Powering the New Energy Future From the Ground Up

Profiles in City-Led Energy Innovation

New Energy Cities
Accelerating Community-Led Clean Energy Innovation in the Northwest

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From the Ground up
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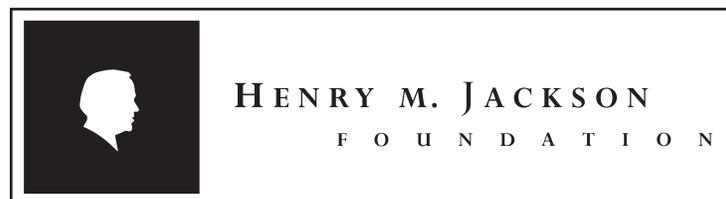
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Cover Photo Credit: A net-zero townhome community in Issaquah, Washington, considered to be the first of its kind in the United States.

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Foreword

United States Senator Henry M. Jackson (WA) was well known throughout his career for his commitment to protecting and managing the environment wisely.

As chairman of the Senate Committee on Energy and Natural Resources for 18 years, he was instrumental in passing legislation regarding national parks, energy resources, and land use.

Senator Jackson authored the landmark National Environmental Policy Act of 1969, compelling federal officials to consider the consequences of their decisions by requiring environmental impact statements.

He also championed the 1970 National Land Use Policy Act, which envisioned a national land use system in which all levels of government coordinated efforts to develop or conserve land. Although the Act never became law, many environmentalists regard it as visionary today, and its provisions have guided the development of land planning and management approaches emphasizing the importance of coordination across sectors.

On the centennial anniversary of Senator Jackson's birth, we find ourselves facing a new set of environmental challenges, in particular the threat of global climate change and the difficulty of fostering economic prosperity in a manner that poses no threat to future generations.

With current federal and state policy progress on climate stalled, local communities must step up to help build a clean energy economy from the ground up. This is why Climate Solutions and the Henry M. Jackson Foundation partnered to produce a series of compelling profiles of energy innovation in small- and medium-sized communities nationwide.

We hope that the lessons learned and featured here will serve as examples for other cities throughout the country and will help them access best practices, find expertise, tap resources, and share knowledge with their peers.

~Lara Iglitzin, Executive Director, Henry M. Jackson Foundation

Introduction

In 2009, Climate Solutions launched the New Energy Cities program to catalyze clean energy innovation in small- to medium-sized Northwest communities. As a nonprofit organization whose mission is to accelerate practical and profitable solutions to global warming, Climate Solutions sees city-led innovation as crucial, not only to build a robust clean energy economy in the Northwest region, but also to create models for other communities throughout the nation.

At the same time, the federal government was in the process of making the largest clean energy investment in American history through the American Recovery and Reinvestment Act: more than $80 billion granted or loaned to energy efficiency and renewable energy programs across the country.[1]

This funding included an unprecedented $3.2 billion in the Energy Efficiency and Conservation Block Grant (EECBG) program, which the Department of Energy allocated to cities and counties around the country for energy efficiency and clean energy projects.[2] The EECBG program also laid the groundwork for the Department of Energy's Better Buildings[3] initiative, launched in 2010 to dramatically improve energy efficiency in the country's built environment.

In parallel, the US Environmental Protection Agency (EPA) awarded $20 million in competitive grants in 2009 and 2010 to help local and tribal governments establish and implement climate change initiatives.[4] The EPA selected 50 communities to implement projects that would serve as replicable models of cost-effective reductions in greenhouse gas emissions across sectors.

Meanwhile, Congress was debating passage of a comprehensive energy bill that would have charged power plants, oil companies, and other large polluters for heat-trapping carbon emissions that contribute to global warming. On July 22, 2010, after more than a year of legislative wrangling, the US Senate abandoned this effort. With federal policy progress on climate stalled, the efforts of communities to execute and scale up local energy projects became all the more critical.

In the fall of 2010, with the goal of examining how this local work could move forward in the absence of national policy, the Seattle, Washington-based Henry M. Jackson Foundation asked the New Energy Cities team to examine the successes and lessons learned in energy programs of cities with populations under 250,000. This research included those who had received federal clean energy funding, as well as others who were innovating without federal assistance.

To date, large cities from New York City to Los Angeles have stolen the headlines with major announcements about dramatic investments and worldwide partnerships that advance clean energy solutions and address greenhouse gas emissions. While these efforts are indeed critical to scaling the clean energy economy, small- and medium-sized jurisdictions also possess the power to nurture clean energy economic development. They can also often execute with a degree of speed and decisiveness that sometimes eludes larger cities.

While their efforts do not usually make headlines beyond their local news outlets, small- and medium-sized cities are stepping up with real results. It is in these living laboratories of innovation that we see the next generation of solutions for the clean energy economy in buildings, transportation, and waste management. These communities have the political leadership, an energized citizenry, receptive utilities, and capable business communities that are working together to build the new energy future from the ground up.

Real innovation is rare, because it is challenging and risky. But cities and towns not yet ready to take entrepreneurial leaps are nonetheless making important changes by using their bully pulpits, planning authorities, and purchasing power to galvanize their communities and move local markets. They are making slow and steady progress that will ultimately result in the full transformation of our built environment and transportation system away from fossil fuel dependency.

Key Findings

The New Energy Cities team notes a number of findings among the examples of city-led clean energy innovation detailed in *Powering the New Energy Future From the Ground Up*.

Overarching Themes

First, cities are making proactive use of their authorities in land use and building oversight, transportation, and waste management to conserve energy and reduce greenhouse gas emissions. These efforts are not limited to regulation and, in fact, often reflect incentives for voluntary action.

Second, cities are maximizing their community-wide impact through partnerships with utilities, businesses, workforce organizations, educational institutions, nonprofit groups, and citizens. In particular, the importance of utility partnerships cannot be overstated. Utilities offer significant resources: market expertise, data collection and analysis, incentives, and deployment of advanced technologies. These approaches provide real-time feedback on energy use and tools such as time-of-day pricing that can drive changes in energy consumption.

Third, federal investments beginning in 2009 catalyzed clean energy innovation and enabled pilot adoption of various models for energy efficiency retrofit programs and renewable energy development. This funding made a significant impact on small- to medium-sized communities nationwide and will likely yield dividends in years to come.

Finally, cities and their local partners are developing long-term strategies that will survive after federal grants have ended. Some developed innovative financing strategies in the absence of grant money altogether.

Clean Energy Innovations

The 22 communities profiled in this report demonstrated specific innovations in the following areas:

- Partnerships that Leverage Existing Capacity
- Catalytic Projects for Long-Term Change
- Focus on Job Creation and Economic Development
- Goal-Setting and Quantitative Analysis in Support of Specific Goals
- Ambitious Requirements for the Building Sector
- Incentives and Voluntary Programs
- Innovative Financing
- Creative Community-Specific Outreach

Partnerships that Leverage Existing Capacity

Many cities were compelled to act quickly, both to meet tight federal grant timelines and to address urgent local concerns ranging from unemployment to poor air quality. They knew that they would have to be innovative, and they recognized the value of mobilizing local expertise and adapting existing programs in other communities. The vanguard cities started by enlisting people and institutions in their communities who already knew how to get the job done: utilities, energy-related service companies, workforce development organizations, community groups, financial institutions, and other local experts.

- Jackson created a formal governance partnership between the town, the county, and the local utility to drive and oversee projects related to energy efficiency and clean energy.
- Bainbridge Island, Bedford, Bellingham, and others relied on utility resources, such as energy data and existing energy efficiency incentives.
- Utilities offered energy-tracking software (NYSERDA in Babylon and Bedford) and dashboards and social marketing tools for energy literacy and awareness (Puget Sound Energy), which enabled programs like RePower Bainbridge to give customers accurate and complete knowledge of energy use.
- Fort Collins partnered with its utility to test how renewable energy generated from the FortZED district could be integrated into peak-load reduction strategies.
- The municipally-run Gainesville Regional Utilities went beyond net-metering to implement a feed-in tariff for solar power, making it a world leader in per capita solar installations.

Catalytic Projects for Long-Term Change
A number of cities have designed projects to catalyze long-term regional change, requiring broad partnerships between and among cities, utilities, businesses, and community institutions.

- Fort Collins, Oberlin, and West Union pioneered advanced energy districts based on public-private partnerships and, in Oberlin's case, an innovative collaboration between the town and Oberlin College.
- Fort Collins, Oberlin, and Issaquah are breaking new ground with the design and construction of net-zero buildings and districts.
- Nearby towns and villages have followed the lead of early adopters such as Babylon and Bedford in a "hyper-local" approach that uses pilot communities to inform longer-term regional program rollout.
- Williamson and the JOBS Project contributed to the convening of local and regional leaders from across central Appalachia to develop a regional strategy for sustainable economic development.

Focus on Job Creation and Economic Development
Many cities forged new or deeper partnerships to advance the goals of job creation and economic development.

- Bainbridge, Bellingham, and Santa Fe formed partnerships with community colleges, workforce organizations, and community groups to align job training with expected job growth in targeted energy programs.
- Knoxville, West Union, Salt Lake City, and Williamson collaborated closely with local economic development institutions, the private sector, and nonprofits, retain businesses, galvanize community support, and spark clean energy economic development.

These efforts are nascent and must be scaled up in order to achieve meaningful economic impact.

Goal-Setting and Quantitative Analysis in Support of Specific Goals
Over the past decade, cities around the United States set ambitious goals to reduce greenhouse gas emissions. Several cities profiled in this report went the extra mile and did the quantitative analysis necessary to determine exactly how they could achieve those goals, broke the goals down into practical actions, embedded them into comprehensive land use and transportation plans, and used them to raise awareness in their communities.

Performance tracking and reporting were required to meet the terms of federal funding grants or other external partners. However, many communities also recognized the value of goal-setting as a tool for management, public awareness, and community organizing. The following communities demonstrated best practices in these regards:

- Oberlin set a goal of going beyond carbon neutral, or being "climate positive," by generating 90 percent of its energy from renewable sources and offsetting additional greenhouse gas emissions in the surrounding areas.
- Eugene set a goal of housing 90 percent of its residents in compact communities, in which all amenities would be accessible within a 20-minute auto-free trip. As further motivation for reducing transportation greenhouse gas emissions, the city also calculated and publicized its community-wide expenditure on fossil fuels for transportation.
- Bainbridge Island set six clear numerical and outcome-based goals, which galvanized the community to conserve energy in order to avoid construction of a new substation.
- The Jackson community, in conjunction with its utility, set numerical goals to mitigate load growth with energy efficiency and renewable energy.
- Salt Lake City set a goal of reducing single-occupancy vehicle trips in order to reduce the days that it was in non-attainment with federal regulations, and later adopted greenhouse gas emissions goals as part of its EPA's Climate Showcase Communities grant reporting.
- Bainbridge, Madison, and Salt Lake City made community-wide commitments to track and report numerical progress against their goals, posting the results online and in public arenas.

- Burlington analyzed the costs of possible strategies to achieve its carbon emissions reduction target of 80 percent below 2007 levels by 2050, and then sought community input on how to prioritize the implementation of those strategies.
- Burlington, Eugene, and Issaquah embedded climate goals into their comprehensive land use and transportation plans.

Ambitious Requirements for the Building Sector
Some cities developed robust requirements for energy efficiency in the building sector.

- Babylon passed one of the country's most comprehensive building codes for the commercial and industrial sector and launched an innovative home retrofit program, including a Green Certificate of Occupancy.
- Boulder published a trio of ordinances for building safety and energy efficiency, including a home energy rating requirement, and implemented a multi-jurisdictional Energy Smart program to help builders meet the higher bar set by the ordinances.
- Santa Fe worked closely with the homebuilding industry to develop a groundbreaking residential green building code program, which incorporates home energy ratings and incentives for builders to exceed the mandatory minimum standards.

Incentives and Voluntary Programs
Some cities adopted voluntary programs, technical assistance, and financial incentives.

- Boulder and Bremerton focused on helping rental property owners make energy efficiency upgrades through outreach and incentives.
- Bellingham, Boulder, and Pendleton created loan programs for residential and commercial energy efficiency and clean energy improvements, with varying parties serving as the financial intermediaries.
- Pendleton used a group purchase model in the first stage of its solar program to reduce the per-unit cost for participants.
- Babylon and Knoxville encouraged consumers to adopt efficiency measures first, before installing renewable energy such as solar, in order to achieve better financial returns.

Innovative Financing
In some cases, cities identified existing or new revenue streams in order to fund projects and programs.

- Babylon used an innovative self-financing mechanism—a benefit assessment charge tied to residential property—for its residential energy efficiency program.
- Both Babylon and Pendleton tapped existing local government funding sources and replenished them on an ongoing basis using energy savings and/or renewable energy payback.
- Boulder voters passed a carbon tax based on electricity consumed to fund the measures identified in their climate plan, including the city's energy efficiency program.
- Jackson voters passed a special purpose excise tax to fund energy efficiency in public buildings.

Creative Community-Specific Outreach
Cities engaged businesses, residents, and schools to mobilize voluntary participation in reaching energy goals.

- Bellingham and Madison tailored programs for local businesses in energy efficiency and renewable energy.
- Bainbridge Island, Bedford, Boulder, Eugene, Hailey, Madison, Salt Lake City, and Williamson developed creative, community-specific publicity and outreach efforts, ranging from community energy dashboards to transportation master classes.
- Bainbridge Island, Bedford, and Salt Lake City used social marketing and community networking to effect energy behavior change.
- Salt Lake City used fun and engaging team-based contests to attract enthusiasm for participation in its strategy to reduce single-occupancy vehicle travel.
- Bellingham, Boulder, and Oberlin worked with local educational institutions to develop curricula on energy efficiency and clean energy topics, and to engage students of all ages.

Ongoing Support for Clean Energy Innovation is Critical

The specific lessons learned from the 22 communities profiled in *Powering the New Energy Future from the Ground Up* reflect the breadth and depth of what American cities have pioneered to date, but by no means represent a comprehensive accounting of city-led energy programs and projects. Clean energy innovation is occurring in communities across all parts of the United States and will continue to evolve as cities and their partners learn from early experiences, exchange best practices, and move into the next stages of implementation.

The future of these city-led efforts will become all the more important to watch as federal grants sunset, and if the US Congress continues to avoid passing a comprehensive energy or climate policy.

Will cities continue to shoulder the primary responsibility for meaningful climate action and clean energy investment in the United States? Signs of city commitment remain positive, as innovations are embraced by a new wave of communities beyond the early adopters. However, as the federal grants programs draw to a close and public budgets remain thin, the near-term imperative will be to continue financing the work catalyzed during this period. This represents both a challenge and an opportunity for cities, utilities, financial institutions, and community groups going forward.

Community Profiles

Each of the 10 communities profiled below has either pursued a variety of clean energy solutions (building energy efficiency, renewable energy development, low carbon transportation strategies, and/or advanced grid technology) or has used various innovative tactics to achieve results in a single clean energy category.

BABYLON, NEW YORK

When it comes to building energy efficiency, the Town of Babylon, New York (population 216,125) is the very definition of an "early adopter."

In 2006, the Town passed one of the most aggressive green building codes in the United States, requiring all commercial and industrial buildings over 4,000 square feet to achieve Leadership in Energy and Environmental Design (LEED) certification at the Bronze, Silver, or Gold level.

Babylon also required all new residential construction to achieve ENERGY STAR certification through design and operational measures. If implemented fully, this requirement would make all new homes 15 percent more energy efficient than those built according to the 2009 International Energy Conservation Code (IECC), and 30 percent more energy efficient than a typical new home.

Town Redefines Solid Waste and Finds Funding

Babylon's existing residential sector consists of approximately 65,000 homes and represented the largest source of energy use and carbon emissions for the Town. Babylon created the Long Island Green Homes Program to reduce the carbon footprint of each participating household by 20-40 percent without asking homeowners to incur high out-of-pocket costs. The program aims to combat global warming by lowering carbon emissions by 65,000-130,000 tons per year, reduce energy costs for homeowners by $1,160 a year, and create 6,600 new green collar jobs.

In its initial efforts to finance a community retrofit program, Babylon quickly found that energy service companies (ESCOs), which generally focus on commercial and institutional building retrofits, were not interested in residential retrofits. Undeterred, the Town Board sought a source of funds to create a self-financing program in which the Town could subsidize energy efficiency and clean energy projects but be paid back through building owner utility bill savings. This approach would allow Babylon to take advantage of the projected energy savings to finance the energy improvements without issuing grants or imposing taxes.

A critical question still remained: what would be the source of funding? The Town identified $2 million in its solid waste revenue fund, which had been required by the State of New York as a reserve fund for capping the ash generated in a waste-to-energy program, as a possible source. Knowing that the average home in Babylon emitted 25 pounds of carbon daily, the Town leaders felt it appropriate to consider carbon emissions a household waste stream. In 2008, the Town passed a resolution expanding the definition of solid waste to include greenhouse gas emissions, called "energy waste," thereby established a funding source for its residential retrofit program.

BABYLON INNOVATIONS

▪ Passage of a resolution to expand the definition of solid waste to include energy waste, so that $2 million in the solid waste reserve fund could support residential retrofits

▪ Ability to finance selected retrofit measures up to $12,000 through a benefit assessment charge tied to the homeowner's property, with payments based on energy savings projections

▪ Requirement that all new homes be ENERGY STAR-certified, making them 30 percent more energy efficient than a typical new home

Innovative Financing for Homeowners

The retrofit process starts with a home energy assessment, the mechanics of which are similar to many other city programs today: a homeowner undergoes a home performance review with a certified auditor, generating an itemized list of possible energy conservation measures and associated savings and costs.

The hallmark of Babylon's program, however, is that an interested homeowner then signs a contract with the Town to finance selected retrofit measures (up to $12,000 in value per home) through a monthly benefit assessment charge, which is tied to the homeowner's property.

Payments are based on energy savings projections developed by Conservation Services Group (a national nonprofit that runs nation-wide energy-efficiency programs) and ongoing monitoring is conducted by the Long Island Power Authority's Home Check software. For homeowners who are delinquent on their payments for a period of 60 days or more, the Town reserves the right to assess a 1.5 percent late fee. This is a variation on Property Assessed Clean Energy (PACE).

In the first year of the program, the total monthly charge (including a three percent administrative fee to cover the Town's costs) was less than the monthly savings on the average resident's energy bill.

Demonstrating a further innovation, each retrofitted home receives a "Green Certificate of Occupancy" indicating how much more energy efficient it is. In addition, the Town has identified ENERGY STAR-certified homes as good candidate for future solar installation projects, in an "efficiency first, renewables second" approach, a proven cost-effective combination.

BABYLON INNOVATIONS

▪ Collaboration with labor (plumbers and laborers) to perform retrofit work and a local education organization to create training for auditors

▪ Creation of a Green Certificate of Occupancy, which indicates how much more energy-efficient a home is after retrofit

▪ ENERGY STAR-certified homes targeted for solar installation, emphasizing an approach of "efficiency first, renewables second"

▪ Passage of one of the most aggressive green building codes in the United States, requiring all commercial and industrial buildings over 4,000 square feet to achieve LEED certification at the Bronze, Silver, or Gold level

Investment in Jobs

To ensure a qualified workforce, the Town of Babylon is collaborating with the Boards of Cooperative Educational Services, to create a training program for Energy Auditors, and with Plumbers Union Local 200, to provide the specific training necessary for plumbers to be able to install and service the newest energy-efficient systems. The Town is also working with some contractors who are members of the Laborers International Union of North America.

In the face of Federal Housing Finance Agency (FHFA) pressure in 2010 to suspend PACE programs nationwide, Babylon leaders refused and sued FHFA, citing the success of its program in job creation and energy savings.

Underway since 2008, the program now results in savings of $1,000 per year (or 20-40 percent in monthly utility bills) for the average Babylon resident who participates in the Long Island Green Homes program and, as of 2011, supports 50 full-time jobs. More recently, the Long Island Green Homes program has expanded to a seven-city consortium across Long Island.

The Department of Energy identified the Long Island Green Homes program as a Home Energy Score partner based on its commitment to score a minimum of 200 homes in the Town of Babylon in its first year.

BAINBRIDGE ISLAND, WASHINGTON

In 2009, the City of Bainbridge Island, Washington (population 21,981) faced a serious energy challenge. For a short but crucial period of time when temperatures dropped below freezing, the community's electricity requirements would exceed the capacity of all three of its power substations by two megawatts. To address this significant annual occurrence, the community's utility, Puget Sound Energy (PSE), proposed to build a new substation to the tune of over $6 million.

Environmentally conscious and politically engaged Bainbridge Island residents had a different idea. They did not see the need to build a new substation to cover such a short window of peak electricity needs. Instead, they decided to band together to reduce peak energy consumption through energy efficiency measures and, in so doing, eliminate the need for a new power station entirely.

Marrying Challenges to Solutions

When Bainbridge Island residents examined their energy usage, they discovered three interesting facts:

- The average Bainbridge Island resident used 60 percent more electricity than the average resident in the entire PSE utility territory.
- Half of Bainbridge Island homes were built before 1980 when new regulations for energy efficiency went into effect and hence were highly energy inefficient (fewer than 20 percent of homes were properly insulated).
- 36 percent of the community's energy came from coal, a point of concern to a community that cared about greenhouse gas emissions.

As in many other communities throughout the United States, Bainbridge Island's construction industry was suffering from high unemployment. The community had very few qualified energy efficiency experts and no training opportunities in energy efficiency and weatherization.

Bainbridge Island residents looked at this set of facts and saw opportunities to embrace energy efficiency and create clean energy jobs in Kitsap County. The City created a Community Energy Task Force, which in turn developed a local nonprofit organization called Positive Energy to implement an energy efficiency program to act on these opportunities. The community committed to achieving the following six key outcomes by 2013:

1. Implement a demand response smart grid pilot in over 500 homes.
2. Complete energy assessments in 4,000 single family homes and 25 small businesses.
3. Complete energy upgrades in 2,000 single-family homes.
4. Install over 150 renewable energy systems.
5. Create 65 clean energy economy jobs.
6. Reduce over 6,904 metric tons of greenhouse gas emissions.

In the summer of 2010, the U.S. Department of Energy chose the City of Bainbridge Island as one of only 20 communities in the nation to receive a Better Buildings award in the amount of $4.88 million. Positive Energy, the City of Bainbridge Island, and Conservation Services Group then developed a program branded as RePower Bainbridge.

Removing Existing Barriers

Preliminary research found that residents lacked information about their energy use and tools for reducing use. Furthermore, despite the fact that Bainbridge Island is a relatively affluent community, homeowners lacked understanding of how to finance retrofits. Finally, the island lacked workers skilled in home retrofits. The RePower Bainbridge program was designed to address these three barriers.

To improve homeowner access to energy use information, RePower Bainbridge:

- Provided home energy assessments that gave homeowners an accurate picture of how energy efficient their homes were.
- Implemented a two-tier energy assessment approach: a 90-minute free Home Energy Check-Up and a more comprehensive Home Energy Assessment with an Energy Performance Score (EPS), which rates the energy efficiency of buildings.
- Created a call center to provide immediate assistance with scheduling home energy assessments and answering questions about energy efficiency and incentives.
- Set up a help desk run by RePower Bainbridge's lead energy advisor to demystify the complexity of energy efficiency and costs.
- Partnered with OPower[5] to deliver Home Energy Reports in real time that gave homeowners accurate data on their specific energy use.

Innovative Approaches to Reducing Energy Use

Positive Energy joined forces with Puget Sound Energy to create an Energy Dashboard that displayed the entire community's energy use by substation in real-time. Positive Energy monitored weather conditions and, when temperatures were expected to drop below freezing on cold winter mornings and cause peak demand, used e-mail, Facebook, and Twitter to ask people to power down appliances and curtail energy usage.

This outreach resulted in a reduction of peak load by 10 megawatts of power during the winter of 2010-2011—the first winter of this voluntary citizen engagement program. No one expected such a significant response.

Drive Demand with Incentives and Financing

To assist with financing energy-efficiency upgrades, the City of Bainbridge Island partnered with Kitsap Credit Union to create an Energy Efficiency Loan Program, making it easier for homeowners and businesses to make cost-saving energy efficiency upgrades. RePower Bainbridge also provided incentives and utility rebates for homeowners to sweeten the pot and encouraged the adoption of energy efficiency measures that delivered the fastest savings.

The three loan options, with interest rates ranging from four to five percent, include:

- Unsecured Home Improvement Loan: Borrow from $1,000 to $10,000
- Unsecured Home Equity Loan: Borrow from $10,001 to $50,000
- Business Improvement Term Loan: Borrow from $5,000 to $25,000

BAINBRIDGE ISLAND INNOVATIONS

- Provided detailed analysis and understanding of the community's energy usage used as a way to galvanize community support for conservation

- Identified and addressed three key barriers: homeowner access to energy use information; access to financing; and access to skilled workers

- Created a high-quality service platform for homeowners to access and understand energy information

- Implemented a two-tier energy assessment approach: a 90-minute free Home Energy Check-Up and a more comprehensive Home Energy Assessment with Energy Performance Score (EPS) that rates the energy efficiency of buildings

- Partnered with a company that delivered accurate data to individual homeowners on energy use

The program also offered utility incentives, tax credits, and special $400 RePower Rewards given to homeowners who received a free Home Energy Check-Up or completed two improvements prior to March 30, 2011. This financing package made projects more affordable and therefore easier to complete.

To build a workforce ready to perform the retrofits being teed up by the home assessments, RePower Bainbridge partnered with Olympic Community College and WorkSource Kitsap to provide training for energy analysts and contractors; used Building Performance Institute (BPI) certification requirements; and provided marketing, referral services, and business training.

Matching the Marketing to the Locale

The RePower Bainbridge team also capitalized on a unique aspect of its community: more than half of the island's residents commute to work daily on the same ferry system, making them a captive audience twice a day. RePower installed large, on-ferry ads featuring people from the community who had already installed energy efficiency upgrades. They placed the real-time Energy Dashboard on the ferries and in 10 public locations—coffee houses, the library, bookstores, and grocery stores—to educate Bainbridge Island residents about energy usage and the energy efficiency opportunities offered by the program.

RePower energy advisors also rode the ferry and answered homeowners' energy questions. Engaging homeowners face-to-face in these settings proved to be a far more effective outreach approach than the old standby of community meetings.

In addition, soon after OPower statements began arriving in mailboxes, ferry commuters started bringing them on the ferry to compare their energy use with that of their friends and neighbors, which greatly stimulated program demand.

Two additional Bainbridge Island characteristics proved useful: (1) the strength of community groups, with one nonprofit for every 90 Bainbridge Island residents, and (2) the connectedness of the small community, with just a few degrees of separation linking nearly every resident, making word-of-mouth an extremely effective way to communicate about the program. In fact, word-of-mouth has proven so successful that residents called the program asking for ductless heat-pumps before they had even received an energy assessment, because they heard how comfortable their neighbors' homes were after installing air sealing, insulation, and ductless heat pumps.

The RePower program also adopted a savvy engagement strategy developed by another project in Brighton, England: an Electric Avenue where neighbors paint and track their aggregate energy use on their streets. Over the period of a few months, neighbors worked to reduce their energy use to below the community average.

To date, the RePower Bainbridge effort has:

- Completed 1,903 home energy assessments.
- Trained more than 30 energy analysts, with more than 30 contractors completing weatherization training.
- Installed over 12,000 Compact Fluorescent Light bulbs (CFLs).
- Completed over 30 renewable energy installations.
- Completed over 436 upgrades.
- Installed a 73 kW-solar array on Bainbridge City Hall.

One year into the program, RePower Bainbridge launched Solarize Bainbridge and is now reaching out in an Organizational Challenge to churches, schools, and other organizations that have not yet participated in the program.

BAINBRIDGE ISLAND INNOVATIONS

▪ Partnered with a credit union to create an Energy Efficiency Loan Program

▪ Partnered with community college and workforce training organization to provide training for energy analysts and contractors

▪ Adopted Building Performance Institute (BPI) certification requirements to ensure a qualified workforce

▪ Focused on creative and community-specific publicity and outreach, including an Energy Dashboard that displayed in real time the entire community's energy use by substation

▪ Used social networking (Facebook, Twitter), e-mail, and the local transportation system to ask residents to curtail energy usage

Bellingham, Washington

Few community retrofit programs have been as successful in realizing the promise of building energy use reduction and job creation as the Community Energy Challenge (CEC) in Bellingham, Washington (population 80,885).

Funded by a $2.79 million Recovery Act grant from the US Department of Energy and a $350,000 Climate Showcase Communities grant from the US Environmental Protection Agency, the CEC has resulted in 28 local jobs created, 345 home retrofitted with an average annual homeowner savings of $450, and 32 small business retrofits.

As with many other communities across the United States in 2009 that were hungry for Recovery Act funding, Bellingham's team started out with a bold vision of weatherizing their entire community. Retrofitting buildings at a neighborhood scale makes common sense: when potential customers are geographically clustered, the costs of program activities—including outreach, marketing, and the actual physical work of retrofitting—can be lower on a per unit basis.

Seasoned Agencies in the Mix

But successful launch of a community-wide retrofit program was not guaranteed. What enabled Bellingham to move quickly where others struggled to get going? Perhaps the most valuable insight of the Bellingham program is that it married two core partners who had been "in the business" for years. The Opportunity Council, Whatcom County's community action agency, had been a weatherization grantee back before the Recovery Act retrofit money was flooding in, and brought two and a half decades of experience serving low-income families, along with a track record of having weatherized over 5,000 homes.

The second group, Sustainable Connections, had spent a decade helping 600 businesses in Whatcom County—including retailers, manufacturers, farmers, and fisheries—develop sustainable practices and establish markets in sustainable business. Simply put, these two organizations had the qualifications and on-the-ground experience needed to grow a weatherization program to a much greater scale. While the tasks at hand were still complex and challenging, these groups were not creating or learning their work entirely from scratch.

Banks and Utilities at the Table

Other partners brought complementary expertise:

- Puget Sound Energy and Cascade Natural Gas utilities brought an existing suite of energy data, marketing tools, and incentives for energy use reduction.
- Bellingham Technical College and the Building Performance Center (an arm of the Opportunity Council) leveraged longtime technical training experience to develop a workforce ready to get the retrofit jobs done.
- Banner Bank provided the loan program, offering reduced rates and preferential terms for participating homeowners and businesses (including annual percentage rates ranging from 1.2 percent to 4.4 percent, depending on project size and loan term, and a 4.75 percent rate buy-down on loan terms up to 180 months).
- RE Sources for Sustainable Communities coordinated the Cool Schools Challenge to galvanize support for energy conservation among students, families, and teachers.

BELLINGHAM INNOVATIONS

- Provided a bank loan program with preferential terms for participating homeowners and businesses at reduced loan rates

- Created a Cool Schools Challenge to galvanize support for energy conservation from students, teachers, and families

- Developed a solar program for local businesses with positive financial returns

- Brought together local governments (cities and county), local utilities, and groups with long histories and expertise in weatherization

- Relied on an existing suite of energy data, marketing tools, and incentives for energy use

- Leveraged established technical training experience at the local technical college and the building performance center to develop the workforce

- The Energy Efficiency Finance Corporation designed the program's finance model, drawing from a variety of different funding sources.

The local governments that received the Energy Efficiency and Conservation Block Grant funding have been at the heart of the program—Whatcom County and the Cities of Bellingham and Ferndale, which coordinated six smaller cities. Without their steady hand in overseeing the many pieces of this program, the Community Energy Challenge would not have been be possible.

Economic Benefits of Solar

Businesses in Whatcom County also discovered that investing in solar energy can a good financial move. The North Fork Brewery, a 106-year-old building installed 40 solar panels, which are offsetting the establishment's annual electricity consumption. The Mountain Veterinary Hospital covered its entire south-facing roof with 45 solar panels. The North Fork installation is expected to be paid back in seven years, while the Veterinary Hospital installation should be paid for in five years. Each of these businesses started with deep energy upgrades, replacing lighting, heating systems, and/or adding insulation first before investing in solar.

BOULDER, COLORADO

The City of Boulder, Colorado (population 97,385) has long been a beacon of clean energy and climate action within the state and country due to its environmentally minded citizens, who include college students, climate scientists at the National Center for Atmospheric Research (NCAR) and the National Oceanic and Atmospheric Administration (NOAA), and employees of clean tech and energy firms.

Like many cities, Boulder adopted a goal of reducing greenhouse gas emissions to seven percent below 1990 levels by 2012, in line with international Kyoto Protocol commitments. But without a dedicated source of funding, the City was limited in how it could establish a serious program to realize this goal.

Nation's First Carbon Tax

In 2006, the citizens of Boulder voted to enact the country's first local carbon tax—or Climate Action Plan (CAP) tax—to fund City-led measures to reduce greenhouse gas emissions. Xcel, the investor-owned utility that serves the community of Boulder, collects the taxes paid by city residents and businesses based on how much electricity they consume. The tax generated approximately $1.8 million in 2010, and is set to expire in 2013 unless it is renewed by the voters.

According to City officials, one of the programs that would not likely exist without the CAP tax is EnergySmart, a collaborative effort between Boulder County and the Cities of Boulder and Longmont to provide energy audits and incentives to homeowners, property owners and managers, and businesses to make energy efficiency improvements to their properties. Funded by part of a larger $25 million grant to Boulder, Garfield, and Denver Counties from the US Department of Energy's Better Buildings program, EnergySmart also relies on the City of Boulder's CAP tax revenue and funds from the City of Longmont.

Unique Approach to Efficiency with Rental Properties

In Boulder, one of the functions of the EnergySmart program is helping rental property owners comply with Boulder's SmartRegs Ordinance. The program requires existing single-family and multi-family rental housing to meet a basic standard for energy efficiency by 2019.

Passed in 2011, SmartRegs is a trio of ordinances that revise the City's housing code and rental licensing code and create baseline energy efficiency requirements for existing rental housing, developed from an in-depth stakeholder outreach strategy to reduce energy use from the residential rental sector. With rental housing representing about half of Boulder's housing stock, this approach represents an important way for Boulder to reduce greenhouse gas emissions from its building stock, and it breaks ground for others in the challenging area of rental housing energy efficiency.

Through the SmartRegs "compliance pathway," the EnergySmart service provides a one-stop shop for energy efficiency questions, providing technical assistance from a licensed SmartRegs inspector, expert advice on how to achieve compliance through targeted energy efficiency measures, support in identifying and scheduling contractors to conduct property energy improvements, and information on relevant rebates and incentives.

In order to renew their rental housing license, rental property owners are required to submit proof that either their property meets a performance standard of 120 Home Energy Rating System (HERS), or that their property was inspected and met at least 100 points on a prescriptive checklist that approximates 120 HERS.

SmartRegs inspections are available to landlords for a small fee of $120 per inspection, with most of the service subsidized by the program. The City also provides additional rebates and incentives for property owners and managers of multi-family and low-income buildings pursuing early compliance with the SmartRegs ordinance.

In the first year, the City exceeded its goals of 1,000 housing units inspected and 500 units achieving compliance. Some property owners even voluntarily chose to make improvements that exceed the minimum requirements. More broadly, this ordinance has also helped to encourage participation in the community's other energy efficiency programs including low income weatherization, energy efficiency loan programs, and rebates from Xcel Energy.

Killowatt Kids, Count Plugula, and Dr. Drafty

Energy Smart also has a strong youth education component with its Teach for Sustainability campaign, including characters such as Kilowatt Kid, Count Plugula, and Dr. Drafty, who model energy-saving behaviors.

In addition, Rocky Mountain Music children's musician Jeff Kagan has created climate change and energy conservation education through his 21st Century Energy Superheroes playlists. These campaigns use fun and friendly competitions through the EnergySmart Challenges and energy conservation checklists to reduce energy use at home. Over 600 students joined the first round of the challenge, and the second round has a waiting list.

On the Path to Create a City-Run Utility

Boulder has not been content to rest on its laurels, but continues to push boundaries in energy innovation. In November 2011, Boulder residents voted to continue a process that could lead to the creation of their own municipal utility, which would enable them to have greater authority over their energy supply.

BOULDER INNOVATIONS

▪ Voted to enact the country's first local carbon tax, collected based on electricity consumed, to fund city-led measures to reduce greenhouse gas emissions

▪ Collaborated with the County and other cities on residential energy audit and incentive program

▪ Required residences to meet a basic standard for energy efficiency by 2019

▪ Focused on rental properties and helping landlords achieve compliance with targeted energy efficiency measures, offering rebates and incentives for property owners of multi-family and low-income buildings

▪ Engaged students of all ages (K-12 and college) in a variety of energy awareness initiatives

Eugene, Oregon

The City of Eugene, Oregon's (population 156,185) Community Climate and Energy Action Plan has received national recognition for using a range of innovative strategies to address climate change and energy independence. With a comprehensive set of action items, the plan addresses and integrates three separate but related goals adopted by the City Council:

1. Reduce community-wide greenhouse gas emissions to 75 percent below 1990 levels by 2050.
2. Reduce community-wide fossil fuel use by 50 percent by 2030.
3. Identify strategies that will help the community adapt to a changing climate and increasing fossil fuelprices.

In addition to climate action planning within the City, the community benefits from innovative energy resource planning through the work of its local utility.

Founded in 1911, the community-owned Eugene Water & Electric Board (EWEB) is Oregon's largest customer-owned utility and provides electricity and water to more than 86,000 homes, business, schools, and other customers in Eugene. EWEB has long been a leader in energy efficiency, showing the way for national change over the course of its 100-year history. EWEB is a critical partner in the development and implementation of the Eugene Climate and Energy Action Plan.

Reliance on Conservation and Renewable Energy

Unlike many utilities, EWEB has considered energy conservation, through the use of Demand Side Management or energy efficiency programs, to be a distinct, quantifiable resource since 2004, when the utility's Integrated Electric Resource Plan identified energy conservation as its top priority resource. EWEB worked with residential and commercial customers to conserve 27,366 MWh of electricity in 2011 alone, an amount equivalent to the annual average electricity consumption of more than 2,000 homes. The accumulated energy efficiency savings since 1990 translates to an approximately 15% reduction in Eugene's electricity use.

EWEB also offers customers the opportunity to invest in on-site renewable energy through two avenues: (1) solar panels and solar thermal, and (2) Greenpower. Starting in 2012, EWEB began using revenues from its Greenpower program to fund incentives for local solar installations to support both clean energy and local jobs.

EWEB's investment in the Foote Creek Rim wind farm in Wyoming in 1999 was one of the earliest actions of its kind among regional utilities. EWEB has also participated in various other renewable energy projects throughout the Northwest, including the Harvest Wind farm and Seneca Mill Cogeneration biomass project.

Walkability a Major Design Focus to Cut Carbon

The idea of promoting walkable community design as a climate change mitigation strategy is certainly not new. Land use planners will easily recognize the 20-minute travel idea as only a new frame for the concept of compact neighborhoods, a pillar of the smart growth movement that promotes a mix of residential and commercial land uses in a densely populated area connected to multiple transportation modes such as sidewalks, bike lanes, and public buses.

Like other cities around the world, Eugene has begun work to create compact, walkable communities with the framing of 20-Minute Neighborhoods, or "places where residents have easy, convenient access to many of the places and services they use daily, including grocery stores, restaurants, schools, and parks," all accessible within 20 minutes without driving a car.

In 2011, Eugene conduted a 20-Minute Neighborhood assessment to help residents, planners, and policy-makers understand which areas of the city were most walkable and why, mapping the results to show residents' auto-free access to common destinations. This work was based on factors such as residential and employee density, distances to common destinations, and modes of travel by the general public, with areas classified as being within a 20-minute radius of walking, biking,

and climate-friendly transportation choices. The study also considered aesthetics, safety, and demographic factors such as income, race, education, and age.

Neighborhood walkability scores have been available publicly by zip code or address for years, and the Partnership for Sustainable Communities between the US Department of Housing and Urban Development, US Department of Transportation, and US Environmental Protection Agency has required or encouraged cities to include this type of metric in their applications for federal grant funding.

What sets Eugene apart in this regard is: the community engagement around 20-minute neighborhoods; the City's analytical work to apply the concept to specific geographical areas; and its commitment to operationalizing the concept. The Climate and Energy Action Plan calls for a specific goal of housing 90 percent of its residents in 20-Minute Neighborhoods by 2030, a bold target that requires broad and deep community commitment.

The City is operationalizing that goal in both its Transportation System Plan and its growth strategy, Envision Eugene. It further helped to communicate compelling statistics about the community as it is, such as the fact that "at least $0.70 of every dollar spent on gas and diesel [for single-occupancy vehicles] immediately leaves Eugene."

Eugene is working to sell smart growth on the ground, neighborhood by neighborhood. As other cities around the world pursue similar planning, Eugene will be a city to watch. True 20-Minute Neighborhoods are a key component of any eco-district strategy strategy (focusing on sustainability at a neighborhood or district scale), taking the often daunting global issue of transportation fossil fuel use and corresponding greenhouse gas (GHG) emissions and making it locally relevant.

SmartTrips and Transportation Masters

In tandem with this work, Eugene won a $100,000 Environmental Protection Agency Climate Showcase Communities Grant to expand residents' awareness of their climate-friendly travel options. The City identified four neighborhoods in which there were comparatively good transit options, pathways, and pedestrian-friendly walkways to downtown, yet over half of the residents drove alone to work each day.

Among the variety of creative outreach efforts the City is using to engage the 12,000 residents of these four neighborhoods is the opportunity to become a "Transportation Master" in one afternoon. Community members can enroll in this free session to learn about climate-positive transportation choices and strategies to convince others in their communities to get out of their cars. In exchange for their "Masters" training, participants agree to devote 10 hours of community service to attending outreach events and conducting transportation audits with their peers.

After the first program, these efforts resulted in a reduction of over 250 metric tons of carbon equivalent annually, a seven percent relative reduction in drive-alone trips, and an increase of 22 percent in bicycling trips and two percent in walking trips.

EUGENE INNOVATIONS

▪ Taking the 20-Minute Neighborhood to a new level

▪ Close collaboration between the City and the utility

▪ Conservation valued by the utility as a distinct, quantifiable resource

▪ Creation of a program to fund incentives for local solar installations

▪ Ambitious goal to house 90 percent of its residents in compact 20-Minute Neighborhoods by 2030, operationalized in Community Climate and Energy Action Plan

▪ Calculating and communicating the amount of fossil fuel expenditures on a community-wide basis

▪ One-day Transportation Master class offered to educate citizens on alternatives to driving

Fort Collins, Colorado

Fort Collins, Colorado (population 143,986) is a city with an ambitious, integrated clean energy vision and partners committed to making that vision real.

The City has long been a national leader in clean energy. It was the first in Colorado and among the first in the nation to offer its customers the option to purchase green power through a contract with the Medicine Bow wind plant in Wyoming.

Fort Collins is home to New Belgium Brewery, which in 1999 became the nation's first brewery to purchase all of its electricity from wind power. The city also boasts 31 clean energy companies, plus a large number of other technology companies (50 bioscience companies, 259 software companies, and 220 hardware companies), the Rocky Mountain Innosphere, an incubator for clean energy companies, and the Colorado Clean Energy Cluster, an economic development organization focused on clean energy.

Pushing the First Net-Zero Energy District

Given the robust presence of clean and high tech companies, it perhaps does not come as a surprise that Fort Collins has joined with a range of community leaders to chart a course for the country's first net-zero energy district, FortZED, which would generate more energy than it uses through both electric and thermal sources.

In the early stages of its development, FortZED brought together the City, the municipal energy and water utility, Colorado Clean Energy Cluster, Colorado State University, New Belgium Brewery, and an array of private sector technology companies to develop the District's components.

A corporate leader such as the New Belgium Brewery was a natural place to start. As a committed environmental business, the Fort Collins-based company features brewing equipment that uses 65 percent less energy than average, and redirects the methane gas emitted from its operations to power 15 percent of its energy needs.

In 2010, New Belgium launched Colorado's largest solar array at the time—a 200 kW installation on the rooftop of its 50,000-square-foot packaging hall and bottling plant—as an anchor project of the emerging FortZED district. The installation, hailed by company leaders as an effort to "reduce need for coal-burning facilities," is projected to reduce the company's peak electrical load by 16 percent and its total energy use by three percent.

FORT COLLINS INNOVATIONS

• Ambitious, integrated clean energy vision to be the first net-zero energy district in the country, producing more energy than it uses from both electric and thermal sources

• Crucial public-private partnership between the City, the energy and water utility, the University, a brewery, and technology companies designed around early-stage catalytic projects

• Used smart grid technology to test how to integrate renewable energy into a peak-load reduction strategy

• Business leader engagement in commercial energy usage

• Shares purchased in community solar garden credited to utility bill

Thanks to the US Department of Energy's investment of $6.32 million in FortZED's smart grid features, New Belgium facility managers and neighboring property owners will be able to tell when energy use is peaking and send power back to the grid as needed.

Casting a Wide Net for Solar

In parallel with the development of the FortZED project, the FortZED Community Energy Challenge asks residents to take a pledge to reduce their energy use and provides a number of opportunities to reach that goal. For example, it invites residents whose homes are not suitable for solar to purchase a share of an off-site Community Solar Garden, which will then be directly credited to their utility bill.

With a total of $11.3 million in federal and local support, the FortZED initiative represents a "jump start" for the district, focused on a number of technologies to reduce peak energy use, integrate renewable energy into the electric energy system, and deploy advanced energy meters to provide more reliable, real-time data collection on building energy consumption.

HAILEY, IDAHO

The majority of the population of Hailey, Idaho (population 8,075) hails from cities like Seattle, Washington, Portland, Oregon, and San Francisco, California, lured by the magnificence of the Sawtooth Range and the surrounding natural beauty. Hailey residents have a strong bias toward protecting the natural environment of the Wood River Valley and the work underway in this community of under 10,000 residents is creating models for small towns where cold weather makes efficient buildings a priority.

Since 2003, Hailey has promoted density and smart growth principles and worked on reducing vehicle miles traveled by encouraging a more tightly woven land-use pattern that is intended to reduce or eliminate sprawl. This forward-thinking work resulted in the City winning an Idaho Smart Growth award for its 2010 comprehensive plan update.

Investing Local Leadership and Talent
On February 12, 2007, Mayor Susan McBryant and the Hailey City Council joined other US mayors and cities in ratifying the US Mayors Climate Protection Agreement, which led to the creation of the Hailey Environmental Leadership Program (HELP), an advisory committee that implements and tracks progress on the goals and requirements of the Climate Protection Agreement.

The following year, Hailey joined ICLEI's Cities for Climate Protection program and finalized a carbon baseline assessment for the Hailey City Council, which led to the Council adopting a goal of reducing municipal carbon emissions by 15 percent by 2015.

Hailey also created building incentives for ENERGY STAR homes and, at the recommendation of HELP, the City Council created the Sustainable Building Ad Hoc Advisory Committee in November 2008. Composed of architects, builders, and members of the nonprofit community, the Committee is charged with making recommendations for improving the City's building codes to encourage sustainable development.

Prioritizing the Built Environment
The Committee met for two years, from 2008 to 2010, and researched existing green building codes, including all LEED certification programs. While the State of Idaho had mandated the adoption of the 2009 International Energy Conservation Code (IECC), which requires that residential and commercial buildings be built to 10 percent more energy efficient standards than 2009 standards, the Committee recommended the Hailey Build Better Program, which is 10 percent more efficient than the 2009 IECC. The Build Better Program is voluntary until January 2013, when the Council will consider making it mandatory.

On October 25, 2010, the Council adopted a resolution that combined the 2009 IECC and the Better Building Program.

Small City Cutting Carbon
In 2011, Hailey became a US Environmental Protection Agency Climate Showcase Community, receiving a $472,429 grant to demonstrate how small communities can reduce greenhouse gas emissions through a strong alliance of community partners and an integrated suite of greenhouse gas reduction projects. The City intends to use the grant as a stepping stone to prepare the community for a larger, more long-term community carbon emissions reduction effort.

The Showcase elements include:
- An Energy Audit and Retrofit Program with Renewable Energy Incentives
- Green Building Demonstration Project
- Solid Waste Management Capacity Building
- Downtown Bike Share System and Energy Efficient Streetlight Upgrade
- Hailey Government Capacity Building
- Focus on Education, Outreach, and Replicability

To achieve the goals of the Showcase grant, the City created the Hailey Community Climate

Challenge, which aims to reduce through energy conservation the amount of energy required to heat and power 57 homes in area. The City's overall goal for the Showcase grant is to reduce energy consumption by 525 metric tons of carbon annually by retrofitting 40 homes and installing 70 downtown energy efficient street lights.

As part of this work, the City is creating a bike share system provided by Social Bikes (SoBi) in downtown Hailey that is expected to ease congestion and reduce vehicle miles traveled. SoBi is a new company with an innovative approach to bike share, using social media, GPS, and phone applications to locate, check out, and return bikes. Electronic bike locks are built into the bike, so there are no kiosks or specific bike stations, where bikes have traditionally been required to be returned. Residents will use 16 SoBi bikes primarily downtown or returned to the downtown area through the use of business and downtown bike return incentives. In addition, the bikes will be used in conjunction with the City's major park and ride transit station downtown.

Also as part of this work, the Hailey Rodeo Park Interpretive Center is a City-owned green building demonstration project that will be LEED-certified and is estimated to save 30 percent of water usage and 35 percent of energy consumption, and will incorporate a number of other green building practices. It will house the Hailey Chamber of Commerce, a gallery exhibit on the history of rodeo in Hailey, and a LEED interpretive panel.

Rebates for Retrofits
Energy retrofit rebates are available through Blaine County's Community Audit Retrofit Rebate Program (CARRP) to homeowners who conduct certified energy audits and implement basic energy improvements to existing buildings. Residents can receive a 50 percent rebate on qualified materials and labor, up to $1,800, for eligible energy improvements, plus 50 percent of the energy audit, up to $200, for a total rebate of $2,000. Residents may apply for one additional rebate of $2,000 for new energy improvements.

In 2012, the Hailey Save-A-Watt program launched, providing rebates for energy assessment and upgrades of homes and commercial buildings. The Save-A-Watt program is offering a total of 30 $2,000 rebates through 2013 to those participants who receive an audit and implement retrofits. In addition, nine Save-A-Watt participants will be awarded $2,000 to install a renewable energy system.

Hailey homeowners who combine the Save-A-Watt and CARRP programs can receive a 100 percent rebate on labor and an 80 percent rebate on materials, up to $4,000.

Major Public Awareness Focus
Hailey's Community Climate Challenge program focuses on public information and community outreach measures to raise awareness and encourage behavior change, including developing ads, brochures and a web page, and hosting kick-off events for the various program/projects, as well as producing a full-length documentary film about the Challenge and a how-to booklet that could serve as a guide to other communities interested in replicating Hailey's carbon reduction efforts. The film will highlight everyone in the community who is participating as a partner, a volunteer, or a participant in any of the Challenge programs.

The City of Hailey created a new Sustainability Coordinator position to lead Hailey's Community Climate Challenge program and ensure that capacity would exist in the municipality to encourage the continued reduction of carbon emissions through ongoing City and community initiatives and projects.

HAILEY INNOVATIONS

- Early focus on sprawl, reduction of vehicle miles traveled, and impact of land use decisions on the environment

- Significant community engagement, including volunteer Green Building Committee

- Investment in organizational capacity to coordinate work across different programs

- Linkage of energy efficiency with renewable energy rebates

- Packaging of incentives to bring cost of retrofits close to zero

- Creation of documentary film to highlight the steps implemented by the Hailey Community Challenge

- Strong working relationship and partnership with utility

Making Small-Scale Renewables Possible

In 2009, the City of Hailey received $130,000 from the state of Idaho to study a wastewater biosolids treatment and energy recovery project. This is part of an effort by the State to solicit ideas for the development of Renewable Energy Enterprise Zones, which are expected to spur economic growth and job creation by encouraging renewable energy development collaboration between local authorities and energy developers.

Using local engineers and contractors as well as funding from the Idaho Office of Energy Resources, the City of Hailey installed a 25kW photovoltaic system and HVAC retrofit that uses reclaimed heat for its wastewater treatment plant in South Hailey. The power generated is used to supplement the treatment plant's energy needs, which account for nearly 80 percent of the total energy used for all city operations.

In 2012, the Hailey Community Climate Challenge attached a renewable energy rebate program to the energy efficiency program; residents who participate in the retrofit program are automatically entered to win one of nine $2,000 rebates awards for installing renewable energy.

The City also amended the building and zoning code to eliminate the permitting requirements for roof-mounted small-scale solar and minimize the requirements for small-scale wind.

Close Partnership to Reach Renters

The City has partnered closely with its utility, Idaho Power Company (IPC), in numerous ways. First, the utility installed smart meters, which enable utility customers to monitor their energy usage, throughout the entire utility territory. The City has worked closely with IPC to conduct workshops and tutorials on how smart meters and the smart grid work.

The City is particularly proud of its public-private partnership with the South Central Community Action Partnership (SCCAP) and IPC. SCCAP is a nonprofit organization that provides services to low-income and elderly individuals and families, including a weatherization program that provides 100 percent of the cost of the energy assessment and retrofits.

Most SCCAP clients live in rental housing and often do not have the funds needed to participate in the Save-A-Watt program. The partnership between the City of Hailey, SCCAP and IPC will make it possible to reach a greater number of individuals and families who represent an underserved population.

The City of Hailey reserved $20,000 of its Save-A-Watt funds to provide energy efficiency services to SCCAP clients. SCCAP spends up to $5,000 on each home, and the City of Hailey provides 50 percent, up to $2000 per home, for a total of $20,000 from the City of Hailey. IPC and the Department of Energy, among others, provide the remainder of the funds SCCAP requires to complete the projects.

IPC has also been supportive of Hailey throughout its regional planning process: helping resolve issues with the Public Utilities Commission; supporting the City to monitor energy usage; and giving the community over $20,000 in the past three to four years to support municipal building energy efficiency upgrades.

JACKSON, WYOMING

Early in 2009, James Wolfensohn, former President of the World Bank, spoke at a fundraising dinner in Jackson, Wyoming (population 9,915), where he challenged Mayor Mark Barron to transform Jackson into a model of energy efficiency to the world.

Wolfensohn, who considers Jackson his home, told Mayor Barron that he was willing to lend his leadership and financial support to Jackson's efforts to pioneer energy efficiency and clean energy solutions.

Putting Jackson on the Energy Innovation Map

Mayor Barron immediately created the Wolfensohn Challenge Steering Committee, composed of officials representing the Town, Teton County, Lower Valley Energy (LVE), the rural cooperative utility that serves the area, and a representative from the Governor's office, as well as other influential local leaders. The Committee raised nearly $350,000 in private donations.

The Town of Jackson used Energy Efficiency Conservation Block Grant funding to work with Climate Solutions' New Energy Cities program to create the Jackson Hole Energy Sustainability Project (JHESP), whose mission is to make Jackson a national leader in energy efficiency and energy innovation and a model for sustainability, cost savings, and conservation, and to create a 20-year Action Plan for conserving energy.

Setting Specific Goals with Metrics

With grant money from a local charitable organization, 1% for the Tetons, the JHESP performed a county-wide greenhouse gas emissions inventory and then, working with the community and facilitated by the New Energy Cities team, set the following specific goals:

- Reduce by at least 33 percent the additional 30 megawatts of energy needed to meet the area's projected load growth for the next 20 years through resource conservation
- Develop local renewable energy resources to generate at least two megawatts of additional energy over the next 20 years
- Achieve at least an 80 percent penetration rate for energy efficiency building retrofits
- Encourage and advocate for adoption of building codes that require maximum energy efficiency for future buildings and infrastructure
- Share the message of energy efficiency and care for the region's special environment with the millions of visitors who come to Jackson and the Yellowstone ecosystem

In the three years since the Wolfensohn Challenge got underway, the JHESP has made considerable progress toward its goals.

Governance Agreement with Utility

First, the JHESP reached a tri-partite governance agreement between the Town, the County, and LVE, which formalized the JHESP's authority to oversee projects and make key decisions about financing. Initially supported by members of the Town, County, and LVE staff for the first two years of operation, the JHESP hired a full-time Executive Director in 2011. Also in 2011, the JHESP became a Joint Powers Board of the Town and County managed by nine board members.

Using the Ballot and Legislature to Enable Improvements

As part of a public buildings energy efficiency retrofit strategy, the JHESP ran a successful ballot measure in August 2010, asking voters for $3.7 million in Special Purpose Excise Tax monies to upgrade the public facilities of the community.

Because the Wyoming constitution prevents public money from being loaned to private parties and citizen for retrofits, the JHESP hired the Boulder, Colorado law firm of Kutak Rock LLP to provide advice on changing these restrictions. This work resulted in the successful passage of HB0179, sponsored by Wyoming Representative Ruth Ann Petroff, which permits the JHESP to designate energy improvement areas and establish loan programs for cost-effective energy upgrades and energy audits for property owners within the area.

The State of Wyoming Steps Up

The Town also received $572,000 from LVE in energy rebate funds as a reward for energy efficient upgrades made to the aeration system of Jackson's wastewater treatment plant.

For its residential energy efficiency retrofit program, the JHESP analyzed data to determine the payback and return on investment on an energy efficiency and smart metering pilot project for up to 300 buildings in Jackson.

The JHESP applied for and received a $1,500,000 loan from the State of Wyoming Energy Office to provide an energy efficiency loan program in the community. Loans of up to $7,500 are at zero percent; loans of up to $20,000 are available at varying interest rates. They must be repaid in five years, and payments appear on the customers' monthly utility bills.

Residents can use loans for installation of windows, insulation, smart thermostats, caulking and weather stripping, fuel switching from electricity to gas, solar panels, solar hot water heaters, ground source heat pumps, home natural gas fueling stations for vehicles, energy efficient furnaces, and heat recovery ventilation systems.

Community Engagement and Outreach

The JHESP focused significant attention on communications: developing a community outreach and education strategy, creating a website that monitors all JHESP activities, and keeping an active presence at all community events where the efforts of the JHESP could be promoted. The JHESP hosted the Jackson Eco Fair on May 12, 2012, for example, sharing information about its mission and the importance of energy auditing and energy efficiency with nearly 2,500 attendees in Powerhorn Park, in the center of Jackson.

Knowing the importance of engaging and educating property owners about energy efficiency retrofits, the JHESP partnered with the University of Wyoming to conduct a community survey gauging local attitudes toward energy retrofits in homes, while LVE engaged homeowners in a Smart Grid pilot program related to water heater usage.

Largest Solar Array in the State

By the fall of 2011, the JHESP has exceeded its renewable energy goal of two megawatts by building the largest solar array in the State of Wyoming—four megawatts—on the Town's Wastewater Treatment facility. The JHESP plans to expand the array to five megawatts.

The Town of Jackson is well on its path to becoming a national leader in energy efficiency and renewable energy. With over four million annual visitors to the area, Jackson has the potential to educate millions of Americans about the value of investing in energy efficiency and renewable energy and pioneering a clean energy future.

JACKSON INNOVATIONS

▪ Created a formal collaboration between the utility, the Town, and the County to reduce energy

▪ Set aggressive, measurable goals to reduce energy usage throughout the community in order to meet projected load growth and to supplement energy demand with renewable growth

▪ Ran a ballot measure to raise public money for retrofitting public buildings

▪ Passed legislation in the Wyoming State Legislature enabling the creation of energy improvement districts

▪ Developed a strategy for residential retrofits that enabled the collection of up to $1.5 million to create a loan loss reserve fund

KNOXVILLE, TENNESSEE

In Knoxville, Tennessee (population 178,874), investment in clean energy is all about economic development. Using the presence of the Oak Ridge National Laboratory and the University of Tennessee, the Knoxville Chamber of Commerce consciously recruits clean, green, and high tech companies to locate there as part of what local officials call the Greater Knoxville Innovation Valley.

The results? In 2011, Knoxville was ranked second in the nation for green jobs growth, according to the Brookings Institute. Green Mountain Coffee has moved its headquarters there, and other homegrown firms have gained national exposure, including Clayton Homes, for its green pre-fabricated housing. Aqua-Chem, also headquartered in Knoxville and a 2012 Chamber Innovation Award recipient, specializes in water treatment technologies and has been working since 1943 to ensure that deployed troops have safe drinking water.

Leveraged Solar City Grant
The City has played a seminal role, building on a $200,000 Department of Energy Solar Cities grant that leveraged $250,000[6] to take the community from just under 15 kilowatts of solar energy capacity to two megawatts.

The City used the grant to lay critical groundwork by getting contractors and permitting officials comfortable with solar energy installations. The City also packaged a green incentive program with a solar rebate of up to $15,000 for ENERGY STAR-certified homes, providing an extra solar incentive for homes that use energy efficiently.

Solar-Powered Electric Vehicle Charging Stations
Partnering with the Oak Ridge National Laboratory, the City has also invested in 10 electric vehicle charging stations that are powered by solar energy, adding to 18 existing stations that were funded by ECOtality, a San Francisco, California-based clean electric transportation and storage company, through a Department of Energy grant.

Public Engagement to Overhaul Building Codes
Looking ahead, the City has more in store. Using a $4.3 million grant from the US Department of Housing and Urban Development, the US Department of Transportation, and the US Environmental Protection Agency, the City plans to develop PlanET, an intensive public engagement process to overhaul zoning and codes that is intended to promote economic, social, and environmental development.

Tapping the TVA
The City also looks to improve upon the foundation it has already built, such as further refining its existing municipal third-party power agreement with FLS Energy and the Tennessee Valley Authority, which supplies electricity and other utility services to seven southeastern states, to make them replicable in other cities in the region.

KNOXVILLE INNOVATIONS

- Developed an economic development strategy focused on attracting clean energy jobs

- Leveraged a government grant to build two MW of solar electric capacity

- Devoted effort to helping contractors and permitting officials understand how solar energy installations work

- Combined a solar rebate with energy efficiency measures

- Invested in 10 electric vehicle charging stations powered by solar energy

- Engaged in intensive public engagement to overhaul building codes and zoning

- Negotiated an agreement with the utility to purchase solar energy output

TVA's bylaws preclude it from recognizing third-party power providers, but through its Generation Partners program, TVA will purchase all of the output from a qualifying solar photovoltaic system at a premium of $0.12 per kWh on top of the retail electricity rates.[7] Through this program, as of spring 2012, more than 360 solar panels (or about 90 kilowatts) are currently being installed on the roof of the Knoxville Convention Center.

OBERLIN, OHIO

The City of Oberlin, Ohio (population 8,286) has partnered with Oberlin College, as well as with private and institutional organizations, to develop the Oberlin Project, which aims to improve the community's resilience, prosperity, and sustainability.

Under the leadership of Oberlin College Professor and Special Assistant to the President for Sustainability Dr. David Orr, Oberlin City Manager Eric Norenberg, and Oberlin College President Marvin Krislov, the Oberlin Project's goal is to create a sustainable model for economic and community development at the College and community-wide level by revitalizing the local economy, eliminating carbon emissions, and restoring local agriculture, food supply, and forestry.

Going Beyond Carbon Neutral

The City of Oberlin has set a goal of reducing carbon emissions 50 percent below 2007 levels by 2015. With over 90 percent of its electricity coming from renewable sources (primarily landfill gas and hydro, as well as solar and wind), the City reports being on target to meet this goal.

Furthermore, the City and College have signed on to become one of 18 Clinton Foundation Climate Positive Development Program (CPDP) cities, one of only three in the United States.[8] The CPDP was created to meet the dual challenges of rapid urbanization and climate change, and aims to encourage urban laboratories seeking to grow in ways that are environmentally sustainable and economically viable.

CPDP communities commit to "going beyond carbon neutral" to achieve a "climate positive" emissions target that lowers carbon emissions below zero by both reducing and offsetting emissions in the surrounding area. Communities that are accepted into the CPDP program are expected to pursue the integrated planning of energy efficient buildings, low carbon transportation solutions, and waste and water management systems. Oberlin is unique in that it is the only example of a town-gown collaboration committed to becoming climate positive on a community-wide basis.

Oberlin College recently completed a $1.1 million study funded by Department of Energy to assess current energy use and renewable energy potential in the region, identify the region's strengths in the new energy economy, and lead the region in its transition away from a fossil fuel-based energy system toward a cleaner, more sustainable future. The City of Oberlin and Oberlin College have committed to exceed net-zero carbon emissions by sourcing renewable energy and sinking more carbon than they emit in a given period of time. (Carbon sinks may include agricultural methods, land use planning, reforestation, and locally created offsets.) With technical assistance from the Oberlin Project, the City is in the process of updating its Climate Action Plan to chart a roadmap to becoming climate positive by 2050.

To mitigate the nearly $15 million spent on energy in Oberlin each year, the Oberlin Project is working with Providing Oberlin With Efficiency Responsibly (POWER), a nonprofit, grassroots environmental justice organization, to provide all Oberlin residents the opportunity to improve efficiency in their home. This work will complement the three-year Efficiency Smart Power Plant program initiated by the community-owned utility, Oberlin Municipal Light and Power System, to encourage electric energy efficiency through market-based incentives and custom services. In addition, the Oberlin Project is exploring innovative financing options to provide access to capital for efficiency improvements and renewable energy installation in the commercial and industrial sectors.

The Oberlin Project is also coordinating carbon neutrality planning in the transportation sector, with assistance from local, county, and regional community partners, to promote a transportation system that serves the needs of all Oberlin residents, but uses sustainable principles to reduce carbon emissions. Current projects include partnering with the City, the College, and City schools to identify alternative fuel options for vehicle fleets, planning an upcoming Complete Streets workshop, and implementing a robust ride-sharing program.

Largest Solar Array on a Campus in Ohio

Oberlin has long been an early adopter of solar energy. Oberlin College completed the largest solar array in northeast Ohio at the time in 2006 with the addition of 100 kW to the existing 60 kW array on the College's Adam Joseph Lewis Center for Environmental Studies.

As of April 2012, the College had entered into a power purchase agreement with Spear Point Energy to purchase electricity from a 2.27-megawatt solar array that will be the largest photovoltaic array on any college or university in Ohio. It will involve 7,722 solar panels, covering 10 acres of agricultural land and generating three million kWh of electricity per year, enough to power 400-450 homes and equivalent to 12 percent of the college's annual energy consumption.

The recently renovated LEED Gold-certified Oberlin Fire Station is powered in part by a 10.8 kW solar array, building on the City's commitment to solar energy, as evidenced by its net metering ordinance allowing residential customers with installed photovoltaic panels to receive credit for feeding back into the grid. In addition, the municipally-owned utility installed a 3.8 kW solar array on its roof in 2008, and will be installing two cutting-edge solar concentrators, designed by Oberlin-based Greenfield Solar, off of South Main Street that will each generate 1.5 kilowatts of electricity and approximately 17 BTU of thermal energy capacity.

Green Energy Ohio, a nonprofit organization dedicated to promoting environmentally and economically sustainable energy policies and practices in Ohio, awarded Oberlin its Clean Energy Community of the Year award in both 2006 and 2011. The 2011 award specifically recognized Oberlin's leadership in spearheading the transition to a climate positive status.

Holistic Community Development and Local Foods/ Agriculture Investment

The Oberlin Project also aims to support existing and launch new business ventures in energy efficiency and renewable energy, and partners with four institutions—Lorain County Community College, Lorain County Joint Vocational School, Oberlin City Schools, and Oberlin College—to enable graduates to understand, value, and implement sustainable practices as they join the workforce.

The Oberlin Project is working with the Western Reserve Land Conservancy and local landowners to identify a 20,000-acre patchwork of land within a six-county area that might be permanently protected to support food, energy, and carbon sequestration projects in northeastern Ohio. This will support the goal of developing a robust local foods economy to meet 70 percent localization across the entire food value chain, including production, distribution, processing/manufacturing, storage, consumption, and waste handling. Additionally, a 16-person Community Engagement Team is leading the way to integrate broad community engagement in all aspects of the Oberlin Project, to define and achieve its collective goals.

OBERLIN INNOVATIONS

- Goal to generate 90 percent of energy from renewable energy sources

- Set a goal of carbon neutrality by 2050, aiming to be "climate positive" and lowering GHG emissions below zero

- Partner with a nonprofit grassroots environmental justice organization for an energy efficiency program

- Collaborate with the community-owned municipal light and power utility

- Conserve 20,000 acres of green space to develop robust local food economy in order to meet 70 percent of the community's food consumption

- Develop a 13-acre LEED Platinum Green Arts District

- Integrated sustainability instruction into schools

Most Important Green Building in 30 Years

Oberlin College's Adam Joseph Lewis Center for Environmental Studies, completed in 1999, was named the most important green building of the last 30 years in *Architect* magazine in 2010. The College has recently completed a $12 million LEED Gold-certified renovation of the Allen Memorial Art Museum and LEED Gold-certified new construction of the Kohl Building, and the City's renovation of the Oberlin Fire Station was awarded LEED Gold certification in December 2011. These buildings are complemented by the sustainably designed, mixed-use East College Street Project, located in downtown Oberlin on a redeveloped brownfield and touted as a "model for sustainable community development" by the Natural Resources Defense Council.

The Oberlin Project aims to develop a 13-acre Green Arts District at the US Green Building Council Platinum level as a driver for community economic revitalization. The District project includes restoration of the Allen Memorial Art Museum (completed) and Hall Auditorium, along with numerous business, entertainment, and community facilities. The major goals in the redevelopment of the District are to create local employment, income growth, and community development and to construct a streetscape that will serve as an exciting gateway to the downtown and the college. In the process, the Oberlin Project will set a new benchmark for community-scale green development.

Community Projects

The following 12 projects demonstrate community-led clean energy leadership in one area of the following: renewable energy, energy efficiency, smart grid, or electric vehicle innovation.

BEDFORD, NEW YORK

In early 2010, the Town of Bedford, New York (population 18,457) unanimously passed a Climate Action Plan that included a list of more than 70 activities designed to meet the Town's goal of reducing greenhouse gas emissions by 20 percent by the year 2020.

Among the initiatives that Bedford has undertaken to meet this goal, the flagship project is Energize Bedford, a community-based residential energy efficiency program made possible by grants from the US Department of Energy's Energy Efficiency Conservation Block Grant program and the New York State Energy Research and Development Authority (NYSERDA).

The program's features include energy efficiency tracking software from NYSERDA and strong community support through Bedford 2020 Coalition, whose mission is to lead, organize, and promote the community-wide effort to reduce greenhouse gas emissions and create a sustainable community that conserves its natural resources.

Households with less than $218,400 annual income qualify for free home energy assessments and are eligible to pursue low-cost financing (APR 3.49 percent) to implement the energy conservation measures identified in their audits.

The first 21 Bedford homeowners to take advantage of the Energize Bedford program are projected to reduce energy consumption by 10-40 percent, saving approximately $43,000 on their combined home energy costs.

Using Energize Bedford as a pilot, Energize Northern Westchester will roll out residential retrofits across 13 other communities in the region, with marketing provided by SmartPower, a Washington DC-based national nonprofit marketing firm dedicated to promoting clean, renewable energy and energy efficiency.

One of the strategic features of the Energize Bedford program is that town leaders and their partners at the US Department of Energy had always envisioned their effort as a "hyper-local" pilot that would test best practices and then scale up to a larger set of cities, towns, and villages in the region. With the residential sector representing an average of 50 percent of total greenhouse gas emissions for many of these towns and villages, the focus on a home efficiency strategy makes quantitative sense, not only for Bedford, but for its neighbors as well.

Now that Bedford has blazed the trail through an initial pilot stage, nearby communities have seen up close that money that is not spent on energy is likely to stay local and be invested locally. As of 2012, members of the Northern Westchester Energy Action Consortium, considered the target audience for the second stage of this work, are preparing to participate in the Energize program, now expanded to a longer-term version under the heading of Energize New York.

BREMERTON, WASHINGTON

The 2010 US Department of Energy Better Buildings grant for RePower Bainbridge also includes Bremerton (population 35,191), a nearby city on the Kitsap Peninsula.

With rentals representing 57 percent of the community's homes, RePower Bremerton has prioritized engaging both landlords and homeowners to generate excitement about home energy assessments and upgrades.

For many cities, the rental market provides significant challenges to retrofits because of what are known as split incentives. A split incentive exists when one party pays for upgrades, but another party gets the financial benefits of the energy savings. In most situations, the split incentive problem occurs when building owners pay the capital expenses for energy upgrades for the building, but tenants receive the financial benefits of energy savings through a reduction in their energy expenses. In these cases, tenants are not incentivized to pay for upgrades and may also be hesitant to commit to pay back owners for upgrades, to get engaged in long-term payback periods, which tie them to properties they do not own, and to agree to pay for upgrades that are completed late in a lease.

To overcome these obstacles, RePower Bremerton, Puget Sound Energy (PSE), and Cascade Natural Gas Corporation provide cash-back incentives to offset the cost of qualifying energy-efficiency improvements. Landlord participation is encouraged through a cash bonus from RePower, available to rental property owners when upgrading multiple rental properties according to the program's requirements. Upgrade of two or more homes or units can yield an additional $200 cash bonus. Kitsap Credit Union, another key RePower partner, offers an energy efficiency loan program to finance improvements. RePower Bremerton benefits are available for single-family homes with one to four units.

As the *Kitsap Peninsula Business Journal* reported in January 2012, rental property owners such as Jim Adrian are getting on board, in response to a summit held by Mayor Patty Lent, proactive outreach, and the rebates. "This is an exciting moment for me and my tenants," Adrian told the Business Journal. "It's truly a win-win: The rebates make the upgrades affordable and my tenants benefit from a decrease in their energy bills."

Looking ahead, RePower Bremerton's goals are to complete 1,000 free "HomePrint Assessments" from PSE and 100 Home Energy Assessments with Energy Performance Score (EPS) technology in city homes. To date, 256 home assessments–just over 25 percent–have been completed since the program's launch in fall 2011.

BURLINGTON, VERMONT

The City of Burlington, Vermont (population 42,417), one of the nation's earliest leaders in sustainability and climate change, passed a resolution in 1996 that set a goal of reducing greenhouse gas emissions to 10 percent below 1990 levels by 2010, and developed the City's first Climate Action Plan soon thereafter. In 2008, Burlington upped the ante by setting a new goal of reducing greenhouse gas emissions to 80 percent below 2007 levels by 2050, with an intermediate goal of 20 percent reduction by 2020.

In the summer of 2008, then-Mayor Bob Kiss formed the Burlington Sustainability Action Team (BSAT), consisting of 30 City employees from across all City departments enlisted to guide department leaders, the Mayor, and the City Council in implementing the policies and initiatives in the Climate Action Plan to achieve the City's Climate Protection Goals. With town meetings every year to report to the public on sustainability targets, including ambitious carbon reduction goals, the City had already established a strong tradition of civic engagement.

Burlington's goals alone are not unique, as many cities around the world have adopted similarly

ambitious plans. Likewise, formation of an action team and outreach to the community are familiar steps for cities charting their paths to meet ambitious climate and energy goals. What set the Burlington effort apart is how local leaders approached the next step—figuring out exactly how to reach their carbon goal—through a practical combination of quantitative analysis and prioritization.

In 2009, the City hired a local consulting firm, Spring Hill Solutions, to analyze the carbon reduction values and costs of over 200 strategies that had been developed by eight community climate action workgroups. The analysis showed each strategy's "carbon bang for the investment buck" and represented them on a graph for easy illustration. This work was based on a 2007 global analysis conducted by the consulting company McKinsey, which had shown that implementation of single measures may be cost-prohibitive, but combining measures, such as energy efficiency with solar energy, could improve the economics significantly.

Spring Hill Solutions took the McKinsey cost-abatement model and applied it locally in Burlington, finding that three of Burlington's top strategies—reducing vehicle miles traveled, implementing Property Assessed Clean Energy (PACE), and requiring new construction to meet specific energy performance standards—could collectively save the community more than $14 million each year, while reducing greenhouse gas emissions to 12 percent below the 2007 base year.

The City subsequently issued a Climate Action Plan Prioritization Survey to planning committee members and the general public, which resulted in a ranking of the proposals. This community input, in conjunction with the quantitative analysis, was critical to developing the City's most recent Climate Action Plan, published in February 2012.

Many proposed strategies in the plan would be familiar to local governments engaged in greenhouse gas reduction and sustainability planning: require new commercial construction to meet energy performance guidelines; improve bicycle and pedestrian infrastructure to help reduce community vehicle miles traveled; increase the urban tree canopy; and build a digester that would turn organic waste into electricity and compost. Other proposals would test newer tools and approaches, including PACE, smart meter deployment for real-time energy data collection, and district heating.[9]

Planning is a bread-and-butter activity of city governments, but Burlington took a fresh look at how to get the job done. When bundled with more expensive strategies, the approaches could potentially help to make the entire plan close to cost-neutral. The results remain to be seen, with implementation of the 2012 plan now underway, but that budgetary insight could be a breakthrough for climate plans in cash-strapped cities nationwide.

GAINESVILLE, FLORIDA

Gainesville, Florida (population 124,354) has more than earned its place in the Sunshine State as a veritable world leader in solar energy. With more than 11 megawatts of solar energy capacity installed since 2009, Gainesville has achieved the target of four megawatts per year since introducing the first solar feed-in-tariff in the United States. As a result of this work, Gainesville now exceeds US cities and even the countries of France and Japan in its installed solar energy per capita.

In 2009, after learning about the success of Germany's solar feed-in-tariff (FIT) program, the Gainesville City Commission authorized the municipally-run Gainesville Regional Utilities (GRU) to launch its own version, building on an existing commercial solar net metering rebate program.

GRU has been providing rebates for solar water heating since 1997 and solar photovoltaic (PV) systems since 2007. Having used the net metering program for several years, Gainesville was well aware of the challenges it wanted to overcome: specifically, project owners received upfront cash but no ongoing incentives to maintain the installations, and the administrative burden on the utility was high.

Since the implementation of the FIT program, Gainesville has found that it provides cost and staff efficiencies. As GRU noted in an open letter, "The simple performance-based incentive can be stated in one sentence: 'Gainesville will pay you a flat rate for every kilowatt-hour of energy generated for 20 years.'"

The City of Gainesville continues to see the costs to construct solar fall. As projected, GRU's FIT pricing for certain sized systems has declined, which puts less of a financial impact on GRU's customers and means that it will be more cost effective than ever for customers to install solar PV.

As an indicator of local job growth, there were only two solar companies in Gainesville up until 2008 and there are now at six locally-based solar contractors operating in Gainesville. In addition, the need for roofers and electricians to work on solar systems has also increased.

HILLSBORO, OREGON

Hillsboro, Oregon (population 91,611) has a solar energy profile much like that of Germany, the world's leading solar economy. And as with Germany, clouds and rain have not dampened the community appetite for solar energy.

About 36 percent of Hillsboro's energy use comes from green power, making it the second-ranking city in the country in 2011 for green energy purchased and percentage of total energy purchased, according to the US Environmental Protection Agency's Green Power Program. This achievement is attributable in large part to the decision by Intel, the predominant local employer, to cover 85 percent of its Hillsboro operations' energy load by voluntarily purchasing renewable energy offsets through Sterling Planet, a company in Norcross, Georgia. Also significant is the participation of over 2,600 residents and businesses in Portland General Electric's Clean Wind program.

Building upon these successes, Hillsboro Solar Advantage (HSA) has taken renewable energy even further. In a partnership between Live Light Energy, SolarWorld USA, and the City of Hillsboro, HSA makes locally produced and installed Solar World photovoltaic systems more widely available to residents by packaging and marketing incentives from the Energy Trust of Oregon and federal and state tax credits to enable deep discounts. HSA delivers solar systems at up to 70 percent below full cost.

In a four-month period in 2011, 142 residents signed up, with 21 homes receiving solar installations, including the home of Mayor Jerry Willey, who enthusiastically served as a public test case. In 2012, the City introduced a $500 cash rebate.

Hillsboro continues to supplement this robust effort with regular community workshops on the basics of solar energy, and a waiver of its building permit fee for renewable energy systems (cumulative savings to citizens of over $9,000 in upfront costs in 2011). For those homes unable to install rooftop solar, the City is now exploring the potential for solar installations on public land, offering "slices" for community purchase.

Beyond solar, Hillsboro has been a leader in promoting other new energy solutions. In 2005, the City developed the Hillsboro Civic Center to LEED Gold certification, only the second municipal building in the US to do so at the time. The City provides a $500 cash rebate for the first 50 Hillsboro Clean Energy Works Oregon energy retrofit projects.

Hillsboro has also made a dramatic investment in infrastructure for electric vehicles, having installed 29 charging stations, including one of the first Level 3 DC "fast" chargers in Washington County since 2009. Most recently, in late 2011, Hillsboro-based ClearEdge Power secured a $500 million deal to supply fuel cells to Austrian renewable energy company Güssing Renewable Energy. In March 2012, the City hosted a workshop in partnership with Climate Solutions' New Energy Cities program focused on developing a framework of opportunities in the areas of building energy efficiency, an eco-district pilot, energy literacy, and expansion of its robust renewable energy efforts.

ISSAQUAH, WASHINGTON

In any city, officials know that making the built environment carbon-neutral requires bold steps. The leaders of Issaquah, Washington (population 24,930), a rapidly growing city in the Puget Sound region, have begun to develop a net-zero townhome community considered to be the first of its kind in the US.

Guided by zero-energy housing projects in England and aiming to be an inspiration for builders, subcontractors, architects, developers, and the average homeowner, the City's project manager began to sketch the plans for this project in 2005. Since that initial spark, the City has teamed with Built Green, King County, Port Blakely Communities, Puget Sound Energy, and Washington State University Energy Program, and enlisted developers Matt Howland and Ichijo USA.

The design measures they selected were based on technologies already in existence, such as super insulated and tight walls, double paned windows, ground source heating, high efficiency lighting and appliances, and energy feedback monitors, but not yet combined under one roof.

Today, zHome is a 10-unit townhome development that uses zero net energy and 60 percent less water, emitting zero net carbon emissions with clean indoor air and low-toxicity materials. It achieved deep energy efficiency—or reached the zone of what the New Buildings Institute calls "zero energy capable" buildings—and then achieved the net-zero goal through rooftop solar power. In the words of the project team: "zHome uses one third the energy [of a typical townhome]. That one-third is then generated on-site."

The team's tenacity through economic ups and downs, the City leadership's ongoing support, and the diverse public-private partnership have been key ingredients in the project's survival and success today. The homes are now selling, and the City is looking ahead to incorporate lessons learned into a community-wide Sustainable Energy Strategy. Built Green is working to establish a new 'z-Star' level in its nationally recognized residential green building certification program, fashioned on the zHome benchmarks.

Most notably, Issaquah is focusing on how to build on the experience of zHome to achieve an even bigger goal: reducing community-wide greenhouse gas emissions to 80 percent below 2007 levels by 2050. In 2012 Issaquah did the hard work of figuring out how to achieve this goal through quantitative analysis based on the "carbon wedge" framework first promoted by Princeton University in 2007. This analysis is described in Issaquah's Sustainable Energy Strategy, which the City developed in order to understand how it would chart a path to the 2050 carbon reduction goal that would be compatible with its anticipated population growth and development plans.

MADISON, WISCONSIN

Like a number of cities in the vanguard of climate and energy work, the City of Madison, Wisconsin (population 233,209) set a community-wide goal of reducing greenhouse gas emissions to 80 percent below 2007 levels by the year 2050.

What sets Madison apart, however, is a community-wide commitment to track and report on progress in emissions reduction in the near term, not just decades into the future.

In 2007, the City put a challenge to the community: reduce the collective annual carbon footprint by 100,000 tons, the equivalent of enough coal to fill 3.5 miles of railroad cars, by April 2011. To make this real, Sustain Dane, a nonprofit organization, joined with the City of Madison and Madison Gas and Electric to create and develop the MPower Madison program and the MPower Business ChaMpion program.

Funded by a US Environmental Protection Agency Climate Showcase Communities grant, the

program represents a year-long commitment for Business ChaMpions that kicks off with an "energy boot camp" and a commitment to act on five projects over the year to reduce building energy use and transportation emissions.

Through the program, businesses receive a range of free technical assistance, including energy use tracking, energy efficiency and alternative transportation support, and monthly peer-to-peer educational and networking meetings. In the launch years, participating businesses have included financial firms, manufacturers, two hotels, and the Madison Mallards Baseball Club.

Between 2007 and 2011, the community far surpassed its goal, achieving a reduction of 300,000 tons, or three times its original target. With collective savings to the MPower businesses projected to be $3.4 million over five years, the growth Madison anticipates seeing is not in carbon, but in participation rates.

PENDLETON, OREGON

In 2009, Pendleton, Oregon (population 16,450) wanted to adopt the Solarize model, a program that enables a group purchase of solar power by community members through financial and technical assistance. A city that embodies its motto, "The Real West," Pendleton is known for both its place on the historical Old Oregon Trail and its current attractions of rodeos, round-ups, and woolen mills that produce the famous Pendleton woolen blankets.

Pendleton community leaders laid out a vision to create a "vibrant solar community" and set an example for other rural communities around the United States. From the outset, City leaders emphasized simplicity and voluntary participation, "making resources available that allow residents to make informed decisions while pursuing solar," according to the Solarize Pendleton website.

The Solarize model's components are essentially the same for all participating cities: program administration and implementation, community education and outreach, and financing. In the first two years of the program, one of the advantages of Solarize Pendleton was that residents were able to pay below-market rates for solar, because the City secured bulk purchasing of solar panels.

Well before the first community outreach, the City began setting up the program mechanics, creating and issuing a Request for Proposals for a contractor to oversee and install the solar panels, including providing materials (e.g., yard signs and fliers) for community-led marketing.

After a competitive bidding process, Pendleton selected LiveLight Energy as its contractor for construction and installation, using panels from Hillsboro-based SolarWorld.[10] Solar Oregon, a nonprofit organization created in 1979 to engage the public with a full range of solar-related programs, has also been a key partner as a nonprofit membership organization with more than three decades of experience in outreach on solar technology.

As the public-facing component of the program, workshops have taught homeowners the basics of how solar energy would work in their home, and empowered homeowners with information about incentives, tax credits, and other potential opportunities such as net metering (when a utility pays credits to a producer of renewable energy).

Similar to the Hillsboro Solar Advantage program, LiveLight Energy provided site assessments of the solar resources available to specific homes, often at community gathering places such as farmers' markets and other community centers. The workshops helped residents become comfortable with investing in solar energy, focusing primarily on financial payback rather than the less tangible benefits of going green.

Pendleton was deliberate in constructing an interest-free loan program for residents to use in funding their solar installations.[11] Observing that residents might be less likely to approach a traditional bank for a loan, the City stepped up to be an intermediate broker of the loans to homeowners, with liens placed on the properties to ensure repayment.

The City's Public Works Director, Bob Patterson, identified an internal funding source for the residential loan program, about $450,000 in the City's Waste Water Rate Stabilization Fund.[12] The City gave its approval to proceed and structured the loans to be paid back over four years as participants received federal and state tax credits. After a credit check, loan recipients were selected by lottery, necessary because of the early popularity of the program.

At the end of the first phase of the program, the City Council initially approved 50 loans of $9,000 each, of which 39 were ultimately issued. In total, the financing package, a combination of federal and state tax credits, an Energy Trust of Oregon rebate, and the municipal loan, brought the price of a two-kilowatt solar system down by 90 percent in the first round of implementation, to an average of $1,200 per home.

In 2010, the Pendleton program issued 39 loans at $9,000 each (for a total of $351,000), and resulted in 56 installations with a total of 135 kilowatts. In 2011, 25 loans at $9,000 each for issued for a total of $225,000, and 46 more installations were made for a total of 103 kilowatts. In 2011, the program also included four commercial installations with a total of 57 kilowatts and a total loan value of almost $200,000.

As a result of this success, Pendleton now holds the honor of being the city in the northwestern United States with the most per-capita solar installation—a notable accomplishment in a region that includes such clean energy pioneers as Portland, Oregon and Seattle, Washington.

With Oregon's residential energy tax credit dramatically reduced and its business energy tax credit now gone, the financing future of the Solarize program in Oregon communities is unclear. While cities like Pendleton can make great strides in pioneering the new energy economy, their success will be dependent on clear state-level policy and strong incentives to kick-start participation.

SALT LAKE CITY, UTAH

In the winter of 2008-2009, Salt Lake City, Utah (population 186,440), convened a team of partners from state and local government, the business community, and nonprofit and faith-based organizations to address a very visible problem: the region's poor air quality.

At the time, the Salt Lake Valley's air quality was in non-attainment with the US Environmental Protection Agency for a handful of days out of the year, due to particulate matter increases in the winter and ozone in the summer. This problem was obvious to public officials, residents, and businesses alike, with a thick layer of air pollution hanging over the mountain basin community.

According to the Utah State Department of Environmental Quality, over 50 percent of air pollution in the region came from motor vehicles. Commute trips from the suburbs were resulting in a doubling of Salt Lake City's population each workday. Based on this analysis, the coalition made the decision to focus on transportation solutions with an emphasis on reducing single-occupancy vehicle trips to reduce air pollution.

Given the immediacy of the problem, the coalition partners determined that action would have to be concrete and proactive, using tools within their control. Longer-term plans for light rail construction remained important, but the coalition wanted to take action more quickly.

Ultimately the coalition chose a strategy of community-based social marketing through social media, web tools, and other outreach tools to influence voluntary, individual change in driving patterns. The Clear the Air Challenge was born in 2009, with strong support from Salt Lake County and the State of Utah among numerous partners in the private and nonprofit sectors.

The Challenge focuses on marketing alternative transportation choices, such as vanpools, carpools, and biking to work, to encourage residents to "drive down their miles." To motivate businesses and residents even further, the Challenge stokes friendly competition by encouraging the formation of

teams that compete against one another to be entered into weekly prize drawings over the course of the summer season.

To show the results of drivers' efforts, the Challenge carefully tracks and reports on performance metrics at its website. In 2011, with over 6,300 participants, the Challenge resulted in 113,000 single-occupant vehicle trips eliminated, 1.2 million single-occupant miles avoided, 58,000 gallons of gas saved, $721,000 saved, and 2.1 million pounds of harmful emissions reduced. In 2012, the goals are more ambitious: 300,000 trips eliminated and two million miles avoided.

From the outset, Challenge partners had differing opinions about the importance of climate change as a motivating factor, but found common ground—and room to achieve their own goals—in their focus on improving air quality through transportation solutions. In 2010, the US Environmental Protection Agency granted Salt Lake City a Climate Showcase Communities grant of $368,000 from to track the initiative's impact on greenhouse gas emissions. In 2011, the Salt Lake City Chamber of Commerce convened over 100 business leaders to discuss the economic case for clean air, citing the negative consequences of poor air quality: challenges to attracting top businesses, health care costs, and regulatory burden, among others.

As of May 2012, the Clear Air Challenge contributed to a statewide victory: the US Environmental Protection Agency found that Utah was in compliance with ozone standards, which had recently been made more stringent. Air quality regulators attributed the progress to the Challenge's aggressive campaign work to reduce car trips during at-risk days.

SANTA FE, NEW MEXICO

Santa Fe, New Mexico (population 73,979) has set a high bar for green building regulation. Known nationally as the first city to adopt the "2030 Challenge"—a call from the American Institute of Architects to reduce greenhouse gas emissions from the building sector to zero by the year 2030—Santa Fe is also walking the talk locally. Home to the Architecture 2030 program itself as well as the program's creator, architect Ed Mazria, the Santa Fe community has undertaken this work with the benefit of local capacity and national expertise.

The City cites three reasons for focusing its time and energy on strategies to upgrade its built environment:

- Buildings are the country's predominant user of electricity.
- Building materials contain significant embodied energy (the total of all energy required to produce services and goods, such as building materials).
- The design of buildings and selection of materials represent strategic opportunities to reduce greenhouse gas emissions and maximize energy savings.

In 2008, the City published its Green Building Code, a groundbreaking regulation for new construction that would not have been possible without key partnership from the local building community. That collaboration was nurtured over the prior two years, when the City worked extensively with local builders, architects, real estate agents, building product companies, building energy raters, and other stakeholders to explore how aggressive the code could be while remaining reasonable. Notably, the meetings did not just include the Santa Fe Area Homebuilders Association; they were actually convened at the association's facilities.

The resulting code, modeled after Build Green New Mexico and consistent with the State of New Mexico Green Building Code, is as remarkable as the collaboration that created it. First, it mandates that all new homes be tested and certified according to the National Home Energy Rating System (HERS) as adopted by the Residential Energy Services Network (RESNET). (The HERS rating provides an evaluation of current energy efficiency relative to other buildings.)

Second, the code offers eight levels of certification (Silver, Silver Plus, Gold, Gold Plus, Platinum,

Platinum Plus, Emerald, and Emerald Plus), each of which require a variety of different energy efficiency and sustainability measures for builders to adopt in design, construction, and operations. These include achievement of specific HERS levels and energy efficiency targets, as well as minimum point totals across six categories: project implementation and lot development; resource efficiency; energy efficiency; water efficiency; indoor environmental quality; and operation, maintenance, and sustainable practices.

For context, Emerald-certified buildings produce no greenhouse gas emissions associated with their operations, and Emerald Plus-certified buildings additionally require a HERS index no greater than minus 10, making them among the most energy efficient buildings in the country.

Third, the code requires all new residential single-family units built within the City of Santa Fe to post and meet specific HERS targets, depending upon the size of the building. Those with the following heated gross floor areas must meet the noted certification levels:

- Silver: up to 3,000 square feet
- Gold: 3,001 to 5,000 square feet
- Platinum: 5,001 to 8,000 square feet
- Emerald: 8,001 square feet and greater

Importantly, the code is also tailored to Santa Fe's climate and traditional local building materials and methods. With 320 sunny days per year, the code awards more points for passive building design that makes use of abundant solar power. Adobe homes, using on-site sand, clay, water, and organic material, also get more points because their physical features moderate swings in indoor air temperature, offer greater building longevity and help avoid emissions from transportation of building materials.

The City further welcomes innovation in building design by offering incentives for builders to exceed the code's mandatory minimums and explicitly invites the use of evolving technologies and construction methods. Toward this end the City's Green Building Code Administrator is empowered to approve advanced approaches that are not already explicitly included.

While the new code addresses new homes, the City has also partnered with Homewise (a local nonprofit that helps moderate-income residents with home purchase, home improvement, and refinancing services) to offer low-interest loans for energy efficiency upgrades and solar installations on existing homes.

All of these efforts are included in the Sustainable Santa Fe Plan, published in October 2008, which proposed sustainability measures in development and zoning, clean renewable energy, transportation, education and outreach, and green building. The City is facilitating additional workgroups, beyond the initial group consulted on the residential code, that have drafted codes for single-family home renovations and additions, commercial buildings, and historic structures.

To meet the future workload generated by these new policies, Santa Fe is also investing in the next generation of its construction workforce. YouthWorks (funded by the City of Santa Fe, the Santa Fe Business Alliance, EarthCare, and the Santa Fe Community College, and implemented by the Community College) offers a General Educational Development (GED) certification program to students that incorporates green building skill-building.

This partnership, in the form of the Green Collar Jobs Apprenticeship Program, aims to bring disenfranchised at-risk youth of Santa Fe and northern New Mexico into good-quality employment pathways, to offer these youth a higher quality of life while also addressing many of the environmental challenges that are emerging with extreme weather events and increasing energy costs.

In the first year and a half of the program, the City approved over 120 permits through the Residential Building Code, resulting in the avoidance of 664 tons of annual greenhouse gas emissions, the equivalent of permanently removing 237 cars from the road.

WEST UNION, IOWA

The community of West Union, Iowa (population 2,486) is taking meaningful steps towards sustainability and greenhouse gas emissions reduction in its downtown area. As the Iowa Department of Natural Resources reports, "What started as a small project to update six blocks of the downtown streetscape has blossomed into a community effort to create a more sustainable West Union."

Like many cities, West Union envisioned the West Union Green Pilot Project's new walkable streetscape designs reducing vehicle miles traveled and improving pedestrian safety, as well as providing porous pavement in order to improve storm water management.

But taking it a step further, in 2010, West Union received a $1 million Energy Efficiency and Conservation Block Grant from the US Department of Energy, $1 million Community Development Block Grant from the State of Iowa, and a $500,000 US Environmental Protection Agency Climate Showcase Communities grant to support the development of a geothermal heating and cooling system made available to all downtown buildings.

Additionally, the Iowa Department of Economic Development provided support to business owners to help them apply for guaranted loans under the US Department of Agriculture's Rural Energy for America Program.

With completion slated for December 2012, this district energy system is projected to reduce building heating and cooling costs by 50 percent over a building area of 330,000 square feet. Approximately 20 businesses are interested in converting to the new system once it is completed, which is expected in early 2013. More than 70 businesses have participated in energy efficiency measures, including energy audits and improvements to their historic buildings, and planners project this system may extend to businesses and residences beyond the downtown district. Initial analysis suggests that individual buildings will see greenhouse gas emissions reductions of over 30 percent.

WILLIAMSON, WEST VIRGINIA

The importance of coal in central Appalachian towns like Williamson, West Virginia (population 3,022) is second to none.

As reported by the Energy Information Administration, West Virginia is responsible for more than one-tenth of total US coal production, and coal-fired plants generate almost all of the state's electricity. Culturally and economically, the value of coal is deeply ingrained in the area, with a King Coal festival marking each year.

Yet one of the West Virginia communities that best embodies the fundamental spirit of clean energy economic development is Williamson, historically billed as the "Heart of the Billion-Dollar Coalfield." In 2011, Williamson installed 48 solar panels (11.27 kilowatts) on the roof of a local health clinic, in what is probably the largest solar array in the coalfields of Appalachia.

Mountain View Solar, from the nearby Berkeley Springs, West Virginia, managed the installation, employing local labor and supporting the training of workers for new companies such as Gilliam Solar, a solar energy company led by a third-generation coal mine electrician. The solar panels are US-made, by SolarWorld in Hillsboro, Oregon.

Near the health clinic, a resident has installed 10 panels and solar water heating at his home. These efforts may seem gradual or small in comparison to other cities, but are, in fact, meaningful and "ahead of their time," in the words of Mayor Darrin McCormick, for a community that has long relied on coal for its livelihood.

The JOBS Project, a nonprofit organization focused on sustainable economic diversification in

central Appalachia, has been an important catalyst for the efforts. In June 2010, it organized an "Energy Independence Day" at the Williamson campus of Southern West Virginia Community and Technical College, hosting informational workshops about clean energy alongside live music and cookouts. Paying respect to local history and culture, the event also honored sacrifices made by West Virginia and Kentucky to provide energy for the US.

Hand-in-hand with Mayor McCormick and local agencies and groups such as the Williamson Redevelopment Authority, the JOBS Project has also helped to form Sustainable Williamson, with the mission of making Williamson one of the greenest, healthiest, and most economically viable cities in the region by improving quality of life for the community and creating regional jobs in sustainable economic development.

Sustainable Williamson has helped establish a free health clinic, a farmers' market, and community gardens. Thanks to the organization's input, the fire department has also implemented energy-saving and cost-saving measures in its station. Plans for biofuel and more solar projects are on the horizon, as well as a downtown sustainability hub at the local train depot.

Finally, an initiative called Smart-Office will provide on the job training opportunities in energy efficiency and renewable energy equipment installation for the local workforce including "train the trainer" program in conjunction with community and technical colleges. These ongoing trainings will target builders, electricians, contractors, and entrepreneurs with a goal of retaining local wealth from regional sustainable energy sector growth in Williamson and neighboring communities. With guidance from Leadership in Energy and Environmental Design (LEED) professionals, the Smart Office will also become a LEED certified workspace for interns and consultants.

Williamson's leaders are looking beyond the city borders. As a starting point, the City of Williamson and the JOBS Project supported a Central Appalachian Sustainable Economies (CASE) convening in November 2011, intended to bring together community groups, state and local governments, and others pursuing a mission of sustainable regional solutions that are mutually beneficial to the fossil fuel and renewable energy industries.

Also emerging as an important platform, the Center for Economic Options' Green Accelerator social networking tool supports the creation of a network of people around Appalachia committed to a sustainable economic future, through tools that connect one another and enable learning, business development, and job searches. Through efforts such as CASE, JOBS Project President Eric Mathis and Mayor McCormick believe that Williamson can set an example for other mountain communities in Virginia, Tennessee, and Kentucky.

Williamson leaders such as Mayor McCormick emphatically note that they are not saying "no" to the coal industry jobs that have fed their families for generations; rather, they are saying "yes" to new clean energy economic opportunities with which those jobs can co-exist. With an emphasis on creative collaboration, Mathis said, "As the age old 'us vs. them' debate continues, many West Virginia residents, companies, and entrepreneurs are beginning to identify synergies between renewable energy and fossil fuels, specifically building unexpected coalitions in the heart of coal country."

The Williamson Redevelopment Authority has adopted a new motto: "Where Sustainability Meets Development." As Mayor McCormick has said, "For the town of Williamson, renewable energy and sustainable development is not about taking coal jobs. It is about maintaining West Virginia's legacy as an energy producer by providing a viable mechanism for sustainable economic diversification in the fastest growing sector in energy today, the renewable energy sector."

Cities to Watch

During the course of the research for this report, New Energy Cities identified a number of US cities and towns as early adopters of clean energy solutions that merit mentioning in addition to those profiled in this report. These "cities to watch" are in the early stages of testing and refining different strategies to save energy, increase use of renewable energy, reduce greenhouse gas emissions, and create broadly shared prosperity.

The **City of Aiken, South Carolina** (population 29,000) has distributed energy-saving advice to and completed light weatherization for over 60 homes in a low-income neighborhood, and plans to follow up with home energy assessments to monitor ongoing energy savings. This work is funded by a 2011-2014 Climate Showcase Communities grant of $320,000, the first such grant awarded in South Carolina.

The CharlestonWISE program, led by the nonprofit Sustainability Institute in partnership with the **City of Charleston, South Carolina** (population 120,000), is an energy advocate/concierge program that provides technical assistance to homeowners and small businesses on energy efficiency and renewable energy. Designed to guide residents and business owners through the process of property energy assessments and upgrades, CharlestonWISE offers tailored and unbiased assistance in how to select contractors to do the work, as well as how to take advantage of potential financing options. Participating contractors score and retrofit single-family homes in Charleston and neighboring communities in Charleston County. The program is funded by a Department of Energy Better Buildings Neighborhood grant through the Southeast Energy Efficiency Alliance and a grant from the Sustainable Cities Institute.

The **City of Columbia, Missouri** (population 99,000) has established the City Green initiative to improve energy performance in its downtown area, known as The District. In its first stage, the initiative has collected and analyzed energy consumption data for participants using the ENERGY STAR Portfolio Manager program, and has also worked with the property owners and businesses that comprise the city's Special Business District as a forum for stakeholder feedback. As of December 2011, the initiative exceeded its target of enrolling 100 participants. This work is administered by the municipally-run Columbia Water and Light utility, and funded by a $285,000 Climate Showcase Communities grant, which ends in 2012.

Columbia Water and Light is also offering a home energy score program in conjunction with its existing Home Performance with ENERGY STAR program, in partnership with the Better Buildings program. (Home Energy Score Partners commit to scoring a minimum of 200 homes in their first year of implementation and also rescore five percent of scored homes, as a quality assurance measure.)

The **City of Corvallis, Oregon** (population 55,000) launched a Kilowatt Cruncher Challenge, an effort to reduce energy consumption by promoting no-cost and low-cost actions in partnership with Corvallis' neighborhood associations. This effort is funded by a $490,000 Climate Showcase Communities grant from 2011 through 2014.

The **City of Dubuque, Iowa** (population 58,000) has plans to develop a community-wide dashboard that will help track the performance measures for Smarter Sustainable Dubuque, an initiative that helps households and businesses reduce their use of water, electricity, and natural gas, as well as vehicle miles traveled and waste. This work is funded by a $473,000 Climate Showcase Communities grant from 2011 through 2013.

The **Cities of El Cerrito, Albany, Piedmont, and San Pablo, California** (collective population 82,000) are implementing the Small Cities Climate Action Partnership (ScCAP), to share their work, processes, and best practices as they implement various energy efficiency projects and policies. These small cities, each with a population of 30,000 or fewer, are building the capacity to track and reduce greenhouse gas emissions reduction by banding together. This work is funded by a 2010 Climate Showcase Communities grant of $497,000 that ends in December 2012.

The **City of Grand Rapids, Michigan** (population 188,000) has partnered with Grand Valley State University to offer incentives for home energy upgrades, funded by the Better Buildings of Michigan initiative. This program offers zero-interest home energy loans of up to $20,000, utility rebates, and a 20 percent discount on home energy improvements for the university's faculty and staff who live in the City of Grand Rapids. Those living outside the city limits receive rebates and low-interest financing options for home energy conservation measures.

The **Town of Greenfield, Massachusetts** (population 18,500) conducted a five-week door-to-door canvassing effort, reaching approximately 500 homes downtown, where over 70 percent of the households are renter-occupied. The next stage of outreach will be for the town's energy advisors to follow up with residents interested in home weatherization. This work is funded by a $161,000 Climate Showcase Communities grant from 2011 through 2014.

The **City of Keene, New Hampshire** (population 23,000) is pursuing a project that would demonstrate biofuel generation, using restaurant waste grease and possibly algae grown with heat from the city's landfill, in partnership with Carbon Harvest Energy, the University of Vermont, Keene State College, and Dartmouth College. As proposed, the combined heat and power plant would provide up to 600 kilowatts of renewable energy from the landfill to power a 20,000-square-foot greenhouse supporting year-round produce and aquaculture. To date, the city has hired engineers to assess whether its landfill gas volume will be a sufficient source of energy. This project is funded with part of a larger $500,000 grant from the Climate Showcase Communities program, which ends in 2014.

The **City of Little Rock, Arkansas** (population 189,000) partnered with the Clinton Climate Initiative of Arkansas to develop its Home Energy Affordability Loan (HEAL) program, which focuses on reducing greenhouse gas emissions by improving energy performance in residential buildings. Among other program components, the initiative worked with a national partner that performs carbon quantification to verify carbon savings and explore whether the savings could be used as a potential source of revenue to sustain energy efficiency programs. This work is funded by a $500,000 Climate Showcase Communities grant that ends in December 2012.

The municipal utility of **Palo Alto, California** (population 64,000) is implementing a Clean Local Energy Accessible Now (CLEAN) program, based on a feed-in tariff model, which provides compensation for distributed renewable energy investment with a long-term contract and guaranteed price. (The CLEAN name represents a rebranding of the feed-in tariff.)

In the **City of Richmond, California** (population 104,000), the RichmondBUILD Pre-apprenticeship Construction Skills and Green Jobs Training Academy was developed in 2007 to create employment and career opportunities for Richmond residents and to implement a strategy for reducing violence in that community. The program is a public-private partnership focused on developing talent and skills in high-wage construction and renewable energy fields. The results are clear: to date, RichmondBUILD graduates have a 90 percent placement rate with an average hourly wage of $18.33. The program has been recently expanded to include individuals from neighboring communities through the East Bay Green Jobs Corps.

Conclusion

The communities profiled in *Powering the New Energy Future from the Ground Up* are demonstrating to the nation and the world how to seize the economic opportunities of the clean energy economy and achieve meaningful reductions in greenhouse gas emissions. Small- to medium-sized communities throughout the United States, from Knoxville, Tennessee, to Bellingham, Washington, are experimenting with groundbreaking strategies and approaches in the early stages of the clean energy revolution. Their innovation and lessons learned through trial and error provide a springboard for communities throughout the United States to transform how energy is produced, distributed, stored, and saved.

This shift is imperative if the country is to reduce its greenhouse gas emissions to levels that will keep our planet from overheating irretrievably. But full-scale clean energy deployment is a difficult and long road that American communities have only just begun to travel. Communities are at the beginning stage of a new generation of innovation that has not yet reached the critical scale for market transformation. But it is a movement that cannot be stopped because it makes financial, environmental, and social sense.

Will this shift of our built environment and transportation system away from fossil fuels happen quickly enough to stabilize the global climate and prevent catastrophic change caused by greenhouse gas emissions? Against this backdrop, the work of all communities, large and small, takes on a heightened significance. If a majority of state legislatures, national governments, and international bodies were acting in concert to combat climate change, local efforts such as the ones profiled here would be crucial. In the absence of such action, this work is mission-critical.

Glossary

2009 International Energy Conservation Code (IECC): a set of rules published by the International Code Council that encourages energy conservation through efficiency in envelope design, mechanical systems, lighting systems, and the use of new materials and techniques.

2030 Challenge: a challenge made by the nonprofit organization Architecture 2030, asking the global architecture and building community to adopt graduated targets for new and existing buildings, with the goal of using no fossil fuel-emitting energy to operate new buildings by 2030.

20-Minute Neighborhoods: places where residents have easy, convenient access to many of the places and services they use daily, including grocery stores, restaurants, schools, and parks, without relying heavily on a car.

American Recovery and Reinvestment Act (Recovery Act): federal legislation passed in 2009 intended to create and save jobs, spur economic activity, and invest in long-term growth. The Recovery Act was responsible for an investment of $787 billion in the US economy, including tax cuts and benefits, funding for existing programs, and contract, grant, and loan awards.

Anaerobic digester: a vessel that breaks down biodegradable material, such as waste, and can be used to generate renewable energy.

Benefit assessment fee or charge: the charge a municipality or utility district levies on a property to recover the cost of expenditures for the acquisition, construction, or upgrading of facilities. The assessment represents how the costs of a facility or construction project are divided among the properties served.

Carbon tax: a tax based on the carbon content of energy used, as used, for example, in Boulder, Colorado.

Climate positive developments: buildings, properties, and districts that reduce the amount of on-site greenhouse gas emissions to below zero.

Climate Showcase Communities: a US EPA program from 2009 to 2010 that awarded $20 million in competitive grants to 50 local and tribal governments, to help them establish and implement climate change initiatives.

Clinton Foundation Climate Positive Development Program: a program intended to create models for large-scale urban communities to reduce greenhouse gasses and serve as urban laboratories for cities seeking to grow in ways that are environmentally sustainable and economically viable.

Combined heat and power or cogeneration: the simultaneous generation of electricity and useful heat from a facility, such as a power plant, hospital, or wastewater treatment plant. CHP is most efficient when the heat can be used on-site, and is therefore common in district energy applications.

Community action agencies: local nonprofit organizations that implement programs (e.g., the Weatherization Assistance Program) intended to build self-sufficiency among low-income individuals.

Demand response: a type of smart energy demand that requests or encourages electricity customers to reduce their consumption at critical times or in response to market prices. Demand response is different from energy efficiency, which involves using less power for a given activity on a continuous basis. Evolving smart grid programs can now enable demand response on a regular basis, based on homeowner or property owner incentives such as pricing, rather than on an event basis or for emergencies only.

Distributed generation: the generation of electricity from multiple small sources, with benefits for energy security and local control of energy supply.

District heating: a system of centralized heating that can offer greater energy efficiency and reduced carbon emissions, especially if based on combined heat and power technology and renewable energy.

Eco-district or eco-community: an effort to focus on sustainability at the neighborhood or district scale, such as a downtown business district. Partners commit to work together to incentivize energy and carbon reductions and share best practices.

Embodied energy: the total of all energy required to produce services and goods, such as building materials.

Energy advocate or energy concierge: person who acts as a single point of contact to simplify the process for home and business owners looking to make energy efficiency retrofits, coordinating between banks, auditors, contractors, and utilities.

Energy boot camp: a convening of businesses and organizations for training and peer-to-peer networking in efforts to reduce energy use and greenhouse gas emissions. Madison, Wisconsin, has used a boot camp-like workshop as a part of its business outreach effort. In 2009, Living Cities and the Harvard Kennedy School hosted a "green boot camp" for city leaders from around the country on the topic of large-scale green retrofits.

Energy conservation measure: a project or technology used to reduce energy consumption.

Energy Efficiency Conservation Block Grant (EECBG): a $3.2 billion US Department of Energy program funded in 2009 by the Recovery Act that provided block grants for energy efficiency and renewable energy projects to thousands of city, county, and state governments across the US. EECBG funds were distributed in two ways, based on population (formula) and on competitive application (competitive).

Energy feedback monitor: a device that can provide instantaneous feedback on energy use, as well as associated costs and greenhouse gas emissions. Also see Smart meter.

Energy improvement district: an organization created by a municipality that enables the issuing of bonds to plan, finance, and install micro-grids.

Energy performance standards: specifications embedded within incentives or regulations that encourage or require minimum energy performance.

Energy service companies (ESCOs): businesses that develop, install, and arrange financing for projects designed to improve the energy efficiency and maintenance costs for facilities over a seven- to 20-year time period.

ENERGY STAR: a voluntary labeling program jointly led by the US Environmental Protection Agency and the US Department of Energy, designed to identify and promote energy-efficient products and buildings and to reduce greenhouse gas emissions.

ENERGY STAR Portfolio Manager program: Portfolio Manager is an interactive energy management tool that allows tracking and assessing energy and water consumption across a portfolio of buildings in a secure online environment.

Energy use intensity: the measure of the energy efficiency of a building, with a lower number meaning a more efficient building.

Feed-in Tariff: a policy that rewards decentralized renewable energy production by setting a guaranteed price premium for selling renewable energy back to the grid. The stability provided by a feed-in-tariff has been very effective in incentivizing renewable energy production (especially in Germany).

Green building codes: sets of rules adopted by government agencies that establish minimum requirements for elements of green building (e.g., design, heating and cooling).

Green Certificate of Occupancy: a permanent municipal record of a development that uses sustainable design, construction, and operations. The certificate sometimes indicates measures such as energy efficiency or other information useful for prospective buyers.

Greenhouse gas emissions (GHG): gases that trap heat in the Earth's atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases.

Ground source heating: a central heating or cooling system that use the transfer of heat to or from the ground.

Home energy assessment or home energy audit: an assessment of how much energy a home consumes in a given time period, with associated recommendations on ways to reduce energy use.

Home Energy Rating System (HERS): a numerical evaluation of home energy efficiency on a relative scale. Home Energy Scores are based on a scale of one to 10, with 10 representing a home with excellent energy performance. A HERS of 100 represents an average American home's energy profile with 0 being a building that uses zero energy.

ICLEI—Local Governments for Sustainability: an international association of local governments who have made a commitment to sustainable development.

Investor-owned utility: a business that provides a product or service (e.g., energy) via private enterprise.

Kilowatt hour: a unit of energy used by electricity providers for the purposes of billing. Monthly energy consumption of a typical residential consumer ranges from a few hundred to a few thousand kilowatt-hours.

Landfill gas: a mix of gases created by the breakdown of materials in a landfill. Landfill gas is typically 40-60 percent methane, with much of the remainder being carbon dioxide. Local governments are increasingly capturing landfill gas and turning it into energy for operational use, which has the additional benefit of reducing greenhouse gas emissions.

Leadership in Energy and Environmental Design (LEED): independent, third-party verification that a building, home, or community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. In order of performance levels, the LEED standards are: Platinum, Gold, Silver, Bronze, and Certified. LEED categories include homes, neighborhood development, new construction and major renovation, existing buildings, schools, retail, health care, commercial interiors, and core and shell.

Maine Housing Carbon Quantification Project (CQP): created in 2008 to research the feasibility of generating carbon offset revenue from home energy efficiency retrofit projects.

McKinsey carbon-cost abatement curve: global analysis published by McKinsey and Company in 2007 regarding greenhouse gas emission reduction opportunities and their associated costs.

Megawatt hour: a unit of energy equal to 1,000 kilowatt-hours. Commonly used to characterize industrial energy use and power generation.

Micro grid: a localized cluster of electricity generation, energy storage, and loads that typically operates in connection to a traditional centralized grid, but can also operate autonomously, and can receive inputs of distributed and renewable energy.

Municipal utility: an organization that provides a product or service (e.g., energy) as a function of government or public cooperative.

Net-zero (or zero-energy): the concept that, through efficient materials, systems, operations, and practices, a building can reduce its waste, energy, or carbon footprint to zero. A net-zero or zero-energy building is one that produces more energy than it consumes, in a given period of time, often through deep efficiency and on-site renewable energy generation.

Peak load: the maximum energy load on an energy supply system in a given period of time.

Power purchase agreement: a contract between a buyer and a seller of energy, defining the terms of sale, including project start date, schedule, penalties, payment, and termination.

Property Assessed Clean Energy (PACE): a voluntary local government or community initiative that allows property owners to receive financing for home energy improvements that they can repay through an assessment on their property taxes for up to 20 years.

Renewable energy systems: both large-scale and small-scale projects that involve the harnessing of energy flows from natural phenomena such as sunlight, wind, tides, geothermal heat, and plant growth.

Retrofit: improvement of existing buildings or infrastructure with measures to increase energy efficiency or reduce greenhouse gas emissions. Also see Weatherization.

Revolving loan fund: a source of funding for small loans that is replenished as borrowers make repayments.

Smart grid: a digitally enabled electrical grid that gathers, distributes, and acts on information about the behavior of all participants (suppliers and consumers) in order to improve the efficiency, importance, reliability, economics, and sustainability of electricity services.

Smart meter (or advanced energy meter): an electronic meter that records energy consumption data and sends that data to the grid to help utilities and homeowners reduce energy use and increase efficiency in the grid. Also see Energy feedback monitor.

Solar America Cities and Communities: a Department of Energy program from 2007 to 2008 that selected 25 major US cities to accelerate the adoption of solar energy technologies and help identify barriers to solar energy use in various locations around the US. The program's lessons learned and other related resources are available through the Sunshot Resource Center.

Solar panel: a connected, assembled package of photovoltaic cells that generate and supply electricity. A solar array is a large set of solar panels located together.

Solar slices: financial shares of a community solar project. Solar slices are often marketed to individuals who do not have access, space, or solar potential for their own installation.

Split incentives: a circumstance in property or housing management in which one party pays for upgrades, but another party receives the financial benefits of the energy savings.

Time-of-day pricing: pricing that varies based on the time of day. Utilities often use time-of-day pricing to encourage off-peak consumption through financial signals (i.e., higher prices at peak hours). Time-of-day pricing is made easier by utility investments in smart grid and smart meters, which provide information about costs and energy use on a real-time basis.

Urban tree canopy: layer of tree leaves and branches that cover the ground when viewed from above, providing natural cooling effects in urban areas.

Vehicle miles traveled (VMT): measure of distance traveled by passenger vehicles and freight transportation, often represented collectively (i.e., at city, state, and national levels) and used to estimate greenhouse gas emissions from the transportation sector.

Weatherization: process of protecting a building from natural elements, such as extreme heat and cold, wind, and precipitation, and reducing temperature-related and weather-related energy consumption. Also see Retrofit.

Zero Energy Capable: a building that can become zero-energy with the introduction of on-site renewable energy generation. A zero-energy capable building is designed and built with high-efficiency materials and systems, so it already uses as little energy as possible and can be easily outfitted with renewable generation.

Endnotes

INTRODUCTION
[1]Center for American Progress, February 2011 press release. Available online at:
http://www.americanprogress.org/pressroom/releases/2011/02/ARRA_cleanenergy.html.

[2]US Department of Energy EECBG program website. http://www1.eere.energy.gov/wip/eecbg.html

[3]US Department of Energy Better Buildings initiative. http://www1.eere.energy.gov/buildings/betterbuildings/

[4]US EPA Climate Showcase Communities Program. http://www.epa.gov/statelocalclimate/local/showcase/.

BAINBRIDGE
[5]OPower is a customer engagement platform for the utility industry that enables utility customers to receive accurate real-time information about their energy usage. http://opower.com/

KNOXVILLE
[6]SAC Overall Project Cost = $416,661.67:Total DOE Cost = $200,000; Total Project Partner Cost Share = $216,858.01 (52% total project cost); City of Knoxville Cost Share = $22,444 (5.4% total project cost); Tennessee Valley Authority = $124,694.89 (29.9% overall project cost); Knoxville Utilities Board = $30,813.12 (7.4% overall project cost); Ijams Nature Center = $5,020 (1.2% overall project cost); and Knox Heritage, Inc. = $33,886 (8.1% overall project cost).

[7]According to the Database of State Incentives for Renewables and Energy Efficiency (DSIRE).
http://www.dsireusa.org/

OBERLIN
[8]The other two are Portland, Oregon, and Treasure Island, California.

BURLINGTON
[9]District heating is not a new practice, but had only been implemented in a handful of cities worldwide until recently.

PENDLETON
[10]As of 2012, Pendleton has discontinued the group purchase component of its program, which was enabled by working with a single contractor, and has instead expanded eligibility to include all contractors certified by the Energy Trust of Oregon (ETO) http://energytrust.org/. This change has allowed all customers of ETO-certified contractors to apply for Solarize Pendleton loans.

[11] A variety of finance models have been pursued since Solarize was created, including standard bank and credit union loans, municipal loans, solar leases and power purchase agreements, and utility loans. These approaches, as well as broader lessons learned about Solarize programs in Washington, Massachusetts, Vermont, and other places around the United States, are documented in a guidebook written for the National Renewable Energy Laboratory and the City of Portland by Northwest Sustainable Energy for Economic Development.

[12] In a June 2011 article of Photon International magazine, City Manager Larry Lehman noted that other cities might explore using other sources, such as library trust funds, that can be tapped and repaid over time.

Sources

BABYLON
Conservation Services Group Case Study
http://www.csgrp.com/business/casestudies/cons01.html
ENERGY STAR Qualified Homes website
http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.pt_bldr
Green for All blog
http://www.greenforall.org/blog/babylon-ny-creating-green-jobs-through-pace-crosspost
Green for All case study
http://www.greenforall.org/what-we-do/building-a-movement/community-of-practice/case-studies/long-island-green-homes-case-study/
Green Project Exchange
http://www.greenprojectexchange.org/gpe/projects.html?action=detail&skuvar=26
Grist article
http://grist.org/cities/2010-07-13-long-island-town-threatens-to-sue-fannie-freddie-over-clean-ener/
ICLEI case study
http://www.townofbabylon.com/uploads/pdffiles/CaseStudy_BabylonNYGreenHomes.pdf
Long Island Green Homes Program
http://ligreenhomes.com/
Town of Babylon
http://www.townofbabylon.com/whatsnew.cfm?id=252
USGBC Advocacy and Policy Update
http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1943#steve

BAINBRIDGE ISLAND
Better Buildings website
http://www1.eere.energy.gov/buildings/betterbuildings/bainbridge_profile.html
Kitsap Credit Union
https://www.kitsapcu.org/site/borrow/energyefficiencyloans.aspx
Loan Program
http://www.positiveenergybi.org/repowerbainbridge/home/loanprogram
RePower Bainbridge
http://www.positiveenergybi.org/repowerbainbridge
Repower Bainbridge utility incentives
http://www.positiveenergybi.org/sites/default/files/RePower_Incentive_Grid.pdf

BEDFORD
Bedford 2020
http://www.bedford2020.org/B2020Site/Energy.html
Better Buildings Profile
http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/new_york_profile.html#lessons
Energize Bedford
http://energizebedford.org/
Recognition of first 21 Homeowners
http://www.tumblr.com/tagged/energize-bedford.
Smart Power
http://www.smartpower.org/our-work/energize-bedford

BELLINGHAM
Bellingham Herald
http://www.bellinghamherald.com/2012/05/12/2518794/energy-challenge-creates-jobs.html
Businesses Investing in Solar
http://bbjtoday.com/blog/whatcom-county-businesses-economic-benefits-solar/10286
City of Bellingham EECBG Program
http://www.cob.org/government/departments/pcd/eecbg-program.aspx
Community Energy Partners
http://sustainableconnections.org/energy/energychallenge/partners
EPA Climate Showcase Communites
http://www.epa.gov/statelocalclimate/local/showcase/whatcom.html
Sustainable Connections Community Energy Challenge
http://sustainableconnections.org/energy/energychallenge/index_html

BOULDER
Better Buildings Profile
http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/boulder_garfield_denver_profile.html
Boulder Climate Action plan website
http://www.bouldercolorado.gov/index.php?option=com_content&view=article&id=15356&Itemid=2150
Boulder's Climate Action Plan Tax white paper
http://www.bouldercolorado.gov/files/LEAD/climate%20and%20energy/boulders_carbon_tax.pdf
Daily Camera
http://www.dailycamera.com/news/boulder/ci_20527234/boulder-leaders-show-support-carbon-tax-sales-tax
Energy Smart for Landlords and Tenants
http://energysmartyes.com/home/for-landlords-tenants
Home Performance Resource Center
http://www.hprcenter.org/sites/default/files/ec_pro/hprcenter/best_practices_case_study_boulder.pdf
Lawrence Berkeley National Lab's Clean Energy Program Policy Brief
http://eetd.lbl.gov/ea/EMP/reports/mi-policybrief-3-16-2012.pdf
NREL study of Boulder's EnergySmart program
http://www.nrel.gov/docs/fy12osti/54724.pdf

BREMERTON
Kitsap Peninsula Business Journal
http://kpbj.com/special_report/energy/2011-11-04/mayor_s_summit_focused_on_energy_efficiency
RePower Bremerton
http://positiveenergybi.org/repowerbremerton

BURLINGTON
New England Futures
http://www.newenglandfutures.org/issues/energy/sidebar3/
Burlington, Vermont Climate Action Plan
http://www.burlingtonvt.gov/CAP/

EUGENE
EPA Climate Showcase Communities
http://www.epa.gov/statelocalclimate/local/showcase/eugene-smarttrips.html
Eugene Water and Electric Board (EWEB)
http://www.eweb.org/sustainability/report/energy
EWEB Demand Management
http://www.eweb.org/sustainability/report/energy
EWEB Solar Program
http://www.eweb.org/solar
Sustainable Eugene (City website)
http://www.eugene-or.gov/portal/server.
pt?space=CommunityPage&control=SetCommunity&CommunityID=730&PageID=4659

FORT COLLINS
Coloradoan.com
http://fortzed.com/news
FortZED
http://fortzed.com/
FortZED Community Energy Challenge
http://fortzedchallenge.com/Community_Solar_Garden
greenUPGRADER article on New Belgium Brewery
http://greenupgrader.com/1995/new-belgium-brewery-sustainable-business-heroes/
Smart Grid
http://www.smartgrid.gov/federal_initiatives/featured_initiatives/doe_helps_jump_start_zero_energy_
district_fort_collins_colorado

GAINESVILLE
Fast Company
http://www.fastcoexist.com/1678949/gainesville-florida-an-unlikely-world-capital-of-solar-power
Gainesville Regional Utilities Strategic Planning letter
http://www.clean-coalition.org/storage/references/Letter%20from%20CLEAN%20Gainesville%20
administrator%20John%20Crider%205%20Jul%202011.pdf

HAILEY
Communities Audit Retrofit Rebate Program (CARRP)
http://www.co.blaine.id.us/index.asp?Type=B_BASIC&SEC=%7BD96A5E52-277F-4644-B670-
6EF4021C06AA%7D

EPA Climate Showcase
http://www.epa.gov/statelocalclimate/local/showcase/hailey.html
Hailey Green Building Advisory Committee
http://www.haileycityhall.org/GreenBuildingandPlanningAdvisoryCommittee.asp
Hailey Resource Recovery Center Feasibility Study
http://www.energy.idaho.gov/stimulus/d/hailey_final_study.pdf
HELP
http://www.haileycityhall.org/finance/ClimateCom.asp
Idaho Power Smart Meter Program
http://www.idahopower.com/servicebilling/residential/billing/amr.cfm
Idaho Renewable Energy Enterprise Zone Program
http://www.energy.idaho.gov/stimulus/enterprise_zoneprogram.htm
Save-A-Watt
http://www.haileycityhall.org/ClimateChallenge/SaveAWatt.asp
South Central Community Action Partnership
http://www.sccap-id.org/

HILLSBORO
Bloomberg News-Clear Edge Power
http://www.clearedgepower.com/news/clearedge-weans-austria-city-gas-top-fuel-cell-order
EPA Green Power Partnership
http://www.epa.gov/greenpower/communities/communities/hillsbororcommunity.htm
Hillsboro Solar Advantage
http://livelightenergy.com/hillsborosolaradvantage/
New Energy Cities Hillsboro Workshop
http://newenergycities.org/communities/hillsboro-or
Oregon Live
http://www.oregonlive.com/argus/index.ssf/2011/10/hillsboro_ranks_no_2_nationall.html

ISSAQUAH
New York Times green blog
http://green.blogs.nytimes.com/2011/10/05/points-of-light-for-green-construction/
zHome
http://z-home.org/

JACKSON
Jackson Hole News and Guide
http://www.jhnewsandguide.com/article.php?art_id=8497
Jackson Hole Energy Sustainability Project
http://www.tetonwyo.org/jhesp
Lower Valley Energy
http://www.lvenergy.com/energy-efficiency/our-conservation-programs/
New Energy Cities Jackson Workshop
http://newenergycities.org/communities/jackson-wyoming
Town of Jackson
http://www.ci.jackson.wy.us/content/index.cfm?fuseaction=showContent&contentID=135&navID=133

KNOXVILLE
Brookings Institute
http://www.brookings.edu/research/reports/2011/07/13-clean-economy
Clean Energy Authority
http://www.cleanenergyauthority.com/solar-energy-news/tva-using-new-financing-methods-for-solar-projects-040611/
KnoxvilleBiz.com
http://www.knoxnews.com/news/2011/jul/15/area-top-5-for-green-jobs/

MADISON
MPowering Madison
http://www.mpoweringmadison.com/apply

OBERLIN
Clinton Foundation Climate Positive Development Program
http://www.clintonfoundation.org/what-we-do/clinton-climate-initiative/c40-cci-cities/climate-positive-development-program
Green Energy Ohio: 2011 Recognition Awards
http://www.greenenergyohio.org/page.cfm?pageID=3230
Green Energy Ohio: A Roadmap for Full-Scale Change

http://www.greenenergyohio.org/page.cfm?pageId=3199
Inhabitat: Oberlin's LEED Gold Downtown Development Revitalizes a Community
http://inhabitat.com/oberlins-leed-gold-downtown-renovation-revitalizes-a-community/
Oberlin College Alumni Magazine
http://oberlin.edu/alummag/fall2011/features/project.html
Oberlin College solar project
http://new.oberlin.edu/home/news-media/press/detail.dot?id=3982197
The Oberlin Project
http://www.oberlinproject.org/

PENDLETON
ACEEE Study on Solarize Portland
http://www.aceee.org/files/proceedings/2010/data/papers/1974.pdf
Photon Magazine
http://solarizependleton.com/main/wp-content/uploads/2011/12/Photon_2011-06_Pendleton1.pdf
The Solarize Guidebook: A community guide to collective purchasing of residential PV systems
http://www.nrel.gov/docs/fy12osti/54738.pdf
Solar Oregon
http://solaroregon.org/
Solarize Pendleton
http://solarizependleton.com/main/program/
Solarize Pendleton "Lessons Learned"
http://solarizependleton.com/main/wp-content/uploads/2012/01/LESSONS-LEARNED.pdf
Solarize Pendleton Loan Program
http://solarizependleton.com/main/wp-content/uploads/2011/12/loan-replication.pdf
Solarize Pendleton "Replication"
http://solarizependleton.com/main/replication/

SALT LAKE CITY
Clear the Air
http://cleartheairchallenge.org/challenge.php
Deseret News
https://www.deseretnews.com/article/865555098/Wasatch-Front-achieves-ozone-victory-more-work-to-be-done-on-other-pollution-plans.html
EPA Climate Showcase Communities
http://www.epa.gov/statelocalclimate/local/showcase/sustainable-transportation.html
Salt Lake City Chamber
http://slchamber.com/blog/the-business-case-for-clean-air-10002634.htm
TravelWise Utah
http://travelwise.utah.gov/

SANTA FE
Homewise
http://www.homewise.org/
Santa Fe Green Building Code Update
http://www.santafenm.gov/index.aspx?NID=1297
Santa Fe HERS Ratings
http://www.santafenm.gov/index.aspx?NID=1317
Sustainable Santa Fe Commission and Youth Advisory Board
http://www.santafenm.gov/index.aspx?NID=682
Sustainable Santa Fe Plan
http://www.santafenm.gov/DocumentView.aspx?DID=702

WEST UNION
EPA Case Study: West Union Green Downtown
http://www.epa.gov/statelocalclimate/local/showcase/west-union.html
EPA Climate Showcase Communities
http://www.epa.gov/statelocalclimate/local/showcase/west-union.html
Iowa Department of Natural Resources
http://www.iowadnr.gov/Environment/WaterQuality/WatershedImprovement/WatershedSuccesses/WestUnion.aspx
Iowa Environmental Focus
http://iowaenvironmentalfocus.org/2011/05/09/on-the-radio-using-geothermal-energy-west-union-colors-historic-downtown-green/
Preservation Green Lab
http://www.preservationnation.org/information-center/sustainable-communities/sustainability/green-lab/additional-resources/West-Union_FINAL.pdf
Recovery.gov EECBG Project Summary

http://www.recovery.gov/Transparency/RecipientReportedData/pages/RecipientProjectSummary508.aspx?AwardIDSUR=112330&qtr=2012Q1
Sustainable City Network
http://www.sustainablecitynetwork.com/topic_channels/energy/article_fc6f2248-161c-11e1-afb1-0019bb30f31a.html
A Sustainable Vision for West Union
http://www.westunion.com/uploads/PDF_File_24604713.pdf

WILLIAMSON
Central Appalachian Sustainable Economies 2011 convening report
http://www.thegreenaccelerator.com/file_cabinet/download/0x000076d28?1328034371&utm_source=2012/01/31%2013:52:59&utm_campaign=CASE%201&utm_medium=email
Daily Yonder
http://www.dailyyonder.com/start-reach-sustainable/2011/08/02/3457
Earth Techling
http://www.earthtechling.com/2011/02/sustainable-development-in-coal-country/
Energy Information Administration—West Virginia page
http://205.254.135.7/state/state-energy-profiles.cfm?sid=WV
Green Accelerator
http://www.thegreenaccelerator.com/main/summary
Green for All
http://www.greenforall.org/blog/the-green-economy-in-coal-country\
The JOBS Project—Solar in the Heart of Coal Country
http://www.youtube.com/watch?v=-yzEqWAUSGE&feature=colike
RenewableEnergyWorld.com
http://www.renewableenergyworld.com/rea/news/article/2012/01/west-virginia-energy-outlook-2012-identifying-synergies-between-renewables-and-fossil-fuel
Solar Helps Sustain Williamson, WV
http://www.youtube.com/watch?v=Yds1-sNvSds
Williamson Daily News article ("Energy Independence Day a success")
http://www.williamsondailynews.com/view/full_story/7851461/article-Energy-Independence-Day-a-success-?

CITIES TO WATCH
CBS Detroit
http://detroit.cbslocal.com/2012/01/12/grand-valley-grand-rapids-partnership-offers-energy-saving-opportunities/
CharlestonWISE
http://www.charlestonwise.org/
City of Columbia, MO http://www.gocolumbiamo.com/WaterandLight/Documents/EnergyConservationMeasures.pdf
City of Richmond, CA
http://www.ci.richmond.ca.us/index.aspx?nid=1243
CleanEnergyAuthority.com
http://www.cleanenergyauthority.com/solar-energy-news/palo-alto-launches-4-mw-feed-in-tariff-pilot-032112/
DOE Home Energy Score program
http://www1.eere.energy.gov/buildings/homeenergyscore/partners.html
EPA Climate Showcase Communities Program
http://www.epa.gov/statelocalclimate/local/showcase/
Green for All
http://www.greenforall.org/resources/solar-richmond-trains-low-income-residents
Inside Climate News
http://www.insideclimatenews.org/news/20120514/europe-feed-tariff-solar-wind-long-island-new-york-germany-rates-utility
Palo Alto CLEAN
http://www.cityofpaloalto.org/news/displaynews.asp?NewsID=1877&targetid=223

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Cover: zHome; City of Issaquah.

Foreword: Senator Henry M. Jackson; Henry M. Jackson Foundation.

Babylon: Long Island Green Homes program; Town of Babylon.

Bainbridge Island: RePower Superhero; RePower Bainbridge.

Bedford: Launch of Energize Bedford; Town of Bedford.

Bellingham: Community Energy Challenge energy advisor provides technical assistance to a homeowner;City of Bellingham.

Boulder: Solar thermal system at South Boulder Recreation Center; City of Boulder.

Bremerton: Insulation outside of a RePower Bremerton home; RePower Bremerton.

Burlington: University of Vermont and Burlington waterfront; City of Burlington.

Eugene: City of Eugene Transit Service; City of Eugene.

Fort Collins: Solar array on top of Fort Collins' New Belgium Brewery; City of Fort Collins, CO.

Gainesville: Solar photovoltaic (PV) systems on the rooftops of local Gainesville, Fla. businesses join with home-mounted and ground-mounted systems to generate renewable energy through the nation's first utility-offered solar feed-in-tariff; Gainesville Regional Utilities.

Hailey: Solar array on the wastewater treatment plant in South Hailey; City of Hailey.

Hillsboro: Electric vehicle charging station at Intermodal Transit Facility; City of Hillsboro.

Issaquah: zHome; City of Issaquah.

Jackson: Jackson's four-megawatt solar array; Town of Jackson.

Knoxville: LEED Silver Transit Center's solar array; City of Knoxville.

Madison: Madison Mallards Baseball Club, an MPowering Madison participant; City of Madison.

Oberlin: Downtown Oberlin; Dr. John E. Petersen, Director of Environmental Studies Program, Oberlin College.

Pendleton: Pendleton Public Works Director Bob Patterson outside of a Solarize Pendleton home; City of Pendleton.

Salt Lake City: Clear the Air Challenge team; Salt Lake City.

Sante Fe: Santa Fe YouthWorks; City of Santa Fe.

West Union: Local business owner, in front of downtown building soon to draw geothermal energy; City of West Union.

Williamson: Energy Independence Day gathering; the JOBS Project.

Methodology

The New Energy Cities team began researching *Powering the New Energy Future from the Ground Up: Profiles in City-Led Energy Innovation* by identifying small- and medium-sized cities and towns in the United States that have made notable efforts to develop local clean energy economies. Mirroring the New Energy Cities program criteria, this research focused on cities and towns with fewer than 250,000 residents.

Research Considerations

As a starting point, the team researched the involvement of small- to medium-sized cities in a variety of national initiatives and networks related to climate and energy action, activities implemented as a result of federal climate or energy funding, and unique, innovative climate and energy initiatives driven by local leadership.

It is important to note that many cities do not explicitly focus on climate change as a reason for their work in energy efficiency, clean energy, and sustainable transportation. A number of cities that invest in these programs and projects do so in order to capture other benefits associated with reducing fossil fuel use: better air quality, attraction and retention of top businesses and talent, job creation, and financial savings. As a result, the New Energy Cities team realized that we had to look beyond the typical climate-related programs and initiatives to find clean energy innovations that were happening outside of the traditional climate movement.

Additionally, while the New Energy Cities team viewed city commitments to reducing greenhouse gas emissions as potential indicators of city-led clean energy innovation, we also recognized that local climate pledges were in and of themselves not sufficient to determine the depth of leadership.

These considerations drove the selection of research sources that the team used to identify candidates for inclusion in this report.

Research Resources

The team researched the following areas to identify preliminary candidates for inclusion:

Direct Action or Direct Receipt of Federal Funding by Cities for Energy or Climate Action

- Signatories of the US Mayors Climate Protection Agreement, under which cities commit to take the following three actions:
    1. Strive to meet or beat the Kyoto Protocol targets in their own communities, through actions ranging from anti-sprawl land-use policies to urban forest restoration projects to public information campaigns;
    2. Urge their state governments, and the federal government, to enact policies and programs to meet or beat the greenhouse gas emissions reduction target suggested for the United States in the Kyoto Protocol—seven percent reduction from 1990 levels by 2012; and
    3. Urge the US Congress to pass the bipartisan greenhouse gas reduction legislation, which would establish a national emission trading system.

For more information: http://www.usmayors.org/climateprotection/agreement.htm.

- Members of ICLEI—Local Governments for Sustainability, "an international association of local governments as well as national and regional local government organizations who have made a commitment to sustainable development." For more information: http://www.iclei.org/index.php?id=about.
- Members of Climate Communities, "a national coalition of cities and counties that is educating federal policymakers about the essential role of local governments in developing new approaches to create livable communities, reduce energy use and curb greenhouse gas emissions." For more information: http://climatecommunities.us/about.html.
- Recipients of Energy Efficiency Conservation Block Grant competitive funding from the US Department of Energy, which sought to "stimulate activities and investments which can:
    1. Fundamentally and permanently transform energy markets in a way that make energy efficiency and renewable energy the options of first choice; and

> 2. Sustain themselves beyond the grant monies and the grant period by designing a viable strategy for program sustainability into the overall program plan."

For more information: http://www1.eere.energy.gov/wip/eecbg_grants.html.

- Recipients of the US Environmental Protection Agency Climate Showcase Communities competitive grant funding, intended to "create replicable models of cost-effective and persistent greenhouse gas reductions that will catalyze broader local and tribal government actions to stabilize the climate and improve environmental, economic, health, and social conditions." For more information: http://www.epa.gov/statelocalclimate/local/showcase/.

Federal Designations and Other Partnerships Relating to Energy and Climate Action Whole Communities, Involving Cities as Partners

- Participation in the US Department of Energy Better Buildings program, a nationwide initiative intended to amplify on successes achieved by state and local communities to improve the energy efficiency of public, commercial, and residential buildings. For more information: http://www1.eere.energy.gov/buildings/betterbuildings/.
- Designation as US EPA Green Power Communities, which are "towns, villages, cities, counties, or tribal governments in which the local government, businesses, and residents collectively buy green power in amounts that meet or exceed EPA's Green Power Community purchase requirements." For more information: http://www.epa.gov/greenpower/communities/index.htm#list.
- Designation/receipt of grant funding through the Department of Energy Solar America Cities, 25 major cities identified in 2007 and 2008 to "develop comprehensive, city-wide approaches to increasing solar energy use." For more information: http://solaramericacommunities.energy.gov/.
- Participation in the Emerald Cities Collaborative, "a consortium of businesses, unions, government representatives, community organizations, research and technical assistance providers, development intermediaries, and social justice advocates, united around the goal of 'greening' our metropolitan areas in high-road ways (http://www.emeraldcities.org/?q=highroad) that advance equal opportunity, shared wealth, and democracy. For more information: http://www.emeraldcities.org/.
- Participation in the EV Project, responsible for the deployment of tens of thousands of electric vehicle charging stations in metropolitan areas nationwide. For more information: http://www.theevproject.com/.

The New Energy Cities team also reviewed the websites of nonprofits, thought leadership organizations, and issue-specific media outlets with the intention of identifying further examples of innovation that may not have received wide recognition to date. These additional research sources included but were not limited to: the Efficiency Cities Network, Green for All, Grist, Brookings Institute, and the Clinton Climate Initiative.

Selection Process

From this preliminary research, the team identified more than 60 candidate cities. The team then conducted further analysis of the specific work that each of the cities had done as of May 2012, particularly reviewing federal and local government websites and local media outlets and seeking information about whether cities had shown:

- Innovative engagement in energy efficiency, electrified transportation, district energy distributed and/or renewable energy, and smart grid applications.
- Clarity and boldness of vision for a clean energy future.
- Breadth and depth of programming and projects on climate change and clean energy.

When possible, research also included phone interviews and email exchanges with city sustainability, climate, energy, and/or economic development directors. A list of the city reviewers is found on the Acknowledgments page at the outset of this report. In these communications, the team researched the organizational, political, and cultural nuances that form the context for each city's work, while also maintaining an emphasis on quantitative results.

This stage of research narrowed the pool to the final list of cities and projects profiled in this publication. The assessment at this point was subjective, with an emphasis on highlighting the insights that a given city's experience could offer to others working in the same program or project area.

New Energy Cities

Accelerating Community-Led Clean Energy Innovation in the Northwest

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New Energy Cities is a project of Climate Solutions