

# Accelerating Energy Conservation in Bellingham: An Application for the Georgetown Prize

June 27, 2014

## **1. Introduction**

The City of Bellingham and its community partners are committing themselves to make major strides in reducing energy consumption in pursuit of the Georgetown University Energy Prize. Although the City of Bellingham's citizens and municipal leaders have been committed to energy reduction for some time, the Bellingham community plans to take its energy reduction performance to the next level by building on a strong base of accomplishment that includes substantial investments in municipal and residential energy retrofit projects, and the creation of a number of successful local energy initiatives.

This work dovetails precisely with existing City of Bellingham goals derived from a Local Climate Action Plan and with its municipal Performance Indicators for energy use reduction. The City of Bellingham has also adopted a number of resolutions that guide its efforts to reduce local energy consumption or accelerate the shift to renewable energy sources, and we anticipate that the energy reduction plan required in this competition will include aggressive goals for further reductions.

The City has made major investments in improving its energy infrastructure via its participation in Energy Efficiency Community Block Grants, and loan programs. Recent municipal efforts include an innovative waterfront utilities plan, and the expenditure of \$6.2 million in bond funds to complete the repair or replacement of energy systems in 20 city buildings.

Community-wide campaigns include the Community Energy Challenge, which supports residential and commercial building energy retrofits, and a Green Power campaign that encourages purchase of renewable power or credits. These efforts are described in the sections below.

Bellingham's early commitment to efficiency and renewables has resulted in national recognition. In 2007, the EPA named Bellingham the #1 Green Power Community in the US. In addition, Bellingham has been named an EPA Climate Showcase Community. Also, as a result of these programs and initiatives, Bellingham has developed a highly trained energy workforce ready to respond to new commitments and goals. We expect this workforce to be a critical element in allowing us to meet new energy reduction goals.

We will be looking for ways to build on this legacy to take the city to the next stage in energy innovation. The Bellingham City Council is working closely with the Mayor's office and executive department staff to build a framework for the next level of planning. Supporting this framework, City staff are completing a review of innovative programs elsewhere that will help inform new initiatives. The City has worked with community organizations from the outset of this project, and we have begun to assemble an energy Leadership Team involving utilities, the

Bellingham School District, and many community organizations with expertise and experience in developing successful energy programs. Involvement of this Leadership Team has already created momentum toward the creation of an effective plan, and its successful implementation during the competition period for the Prize.

The following sections review prior energy-related resolutions, plans, programs and campaigns that will assist Bellingham in being a successful competitor for the prize. A subsequent document will describe the approach we will use to formulate our energy reduction plan.

## ***2. Energy-related Resolutions, Plans and Programs***

The City of Bellingham has adopted a number of resolutions, policies, and plans that address aspects of energy conservation, renewables, or greenhouse gas emissions, and that set targets or goals for these activities. This section briefly summarizes the content of these plans or resolutions, and also describes a number of community-wide campaigns and programs that will serve as the base from which we will build our plan to substantially improve our energy savings performance.

### Energy-related Resolutions:

- **Resolution 2005-08**, passed in March of 2005, committed the City to participate in the five milestones of the Cities for Climate Protection Program. The milestones are:
  - Milestone 1: Conduct a baseline emissions inventory and forecast.
  - Milestone 2: Adopt an emissions reduction target.
  - Milestone 3: Develop a Climate Action Plan for reducing emissions.
  - Milestone 4: Implement policies and measures.
  - Milestone 5: Monitor and verify results.
- **Resolution 2005-21** promotes the use of LEED standards for city buildings and commits the City to encourage LEED construction in the private sector.
- **Resolution 2006-28** commits the City to purchase renewable electricity. The resolution states that "The City shall begin purchasing renewable energy credits from Puget Sound Energy equal to 100 percent of electricity used in municipally-owned facilities in 2007."
- **Resolution 2007-05** committed Bellingham to an environmentally-preferable purchasing program which includes energy-related components, including direction for the City to select "energy efficient equipment and appliances, such as Energy Star, whenever practicable."
- **Resolution 2007-10** adopted greenhouse gas reduction targets as called for in Resolution 2005-08, above. According to the 2007 resolution, "The City hereby adopts and expresses the goals of reducing the annual emissions of greenhouse gas pollution

resulting from City of Bellingham municipal operations by 64% below 2000 levels by 2012 and by 70% below 2000 levels by 2020. The City also adopts and expresses the goals of reducing greenhouse gas pollution resulting from activities of the entire Bellingham community by 7% below 2000 levels by 2012 and by 28% below 2000 levels by 2020."

- **Resolution 2009-05** declares the city's intent to take a leadership role in promoting energy efficiency by promoting the Bellingham Energy Efficiency Challenge.

Strategic plans or frameworks:

**Greenhouse Gas Inventory and Climate Protection Action Plan, May 2007.** Bellingham conducted a planning process to achieve broad-scale greenhouse gas reduction, to be guided by the creation of a Climate Protection Action Plan and associated reduction targets. The resulting plan endorsed the greenhouse gas reduction goals for municipal operations and the community as specified above in Resolution 2007-10.<sup>1</sup> The report also noted that by buying Green Power, a greenhouse gas reduction of 83 percent of the 2012 municipal target had already been achieved. Although the City has not yet conducted a complete performance review of the activities outlined in the plan, in the second half of 2014 a revision to the plan, to include data on achievement of goals to date, will be completed. This timing will allow for the Greenhouse Gas reduction and energy conservation plans to be harmonized.

**City of Bellingham and Whatcom County Energy Resource Scarcity/Peak Oil Task Force Report.** This report catalogued possible impacts from rapidly rising energy prices on a wide range of areas including the local economy, transportation, food, and agricultural production. The report provides a historical profile of energy use in Whatcom County. The report identified longer and shorter-term priorities for achieving a reduction of energy use, and a shift to local renewable supplies. Intermediate-term priority activities identified in the report include the following:<sup>2</sup>

- Encouraging energy efficiency and conservation programs.
- Supporting increased energy audits.
- Encouraging increased use of renewables in the vehicle fuel mix.
- Encouraging creation of biogas production from dairy waste.

**City of Bellingham Comprehensive Plan.** The Comprehensive Plan Environment Element Chapter includes statements of goals and policies regarding energy. The most notable sections include statements reiterating the above-specified greenhouse gas emission reduction goals, and discussing possible future use of sewage heat recovery systems or district heating in appropriate locations. Policies in the Chapter include promotion of LEED and "Built Green" standards in new housing developments, energy-efficient construction codes, and energy efficiency investments and operating procedures in municipal facilities. The Chapter also calls for energy efficiency efforts to be monitored to assess the effectiveness of use reductions and cost savings.<sup>3</sup> The City is in the process of revising its Comprehensive Plan, to include a revision

of the environment chapter. Similar to the Greenhouse Gas Reduction plan, this revision will dovetail with and inform the energy reduction plan.

### Community Programs and Campaigns.

A number of campaigns, programs, and projects have been undertaken in Bellingham, or countywide, to reduce energy use or increase use or production of renewables. This section catalogues these efforts. The focus is primarily on projects within the City limits, although projects that entail cooperation countywide or with other jurisdictions are also included. We also include some projects focusing on renewables. While expansion of renewables is not necessarily linked explicitly to conservation, many of these projects lead to reduced energy use as a side effect since consumers installing renewable energy capacity often increase energy efficiency of a building before installation.

### Local energy campaigns and measures.

- **Green Power.** A successful student-led campaign to get Western Washington University to purchase Green Power began in 2003. As a result, in 2005, Western became the first U.S. university to decide via student vote to purchase 100 percent renewable energy in 2005.<sup>4</sup> The citywide Green Power campaign built off this success, starting in 2006 as a partnership of Sustainable Connections, Puget Sound Energy, and the City of Bellingham.

In 2007 both the City of Bellingham and Whatcom County also chose to purchase 100 percent green power. And, as part of the Green Power campaign, in 2007 Bellingham (citywide) became the #1 EPA certified Green Power community in the US with a total purchase of Green Power equaling about 12 percent of Bellingham's residential energy electricity use.<sup>5</sup> While other, larger, cities have now surpassed Bellingham in terms of total kWh of Green Power, Bellingham is still in the top 20 nationally for municipal purchases.<sup>6</sup> Puget Sound Energy and its partners have also encouraged residential participation in the Green Power program. As a result of these efforts, the number of residences purchasing some level of Green Power has steadily increased since 2002.

**Community Energy Challenge.** The Community Energy Challenge (CEC) is a multiagency partnership created in 2009. This partnership includes a number of organizations such as the City of Bellingham; Opportunity Council, an organization serving low income households; Sustainable Connections, an alliance of green-oriented businesses; utilities such as Cascade Natural Gas and Puget Sound Energy; the Northwest Clean Air Agency; and, the Washington State University Energy Program. The City of Bellingham has been an integral partner to the CEC since 2009. The program has received funding via Federal stimulus dollars, and recently received a \$2 million grant from the Northwest Clean Air Agency to continue its activities.<sup>7</sup>

The Energy Challenge provides whole-building energy assessments for homes and businesses, resulting in a list of prioritized upgrades.<sup>8</sup> Participants are provided access to utility rebate programs that assist them in completing projects such as insulation improvements or sealing of the building envelope for their respective residences or businesses. Along with the weatherization work, many participants have added solar panels or upgraded their heating systems. Puget Sound Energy and Cascade Natural Gas assists the program in a number of ways including co-marketing, and financial support.<sup>9</sup>

Other organizations bring additional expertise to this effort. The Building Performance Center (BPC), an affiliate of the Opportunity Council, is a central partner in the Community Energy Challenge.<sup>10</sup> The BPC provides weatherization training for contractors and other community action programs in one of the state's three state-of-the-art building performance training facilities.<sup>11</sup>

The following table summarizes program participation countywide through January 2014. Over 1000 residential units and almost 350 businesses have gone through the first phase of the program, an energy assessment. Over half of the residences went on to make specific upgrades, as have about one-quarter of the businesses. Energy savings on the residential side were estimated at 4.2 million kilowatt hours, with over 1 million saved on the business side.<sup>12</sup> According to an analysis of the program, the Energy challenge has catalyzed \$14 million in direct economic activity and resulted in more than \$500,000 in energy savings per year. In addition, more than 80 jobs have been supported by the program. We expect the Community Energy Challenge, with its trained workforce and logistical support, to be an integral part of our participation in the Georgetown University Energy Prize competition.

<b>Table 1. Community Energy Challenge Outcomes Through January 2014</b>		
	<b>Residential</b>	<b>Commercial</b>
Completed Assessments	1,360	342
Completed Projects (total across all units)	1,013	144
Number of Households or Businesses Completing One or More Projects	768	97
Households or Businesses Completing at Least One Project (Rate)	56%	28%
Source: Sustainable Connections		

- **City municipal facilities energy upgrade.** The City of Bellingham completed an energy audit followed by some initial projects to reduce energy use, funded by federal Energy Efficiency and Conservation Block Grant dollars. Using information from the audit, the City initiated a larger project to retrofit energy systems in most city buildings and facilities via a federally-backed financing program. Through this program, Qualified Energy Conservation Bonds were issued March 14, 2011 in the amount of \$6,500,000.

A total of 22 retrofit projects to city buildings or facilities, consisting of 47 energy improvement projects, were funded. Retrofits include elements such as new lighting, HVAC systems, system control mechanisms, and replacement of boilers. The contract required the contractor to guarantee a 20 percent reduction in energy costs. According to the first annual verification report, the projects are expected to exceed the 20 percent energy cost reduction goals specified in the project, saving the City over \$20,000 annually.<sup>13</sup> In addition, because of the retrofits, the City received an incentive payment of \$109,312 from Cascade Natural Gas for the portion of the retrofits completed at its Arne Hanna Aquatic Center.<sup>14</sup> Although this capital investment in fixing "low hanging fruit" may disadvantage Bellingham to some degree in the GUEP competition, we expect that there are additional operational efficiencies, and savings from changes in employee behavior, that will occur as we optimize the new systems.

- **City of Bellingham Water Conservation Program: The Water – Energy Nexus.** This program recognizes that water and energy are inextricably linked when it comes to utilities providing customers with electricity to turn on their lights and get water from the tap. It takes water to produce energy and energy to produce drinking water at our water treatment plant or to transport water to households and businesses for drinking, bathing, cooking, washing clothes, flushing toilets, operations, and outdoor watering. A 2010 study on the treatment, delivery, and volume of water consumed and wastewater treated at both the City's Water Treatment and Wastewater Treatment Plants found that for every 100 cubic feet of water conserved within the water system, a \$0.37 savings would be realized in treatment and delivery costs.

The City offers a rebate program to its residential and commercial water customers. For a portion of the program, the City has partnered with Sustainable Connections and the Opportunity Council's Community Energy Challenge to provide each participating household and business with quality information, a full energy assessment, a water assessment, a customized energy action plan detailing cost-effective measures, assistance with utility and tax rebates, identification of reliable contractors, and quality assurance. Participating residential water customers can access a \$150 rebate for purchase and installation of a WaterSense labeled toilet, a water saving clothes washer, or outdoor water conserving equipment (e.g. rain barrel, tank/cistern, drip irrigation, etc.). To date, 329 rebates have been issued with 42% being Community Energy Challenge participants. Approximately 5 million gallons of water have been conserved within the project's five-year period, with corresponding savings in treatment and delivery costs. Commercial customers are also eligible for rebates on water-efficient equipment.

- **City of Bellingham Housing Programs.** The City of Bellingham Home Rehabilitation Program uses federal grants to pay for home rehabilitation for owner-occupied low income homes. Although these renovations are focused on health and safety, improved energy efficiency is usually a side-effect of the rehabilitation. For example, the City

requires Energy Star-rated appliances when it pays for appliance upgrades. The program works in cooperation with community groups such as the Opportunity Council. A citywide Home Fund housing levy was passed by voters in 2012 to build and maintain affordable housing. New construction and renovation projects funded by the levy will be built to meet the state's Evergreen Sustainability Design Standards that include rigorous energy efficiency and sustainability criteria.

- **Solar permitting improvements.** According to energy analysts, a substantial proportion of the expense of residential solar results from costs associated with permitting, system design, and installation.<sup>15</sup> Locally, as part of a project advocated by Sustainable Connections, the City of Bellingham initiated a project to streamline solar permitting processes. An exemption to standard permitting for small rooftop solar was adopted as City policy on September 4, 2009. This allows an exemption from structural review and building permits for small (according to weight and projected load) solar projects on single family, two family and town home buildings.<sup>16</sup> A similar exemption process was approved for solar hot water heating.<sup>17</sup> As a side effect of solar installations, we expect many residents to also increase the energy efficiency of their residences.

**Waterfront Energy Planning.** The City, working in conjunction with the Port of Bellingham, drafted a Waterfront District Sub-Area Plan for the rebuilding of a site of a former paper mill. Provisions in the plan include exploring development of advanced energy systems on the site. According to the utility chapter of the plan, the area "could include additional piping and infrastructure to support the long-term development of district heating and cooling, on-site energy generation, and wastewater reuse." The City took the next step to examine this as part of its utility planning, which reviewed and updated the feasibility numbers. According to the recent report, "Waste heat recovery, thermal energy storage, balance of renewable generation, and regional renewable energy processing (as a district energy asset) at scale all have high potential."<sup>18</sup> Western Washington University, a potential customer for district energy, may also improve the prospects for its development. A Puget Sound Energy gas fired turbine on the waterfront also provides an opportunity for use of waste heat within a district system. Note that while this project is not focused on energy reduction per se, and will likely come on-line only after the GUEP contest window is closed, this project will allow the city to continue to develop its energy-related expertise and help galvanize community interest in energy issues.

Another waterfront energy possibility is the creation of a small hydro system using an old industrial water outflow to the district. In February 2013 the Northwest Clean Air Agency granted the City of Bellingham \$760,000 to continue planning for the project.<sup>19</sup> Further analysis of these two projects, and the district energy possibility, will occur in the near future.

- **University energy and sustainability measures.** Local colleges and universities have adopted a number of energy reduction measures and have also created energy-related

research, education, and training programs. Universities may also be a locus for educating of off-campus residents in ways to reduce their energy use and bills. Specific energy-related efforts at Western Washington University (WWU) include:

- In 2009, the University approved a Climate Action Plan. As mentioned above, the university purchases 100 percent Green Power. Energy goals for the university include the achievement of climate neutrality by 2050. WWU also created a Sustainability Office to oversee a wide range of sustainability programs, including energy.<sup>20</sup>
  - A Green Energy fee was adopted by students in 2009 to raise funds for on-campus projects. For example, one project included a \$167,000 solar array on the Environmental Studies Building. The fee also helps pay for Renewable Energy Credits.
  - An energy-reduction residence hall campaign called "Go for the Green" resulted in over 20 percent energy use reduction from baseline levels.
  - A WWU Institute for Energy Studies was founded in 2013. The institute has a broad focus including research, education, and energy studies. The program currently offers a minor in energy policy, and plans for an additional minor and a possible major are in the works.<sup>21</sup>
  - A "10x12" program was adopted that reduced overall campus energy use by 10 percent by the end of 2012.
  - The university contracted for \$3.2 million in building energy retrofits in 2011.
- **Utility and State conservation and incentive programs.** Local utilities maintain a number of incentives for energy reductions. Some state incentives are also available. The energy reduction plan will include education about these incentives as an essential element.
- Puget Sound Energy offers rebates for qualified heat pumps and heat pump conversions; energy efficient water heaters; energy efficient appliances, etc. More extensive measures can also qualify for rebates, such as substantial increases in insulation, window replacements, or whole-house Energy Star performance evaluations.<sup>22</sup>
  - Cascade Natural Gas incentives include rebates for energy-efficient furnaces, high efficiency or tankless hot water heaters, furnace duct sealing, increases in insulation to higher R thresholds, and Energy Star whole-house retrofits.<sup>23</sup>
  - State renewable energy incentives include per-kilowatt annual rebates according to the amount of energy produced. These increase if some or all of the equipment installed is manufactured in Washington. Rebates for individual homeowners or businesses are capped at \$5,000 per year and range from \$.12 to \$.54 per kilowatt hour depending on the type of energy produced and the equipment used. Solar projects using Washington-state made panels and inverters qualify for the maximum \$.54 per kWh. Wind and anaerobic digestion



production also qualifies for incentives. Larger rebates are available for participants in Community Solar projects.<sup>24</sup>

- Cascade Natural Gas provides grants to community action agencies for low income weatherization.
  
- **School-based activities.** In 2003 the Bellingham School District began using utility management software, leading to a 20% drop in electricity use. The District also maintains policies restricting energy-gobbling appliances in classrooms and meeting rooms. The district has replaced gravity flow toilets or put them on timers to reduce water use. All schools are now benchmarked on the ENERGY STAR Portfolio Manager, with some getting rated at 100 percent. Some buildings appear to be performing better than others, so there is still room for improvement. A 2009 grant focused on lighting improvements.

A Bellingham-based organization, RE Sources, works with the schools with a focus on environmental education and behavior. The Sustainable Schools program works in cooperation with the Resources Conservation Managers at the school district and is currently focused on elementary schools. The program includes a "green classroom certification" process, and students are asked to adopt at least one energy-conserving behavior in their classroom. The program also includes community action projects focusing on reduction of water use, energy, and waste. A pilot project in 2014 included 31 schools and 1000 students countywide. This program will continue in subsequent years and will be one component of our energy reduction plan.

### **3. Conclusion**

As this review indicates, the Bellingham community is well-placed to make significant strides in the competition phase of the prize. The area has been a leader or early-adopter in campaigns to shift the local energy mix toward renewables and to reduce energy use. The area is a leader in Green Power and in energy efficiency retrofitting programs, and local institutions have adopted greenhouse emission reduction plans to guide future efforts. The waterfront redevelopment project provides a rare opportunity to develop new infrastructure from scratch, possibly including district energy or hydropower. Puget Sound Energy provides a wide array of conservation incentives, provides net-metering for solar, pays attractive rates for some local distributed power sources, and supports local Green Power and Community Energy Challenge campaigns. Cascade Natural Gas also has a wide array of incentive programs, supports the CEC, and provides grants for weatherization. Taken together, these elements will help Bellingham develop a robust and effective energy reduction plan. A subsequent document will describe how we will go about building on this base to power up the energy reductions to come through even more innovative, collaborative and replicable measures.

## Notes

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- <sup>1</sup> City of Bellingham, "Greenhouse Gas Inventory and Climate Protection Action Plan," May 2007, p. 12.
- <sup>2</sup> Energy Scarcity/Peak Oil Task Force Report, Goal 3.4.2 Intermediate priority – Energy supply, p. 18.
- <sup>3</sup> City of Bellingham, *Comprehensive Plan*, Environment Element Chapter.
- <sup>4</sup> US EPA, Green Power Partnership, Partner Profile,  
<http://www.epa.gov/greenpower/partners/partners/westernwashingtonuniversity.htm>
- <sup>5</sup> U.S. Environmental Protection Agency (and others), "Guide to Purchasing Green Power," March 2010,  
[http://www.epa.gov/greenpower/documents/purchasing\\_guide\\_for\\_web.pdf](http://www.epa.gov/greenpower/documents/purchasing_guide_for_web.pdf)
- <sup>6</sup> Environmental Protection Agency, <http://www.epa.gov/greenpower/toplists/top20localgov.htm>
- <sup>7</sup> Northwest Clean Air Agency, "NWCAA awards \$3.2 million for local clean air projects," Press Release, February 14, 2013.
- <sup>8</sup> Sustainable Connections, "Community Energy Challenge hits targets, creates jobs," March 1, 2013,  
<http://sustainableconnections.org/news/sc-press-releases/community-energy-challenge-hits-targets-creates-jobs>
- <sup>9</sup> U.S. Environmental Protection Agency, "The Whatcom Energy Challenge,"  
<http://www.epa.gov/statelocalclimate/local/showcase/whatcom.html>
- <sup>10</sup> Thomas Dolan, "Nonprofit Energy Savers Thrive in Washington State," *Home Energy*, January 3, 2012,  
<http://www.homeenergy.org/show/article/id/1751/viewFull/>
- <sup>11</sup> Building Performance Center web site, <http://www.buildingperformancecenter.org/about-2/>
- <sup>12</sup> Community Energy Challenge, Report from January 1010 to March 15, 2013.
- <sup>13</sup> Johnson Controls, "Post Installation Measurement and Verification Report," May 2013.
- <sup>14</sup> City Council Agenda Bill number 19371, November 7, 2011
- <sup>15</sup> For more information, see Rocky Mountain Institute, "Solar PV Balance of System,"  
<http://www.rmi.org/SolarPVBOS>
- <sup>16</sup> Jim Tinner, City of Bellingham Policy, "Roof Mounted Photo-Voltaic Solar Panels for One and Two Family Dwellings," September 4, 2009.
- <sup>17</sup> City of Bellingham, "Advanced Methods and Materials, Solar Water Heating Systems," undated.
- <sup>18</sup> FVB Energy, *Bellingham Waterfront Utility Master Plan District Infrastructure Assessment, Preliminary Finding Report*, April 2014.
- <sup>19</sup> Northwest Clean Air Agency, "NWCAA awards \$3.2 million for local clean air projects," press release, February 14, 2013.
- <sup>20</sup> Western Washington University, "2010-2011 Western Sustainability Report," undated.
- <sup>21</sup> See <http://www.wvu.edu/energy/>
- <sup>22</sup> See Puget Sound Energy, "Re-Energize with Energy Efficiency and Get Rebates,"  
<http://www.pse.com/savingsandenergycenter/ForHomes/Pages/Rebates-and-Offers.aspx>
- <sup>23</sup> Cascade Natural Gas, "Cascade Natural Gas Conservation Incentive Program Existing & New Homes Incentives,"  
<http://cngconserve.com/wp-content/uploads/2013/05/CNG-IncentiveProgram-IncentiveList-current.pdf>
- <sup>24</sup> Solar Policy Information, "Renewable Energy Cost Recovery Incentive Program,"  
[http://www.dsireusa.org/incentives/incentive.cfm?Incentive\\_Code=WA27F](http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=WA27F)