is doing with its Early Adopter Program, which addresses both demand (the "ask") and supply (the "offer"). The pre-procurement aspect is called out here because this kind of linkage works best in the project concept and scoping phase, well before formal procurement activities begin.

TEST BED PROVISION—The Vegetal i.D./MMSD, Lucid Energy/Portland Water Bureau, and San Jose Demonstration Partnership program show the power of an organization's making its assets or staff available to pilot a business's technology or service. This is a manifestation of introductions or linkage programs, but one worth calling out separately.

SALES ASSISTANCE—While the previous three strategies are focused on relationship building and partnerships, this strategy is focused on setting up and closing sales. It can include any number of ways to match companies offering specific products and services to customers with specific needs. The CEW case study exemplifies this. CEW identifies potential buyers of home performance services and provides them as sales leads to qualified contractors.

MARKETING ASSISTANCE—This is a broad category of more diffuse strategies. It includes making directories of services and products available to potential buyers, as MMSD did with its Green Vendor Resource List. It also includes events that offer marketing and branding opportunities, such as the Water Council's annual Water Summit. And it includes promotional programs, such as PDC's We Build Green Cities website and program to tout Portland-based sustainability-focused businesses.

BEST PRACTICES

Best practices are specific ways organizations have effectively approached and implemented the strategies discussed above. Many of these best practices cut across multiple strategies. Here are some of the best practices exemplified in the case studies.

COLLABORATE EXTENSIVELY. Successful programs bring together as many stakeholders as possible to inform program development, assist ongoing operations, and support the mission. For example, the Water Center has brought together a wide range of water-focused businesses, agencies, nonprofits, and university programs to advance the goal of establishing the Milwaukee region as a world water hub. CEW's predecessor program run by the City of Portland developed a high-road agreement on program goals, operations, and expectations of participating contractors through collaboration with a broad set of local industry, labor, and government leaders.

ESTABLISH FOCUSED PARTNERSHIPS. While collaboration is extensive, partnerships are intensive. They may be project-based, like the MMSD/Vegetal i.D. green roof pilot study. They can also be formed around ongoing or programmatic needs. CEW's ongoing, highly interactive work with the contractor trade association and contractors in general is central to the success of both CEW and the contractors. San Jose has a long-term partnership with the Cleantech Open to help accelerate local clean tech businesses.

ENSURE TRANSPARENCY AND ROBUST DIALOGUE. These are the keys to successful partnerships, as shown by CEW's open process with contractors to transform the program. There was a lot of give-and-take required to move from a pilot program to the business model needed for long-term success. Without complete transparency, the contractors would not have trusted CEW and likely would have resisted many of the necessary changes. Similarly, SBN's Good Economy Challenge provided important perspective on the nascent green infrastructure market during an election year.

UTILIZE NEARBY UNIVERSITIES. They offer a wealth of expertise, and sometimes low-cost labor as well. The Vegetal i.D. pilot study of green roof technology with MMSD relies on local academics for study design and students for study implementation. Universities can also provide educational and consulting services in support of business capacity building. Consider, for instance, how the Water Council's BREW business accelerator makes use of the University of Wisconsin–Whitewater's Institute for Water Business.

USE ONLINE INNOVATIONS TO FACILITATE LINKAGES. The Portland Switchboard is perhaps the most innovative example, linking city bureau "asks" with start-up business "offers." CEW developed a highly polished website to appeal to potential home performance service customers. AdvantageWest developed eLaunch, an interactive directory to connect entrepreneurs with services ranging from prototyping to mentoring.

MAKE A NAME AND FACE AVAILABLE. Notwithstanding the value of online tools, many people like to make linkages the old-fashioned way, through personal contact. The PDC Early Adopter program provides two points of contact in addition to its online tool and its events.

GET BUSINESSES INVOLVED EARLY. Examples in Portland and Philadelphia show the power of connecting innovative businesses with agencies at the conceptual stage of a project.

UTILIZE AND SPIN OFF NONPROFITS. Portland developed the CEWP pilot project within a City bureau, demonstrated its potential, and then spun off a nonprofit, CEW, to operate and expand the program. The North Carolina legislature set up AdvantageWest as a nonprofit. PDC has spun off some of its programs.

SEEK AND ADAPT MODEL WAYS TO TARGET PROGRAMS TO HISTORICALLY DISADVANTAGED BUSINESSES. Many cities are innovating on ways to steer assistance to minority-owned, women-owned, and other historically disadvantaged businesses. The CEWP's Community Workforce Agreement provides an excellent model, one that proved successful. Local governments can seek out other potential models and put together the components that best fit their own situations.

RECOMMENDATIONS

There is no single best solution for any agency or region seeking to foster growth of green businesses. What will work best depends on organizational capacity, history, culture, partnership opportunities, stakeholders, political dynamics, legal constraints, policies, and much more. However, the following general recommendations based on lessons learned from the case studies, individually and collectively, should help organizations build effective initiatives and programs.

CONSIDER ALL THREE STRATEGY TYPES. Supply-based strategies, demand-based strategies, and supply and demand connection strategies are all important. Each should be addressed in some manner, either by the organization directly, through its partners, or through other entities in the region.

FIND WHAT FITS. Consider the range of situations, goals, strategies, and practices in these case studies. What is most analogous to your situation? There will be no perfect match. Probably a combination of ideas and approaches from multiple cases will work best. What are the particulars in the cases that resonate in your situation, and how can those various particulars be put together?

LEVERAGE WHAT YOU HAVE. What special local expertise and energy can you build on?

BUILD WHAT HAS WORKED ALREADY. If you've had some ad hoc successes, work to systematize the approaches they used. Draw analogies from the successes of sister organizations that have different missions but also work to support local businesses.

PROACTIVELY ADDRESS POTENTIAL PROCUREMENT ISSUES. Early-stage interaction is now seen as less problematic by some procurement offices. There are strategies available to address potential issues; look at what others have done to resolve obstacles raised by procurement regulations and practices. One example is MMSD's development of a memo of understanding with the Water Council and a local foundation that will allow it to target funds toward companies affiliated with the Water Council. Another example is PDC's Early Adopter Program, which worked with the City of Portland procurement office to develop its approach and now connects city bureaus and start-ups in the problem definition/concept development stage, well before formal procurement processes begin. Work with your procurement office on innovative approaches; show them examples of innovation.

WALK BEFORE YOU RUN. Incubators and accelerators are major programs. Gain experience with a smaller set of services before launching major initiatives. However, one possible shortcut toward offering an incubator or accelerator is to find partners who already have the capacity to do them.

APPLY INCUBATOR AND ACCELERATOR THINKING TO YOUR OWN PROGRAM. If you want to walk, what do you need? If you're walking and ready to run, what do you need? Know your business case and business plan. Conduct feasibility studies as needed. Plan for growth and transitions. Obtain advice and assistance from peer organizations and experts.

EXPECT SOMETHING IN RETURN FOR YOUR SUPPORT. For instance, it's OK to demand that contractors adhere to high standards in return for the various supports you provide.

ALIGN INCENTIVES. Think about how every program element affects participant incentives. Be sure that the incentives move participants in the right directions. Align rewards with the party or parties most able to achieve the tasks and goals being rewarded.

CONTINUALLY FOCUS ON VALUE. Well-meaning people often make programs more onerous on participants than they need to be. Identifying and removing negative value, and growing positive value, are keys to effective partnerships and programs.

CONCLUSION

Fostering green business growth and leveraging public infrastructure investments to meet other goals, like social and economic development, are common concerns of public agencies at this time. As the case studies demonstrate, agencies across the country are trying a range of strategies and developing a substantial body of experience and lessons learned. The nonprofit sector is also a major player in this growing area of governance and community development. Organizations with similar agendas can look to these case studies and draw on networks of economic development and sustainability professionals to identify the approaches that best fit their specific objectives and circumstances, and implement best practices to ensure success.[149]

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