The Berkshire Regional Energy Plan: First Steps

Governor Patrick participates in the ribbon cutting ceremony for the Berkshire Wind Farm, the first utility-scale wind farm in Massachusetts. (Photo credit: Matt Bennett/Governor's Office)

Environmental Planning Fall 2012

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Project Scope

The purpose of this report is to provide context and background research to support the development of a Regional Energy Plan for Berkshire County, an undertaking that has not been completed since 1980. Our work for the Berkshire Regional Planning Commission (BRPC) will supplement that of Peregrine Consulting Group and the Center for EcoTechnology (CET).

In the “Proposal for Providing Regional Energy & Efficiency Planning Services,” Peregrine and CET outline five specific tasks for developing a regional plan. These tasks are:

- Gathering existing information and local opinions from as many sources as possible.
- Organizing this information into inventories of opportunities, accomplishments, and perspectives (i.e., regional technical potential for energy efficiency and renewable energy development, energy efficiency and development achieved to date, key issues perceived by a variety of parties with respect to energy development and efficiency.)
- Sharing these inventories back with residents, businesses, and community leaders to develop a common understanding of opportunities and concerns.
- Preparing goals and strategies to address opportunities and concerns identified.
- Presenting draft goals, policies, and strategies for public comment and prioritization.¹

Our report will specifically support the first two tasks outlined in the proposal, described below in more detail:

a. TASK 1: Outreach Strategy and Key Issues Roundtables
   i. Solicit input from the full range of residents, businesses, and community leaders on the topic of renewable energy generation

b. TASK 2: Develop a Regional Energy Inventory
   i. County-wide energy efficiency and renewable energy project inventory

ii. Regional energy baseline by sector, detailing as possible how energy is used community to community, including levels of local participation in the Green Communities program, where local energy committees are active and what their focus has been, and resources and incentives available to support local efforts.

To satisfy the requirement of “community outreach” in Task 1, we surveyed 55 residents throughout Berkshire County to gauge public opinion about energy conservation and various methods of renewable and non-renewable energy production. The results are discussed in detail, and the complete survey can be found in Appendix C. To address the second task, we created an inventory of current renewable energy projects throughout Berkshire County and created a map detailing these projects. A third component of our project involved interviewing representatives from the designated Green Communities in Berkshire County to learn what progress had been made toward their energy efficiency and renewable energy goals and what successes and challenges they have faced. Summaries of these interviews are in the report, and Appendix B contains the complete interviews.

In addition to these three sections, we also provide relevant background information on different forms of energy production and their economic and environmental costs, a general picture of energy use in Berkshire County, and an overview of relevant policies, grants, and incentives. We hope this information will be valuable to Peregrine, CET and the Berkshire Regional Planning Commission as they move forward with the development of a Berkshire County Regional Energy Plan.
The Importance of a Regional Energy Plan

According to a recent study in the New York Times, global carbon dioxide emissions reached a record high in 2011 and are expected to surpass this level in 2012\(^2\). Carbon dioxide emissions are linked to increased global temperatures and dramatic changes in the world’s climate. Over the last 8 years, the United States has achieved a nearly 9% reduction in annual carbon emissions. However, according to a 2012 study by Dr. Eric Larson of Climate Central, this trend “is unlikely to continue in the years ahead without major departures from the ways energy is currently produced and used”\(^3\). This likely means increased generation and use of renewable energy, increased energy efficiency measures, and widespread energy conservation. This understanding has prompted an analysis and a call for development or revision of energy plans across the United States.

In order to do our part in Berkshire County, a new regional energy plan is needed to address growing problems with our energy production and consumption. By establishing energy goals for the future and building the infrastructure to achieve them, Berkshire County will be better able to mitigate and adapt to climate change while time promoting energy security and environmental and public health.

Energy Use in Berkshire County

In 2009, Williams College undergraduate Connor Stern compiled a report for BRPC entitled “Energy Use and Greenhouse Gas Report.” Using data from the utilities companies National Grid and Western Massachusetts Electric Company, Stern conducted a comprehensive analysis of energy consumption and greenhouse gas emissions across Berkshire County. The report is still relevant to the development of a regional energy plan and is a good resource for all parties to consult. We

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summarize only a portion of his findings to provide a basic understanding of energy use in Berkshire County. The majority of the data in the Stern Report is from the year 2007. However, because Berkshire County has not experienced significant economic or population growth in the last five years, it is likely that the data is still a fair assessment of Berkshire County’s energy use.

*How Much Energy Do We Use?*

The tables below show Berkshire County’s electricity consumption each year from 2003 to 2007 for both residential (Table 1a) and commercial/industrial/municipal (Table 1b) buildings.

Table 1.a.: Berkshire County Residential Electricity Consumption

<table>
<thead>
<tr>
<th>Supplier</th>
<th>2004 kWh</th>
<th>2005 kWh</th>
<th>2006 kWh</th>
<th>2007 kWh</th>
<th>2008 kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMECO</td>
<td>271,951,372</td>
<td>281,885,468</td>
<td>270,047,344</td>
<td>273,219,469</td>
<td>-</td>
</tr>
<tr>
<td>National Grid</td>
<td>148,865,172</td>
<td>149,425,049</td>
<td>156,247,851</td>
<td>149,053,264</td>
<td>149,682,073</td>
</tr>
<tr>
<td>Total</td>
<td>420,816,544</td>
<td>431,310,517</td>
<td>426,295,195</td>
<td>422,272,733</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Western Massachusetts Electric Company, National Grid

Table 1.b.: Berkshire County Commercial, Industrial, and Municipal Electricity Consumption

<table>
<thead>
<tr>
<th>Supplier</th>
<th>2004 kWh</th>
<th>2005 kWh</th>
<th>2006 kWh</th>
<th>2007 kWh</th>
<th>2008 kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMECO</td>
<td>543,394,937</td>
<td>541,776,261</td>
<td>527,264,067</td>
<td>510,668,259</td>
<td>-</td>
</tr>
<tr>
<td>National Grid</td>
<td>258,088,891</td>
<td>276,701,422</td>
<td>278,490,395</td>
<td>263,014,693</td>
<td>257,263,606</td>
</tr>
<tr>
<td>Total</td>
<td>801,483,828</td>
<td>818,477,683</td>
<td>805,754,462</td>
<td>773,682,952</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Western Massachusetts Electric Company, National Grid

Residential electricity consumption remained relatively constant between 2004 and 2007. Over the same time period, commercial, industrial, and municipal electricity consumption slightly declined. In 2007 we see a sharp decrease in the amount of electricity consumed by non-residential buildings and a modest decrease in residential electricity consumption. Using customer data from WMECo, Stern calculated that in 2007 the average customer consumed 7,403 kWh of electricity. A 2009 EIA study revealed that for Berkshire County, a single-family attached house using fuel oil

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5 Ibid.
averaged 8,036.3 kWh, while a single family household using natural gas averaged 7,334.0 kWh, revealing that the Berkshire County average customer use lines up with these estimates.

Using the upper end of this average (8,036.3 kWh) for a single-family household, we calculated a rough estimate of electricity consumption in 2012. According to a 2009-2011 American Community Survey, Berkshire County has roughly 55,338 households. By multiplying the average electricity use for a single household by the number of homes in Berkshire County, we can estimate that the residential sector utilizes roughly 444,712.77 MWH of electricity.

Calculating the current consumption of the non-residential sector has proved much more difficult. However, we can assume, though with some element of uncertainty, that based on trends from 2003-2007, and the maintenance of a steady population just above or below 30,000 in Berkshire County from 2007 until now, that electricity consumption has remained relatively consistent, and likely is within the 800,000-900,000 kWh range, with a margin of error = +/- 100,000 kWh.

Figure 1 below divides commercial/municipal energy use by building type. This information can be helpful when considering which industries or sectors to target first when introducing efficiency-projects into the Berkshire County non-residential sectors.

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As the chart above indicates, the retail and service sector uses the most electricity in Berkshire County (20%), while offices (17%) and education (13%) round out the top three. These three building types alone constitute 50% of all non-residential Berkshire County electricity consumption (over 400,000 kWH). Health care, lodging, warehouses, food service, and public assembly buildings each constitute roughly 14% of electricity consumption.

If BRPC and its consultants decide to take a sector-by-sector approach to improving energy efficiency in buildings, these data suggest it may be wise to tackle the retail and service industry first, followed by office spaces and education buildings. Improvements in these sectors may lead to decreased overall electricity consumption. Furthermore, these sectors may benefit most from small-scale energy generation projects to power their specific buildings.

Another important take-away from the Stern report is his observation that utility companies in Berkshire County (WMECo, National Grid, and Berkshire Gas) all tended to report, “larger scale commercial entities generally are responsive to calls to improve efficiency and take the necessary steps to reduce their energy use” while smaller commercial entities were often “overwhelmed into

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ination when it comes to energy efficiency.” Small business owners tended to focus on small-scale improvements such as turning down the thermostat or putting in LED light bulbs. The gains that large-scale industries can achieve through efficiency improvements are much larger than those for small businesses, thus larger enterprises tend to have higher incentives to participate in energy-saving programs.

This suggest two preliminary conclusions: 1) larger companies may be more open to and capable of handling stricter regulations for efficiency and technology improvements, and 2) smaller businesses may benefit more from programs geared towards conservation and efficiency measures. For these reasons, we believe that it may be wise to implement separate plans for large-scale industry and small-scale business.

Where Does Our Energy Come From?

Currently we do not have exact figures for where our energy comes from in Berkshire County. Peregrine Energy Group will be working towards calculating an energy mix for Berkshire County in the upcoming months. However, the figure below depicts the regional electricity mix for all of New England by source type.

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The majority of electricity in New England is produced from natural gas (36%), followed closely by nuclear (29%). Fossil fuel production accounts for nearly 91% of all electricity consumed in New England, meaning renewables only constitute 9% of all electricity production (including municipal trash and landfill gas and biomass). Solar power does not even constitute 1% of total electricity production. If we intend to meet state and regional goals to reduce greenhouse gas emissions, discussed below, the energy mix will need to change dramatically in the upcoming years.

**Policies, Grants, & Incentives**

**Relevant Policies**

Regulations and conventions provide the impetus and often the funding for action on energy efficiency and renewable energy. Various attempts have been made at all levels of government, with varying degrees of success.

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9 New England Greenstart and New England Wind Disclosure Label 2009
The Kyoto Protocol was the first international attempt to address climate change. The agreement, which came out of the United Nations Framework Convention on Climate Change, set binding targets for nations’ greenhouse gas (GHG) emissions reductions. Since the Kyoto Protocol was adopted in 1997 and came into effect in 2005, 192 countries have ratified the protocol; however the United States is not one of them.\(^\text{10}\)

Hopes for an international agreement were renewed with the Copenhagen Climate Change Convention in 2009. The summit was widely considered a failure, though President Obama committed to reduce the United State’s GHG emissions to 17% below 2005 levels by 2020 on the way to 83% reductions by 2050.\(^\text{11}\) A 2010 report by the World Resources Institute concluded, however, that even ambitious actions by federal agencies and state governments under existing regulatory authority will fall short of this goal.\(^\text{12}\)

Figure 3: Projected U.S. Emissions under Different Federal Regulatory Scenarios and State Scenarios\(^\text{13}\)
Federal

Beyond President Obama’s Copenhagen commitment, several bills to address climate change have been introduced in Congress, but to date none has passed. However, a number of federal tax incentives currently support energy efficiency and renewable energy development, including the Business Energy Investment Tax Credit, the Energy-Efficient Commercial Buildings Tax Deduction, and the Renewable Electricity Production Tax Credit. In addition, more stringent pollution regulations set by the Environmental Protection Agency (EPA) encourage the closing of older and smaller fossil fuel-burning plants, as is expected in Massachusetts.

Regional

In the absence of comprehensive federal regulation, states in the Northeast and Mid-Atlantic are trying to address climate change on a regional level through the Regional Greenhouse Gas Initiative (RGGI), the first market-based GHG regulatory program in the United States. The program began in 2009 and established a regional cap on carbon dioxide emissions from fossil fuel-fired power plants, which will remain at the initial level for six years then decrease 2.5% each year for the next four years to achieve a total reduction of 10% by 2018. Along with Massachusetts, the participating states are Connecticut, Delaware, Maine, Maryland, New Hampshire, New York, Rhode Island, and Vermont.

Massachusetts Governor Deval Patrick has helped the state become a national leader in clean energy. Governor Patrick set ambitious renewable energy production goals of 250 MW solar power by 2017 up from the current 174 MW and 2000 MW wind power by 2017 from today’s 61 MW, which would require the equivalent of 68 new wind projects the size of Hoosac Wind. In August 2008, Massachusetts became one of the first states in the nation to establish a comprehensive regulatory program to address climate change when Governor Patrick signed the Global Warming Solutions Act (GWSA) into law. The GWSA requires the Executive Office of Energy and Environmental Affairs to consult with state agencies and the public to set greenhouse gas emission reduction goals and to create a plan for the state to achieve reductions of between 10 and 25% below 1990 statewide GHG emissions by 2020 and ultimately achieve 80% reduction by 2050.

To this end, the GWSA requires the Office to set regulations for GHG emission reporting, as well as establish a baseline assessment of statewide 1990 GHG emissions and make projections of 2020 GHG emissions under a “business-as-usual” scenario and with reductions from existing (post-2007) policies (Figure 1). These projections indicate a 0.2% GHG emission reduction in a business-as-usual scenario and an 18.6% reduction from post-2007 policies including the Green Communities Act of 2008, measures supported by the Patrick-Murray administration but not fully implemented, highly probably regional efforts (e.g. new transmission lines to import non-fossil electricity from Canada), and existing federal policies (e.g. vehicle fuel efficiency CAFE standards). It does not

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include strong federal GHG regulations that have been proposed but not adopted, such as cap-and-trade programs, the enactment of which is considered too uncertain.

Figure 4: Initial Estimates of Statewide Emissions Reductions

With these baseline assessments, in December 2010 the Executive Office of Energy and Environmental Affairs published the Massachusetts Clean Energy and Climate Plan for 2020, which described the importance of the GWSA’s goals and detailed the new and existing policies to achieve the carbon emissions reduction goals aimed at the sectors of buildings, electricity, transportation, non-energy emissions and cross-cutting policies. Assuming mid-range effectiveness, the policies are projected to result in a 27% emissions reduction below 1990 levels by 2020.23

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22 Ibid.
Also in August 2008, Governor Patrick signed the Green Communities Act, which makes eligible for funds cities and towns designated as Green Communities for developing a plan to reduce energy use by at least 20% within five years and making the siting and permitting of renewable energy projects easier. There are currently 103 Green Communities, including Berkshire County’s Pittsfield, Lenox, Becket, Williamstown, Richmond, and Great Barrington.

In August 2012, Governor Patrick signed S. 2395, “An Act Relative to Competitively Priced Electricity in the Commonwealth,” which extends long-term contracts between the utilities and renewable energy companies and raises the cap of net metering.

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24 Ibid.
In April 2011, the Massachusetts Department of Environmental Protection (MassDEP) launched a Regulatory Reform Initiative to streamline permitting processes with a dual purpose of lightening the regulatory burden on businesses as well as the burden on MassDEP, without lowering standards of environmental protection. After an extensive stakeholder review process, MassDEP published a Final Action Plan in March 2012. Among the regulatory reforms proposed is an amendment to the Wetlands Protection Act (WPA) that would allow access roadways to renewable energy projects on lands subject to the WPA as “limited projects,” streamlining the review and permitting process, provided alternatives are explored and adverse impacts are mitigated. “Limited Projects” are defined as projects promoting the public good. The notice of the reform for public comment states the amendment is consistent with the state’s goal of renewable energy generation and will protect the environment by encouraging renewable energy projects that “improve air quality, reduce greenhouse gases and boost the green economy.” The proposed regulation is open for public comment, and promulgation is expected early-mid 2013.

Municipal governments are especially critical to developing renewable energy projects, because in Massachusetts these bodies control land use. Municipal governments can encourage renewable energy projects by making the zoning process easier and passing bylaws to allow “as-of-right” siting for renewable energy research and development, manufacturing, or generation, and by streamlining the application and permitting process for these facilities. In fact, these are the first two

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28 Ibid.
criteria toward fulfilling the Green Communities designation, so all six Green Communities in the county have already adopted these regulations in some form. In addition, the Lenox Planning Board is currently considering a local solar ordinance to facilitate siting.

Grants and Incentives

Financial support in the form of grants, tax credits, and other incentives can be crucial to the viability of renewable energy and energy efficiency projects. Numerous incentives are available from public as well as private entities on the federal, state, and regional level for municipal, commercial, and residential projects. Below are some of the most important grants and incentives available in the public and private sectors, detailed in Appendix A.

Available to municipalities:

- Green Communities Grants
- Massachusetts Clean Energy Center (MassCEC) Grants:
  - Department of Energy Grants
  - Incentives from Utilities Companies

Available to businesses and residents:

- Business Energy Investment Tax Credit (ITC)
- Renewable Electricity Production Tax Credit (PTC)
- Renewable Energy Portfolio Standard (RPS)
- Alternative Energy Portfolio Standard (APS)
- Energy Efficiency Programs Offered by Utilities:
  - Net Metering

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Checking in with Green Communities

Task 2 of the proposal Peregrine Energy and CET submitted to BRPC, Develop a Regional Energy Inventory, includes documenting “levels of local participation in the Green Communities (GC) program, where local energy committees are active and what their focus has been, and resources and incentives available to support local efforts.”³²

Six municipalities in Berkshire County have received the Green Communities designation (in order of designation): Pittsfield, Lenox, Becket, Williamstown, Richmond, and Great Barrington. We reached out to town officials and citizens working on energy and asked about completed, current, and future energy efficiency and renewable energy projects, the Green Communities energy reduction plan, funding sources, and their successes and challenges. These municipalities have made important progress and continue to lead on energy initiatives, and the interviews provided much valuable feedback (complete interviews in Appendix B), though it is worth noting none that has successfully developed a wind energy generation project.

Pittsfield

Pop. 44,737 (2010 Census)

Designation: 5-25-10

Pittsfield was part of the first round of municipalities to receive the GC designation. We met with Park, Open Space and Natural Resource Manager James McGrath.³³ Pittsfield’s Green Commission was established in 2008 to serve as an advisory board to the mayor on sustainability and is mostly composed of citizen volunteers, but city employees, and especially McGrath, handle what he called the “heavy lifting.”

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Pittsfield received $256,632 from the first round of GC funding to install an energy management system (EMS) at City Hall and an additional $92,787 in 2012 to fund a heating system conversion from electric to high-efficiency natural gas in the Lichtenstein Art Center. Berkshire Gas and Western Massachusetts Electric Company (WMECo) also contributed a combined $44,000 to that project, leaving a surplus McGrath hopes to use for a boiler replacement at the police station. Pittsfield’s most significant energy efficiency initiative was a program called Powering Pittsfield, funded by the utilities companies, which provided “energy concierge” services through CET for businesses and residents to make efficiency improvements. The city is hoping to launch a second phase soon, which Berkshire Gas and WMECo are interested in funding again, conditional on more control of the program. McGrath and the city considered Powering Pittsfield to be a great success, particularly as a learning experience, but he noted the utilities companies are focused on the numbers and measurable improvements and were less satisfied. Pittsfield also teamed up with Lenox in the summer and fall of 2012 to participate in Solarize Mass, a program to install residential solar panels, which was very successful (see Lenox below).

McGrath appreciates that the GC designation has officially recognized Pittsfield’s sustainability leadership, to which he says the public has responded: “A lot of people like the warm and fuzzy aspect,” though he sold the project on the financial support it makes available, of which Pittsfield has already received nearly a third of million dollars. McGrath said the city likes to work with the state and participate in its programs and has been able to prove itself as a progressive community that writes good grants and follows through. He credits Pittsfield’s success to its team of creative people who care about sustainability and support from the mayor. They are limited, however, by staff time, and McGrath would like to hire a full-time sustainability coordinator, noting this role could perhaps be filled by BRPC. The greatest challenges going forward are the age of the building stock and the socioeconomic reality of Pittsfield, which makes messaging difficult: “How
do we reach that single mom who’s got three kids and just bought her starter home? How do we talk to her about energy efficiency when what she’s thinking about is how to pick up her kids?”

McGrath hopes the BRPC regional energy plan will document goals and objectives and give added weight to his grant proposals, saying, “Half of what I do is reference other things that say we should be doing it.” He is pleased with the undertaking: “It’s been a long time since we’ve had a regional energy plan. The field, the technology, the urgency is more dire.”

**Lenox**

Pop. 5,025 (2010 Census)

Designation: 5-25-10

Lenox has been ahead of the curve in thinking about energy. They have had an active Environmental Committee for several years, and the Board of Selectmen voted to study the feasibility of a municipal wind turbine in February 2004, though the plan was ultimately rejected.\(^{34}\) We spoke to Town Manager Greg Federspiel, who first created the Environmental Committee several years ago as a citizen group to make recommendations to the Selectmen.\(^{35}\) The committee is now in transition to a more formal body whose members are appointed by the Board of Selectmen. Prior to the Green Communities Act, Lenox received funding from the state for energy efficiency projects. The town then received two separate grants from MassCEC to explore wind energy.

Like Pittsfield, Lenox then became one of the first municipalities designated a GC by DOER in May 2010, for which it received $134,766 for energy efficiency improvements at the elementary school, training, expert energy consulting, and a mini-grants program for residential and commercial projects.

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\(^{35}\) Greg Federspiel, Lenox Town Manager, telephone interview by Zoe Grueskin, Lenox, MA, November 28, 2012.
solar PV and water heating systems. The municipalities collaborated on Solarize Mass in the summer and fall of 2012, through which 30 Lenox residents signed up for solar installation mini-grants. Lenox also used the GC funding to hold community wind forums and formed a Wind Energy Research Panel to evaluate the municipal wind turbine feasibility study, and the Board of Selectmen voted to not pursue the project in early 2012. A 3 MW solar PV array is in development at the wastewater treatment facility, which will cover the total electricity needs of the town and schools, which Federspiel said optimistically will be constructed summer 2013 and operational that fall. He said the project is moving forward a lot slower than he would like, mainly with the utilities companies, which he said have not sufficiently scaled up for large renewable energy projects. “It’s two steps forward, one step back,” he said.

The Planning Board is also considering a local solar ordinance, which, perhaps in light of the failed wind project, Federspiel said is intentionally proceeding slowly. Despite the wind project controversy, public support has generally been good, including for the stretch code and municipal solar projects.

Lenox was recently able to hire a part-time sustainability coordinator, Adele Gravitz, though Federspiel would like to see someone working on it full-time and ideally a position he called a “circuit-rider,” someone like a consultant, well-versed in grant opportunities, community outreach, and energy efficiency and renewable energy projects who could spend time in several communities, which he also noted BRPC could perhaps provide.

Becket

Pop. 1,779 (2010 Census)

Designation: 5-25-10

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Becket is a small town without an energy or environmental committee or the staff to commit to overseeing the GC requirements. As both McGrath and Federspiel suggested, BRPC has stepped in to assist the municipality. BRPC Senior Planners Lauren Gaherty and Patricia Mullins have been working with Becket on their energy efficiency projects as well as the GC annual reports. Becket received GC funding for building envelope improvements to the highway garage, currently underway. Earlier, efficiency improvements included building envelope improvements as well as a new heating system were completed on Fire Station #2 and Ambulance Garage, funded by a DOER grant under ARRA and the EECBG program. Mullins provided valuable feedback on planning and executing energy efficiency projects (Appendix).

Williamstown

Pop. 7,754 (2010 Census)

Designation: 12-16-10

We met with Assistant Assessor Jason McNair, who told us about what Williamstown has done in the past and what is going on now. In 2001, the Board of Selectmen voted to join the Cities for Climate Protection Campaign, and the citizen-based COOL (CO₂ Lowering) Committee was formed to help the town achieve its goal of 10% below 2000 level CO₂ emissions by 2010. The COOL Committee was also charged with public outreach and education, which remains their main work, especially since Williamstown became a Green Community in 2010, which focuses on municipal energy. Williamstown received a GC grant of $142,000 for energy conservation measures at several municipal buildings, the installation of a 6 kW solar PV array at the Cemetery office.

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37 Patricia Mullins, Senior Planner, Berkshire Regional Planning Commission, email correspondence, November 28, 2012.
38 Jason McNair, Assistant Assessor, personal interview by Zoe Grueskin, Williamstown, MA, December 3, 2012.
building, which was completed in August and was expanded to 9.75 kW and supply 25% of the building’s energy needs, and $5000 for COOL Committee energy education and outreach.

Since receiving the GC designation in 2010, Williamstown has made progress in its energy reduction and is looking into installing solar PV array on the landfill and talking about power purchasing agreements. However, McNair, who oversees the town’s energy inventory and develops action items for each department to make further improvements, has been frustrated by the limitations of the Green Communities Act (GCA). He explained that although the mission of the legislation is ultimately to lighten municipalities’ carbon footprint, its evaluation metrics separate renewable energy from energy use reduction in a manner that seems to miss the point. Despite being a much cleaner source of energy generation, renewable energy does not reduce total energy use, and therefore does not contribute to meeting the commitment of 20% reduction within five years. Even if DOER were accounting for energy generated by renewables, the information about what share of municipal energy was generated by each source is “behind the meter,” and the utilities companies themselves preload the data into MassEnergyInsight. McNair would have to manually go through all the data and make adjustments himself. If DOER wants to make the distinction between generation sources, McNair said, the reporting should be done by the utilities.

Furthermore, prior to receiving the GC designation, Williamstown, in part through the work of the COOL Committee, had already undertaken several energy efficiency and renewable energy projects, including installing solar panels at the Department of Public Works, the library, and the elementary school. So much had been done to improve efficiency that further significant reductions in energy use will be difficult. Also complicating the picture is that the majority of municipal energy is consumed by three large energy sinks to which the most feasible efficiency improvements have already been made: the elementary school and the municipal vehicle fleet, including police cars and
large vehicles (>8500 lbs.) exempt from the GC fuel efficiency requirement, each account for 30% of total municipal energy use, and another large percentage (~18%) is used by well water pumps.

McNair has also been frustrated by the response of DOER when projects are modified as new challenges and possibilities arise. DOER wants to be informed of all changes and approve the plans before they are executed, which is a challenge to the municipalities as they undertake the projects and try to respond to new developments.

Finally, McNair said that if one goal of the Green Communities program was to encourage collaboration with other municipalities, it has fallen short. When the evaluation metrics focus on Williamstown’s energy reduction, the town has little incentive to work with smaller municipalities with fewer resources. This is unfortunate, he said, because municipalities can achieve much larger projects together than on their own. He suggested BRPC could help municipalities, especially smaller ones, undertake large projects and do the legwork of working with utilities to figure out how these projects could come together and help the municipalities work together, citing Franklin County as an example where this has been done effectively. McNair also suggested BRPC could do for small municipalities what he does for Williamstown in analyzing municipal energy use and translating it into doable action items.

**Richmond**

Pop. 1,475 (2010 Census)

Designation: 7-24-12

Having just received the GC designation in July 2012, Richmond Town Administrator Matt Kerwood reported that at this point the municipality had little to tell.\(^{39}\) Prior to the GC designation,

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\(^{39}\) Matt Kerwood, Town Administrator, email correspondence, December 4, 2012.
the town used loans from WMECo to retrofit all municipal lighting with energy efficient lighting and is already starting to see savings.

**Great Barrington**

Pop. 7,104 (2010 Census)

Designation: 7-24-12

Despite several existing projects, including solar arrays on the firehouse and middle school and geothermal in the high school, Great Barrington did not receive the GC designation until 2012. The Energy Committee was formed in October 2010 to look at energy savings in the town and achieve the GC designation, a process that took two years. We spoke to chair of the volunteer-based citizen committee and energy-efficient architect, Christopher Vlcek. The committee spent its first year getting the building stretch code passed, wanting to make sure they had public support before charging ahead with the GC designation. “The next year,” said Vlcek, “We dug into the stretch code and realized it was over our heads for a volunteer committee.” The town provided $25,000 for the committee to hire a consultant who conducted audits and did the work to apply for the GC designation.

Now that Great Barrington has received the designation, the town will start with the “low-hanging fruit” of easy energy efficiency improvements. Vlcek said the Energy Committee reflects the interests of the community and plays a supporting and encouraging role but really doesn’t have any decision-making power: “It’s the town that has to implement this stuff.” For the first year and a half of the committee’s existence, a municipal employee, the Town Manager’s assistant, attended the committee’s meetings, which Vlcek called “invaluable.” Without her work, for example, the town

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40 Christopher Vlcek, Energy Committee Chairman, telephone interview by Zoe Grueskin, Great Barrington, MA, November 28, 2012.
would not have started using MassEnergyInsight. The committee no longer has any municipal representation, which Vlcek sees as a major obstacle.

“It would be nice to have town staff focused on sustainability across the board,” he said, “It's going to be challenging, because everyone in town hall has a full time job already, and on the Energy Committee, we’re volunteers.” In particular, he would like to develop a closer relationship with the Superintendent of the Department of Public Works, Joe Sokul.

**Green Communities Regional Coordinator – Western Region**

We also spoke to DOER employee Jim Barry, who serves as the Green Communities Regional Coordinator for the Western Region of Massachusetts, which includes Berkshire County and east past Springfield: in all, 106 of the state’s 351 municipalities. His job, which he has held since the creation of the Green Communities program in 2008, is to help new communities achieve the GC designation and work with Green Communities to receive additional funding. In the beginning he reached out to regional planning agencies like BRPC and attended dozens of town meetings. In many ways, he is the “circuit-rider” Greg Federspiel imagined, helping municipalities understand the five GC criteria, explore what projects might be feasible, and assisting with grants and paperwork. The biggest problem is there is only one of him for the 106 municipalities in the Western Region, and he is based in Springfield. He emphasized, however: “I have not said no to any town that’s asked for help. And as a matter of fact, I’ve offered to help a number of towns that said no thank you.”

*Findings & Recommendations*

We heard several things over and over in our conversations with Berkshire County Green Communities. These are summarized in three categories:
Limitations of the Green Communities Program

While providing tremendous financial support for certain projects, the Green Communities program has a number of shortcomings. First, it focuses solely on municipal energy use. While some municipalities, including Pittsfield, Lenox, and Williamstown, have found a way to use GC grants to support energy initiatives for businesses and residents, this is not written in. Another limitation, as Jason McNair explained, is that unlike the state’s climate action goals, which are measured in carbon emissions reductions, the Green Communities measures success in energy use reduction, emphasizing energy efficiency over renewable energy generation for at least part of the evaluation. Furthermore, the program does little to encourage collaboration with other municipalities.

Best Practices for Green Communities

The most successful structure for working to meet the Green Communities requirements, and for work toward energy efficiency and renewable energy in general seems to be a committee made of a combination of volunteer citizens and a few municipal employees, such as representatives from the town manager, Department of Public Works, or school board.

For building community support, nearly everyone we spoke to told us they sell the program and energy projects not on the environmental impact but on the cost savings. Jason McNair emphasized that costs drive all municipal decisions and explained how reduced municipal energy costs can translate into lower property taxes. As Christopher Vlcek said, “The projects’ savings pay for themselves, but it still takes work to make it happen.”
Hopes for BRPC & the Regional Energy Plan

The municipal employees and energy leaders in the Green Communities we spoke to hope that the new regional energy plan will clarify and define the goals and objectives of energy efficiency and renewable energy generation in Berkshire County, which will legitimize their work and root it in the context of state climate goals and the work of other municipalities.

Toward the end of meeting these goals, several of those we spoke to mentioned the need for professional staff to assist municipalities in their work, both specifically with the Green Communities program—achieving the designation, applying for grants, meeting the requirements, filing paperwork—and with their broader energy efficiency and renewable energy goals, in particular helping to coordinate work between multiple municipalities and utilities companies. A number suggested BRPC employees could fill this need, which, at least in the case of Becket, it seems is already happening. DOER employees like Jim Barry are another existing resource. It is not clear whether the municipalities are unaware these resources are already available or if there is a need for more assistance or more formalized positions.

Defeated Projects in Berkshire County

While many of the Green Communities have received grants for developing renewable energy projects, and the Green Community designation is designed to support renewable energy initiatives, a number of the municipalities have in fact rejected plans for renewable energy projects. The following section discusses three particular projects that were proposed and rejected in or near Green Communities in Berkshire County. We cite some of the specific concerns that were raised in hopes of better understanding the reasons why the projects were unsuccessful in the ‘Green Communities.’
Wind Turbines in Lenox

The town of Lenox received a federal grant of $79,000 dollars from a Green Communities grant to research the impact of a wind turbine development on Lenox Mountain. The Wind Energy Research Panel, a six-person committee appointed in mid 2011, was given 4 months to decide whether to proceed with the development of one or two wind turbines on top of the mountain. In response to the proposal, local opponents formed Preserve Lenox Mountain, a group dedicated “to preserving the watershed of Lenox Mountain from industrialization,” which meant preventing any industrial development, specifically targeting the wind turbine development. After significant research, the panel produced a final report with data on possible health, environmental, and financial impacts of the wind turbine. The report concluded that due to possible environmental and watershed impacts, health concerns for nearby residents, and “the likely poor financial performance of the project and the associated risks and uncertainties,” the town ought not to move forward with the wind development. The Selectmen of the Town of Lenox were asked to reflect on the findings of the report in addition to considering the stance of the general public. The issue was eventually put to a vote, and the selectmen unanimously voted down the project (4-0).

Solar Development in Great Barrington

In 2011, a solar development company proposed a 3-4 megawatt solar array (around 12,000 panels) on private property owned by the Shaw family in Great Barrington (along Seekonk Road). While the project was still in its early stages, some local residents came forward to argue that such a development was not the best fit for the farmland on which it would be built. Some neighbors argued that the solar development had the potential to lead to decrease their property values,

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particularly because of the aesthetics of solar arrays. In part due to this local opposition and in part due a change in the economic circumstances, the developer lost interest and decided to abandon the project\(^44\).

*Biomass Plant in Pownal, VT*

Although this proposed plant was not going to be developed within Berkshire County, it caused a lot of controversy in northern Berkshire County—particularly Williamstown—because of its proximity and potential effects on the area. Critics of the plant cited increased air pollution, increased truck traffic, water pollution, and forest degradation as potential problems associated with the plant\(^45\). After months of community discussions and controversy, the Pownal Select Board was still unable to come to agreement on whether to move forward with the plant. Developers eventually lost interest in the project largely due to local concerns and moved instead to build a plant in Fair Haven, Vermont, where residents were supportive of the plant\(^46\).

All three of the projects discussed here were proposed in or near Green Communities in the north, central and south regions of the county. They were all slowed and eventually abandoned in part due to vocal public opposition. In addition to citizen concerns, economic factors also played a role in final decisions to halt projects. The developers and not the towns themselves usually made these decisions—though Lenox is an exception here. We recommend that BRPC review these failed energy projects in order to be prepared to counter the arguments made by organized opponents of renewable energy projects.

\(^{44}\) Vlcek, Christopher. telephone interview by Zoe Grueskin, Great Barrington, MA, November 28, 2012


**Renewable Energy Inventory of Berkshire County**

A variety of renewable energy generation facilities already exist in Berkshire County. We created an inventory of all current renewable energy facilities in the county in order to determine how much renewable energy the county already produces. We included all private, municipal, and commercial facilities that produce greater than 20kW of renewable electricity. Our information comes from a variety of sources including online databases, developers’ websites, and local news articles.

We compiled our findings in an inventory map (Figure 4). The sites are differentiated by the type of energy they produce (indicated by the icon) and by whom they provide energy to (indicated by their color). Each site is scaled to its energy output. The 45 sites are numbered and described in Table 2, which contains information about the site and its electricity generation.
Figure 6: Renewable Energy Inventory Map
Table 2: Berkshire County Renewable Energy Inventory

<table>
<thead>
<tr>
<th>Type</th>
<th>Site</th>
<th>Supply to?</th>
<th>Municipality</th>
<th>Year</th>
<th>Capacity (kW)</th>
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<tbody>
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<td>Lee</td>
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<tr>
<td></td>
<td>Crane &amp; Co.</td>
<td>Private</td>
<td>Daton</td>
<td>2008</td>
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<td>2003</td>
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<td>Mass MoCA building 6</td>
<td>Private</td>
<td>North Adams</td>
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<td>Private</td>
<td>North Adams</td>
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<td>Amount</td>
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<td>Private</td>
<td>Lee</td>
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<td>Private</td>
<td>Pittsfield</td>
<td>2012</td>
<td>400.00</td>
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<td>Pittsfield</td>
<td>2010</td>
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<td></td>
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<th>Amount</th>
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<td>Hancock</td>
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<td></td>
<td><strong>Total Wind Capacity</strong></td>
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<td></td>
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<td><strong>45,400.00</strong></td>
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</table>

**Total Renewable Energy Capacity in Berkshire County**: 51,153.56

**Total Renewable from Public Facilities**: 45,295.00

**Total Renewable from Private Facilities**: 4,124.60

**Total Renewable from Municipal Facilities**: 1,557.96
Findings

We found the current total capacity of renewable energy projects in the Berkshires to be 51.15MW. Biomass accounts for 0.82% of the total capacity; hydro, for 0.54%; solar, for 9.89%; and wind, for 88.75%. Although there were only three commercial sites, they produce 45.30MW of electricity, accounting for 88.55% of the total renewable capacity of the county. There are six times more private sites, but they are generally small-scale and only produce a cumulative total of 4.12MW of electricity (8.06% of the total). Municipal sites have the lowest capacity at 1.56MW (3.05%).

Commercial Facilities Profiles:

Beyond this basic inventory, we also profiled the three commercial-scale renewable energy projects in the region: The Silver Lake Solar Facility in Pittsfield, Hoosac Wind in Florida, and Berkshire Wind in Hancock.

Solar

There is currently only one commercial-scale solar project in Berkshire County that supplies energy to the grid. The Silver Lake Solar Facility is located on Kellogg Street in at the Williams Stanley Business Park in Pittsfield, MA. Six thousand five hundred ground-mounted solar panel units cover 8 acres of the William Stanley Business Park making it the largest solar facility of its type in New England at the time of its opening in October of 2010. The project is owned by Western Mass Electric Co. and produces 1.8 mega watts of electricity, enough to power 300 homes. This is part of the company’s efforts – endorsed by the Massachusetts Department of Public Utilities – to build up to 6MW of solar facilities by the end of 2012.47 The project will bring the city of Pittsfield

approximately $150,000 in property tax revenue per year, and at the peak of its construction employed 35 full-time union craft workers.

**Wind**

There are two multi-unit wind projects in Berkshire County that supply a total of 43.5MW of electricity to the grid. The largest and most recent of these facilities is on Florida Mountain in the northeast corner of Berkshire County. When the Hoosac Wind Facility consists of nineteen turbines, and when they come online at the end of 2012, this facility will produce 28.5 MW of power. This is enough to power approximately 10,000 homes.\(^{48}\) The developer, Iberdroia Renewables, is expected to pay a total of $257,000 annually in lieu of property taxes to the municipalities of Florida, MA and Monroe, VT—$135,000 of this going to Florida. The towns also expect to receive $6.8 million in further tax revenue from the project. On top of this, private landowners will receive lease payments amounting to $3 million from the developer annually.\(^{49}\) At the peak of construction, the Hoosac Wind Project generated 140 temporary full-time construction jobs and the developers predict to keep 3-5 employees permanently to maintain and monitor the facilities.\(^{50}\) Iberdrola predicts that Hoosac Wind will offset as much as one hundred million pounds of CO\(_2\) per year for the county. This is the equivalent of the annual carbon output of 9,400 cars or the carbon footprint of 112,000 barrels of oil.\(^{51}\)

The second project is located on Brodie Mountain in Hancock, MA. This ten-turbine facility, called Berkshire Wind, came online, after delays, in April of 2011. This facility generates 15 MW of


\(^{49}\) ibid


\(^{51}\) ibid
electricity, enough to power 6,000 households. The owner of this project, the Berkshire Wind Power Cooperative Corporation (BWPCC), estimates that this project offsets 612,000 metric tons of CO₂ and the consumption of 1.17 million barrels of oil per year. It also created 50 full-time construction jobs during its production. This project was financed by $64.7 million in tax-exempt revenue bonds issued by the BWPCC. It also received a $149,000 predevelopment financing loan from MassCEC, which it has since repaid.

There is another stand-alone turbine that supplies energy to Jiminy Peak, also in Hancock, MA. This is a single turbine and produces 1.5MW of electricity, and according to Jiminy Peak’s advertising accounts for 49% of the resort’s energy needs. The Jiminy Peak Resort received a $582,875 grant from MassCEC for the construction of this turbine. Additionally, there is another wind turbine in Otis, MA at the Williams Stone Company that produces .6MW of electricity. It was built in May of 2009 and produces an excess of electricity for the company’s uses. It sells this extra electricity to its utilities company. The Williams Stone Company received at $500,000 grant from MassCEC to build this turbine.

Other Notable Projects

There are many smaller solar facilities throughout the county that supply to independent businesses and municipal facilities, such as Lee’s Big Y Supermarket and Berkshire Community College in Pittsfield. Additionally, a total of ten solar projects in Lee, Lenox, and North Adams have been approved to help power municipal facilities including landfills and water treatment plants.

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53 ibid
55 ibid
There is a very small biomass anaerobic digester in the Pittsfield wastewater treatment plant. It produces 195kW of electricity to be used on-site by the facility. It is part of an effort to create a net-zero energy facility.

Crane & Co. Paper company in Dalton, MA received a $500,000 grant from MassCEC to build develop their hydropower facility. The facility currently produces all the factory’s electricity needs—179kW.

**Energy Potential in Berkshire County:**

Berkshire County has the potential to produce much more of its own energy from renewable sources. Apart from the coastline and offshore, Berkshire County is the most promising region for wind power in Massachusetts. If Massachusetts is to meet its goals for renewable energy—particularly the goal of 2,000MW of wind energy by 2020—then Berkshire County must play a significant part in this endeavor. The strongest candidates for future energy projects are solar and wind. The county does not have many large rivers and none that is large enough to produce energy on a commercial scale. Furthermore, biomass energy, especially on a large scale has come up against major opposition in this region and is a less clean option than solar or wind.

*Comparing Solar and Wind*

In terms of land use, solar farms are far more efficient than wind farms. For instance, the California Valley Solar Ranch, a 2.34 square mile facility, produces 106.8MW per square mile. Meanwhile, the Cape Wind Facility, proposed to be built off of the coast of Massachusetts, in an
area with extremely high wind speeds, is only predicted to produce 17.75 MW per square mile.\(^{56}\) While it is clear that it is possible to produce more energy per square mile with solar cells than with wind turbines there are other factors considering land use that should be considered.

Large-scale solar projects are best built on flat land – a commodity that is relatively scarce in the Berkshires. Additionally, solar farms are a single-use property, while wind is not. There is a significant opportunity cost implicit in using flat land in Berkshire County for solar projects because it then can be used for neither other commercial and residential developments nor kept as agricultural or natural land in conservation.

Another factor to be considered when comparing wind and solar is the cost. Currently, wind is vastly less expensive than solar power. In a report published by the U.S. Energy Information Administration, wind power is reported to cost, on average, $98.8 per megawatt hour, while solar costs $156.9 per megawatt hour. The wind power industry, however, is a more mature industry than solar, and thus the price of solar is expected to decrease at a much faster rate in the coming years than the price of wind.

*Wind Potential in Berkshire County*

According to a map published by the U.S. department of energy (Figure 7), some of the ridges in Berkshire Country have average wind speeds of 50m above the surface) of up to 8.8 meters per second, placing them in the “outstanding” category for wind power generation potential. Excluding the coastal region, nowhere else in the state has this level of wind potential.

The Massachusetts Department of Energy and Environmental Affairs published a list of 44 potential wind projects that could be constructed on land already owned by the state of Massachusetts to demonstrate the extent of the wind potential in the state (Figure 8).
These projects are entirely hypothetical, but they help to demonstrate the role Berkshire County could play in the expansion of wind energy in the state. Of these 44 potential sites, 35 are in Berkshire Country, which accounts for 85% of the potential energy output proposed by this report. These projects alone would generate 805MW of wind energy (Table 3), accounting for over 40% of the statewide goal of 2,000 MW of wind energy by 2020.

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57 Massachusetts Department of Energy and Environmental Affairs.
<table>
<thead>
<tr>
<th>Site No.</th>
<th>Town</th>
<th>Potential Turbines</th>
<th>Potential MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hancock, Lanesborough, Pittsfield</td>
<td>53</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>Windsor, Peru</td>
<td>19</td>
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<tr>
<td>3</td>
<td>Hancock</td>
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<td>4</td>
<td>Washington, Lee, Becket</td>
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<td>Hancock, Richmond</td>
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<td>Florida</td>
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<td>12</td>
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<td>Otis</td>
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<td>Washington</td>
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**Survey Results**

After administering the survey to 55 individuals, the raw data was analyzed for trends using an excel program. The following section is a question-by-question analysis of our team’s survey results. We would like to emphasize that due to the limited sample size of our response pool we cannot call our data statistically significant. However, we believe the survey responses gathered serve to provide valuable insight in terms of highlighting Berkshire County residents’ concerns and opinions regarding renewable energy.
Figure 9: Question 1 - In thinking about meeting future energy needs in your home or business, how important is each of the following to you?

The graph above was created by averaging all the responses given on a scale of 1-4 (see y-axis label) for both provided concerns. The side by side comparison shows that there is little difference in preference between the two options with “energy conservation and efficiency” being rated slightly more important than “increased energy generation within the county.” If this survey were to be conducted again, one way of clarifying this question would be to ask people to rank these concerns against each other (Ex: In thinking about meeting future energy needs in your home or business, how important is each of the following to you? Please rank the following concerns in terms of importance: Increased energy conservation and efficiency, increased energy generation within the county, etc.).
Figure 10: Question 2 - Below is a list of reasons that have been suggested for increasing energy efficiency and renewable electricity generation in the Berkshires. Please rate the following choices based on their importance to you.

Like the previous figure, the graph above was created by averaging responses based on how important individuals ranked each choice. As one can clearly see, job creation, human health, and reduced air and water pollution emerged as the most important reasons for increasing energy efficiency and renewable electricity generation in the Berkshires. Climate change mitigation and regional energy independence were generally rated lower in importance. This suggests that those concerned with public messaging about renewable energy projects may want to focus on emphasizing the ways in which renewable energy projects can positively affect both human health and environmental quality.
The graph above also corresponds to Question 2 but disaggregates the survey responses by gender. This was done to see if any trends would emerge in the ways that men and women perceived the important impacts of renewable energy production and energy conservation. Women rated the importance of each issue slightly higher in each case except for the “job creation.” This finding correlates with national trends that have found that women tend to be more concerned with issues of health and the environment as compared to men. Conversely, the economy is often a top priority for men nationally, and the job creation is the factor that ties in closely with that issue. Because our data set was not statistically significant, more surveying would need to be done to verify these results.
Figure 12: Question 3 – How much of our electricity do you think currently comes from renewable sources?

This question was designed to gauge people’s knowledge of how their electricity is generated. Ongoing research is still being conducted to determine the actual percentage of Berkshire County’s electricity that comes from renewable sources. However, based on estimates of New England’s Energy Mix (see section entitled “Every Use in Berkshire County”) we can safely assume that the majority of respondents (~64%) answered correctly by choosing (a) 0-25%.
This question was formulated with the intention of gauging peoples’ general attitudes towards renewable energy and the future of renewable energy in Berkshire County. As you can see from this graph, the vast majority of respondents favored between 50-100% of Berkshire County’s electricity coming from renewable sources. It is also interesting that not one person selected (a) 0-25% which seems to point towards a consensus that residents of Berkshire County are generally in favor of a sizeable portion of their electricity originating from renewable sources.

If we think about improving this particular survey question, one of its noticeable shortcomings was the fact that it did not take into account individuals’ opinions on factors such as cost or feasibility. For example, it is quite possible that a resident might favor their electricity coming from renewable sources, but that would not be certain such an option would be cost-effective for Berkshire County. Thus, in a future survey it might be helpful to include a follow-up question aimed at discovering the reasons people might give for having chosen the lower option of (b) 25-50%.
Lastly, we thought it might be interesting to look at responses to this question based on age group. The following figure breaks down responses to this question by our six established age categories.

Figure 14: Question 4 (responses by age category)

The surprising finding that emerged from disaggregating the date by age group was that the last age category (66+) had the greatest percentage of respondents who expressed interest in seeing 75-100% of their electricity come from renewables. This is slightly counterintuitive given the attention that has been placed on the younger generation advocating for more sources of renewable energy. This points to a need for more research to be conducted on the opinions of differing age groups and suggests that the support base for renewable energy in Berkshires could be bolstered by the support of some of Berkshire County’s oldest residents.
The goal of this question was to assess peoples’ attitudes towards different sources of energy in general. We asked respondent to rank their support for various energy sources – renewable and conventional—on a scale of 1-4 (1 meaning strongly oppose and 4 meaning strongly support). In the earlier version of our survey we included a follow-up question to this one structured the same way but asking specifically whether respondents supported these kinds of sources “in Berkshire County.” We later decided to remove this question because it seemed to confuse respondents. To compensate for this loss, we chose to follow-up with people when they answered that they strongly supported an energy source. (Ex: “You said that you strongly support Hydropower as a means of energy production for Berkshire County. Would you support its development in Berkshire County itself?”) The responses to these questions were transcribed and will be featured in another section of this report entitled “Verbal Survey Results.”
Looking at the graph above, it is interesting to note that solar energy is the source most widely supported by our respondents. A three-way tie follows it closely between hydropower, wind (small-scale), and wind farms. In order to get a sense of public opinion regarding different energy sources as it might vary by region, we disaggregated the data to look at the three districts individually. See figures below.

Figure 16: Question 5 (Responses from the north district)
Figure 17: Question 5 (Responses from the middle district)

Figure 18: Question (Responses from the south district)
Looking at these graphs, it is interesting to see how different sources of energy are favored depending on the region. In the graph representing only responses from people living in the north district, the trends mirror the general findings (that solar is the most favored source of energy followed by a three-way tie.) In the middle district, however, hydropower is by far the most favored energy source followed by the two kinds of wind energy generation. Interestingly, solar ranks among the least preferred energy sources in the middle district. This suggests that more research could be done to investigate why solar is disfavored among residents of middle Berkshire County. Looking at the data gathered in the south district we see a two-way tie for the most favored energy source (between solar and small-scale wind energy.) It is also worth noting that across all the graphs we see coal and nuclear consistently ranked in the bottom two preferred energy sources. This finding points towards the fact that our respondents appeared to strongly favor renewable energy sources above more conventional forms of energy generation.

Figure 19: Question 6 – Have you seen any of the renewable energy projects in the Berkshires?

This question was very straightforward and intended to gauge respondents’ familiarity with renewable energy projects (solar installations, wind turbines, etc.) As you can see from the pie chart
above, the majority of respondents had indeed seen various renewable energy projects. Those who responded “yes” were then asked a follow-up question (Questions 7 see below.)

Figure 20: Question 7 – If yes, what do you think of the projects that you are familiar with?

The responses represented in this pie chart support our overall finding that the majority of respondents were highly supportive of renewable energy. The following figures show the same data disaggregated by district.

Figure 21: Question 7 (Response from the north district)
Given the small sample size of 55 survey responses, it does not make sense to draw any broad-sweeping conclusions about different districts’ general feelings towards renewable energy.
That being said, what our data shows is a favorable stance towards renewable energy projects in each of the three districts.

**Verbal Survey Results**

In addition to the statistical information discussed above, we also received verbal input from the residents we surveyed. In the following section, we discuss some of the comments we received while conducting the survey and note some common trends. While these comments do not provide the full range of opinions on all of the issues we addressed, they do provide a small look into public opinion and input on certain issues.

Of all of those residents surveyed, nearly half (26) provided verbal feedback we were able to record. The full range of quotes can be found in the appendix (Appendix D), but we will discuss some of the more prominent and informative quotes below.

The first trend we noticed was a general lack of knowledge about energy production. One resident noted that she did not “know a whole lot about the [renewable energy] projects to make an informed decision” (North Adams, Female, age 18-25, 11/9/12). Another resident noted, “I have nothing negative to say about any of these choices because I am not familiar with how each and every one of these choices are efficient or not efficient” (Adams, Female, age 26-35, 11/9/12). These residents realized that they were not knowledgeable enough to make an informed decision and expressed their concerns. One resident noted that he would welcome more information about energy generation, particularly regarding solar energy: “I’d love to know the numbers, like the solar, and what it’s generating” (Pittsfield, Male, 46-55, 11/11/12).

A large portion of our survey participants made comments about wind energy. We believe that this bias towards wind discussion may be caused by our question 8, “Have you seen any of the
renewable energy projects in Berkshire County (i.e. Jiminy Peak wind turbine, the wind farm in
Hancock or solar array in Pittsfield’s William Stanley Business Park)?” Most of the respondents who
answered yes were familiar specifically with wind project in the region, and we followed up by asking
them their opinion of said projects.

A majority of the respondents did not have objections to wind energy itself (see Figures 15-
18), but some had problems with wind development in Berkshire County. One resident noted, “We
can’t expect tourists to come visit our mountains if we put these big machines on top of them”
(Lenox, Female, 26-35, 11/23/12). This resident believes that wind turbines may negatively affect
the tourism industry in Berkshire County, particularly because of the visual disruption that they
cause on the mountaintops. Another resident thought that wind turbines in the Berkshires would
possibly cause a large number of bird deaths (a commonly cited problem with wind turbines): “I
thought windmills would be a good idea, but not here, because of the bird migrations. We’re right in
their central path” (Stockbridge, Female, age 56-65, 11/11/12). Similarly, another resident believed
that wind turbines do not belong in Berkshire County, stating, “I think wind energy is good. I’ve
seen the wind farms out in California, that’s the place for them. They are in big wastelands out there.
The Berkshires don’t have that type of land. Here they are eyesores and ruin our ridges” (Adams,
Male 26-35 (32), 11/11/12). Out of all of the verbal responses that were recorded, 5 people had
something negative to say about wind energy in Berkshire County. Three out of these five restricted
their complaint to Berkshire County, but expressed support for wind energy in general. The
complaints centered on tourism impact, potential interference with bird migrations, noise, and
aesthetics.

Many survey respondents enthusiastically supported using wind turbines in Berkshire
County. One resident noted, “I know some residents feel the turbines/windmills are an eyesore and
‘ruining the landscape’ but my family and I believe that these sort of energy initiatives are working
towards protecting and preserving said landscapes!” (N. Adams, Female, age 25-35, 11/9/12). Another resident noted that she appreciated wind turbines because their presence indicated a replacement and shift away from fossil fuels: “I see the wind power and I think oh, it’s good it’s wind, not coal, not nuclear, not oil; it’s wind” (Williamstown, Female, age 56-65, 11/17/12). Of those respondents quoted during the survey process, 7 expressed positive support for wind energy in Berkshire County.

In addition to wind energy, a number of respondents reflected on coal as a means of energy production. 5 of the respondents made a comment about coal, and every comment was negative. One respondent mentioned that she was unfamiliar with most of the different forms of energy, but said, “I do know coal. I was told and read about it not being a good choice.” (Adams, Female, age 26-35, 11/9/12). When asked about what types of energy we should use in Berkshire County, one resident made clear that she felt we should have “No nuclear, no gas, no coal, no air pollution, no fracking” (Lenox, Female, age 36-45, 11/11/12). A final resident noted, “Coal has never been a good idea; now it’s just people being lazy and not wanting to solve our problems” (Pittsfield, Male, 46-55, 11/11/12). All of these statements show that amongst survey respondents, most had significant problems with coal power.

The issues raised by many of the respondents can reveal trends in how Berkshire residents are beginning to think about their energy. Many respondents felt they did not have enough information to make an informed decision, while others had very defined opinions about the type of energy we should be using. Wind power in Berkshire County was the most divided stance, while many respondents agreed that coal was problematic and we should look for alternative sources of energy.
Conclusions from Survey

Our survey revealed three key findings. The first finding is simply that Berkshire residents appear to be very supportive of renewable energy. Our data show fifty out of fifty-five respondents indicated they would like to see 50-100% of electricity in Berkshire County generated by renewable sources. In addition, respondents consistently expressed preference for renewable energy sources and rated them higher than conventional sources of energy. A second significant finding is residents favored solar energy, followed by a three-way tie between hydropower, small wind projects, and large wind projects. Finally, we found that of the respondents who indicated that they had seen existing renewable energy projects in the Berkshires, the majority (twenty-five out of thirty-five) indicated they “liked them.” This reveals, perhaps, that familiarity leads to acceptance and even appreciation for renewable energy projects after the initial implementation phase.

Survey Methodology

The purpose of this survey was to gather input and assess attitudes toward electricity use and production and to determine what kinds of renewable energy projects are perceived as good fits for Berkshire County. The survey itself went through multiple drafts and revisions. Our final survey consisted of seven questions and took respondents approximately six minutes to complete (Appendix C). Surveys were administered in-person by each of our four group members with surveyors marking down responses and transcribing quotes. In order to maximize our visibility and encounter as many people as possible, we positioned ourselves in highly trafficked, public areas, such as the entrances to supermarkets, shopping areas, main streets, etc. We attempted to engage every pedestrian who passed.
Responses were solicited over a three-week period on five different dates: 11/11/12, 11/17/12, 11/18/12, 11/19/12, and 11/23/12. In total, we managed to survey 55 individuals from eight towns: Adams, North Adams, Williamstown, Lenox, Lanesborough, Pittsfield, Great Barrington, and Stockbridge. (Note: to avoid biasing our pool of respondents no Williams College students were surveyed.) In order to achieve geographical diversity of our response pool, we surveyed in towns located in each of the three districts: North, Middle, and South. In several cases, we chose to survey people from towns in close proximity to renewable energy projects in hopes of gaining a sense of whether proximity to renewable projects (ex: the wind project on FL mountain) might incline individuals to view these projects more or less favorably.

Survey Challenges

One of the first challenges that the team confronted with the surveying project was the difficulty of finding people willing to stop and answer our questions. Many individuals simply ignored us when we attempted to engage them. We also encountered people who were willing to take our survey but were not Berkshire County residents. This occurred most often in Great Barrington and Stockbridge because of these towns’ high volume of tourists.

A second challenge was that the multiple drafts and revisions of the survey held up the surveying process and kept us from reaching our original goal of 100 surveys. One of the primary problems with our original survey was the length—it was much too long. Many of our respondents expressed frustration at this and walked away before completing it in its entirety. Another problem was the similarity and repetitiveness of the original questions 5 and 6, which first asked participants to evaluate several sources of energy production, renewable and non-renewable, regardless of where the facilities were located, and then repeated the same question specific to projects located in Berkshire County. In later versions, these questions were condensed into a single question similar to
the original question 5 with a follow-up question asking if the participants would support that source of energy generation in Berkshire County (yes/no.)

The original survey was also too broad in its scope. Rather than simply attempting to gauge attitudes toward different forms of renewable energy and discover what residents believed the county’s energy profile ought to look like, there was an additional section about personal energy use. Upon further reflection and after receiving feedback from our first batch of respondents, we made the decision to cut the entire second section. This halved the length of the survey and allowed us to be truer to our original purpose of assisting with Task 1 of the Proposal for Providing Regional Energy & Efficiency Planning Services developed by CET and Peregrine Consulting.

Respondent Demographics

The following graphs show the breakdown of our respondent pool by gender, age group, and district. The labels indicate both the number of responses (N=x) and percentage of the total respondent pool.

Figure 24: Survey respondents by age

Figure 25: Survey respondents by gender
"Fact Checking" Wind Power Concerns

Wind power is one of the mostly widely debated forms of energy. There are those who maintain that wind energy is the ‘green’ and sustainable choice for our future, while others argue that it causes many more problems than advocates and developers acknowledge. Due to the significant controversy in Berkshire County surrounding wind developments and competing information surrounding their social and environmental impacts, we thought it would be important to include a discussion of wind power concerns from local media outlets and find the best possible data and information to support or deny claims made about wind energy both in the media and by our survey respondents. This information is not inclusive of all of the concerns about wind energy but covers the most salient issues raised by residents of Berkshire County (according to local media outlets).

It is important to note that this is a very hotly contested and emotional issue for many people. Our effort is to provide some scientific information regarding concerns over wind development in Berkshire County. Our hope is that this information will be able to support BRPC in the Berkshire Regional Energy Plan, if it contains plans for wind turbine development, by providing a background of information that the Commission can use to educate the public about
this form of renewable energy, particularly if there are concerns about wind turbines going up on our ridges.

Controversy in the Media

Because the surveys that our team conducted could not reveal every potential concern about renewable energy, we researched articles from local media, including The Berkshire Eagle, The Berkshire Record, The North Adams Transcript, and iBerkshires online, to get a sense of the concerns that residents have raised. Most of the articles published in these newspapers about renewable energy projects focused on wind power. The main concerns raised by residents at town meetings and in media interviews about wind power can be classified under six categories: noise pollution, shadow flicker effect, “wind turbine syndrome,” aesthetics and habitat degradation, and impact on wildlife.

Noise Pollution

After the construction of two wind turbines in their town, residents of Falmouth, MA began to complain that noise from the turbines had been keeping them awake late at night. In response to their concerns, the Massachusetts Department of Environmental Protection (Mass DEP) undertook a survey of the noise levels produced by these turbines. The study concluded during the day, the turbines operated at below the 10 level (which is roughly the noise level of ordinary background noise), but at night the turbines exceeded this level. Mass DEP recommended that one of these turbines be turned off at night. Officials in Falmouth then voted to turn off one of the turbines.58

The noise concerns reported in Falmouth have been cited by critics of wind energy across the state, including Berkshire County. The recommendation by Mass DEP to shut off the turbine at night has raised concerns that all wind turbines will be noisy and disruptive. However, many

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supporters of wind energy in Massachusetts argue that the Falmouth turbines specifically were dated and running poorly, causing their noise to exceed that of more modern wind turbines. State of the art wind turbines produce sounds at only 3 decibels, just higher than the sound of rustling leaves. Mass DEP undertook a large-scale study (“Wind Turbine Impact Study”) to address the specific concerns raised with wind turbines across the state. In regards to noise, Mass DEP looked at current research into noise levels of specific wind turbines and their effects. The report concluded that no association between wind turbines and mental health or psychological distress could be confirmed by current research. They also found that there was insufficient evidence that noise from turbines could directly cause health problems. However, they did note that turbine noise may disrupt sleep at close distances. Because of this finding, the report published a “Best Practices” section that details the distance a wind turbine should be built away from homes to avoid these disruptions.

Furthermore, the British Wind Energy Association (BWEA) published a report in 2007 comparing the noise level of wind turbines to other common background noises (Figure 27). Because this report was published nearly five years ago, it depicts wind turbines levels at an even higher decibel than the newer models emit today.

59 Ibid.
The graph reveals that at a distance of 350 meters, wind turbines create a sound that is just noisier than a quiet bedroom, and much quieter than a busy office. This level of noise is not threatening to public health.

While this research shows that noise created by wind turbines is not a direct threat to public health, we cannot necessarily discredit first-hand accounts of noise disruptions and trouble sleeping by nearby residents. These complaints should be taken into account when considering wind turbine construction in Berkshire County, and BRPC should follow the “Best Practices” as outlined by the Mass DEP report to ensure that the most precautions are being taken to ensure comfort and safety of nearby residents. Following the distance procedures should be relatively easy for Berkshire County, as most of the potential locations for wind turbines are on top of ridges, which are a great distance away from nearly all housing in the region.

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Ibid. Graph compiled by Riverview Consulting.
Shadow Flicker Effect

Shadow flicker effect refers to the phenomenon that occurs when the sun is at the right angle behind a moving wind turbine in relation to a home or private property, which causes a flickering strobe effect as the blades move in and out of the sun’s path. While many supporters of wind energy discredit this notion, it is extremely disruptive to the lives of those who live near wind turbines and experience this effect. The flashing light enters homes through windows and doorways, and can disrupt daily life.63

In their “Wind Turbine Impact Report”, Mass DEP found that the shadow flicker from wind turbines do not pose a risk for seizures, which has been a large concern amongst critics. However, the study did find that there is a possible link between prolonged exposure (30+ mins) to shadow flicker and cognitive or physical health effects.

We recommend that BRPC conduct studies for each proposed site for a wind turbine development to ensure that shadow flicker will not fall onto residential homes or heavily used property. These turbines can also be built in relation the sun so that shadow flicker does not occur. Once again, a majority of the proposed wind turbines for Berkshire County are likely to be constructed on ridges, far removed from housing. Projects on agricultural land may need to take shadow flicker into consideration.

“Wind Turbine Syndrome”

Critics of wind turbines have cited a number of health problems that residents have attributed to nearby turbines. In her book entitled Wind Turbine Syndrome, Nina Piermont, Ph.D., explains the claimed symptoms of “wind turbine syndrome” as follows: sleep disturbance and deprivation, headache, tinnitus (ringing in ears), ear pressure, dizziness, vertigo (spinning dizziness),

63 If curious to see shadow flicker effect, please see https://www.youtube.com/watch?v=MbIe0iUtcIQ
nausea, visual blurring, tachycardia (fast heart rate), irritability, problems with concentration and memory, and panic episodes associated with sensations of movement or quivering.\textsuperscript{64} Numerous residents across the U.S. have claimed that these negative health effects are related to their proximity to wind turbines.

Nearly all of the research that supports the notion of ‘Wind-Turbine Syndrome’ has been conducted by Nina Piermont. We were unable to find any other supporting research that did not directly reference her work. The Mass DEP report details many of the problems with assumptions made in her book: mainly that these health problems cannot be directly linked to wind turbines. Current research has not found a causal link between wind turbines and these specific health effects. The study concluded that there is no evidence for “a set of health effects that could be characterized as ‘Wind Turbine Syndrome.’”\textsuperscript{65} While these health symptoms cannot be effectively tied to wind turbine development, we recommend that the BRPC take into account individual concerns throughout the county and follow the “Best Practices” published in the “Wind Turbine Impact Study” Mass DEP report. Based on the number of ridges in Berkshire County, it should not be difficult to set them far enough from homes to lessen fears and create distance between turbines and residents.

\textit{Aesthetics}

One of the main concerns cited by critics of wind energy, both in our surveys and in the local media, is the visual disruption that wind turbines cause on the landscape. When built on mountaintops, wind turbines are highly visible, and can be seen from great distances. Many residents

\textsuperscript{64} Pierpont, Nina. 2009. \textit{Wind Turbine Syndrome: A Report on a Natural Experiment.}
feel that these turbines detract from the natural, visual beauty of Berkshire Mountain tops\textsuperscript{66} (see the preceding Verbal Survey Results).

Such a concern cannot be accurately quantified, and is a matter of personal taste. It is inevitable that some people will dislike the look and presence of the wind turbines, and their opinions will not be easily changed. We recommend that BRPC take into account the visual impacts it will have on the surrounding environment and weigh input from nearby residents when considering installing new renewable technologies such as wind farms or solar arrays.

One possible solution to concerns raised over the aesthetic problems with wind turbines is an incorporation of renewable energy generation into the image of Berkshire County. While this may not solve all of the aesthetic controversies, it may help the region see itself as a place that understands the importance of renewable energy generation and promote the image of the Berkshires being an eco-friendly, environmentally conscious, nature-appreciating region of the United States. The state of Iowa, for example, has embraced its image as one of largest generators of wind energy in the U.S. by putting images of wind turbines on their state IDs. Iowa has become synonymous with wind power and clean energy generation. Similar initiatives in Berkshire County (although not likely changing state IDs) may help ease concerns over visual impacts and better incorporate wind turbines and solar arrays into the surrounding environments.

\textit{Habitat Degradation}

The construction of wind turbines has the potential to cause habitat disruption. In order to build wind turbines on mountaintops, roads must be constructed for construction vehicles to bring supplies. Concerned citizens and environmental groups have argued that these roads may damage wetlands and threaten local wildlife. Although there has not been significant research into the

validity of these claims, the possible environmental damages of wind turbine construction should be taken into account when assessing a potential location. We recommend that wind turbine developers (whether private or public) conduct a careful environmental impact assessment before development and be aware of any and all relevant statutes (including the Wetlands Protection Act). These impact statements will help assure concerned citizens environmental considerations have been taken into account.

**Impact on Wildlife**

One of the most salient and widespread concerns about wind turbines is the negative effect that they have on animal populations, namely birds and bats. Numerous published studies have attempted to quantify the number of deaths caused each year by wind turbines.

Figure 28: Anthropogenic Causes of Bird Mortality

![Figure 28: Anthropogenic Causes of Bird Mortality](image)

The number of bird deaths caused by wind turbines can be estimated at less than 100,000 deaths per year (figure 30). While wind turbines do directly cause a significant number of bird deaths every year, their impact is minimal when compared to other

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anthropogenic causes. Buildings and windows cause the greatest number of bird deaths per year, trumping the number caused by wind turbines, while the common house cat kills roughly 1,000 the number of birds every year killed by turbines. However, if the use of wind turbines were to dramatically increase in the U.S., the number of bird deaths would also likely rise. There is only one bird whose population has been shown to be threatened by wind turbines: raptors. The majority of these deaths occur in California, in older installations.\textsuperscript{68} Furthermore, a study done by the Government Accountability Office (GAO) in 2005 stated that the most bird deaths from wind turbines occurred in California and Appalachia, and were significantly lower in other parts of the county. The study found that “overall bird fatalities from wind power ranged from 0 to 7.28 birds per turbine, per year” while the National Wind Coordinating Committee showed “an average of 2.3 birds per turbine, per year.”\textsuperscript{69} Concerns raised by residents in the survey about siting wind turbines in migratory paths should be carefully studied. Cost-benefit analysis of turbines, the standard development assessment, can account for bird death and may help Berkshire County determine the value of wind projects on a case-by-case basis.

In addition to birds, many citizens have expressed concern over bat deaths related to wind turbines, a topic which has experienced significant media spotlight. According to the same study done by the GAO, “bat fatality rates ranging from 0 to 4.3 bats per turbine, per year.”\textsuperscript{70} Once again, the potential cost of up to four bats a year must be weighed against the potential benefits of a specific wind turbine.

\textsuperscript{70} Ibid.
Conclusions

A majority of the concerns expressed above, including noise pollution and shadow flicker, can be mitigated or circumvented simply by ensuring that wind turbines are placed in a location sufficiently far from housing. In Berkshire County wind turbines are typically constructed on ridge tops where there are no nearby homes. The region provides an abundance of land with these qualities. A small number of bird and bat deaths seemingly cannot be avoided with modern wind turbines, and the costs of animal deaths should be taken into account when deciding whether or not to build. As mentioned above, the most difficult challenge to wind turbines to overcome is that some people just don’t like how they look. We hope that Berkshire County can use renewable energy installations to show our character and our passion for the natural environment.

Economics

This section provides brief context for different forms of energy that may be included in a Berkshire Regional Energy Plan and a basic understanding of the general pricing and costs of various sources of energy.

The Energy Information Administration of the United States Department of Energy recently published a report that details the average levelized cost or energy (LCOE) for new plants entering service in 2017. The average levelized cost of energy is the cost of electricity production at the point where the electricity can be sent back to the grid. It is the price a producer or retailer must charge in order to ‘break-even.’ This cost includes both fixed (initial) and variable (on-going) costs over a 30-year period, and is measured in USD per MWh.
Table 4: U.S. Average Levelized Cost for Plants Entering Service in 2017 (2010 USD/MWh)\textsuperscript{71}

<table>
<thead>
<tr>
<th>Plant Type</th>
<th>Capacity Factor (%)</th>
<th>Fixed O&amp;M</th>
<th>Variable O&amp;M (including fuel)</th>
<th>Total System Levelized Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas Fired</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Combined Cycle</td>
<td>87</td>
<td>1.9</td>
<td>44.4</td>
<td>65.5</td>
</tr>
<tr>
<td>Conventional Combined Cycle</td>
<td>87</td>
<td>1.9</td>
<td>48.0</td>
<td>66.6</td>
</tr>
<tr>
<td>Hydro\textsuperscript{1}</td>
<td>53</td>
<td>4.0</td>
<td>8.0</td>
<td>51.9</td>
</tr>
<tr>
<td>Advanced CC with CCS</td>
<td>87</td>
<td>4.0</td>
<td>52.7</td>
<td>92.8</td>
</tr>
<tr>
<td>Wind\textsuperscript{1}</td>
<td>34</td>
<td>9.7</td>
<td>0.0</td>
<td>96.8</td>
</tr>
<tr>
<td>Conventional Coal</td>
<td>85</td>
<td>4.0</td>
<td>28.7</td>
<td>99.6</td>
</tr>
<tr>
<td>Geothermal</td>
<td>92</td>
<td>11.9</td>
<td>9.6</td>
<td>99.6</td>
</tr>
<tr>
<td>Advanced Combustion Turbine</td>
<td>30</td>
<td>2.6</td>
<td>67.5</td>
<td>106.3</td>
</tr>
<tr>
<td>Advanced Coal</td>
<td>85</td>
<td>6.6</td>
<td>29.2</td>
<td>112.2</td>
</tr>
<tr>
<td>Advanced Nuclear</td>
<td>80</td>
<td>11.3</td>
<td>11.6</td>
<td>112.7</td>
</tr>
<tr>
<td>Biomass</td>
<td>83</td>
<td>13.8</td>
<td>48.3</td>
<td>120.2</td>
</tr>
<tr>
<td>Conventional Combustion Turbine</td>
<td>30</td>
<td>2.7</td>
<td>79.9</td>
<td>132.0</td>
</tr>
<tr>
<td>Advanced Coal with CCS</td>
<td>85</td>
<td>9.3</td>
<td>38.8</td>
<td>140.7</td>
</tr>
<tr>
<td>Solar PV\textsuperscript{1,2}</td>
<td>25</td>
<td>7.7</td>
<td>0.0</td>
<td>156.9</td>
</tr>
<tr>
<td>Solar Thermal\textsuperscript{1}</td>
<td>20</td>
<td>40.1</td>
<td>0.0</td>
<td>261.0</td>
</tr>
<tr>
<td>Wind — Offshore\textsuperscript{1}</td>
<td>27</td>
<td>22.4</td>
<td>0.0</td>
<td>330.6</td>
</tr>
</tbody>
</table>

The table is listed from lowest to highest LCOE, with natural gas fired as the least capital intensive and offshore wind as the most capital intensive. Advances in extraction techniques and technologies have led to a sharp decrease in the cost of natural gas production, but many (including state and local government as well as residents) are fearful of its environmental consequences. Notably, hydropower and wind are expected to be cheaper to produce than coal and nuclear power. However, solar power is expected to remain relatively expensive. Notably, renewable energy projects such as wind and solar tended to have more regional variation than traditional non-renewable plants. The numbers in Figure 3 are the averages for all regions. Because renewable energies rely heavily on the weather and climate of a specific region, they may be much cheaper in specific areas. The capacity for wind and solar in Berkshire County (discussed above) may mean that these energies will have lower LCOEs in our region than what is listed above. Furthermore, the LCOE of wind energy is expected to decrease roughly 25% in the next 30 years (Figure 31).

A significant flaw in the calculations described in Table 4 is that they do not take into account government incentives and tax credits, environmental externalities, or impacts on human health of the various technologies. With the passing of the Global Warming Solutions Act of 2008 in Massachusetts (see above section Relevant Policies – State) and rising national concern about threats of increasing greenhouse gas levels and environmental impacts of specific energies, we believe BRPC should consider these concerns in addition to economic factors when developing a regional energy plan.

The table below lists lifecycle greenhouse gas emissions for various types of electricity generation plants. It is listed from least expected emissions to most expected emissions over a plant’s lifetime.

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Figure 29: Levelized Cost of Energy for Wind; Projections

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Table 5: Lifecycle Greenhouse Gas Emission Estimates for Electricity Generators

<table>
<thead>
<tr>
<th>Technology</th>
<th>Description</th>
<th>Estimate (g CO₂/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>2.5 MW offshore</td>
<td>9</td>
</tr>
<tr>
<td>Hydroelectric</td>
<td>3.1 MW reservoir</td>
<td>10</td>
</tr>
<tr>
<td>Wind</td>
<td>1.5 MW onshore</td>
<td>10</td>
</tr>
<tr>
<td>Biogas</td>
<td>Anaerobic digestion</td>
<td>11</td>
</tr>
<tr>
<td>Hydroelectric</td>
<td>300 KW run-of-river</td>
<td>13</td>
</tr>
<tr>
<td>Solar thermal</td>
<td>80 MW parabolic trough</td>
<td>13</td>
</tr>
<tr>
<td>Biomass</td>
<td>various</td>
<td>14-35</td>
</tr>
<tr>
<td>Solar PV</td>
<td>Polycrystalline silicon</td>
<td>32</td>
</tr>
<tr>
<td>Geothermal</td>
<td>80 MW hot dry rock</td>
<td>38</td>
</tr>
<tr>
<td>Nuclear</td>
<td>various reactor types</td>
<td>66</td>
</tr>
<tr>
<td>Natural gas</td>
<td>various combined cycle</td>
<td>443</td>
</tr>
<tr>
<td>Fuel Cell</td>
<td>hydrogen from gas reforming</td>
<td>664</td>
</tr>
<tr>
<td>Diesel</td>
<td>various generator and</td>
<td>778</td>
</tr>
<tr>
<td></td>
<td>turbine types</td>
<td></td>
</tr>
<tr>
<td>Heavy oil</td>
<td>various generator and</td>
<td>778</td>
</tr>
<tr>
<td></td>
<td>turbine types</td>
<td></td>
</tr>
<tr>
<td>Coal</td>
<td>various generator types</td>
<td>960</td>
</tr>
<tr>
<td></td>
<td>with scrubbing</td>
<td></td>
</tr>
<tr>
<td>Coal</td>
<td>various generator types</td>
<td>1050</td>
</tr>
<tr>
<td></td>
<td>without scrubbing</td>
<td></td>
</tr>
</tbody>
</table>

Wind turbines overall generate the least carbon emissions, followed by hydroelectric, biogas, solar thermal, biomass, and solar PV. All of these are considered renewable energies. The most heavily carbon emitting technologies are diesel, heavy oil, and coal. A coal-fired plant emits 100 times more carbon over its lifetime than a wind farm. To meet our state goal to reduce carbon emissions by 25% below 1990 levels (see above section Relevant Policies – State), then developing and utilizing renewable energy will likely be the best method to achieve these goals.

In addition to the negative impacts associated with carbon emissions, many types of energy generation pose significant threats to human health. While health concerns for wind energy (though not proven) are described above, non-renewable sources are associated with the most serious and widespread human health concerns.

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In 2010, the National Research Council published a book entitled *Hidden Costs of Energy*, which attempts to monetize the negative externalities associated with different forms of energy production. It is the most up-to-date and extensive report of its kind, citing experts from a vast range of fields and numerous preceding reports. The table below displays their conclusions regarding externalities associated with non-renewable energy sources.

Table 6: Monetized Damages Per Unit of Energy Related Activity\(^7^4\)

<table>
<thead>
<tr>
<th>Energy Related Activity (Fuel Type)</th>
<th>Non-Climate Damage</th>
<th>Climate Damages (per ton CO(_2)-eq)(^5) at $10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity Generation (coal)</td>
<td>3.2 cents/kWh</td>
<td>1 cent/kWh</td>
</tr>
<tr>
<td>Electricity Generation (natural gas)</td>
<td>0.16 cents/kWh</td>
<td>0.5 cent/kWh</td>
</tr>
<tr>
<td>Transportation</td>
<td>1.2 to &gt;1.7 cents/VMT (miles traveled)</td>
<td>0.15 to &gt;.65 cent/VMT</td>
</tr>
<tr>
<td>Heat Production (natural gas)</td>
<td>11 cents/MCF (thousand cubic feet)</td>
<td>70 cents/MCF</td>
</tr>
</tbody>
</table>

Coal-powered electricity generates the most climate and non-climate related damages and contributes significantly more to both than natural gas-based electricity. In New England, a majority of our energy comes from natural gas and nuclear power (Figure 1), and the region utilizes much less coal than the nation as a whole\(^7^5\). Even so, renewable energies will generate fewer climate-based and non-climate based externalities than the conventional fuel types listed above. Although these findings were not quantified, these conclusions were explicitly stated in the report.\(^7^6\)

These concerns shed light on the implications of the types of energy we use in the United States and in Berkshire County. The report found that in 2005 alone, up to $120 billion worth of external damages could be contributed to current U.S. energy sources. This calls for a radical change

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in how we produce and consume electricity, and with a lack of national policy to force this change, it seems it must stem from state, regional, and municipal levels.

**Priorities for Berkshire County**

The new regional energy plan for Berkshire County should at the least conform to the state goals established by the Global Warming Solutions Act of 2008, which mandated a 25% percent reduction of carbon emissions from 1990 levels by 2020, or a reduction to statewide emissions of 70.8 million tons of greenhouse gases.77

The latest data available already show progress toward this goal. The 1990 baseline emissions were 94.4 million metric tons of GHG, and emissions peaked in 2005 at 97.0 million metric tons. In 2008, when the Global Warming Solutions Act was passed, GHG emissions had already been reduced to 89.0 million metric tons. In 2009, this fell to 84.1 million metric tons, meaning the state has already achieved 11% GHG emissions reductions from 1990 levels, over 44% of its goal of 25% reductions by 2020.

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Meeting this goal, of course, will require reducing emissions from all sectors, but our highest sources of carbon emissions are a good place to begin.

Table 7: Carbon emissions by source for Berkshire County

<table>
<thead>
<tr>
<th>Source</th>
<th>Annual Use 2007</th>
<th>Units</th>
<th>Annual Emissions (tonnes eCO₂)</th>
<th>Percentage of County Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Gasoline</td>
<td>61,004,591</td>
<td>gallons</td>
<td>542,941</td>
<td>31%</td>
</tr>
<tr>
<td>Electricity</td>
<td>1,195,955,685</td>
<td>kWh</td>
<td>490,342</td>
<td>28%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>52,024,423</td>
<td>therms</td>
<td>286,134</td>
<td>16%</td>
</tr>
<tr>
<td>Distillate Fuel Oil</td>
<td>24,091,155</td>
<td>gallons</td>
<td>245,730</td>
<td>14%</td>
</tr>
<tr>
<td>Motor Diesel</td>
<td>12,728,902</td>
<td>gallons</td>
<td>129,835</td>
<td>7%</td>
</tr>
<tr>
<td>Residual Fuel Oil</td>
<td>2,320,080</td>
<td>gallons</td>
<td>27,377</td>
<td>2%</td>
</tr>
<tr>
<td>Propane</td>
<td>2,836,975</td>
<td>gallons</td>
<td>16,171</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>1,738,529</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 7 displays Berkshire County’s carbon emissions by source in 2007. Motor gasoline accounts for the largest share of emissions, 31%, with electricity as a close second emitting 28% of


the total. These sources can be addressed with improvements to electricity use and generation and transportation.

**Electricity**

Carbon emissions from electricity can be reduced in two important ways: increased energy efficiency and renewable energy generation and use. Generating more renewable energy in Berkshire County and purchasing electricity from renewable sources generated elsewhere in the state and region can greatly reduce carbon emissions (see Table 3), as well making energy efficiency improvements to buildings and facilities throughout the county. These steps are beginning on the municipal level, supported by legislation including the Green Communities Act, but there is more to be done and much to do in the private sector. Fortunately, the results of our survey suggest significant public support for renewable energy development in Berkshire County.

**Transportation**

With motor gasoline accounting for such a large share of the county’s total carbon emissions, improving transportation energy use should be a priority for the regional energy plan.

Table 8: Method, popularity, and aggregate time of work commutes in Berkshire County

<table>
<thead>
<tr>
<th>Method of Commute</th>
<th>People</th>
<th>Percentage of Population</th>
<th>Aggregate Travel Time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car, truck, van: drive alone</td>
<td>50,176</td>
<td>81.6%</td>
<td>1,045,225</td>
</tr>
<tr>
<td>Car, truck, van: carpool</td>
<td>5,043</td>
<td>8.2%</td>
<td>128,735</td>
</tr>
<tr>
<td>Public transit</td>
<td>356</td>
<td>0.6%</td>
<td>15,870</td>
</tr>
<tr>
<td>Walk</td>
<td>2,468</td>
<td>4.0%</td>
<td>25,245</td>
</tr>
<tr>
<td>Taxi, motorcycle, bike, other</td>
<td>951</td>
<td>1.5%</td>
<td>19,885</td>
</tr>
<tr>
<td>Work at Home</td>
<td>2,522</td>
<td>4.1%</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>61,516</td>
<td>100%</td>
<td>1,234,960</td>
</tr>
</tbody>
</table>

Source: American Community Survey (Berkshire County, 2007)

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80 Ibid.
Table 8 displays the method, popularity, and aggregate time of work commutes in Berkshire County. With 81.6% of commuters driving alone in cars, trucks, and vans, increasing the use of public transit and carpooling could significantly reduce carbon emissions from transportation.

**Conclusion**

The development of a Regional Energy Plan for Berkshire County is an important step toward seriously addressing climate change and meeting our state goals of energy use reduction and renewable energy generation. Renewable energy is already supplying a fraction of the county’s energy needs and several projects are in development. However, renewable energy still accounts for a minimal percentage of the county’s energy mix.

Berkshire County has a great potential for further renewable energy development, especially wind power. While recent renewable energy projects proposed in the county have stirred significant controversy, our survey suggests there is broad support for renewable energy. It remains uncertain if the opposition comes from a vocal minority, or if the controversial projects were not well sited and posed considerable negative impacts. We recommend careful assessment of all potential projects that emphasizes community involvement at all stages and includes consideration of economic, ecological, and public health effects. At the same time, we recommend increased public education to address the most common concerns about renewable energy, which can build off our research.

Berkshire County benefits from strong state energy policies. However the existing policies are limited in a number of ways. For example, the Green Communities Act in practice does more to encourage energy efficiency than renewable energy. New legislation to address these limitations should be developed.

Action on the municipal level will be especially important key because of Massachusetts’ strong home rule. Municipalities in Berkshire County have already made important progress toward
increased energy efficiency and renewable energy generation, however, they face a number of challenges moving forward. Most significant is a lack of staff time and technical support. Municipalities would also benefit from strengthened connections between communities in the county to share resources and knowledge and collaborate on large initiatives.

The Regional Energy Plan can help address most if not all of these challenges. The findings presented in this report will help BRPC, Peregrine Energy, CET, and the Energy Subcommittee begin this important process.
References

Berkshire Wind Power Co-op, “Berkshire Wind,” *The Berkshire Wind Power Fact Sheet*,
http://www.berkshirewindcoop.org/documents/DedicationFactSheetsPublisher.pdf
(accessed 12/14/12).


Federspiel, Greg, Town Manager, Lenox, MA. November 28, 2012. Telephone interview by Zoe Grueskin. Lenox, MA,


Jones, Trevor. 2011. “Great Barrington Solar Farm Pushed” Berkshire Eagle. 13 November


Appendix A: Policies, Grants, & Incentives

Green Communities Criteria:
1. Provide as-of-right siting in designated locations for renewable/alternative energy generation, research & development, or manufacturing facilities.
2. Adopt an expedited application and permit process for as-of-right energy facilities.
3. Establish an energy use baseline and develop a plan to reduce energy use by twenty percent (20%) within five (5) years.
4. Purchase only fuel-efficient vehicles.
5. Set requirements to minimize life-cycle energy costs for new construction; one way to meet these requirements is to adopt the new Board of Building Regulations and Standards (BBRS) Stretch Code.

Available to municipalities:
Green Communities Grants
Funding for energy efficiency and renewable energy projects for municipalities designated Green Communities.

Massachusetts Clean Energy Center (MassCEC) Grants: Established by Green Communities Act, MassCEC provides many grant opportunities including Commonwealth Wind, Commonwealth Solar, Solarize Mass (Lenox and Pittsfield).

Department of Energy: The United States DOE administers the Energy Efficiency and Conservation Block Grant Program (EECBG), modeled on the Department of Housing and Urban Development (HUD)'s Community Development Block Grant program. The program was created in 2007 but not funded until Obama’s American Recovery and Reinvestment Act in 2009. DOE provides grants for both energy efficiency and renewable energy projects.

Incentives from Utilities Companies: Western Mass Electric Company (WMECo) and National Grid provide significant funding for audits and energy efficiency improvements to municipal property, such as replacing outdoor lamps with LED lights.

Available to businesses and residents:
Business Energy Investment Tax Credit (ITC)
This federal corporate tax credit is available under 26 USC § 48 and was extended and expanded by the Energy Improvement and Extension Act of 2008 (H.R. 1424) and by the American Recovery and Reinvestment Act of 2009. The ITC provides up to 30% expenditure coverage for solar, fuel cell, and small wind turbine projects and up to 10% expenditure coverage for geothermal systems, microturbines, and combined heat and power projects.

Renewable Electricity Production Tax Credit (PTC)
This federal tax credit is intended to be temporary; it was originally enacted in 1992 and has been repeatedly renewed and expanded since that time. The PTC supports a variety of renewable and alternative

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energy sources including biomass, geothermal, landfill gas capture, municipal solid waste combustion, and hydroelectric, providing 1.1¢/kWh credit for electricity generated by these technologies in his projects operational by the end of 2013. The PTC provides a 2.2¢/kWh credit for wind electricity generation, although the credit is set to expire Dec. 31, 2012.\footnote{Department of Energy Resources, “RPS and APS Program Summaries,” 2012, http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/rps-aps/rps-and-aps-program-summaries.html.}

**Renewable Energy Portfolio Standard (RPS)**

The Massachusetts RPS is a statutory regulation that indirectly supports renewable energy generation by requiring utilities companies to obtain a certain percentage of their electricity from qualifying units by purchasing electricity from generators that qualify for and receive a Renewable Energy Certificate (REC), administered by the New England Power Pool (NEPOOL) Generation Information System. The initial RPS set the requirement at 1% REC in 2003 and increased by one-half percent each year until it reached 4% in 2009. The Green Communities Act of 2008 divided RPS into two classes of electricity generation and set the purchasing obligation to increase by 1% annually.\footnote{Department of Energy Resources, “APS,” 2012, http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/rps-aps/rps-and-aps-program-summaries.html.}

**Alternative Energy Portfolio Standard (APS)**

Established by the Green Communities Act of 2008, the APS came into effect Jan. 1, 2009. Like the RPS, the APS requires a percentage of the Massachusetts electric load from eligible technologies: electricity generation systems that are alternative but not renewable. The APS also makes businesses, institutions, and municipalities in the state eligible to receive an incentive for installing such energy systems. These include combined heat and power, flywheel storage, coal gasification, and efficient steam technologies.\footnote{Department of Energy Resources, “Assessments and Audits: Energy Savings Start Here,” 2012, http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/rps-aps/rps-and-aps-program-summaries.html.}

**Energy Efficiency Programs Offered by Utilities:**

- **Energy Feasibility Audits**
  Assessments of energy use, efficiency improvements, and available incentives, as well as technical assistance, are provided to Massachusetts home and business owners through the Mass Save® initiative, sponsored by the state’s gas and electric utilities and energy efficiency service providers, including Bay State Gas Company, Berkshire Gas Company, Cape Light Compact, National Grid, New England Gas Company, NSTAR, Unitil, and Western Massachusetts Electric Company.

- **Plant Energy Assessments**

**Net Metering**

Net metering is a policy regulated by the state that allows customers generating electricity from agricultural products, solar, and wind to receive credit close to retail value when electricity generation exceeds consumption.\footnote{Massachusetts Department of Energy Resources, “Net Metering,” 2012, https://sites.google.com/site/massdgic/Home/net-metering-in-ma.}
Appendix B: Checking in with Green Communities
Green Communities Check-in: Great Barrington
11-28-12

Telephone Interview:
Christopher Vlcek, AIA Littlewolf Architecture
Chairman, Great Barrington Energy Committee (volunteer, citizen committee)
10 Highland Drive
Great Barrington, MA 01230-1537
(413) 528-5571
chris@littlewolfarch.com

Do you currently have an active energy or climate action committee in your community? When was it formed?
Yes, the Energy Committee was formed in October 2010 to look at energy savings in town, and specifically to achieve the Green Communities designation.

Achieving the designation took 2 years. For the first year we focused on the stretch code. We did town outreach and then had a town meeting and a vote, which passed. We didn’t want to begin working on the energy reduction plan until we knew there was community support for stretch energy code. The next year we dug into the stretch code and realized it was over our heads for a volunteer committee. We told the town we needed funding to hire a consultant, and they provided us with $25,000. The consultant did the audits, did the work to apply for the Green Communities designation.

Does the committee:

Oversee the Green Communities requirements?
We have some partnering, but it’s the town that has to implement this stuff. They get the funding, they have the energy game plan, they have to create the RFP that goes out. We play a supporting role and an encouraging role, but we don’t really have any power. We reflect the interests of the community, which was shown by the support we received at the town meeting and from the Board of Selectmen.

The Department of Public Works is really going to be the group overseeing the implementation of the Green Communities requirements. Joe Sokul is the superintendent. (jsokul@townofgb.org, 413-528-0867).

Conduct community outreach and education?
Yes, we’re partnering with CET, Mass Save, encouraging solar energy education and projects on town properties and beyond. We’re participating in a town dialogue on solar. In January we’re having another joint board meeting to lay out recommendations.

Would it be possible for you to share a copy of the Energy Reduction Plan your community submitted to qualify as a MA Green Community?
Check DOER website. I’ll talk to the town about getting this on the website. Call me in a week if it isn’t up.

Have you submitted a progress report to the MA Department of Energy Resources (DOER)? If so, could we obtain a copy?
N/A: received designation 7-24-12

Renewable Energy Bylaw
Has your municipality passed a bylaw to enable commercial scale solar or wind power in your community? If so, could you forward a copy?
GC requirement as-of-right zoning
Grant funding

For what renewable energy and energy efficiency projects did your town receive funding from the Green Communities grant program?
Energy efficiency projects. We’re starting with low-hanging fruit; our early prioritized projects include weatherization, insulation, and temperature controls.

Renewable energy projects?
We’ve been raising potential properties, but nothing has really happened yet.

Has your community received grant funding from other sources?
Not that I know of.

What is the status of the energy efficiency/renewable projects receiving grant funding?
Just received designation, starting to make projects happen.

Do you have other municipal or other commercial scale renewable energy or energy efficiency projects on the horizon in your community or nearby?
If yes:

Could you describe those projects?
We have several existing projects, including a solar array on the firehouse, solar PV on the middle school, geothermal in high school. The high school is being renovated, which will probably include solar.

There were early stages of a large solar development on the Shaw property last year, which generated some concern from nearby property owners over property values and if it was the best use of agricultural land; there would have had to have been legal change to its status. The economic circumstances changed, and the developer lost interest, maybe in part due to community opposition, but that wasn’t all of it.

Will these projects receive funding from Green Communities Grants?
Energy efficiency improvements will.

Do you think the Green Communities program has been successful? Helpful?
I think it’s a really good program. I applaud Governor Patrick’s administration. It’s kind of a carrot approach that I think works well.

The goal is to reduce town energy use by 20% within 5 years. The projects’ savings pay for themselves, but it still takes work to make it happen.

Is there anything else you would like to share about your successes or challenges with your energy projects?
There are towns where volunteers are trying to do it on their own, and nothing happens. Like with the MassEnergyInsight program, the town really needs to be on board, especially with staffing. The Town Manager’s assistant attended our meetings for the first year and a half, and she was invaluable. She made MassEnergyInsight happen; it wouldn’t have happened if it was just our volunteer committee.

We no longer have a town representative attending our meetings. It would be nice to have town staff focused on sustainability across the board. It’s going to be challenging, because everyone in town hall has a full time job already, and on the Energy Committee, we’re volunteers.

We would really benefit from a closer relationship with the DPW. Joe Sokul is the DPW superintendent.
Do you currently have an active energy or climate action committee in your community?
Yes, we have an Environmental Committee, which is in transition right now from an informal committee I formed to an official town committee that the Selectmen will appoint. That decision was made a few months ago, and the appointments have been made. We’re scheduling our first meeting.

Does the committee:
- **Oversee the Green Communities requirements?**
  Yes, and new renewable energy and energy efficiency initiatives for both town and private sector.
- **Conduct community outreach and education?**
  Yes, specific to projects.

Would it be possible for you to share a copy of the Energy Reduction Plan (to reduce fossil fuel energy use by 20% within 5 years) your community submitted to qualify as a MA Green Community? Yes, PDF available online.
http://www.townoflenox.com/Public_Documents/LenoxMA_Wind/index
“Lenox Energy Reduction Plan”

Have you submitted a progress report to the MA Department of Energy Resources (DOER)? If so, could we obtain a copy?
We’re behind on submitting reports to them. We’ve hired a part-time sustainability coordinator, Adele Gravitz, to try to get caught up.

**Renewable Energy Bylaw**
Has your municipality passed a bylaw to enable commercial scale solar or wind power in your community? If so, could you forward a copy?
Passed the by-right siting for renewable energy projects required for Green Communities designation. The Planning Board is currently considering adopting a local solar ordinance. It’s going slowly, intentionally. We’ll see how it goes.

**Grant funding**
Has your community received grant funding for energy efficiency, renewable energy, community education or other projects through the Green Communities grant program or other grant funds?
- **Could you describe those projects or forward a copy of the grant award?**
  We’ve received three chunks of money:
  - Prior to the Green Communities program we received funding from the state for energy efficiency measures.
  - We received two different grants from Massachusetts Clean Energy Center (MassCEC) to explore wind feasibility.
  - $134,766 from Green Communities (5-25-10) for:
    - Energy efficiency measures and training
    - Expert energy consulting
Community wind forums
Mini-grants program for residential and commercial solar PV and water heating systems

What is the status of the energy efficiency/renewable projects receiving grant funding?
We made energy efficiency upgrades at the elementary school. We had a Wind Energy Research Panel to consider a wind feasibility study (Weston Report) we had done, which ultimately rejected the proposal (Weston study and Panel report: http://www.townoflenox.com/Public_Documents/LenoxMA_Wind/index). It really came down to noise concerns: there would have been several residents within 1/2-3/4 mile of the turbines. And the economics weren’t as solid as we would have liked to see before making that kind of commitment. We’ve done a lot with solar.

Do you have other municipal or other commercial scale renewable energy or energy efficiency projects on the horizon in your community or nearby?
If yes:

Could you describe those projects?
We participated in the SolarizeMass program (partnership between MassCEC and Green Communities Division of Mass DOER) over the summer and fall, which is now closed. It was a joint effort with Pittsfield. MassCEC helped secure a vendor, who offered a volume discount: the more people who signed up, the cheaper the solar panels would be. We were able to reach tier 5, which is the highest level of participation and the lowest cost. All together we had 30 people sign up for mini-grants, 19 or 20 through SolarizeMass and another 10 through a vendor they chose themselves. The mini-grants have not all been distributed, because we’re giving them once the panels have been installed. A number of commercial establishments received mini-grants as well, but not necessarily through SolarizeMass.

We are also currently developing a large solar array for municipal needs. It will be at the wastewater treatment facility and landfill. It will generate 3 MW of electricity, which will cover all the electricity need for the town and schools. Right now we’re slogging through the process of getting the interconnect/power purchase agreement with the utilities. We’re dealing with both National Grid and Unitil. Optimistically, the process will conclude by next summer, so we’ll have construction next summer and be operating next fall. We’ve teamed up with Lee; it’s a joint venture. They’re working on a similar project of a similar size.

Will these projects receive funding from Green Communities Grants?
Yes, the Green Communities grant funded hiring Beth Greenblatt, a consultant to go through the request for proposals process. She’s helping navigate the nitty-gritty details with Broadway Electric Company. She’s been very helpful.

Other grant sources?
We received very small grants from the New England Grassroots Environmental Fund for the Lenox Unplugged program, and early Environmental Committee initiative to conduct home energy audits.

About 5-6 years ago we had an initiative where people could sign up to purchase green energy on their utilities bill for a surcharge, some of which came back to the town. We used that money to do a solar installation at the high school and fund a few interns to do a lot of community outreach through green energy fairs, etc.

Do you think the Green Communities program has been successful? Helpful?
Yes. The stricter energy code in place is going to help over time. We haven’t been building a lot recently, but hopefully the building cycle will kick up again. We have a small fleet, but we’ve already upgraded to 6-cylinder police cars, which saved us a quarter of our gas bill. We’re seeing real dollar savings. I always go back to this. I don’t try to sell it on saving the environment; I sell it on the dollars.
What kind of community response have you seen?
It varies a lot, but overall there’s good support. We’ve had 15% of homeowners do their own energy audit. I would love to have it at 90%; it doesn’t make sense not to. We’ve had very strong support for municipal solar projects at town meetings, and for the approved stretch code for higher energy efficiency standards.

Is there anything else you would like to share about your successes or challenges with your energy projects?
It’s two steps forward, one step back, but it’s still in the positive column. The Solarize project really exceeded expectations, and we would like to keep going with that, build on the momentum. We’d like to launch a Phase 2. I’m anxious to get our own large solar projects going. I think it will; it’s a matter of time. It’s taking a lot longer than we had hoped. The utilities are slogging along. They haven’t ramped up staffing sufficiently to work on this.

There’s always more to do. We’ve done a lot on the municipal side, but in the private sector there’s a lot more to do. We’ll keep plugging away at that.

We need to do a little better on the Green Community reporting. We don’t have the staff, that’s our biggest challenge. In these economic times, it’s tough to find the funding for the hours it really requires.

I would really like to see what I call a circuit-rider to serve a number of communities, maybe 2 or 3 for the county. That would a person who is well-versed in the grant opportunities and community outreach efforts and has some background in facility management and building efficiency. This person could spend a day in 5 communities. I think at one point CET was thinking about putting together an AmeriCorps application for a few of these positions, but I don’t think that has moved forward.
Green Communities Check-in: Becket
11-28-12

Email Correspondence:
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The DOER Green Communities funded building envelope improvements on the highway garage are under way now. The highway garage is a large metal building and, essentially, the work includes a new roof and siding, with spray foam insulation in between the old layers and the new.

The completed work on Fire Station #2 and Ambulance Garage (all one building) was funded by a grant from DOER, but under the ARRA program and the Energy Efficiency Community Block Grant (EECBG) and it also included building envelope improvements, as well as a new heating system. I have attached the final report on that project for your use. The architect created 2 information boards, which in pdf format can be printed at 24 x 36, which did a great job of explaining the challenges and opportunities of the project.

These are not terribly exciting projects from a visual standpoint, but the work on the highway garage, especially, should give a really decrepit building a new lease on life. It should save energy, but also make it a better place for the highway crew to work!

The challenges faced in both of these projects are primarily related to making sure the homework has been done before embarking on the project:

1. Ensuring that adequate funding is in place before initiating a project. Many grants are based on 'estimates' of the cost of a project, which may or may not be based in reality. Once actual designs and specifications have been developed, much more accurate project estimates can be made. Finding the additional funding or downsizing the project to meet the funding gap is always a challenge.

2. Understanding procurement and prevailing wage laws, including both Massachusetts and Federal (if using federal funds on the project), which will have a dramatic impact on the bidding, timing and cost of the project.

3. Ensuring that the project designs and specifications will meet the project goals. Remember that most designers (engineers, architects, landscape architects) will generally charge a minimum of 10% of the overall cost of the project, and usually more. So this is an additional cost that frequently is underfunded in the planning stage. Also, there remains a short supply of professional architects and engineers fully trained in 'green' design who are willing to work on small, local municipal projects, which tend not to pay very well or garner a lot of accolades. And there are definitely some charlatans out there, so you have to exercise due diligence in hiring all of your consultants.

4. Procuring contractors who are qualified and willing to work on projects in somewhat remote locations (increasing the cost of mobilizing and transporting materials and workers), and who are willing to comply with wage reporting requirements, etc., as required by funding agencies.

5. Garnering public support for the project (not all energy efficiency measures are particularly attractive, so
the public may have to be willing to sacrifice aesthetics for practicality. But maybe not, if your designer is really talented.) Sometimes you wind up covering a source of natural light, badly needed in a dank, dark garage, because there is no efficient way to address the air leaks around the existing windows.

6. Locating and procuring the most energy efficient components of a project can be daunting, and with the ARRA (American Reinvestment and Recovery Act) funded projects, the 'American Made' requirements were very difficult to meet, especially when coupled with high efficiency rating requirements: in many cases, we just do not manufacture the most energy efficient products in the United States. So obtaining waivers becomes the challenge.

7. 'Staging': Plan where you will be storing both construction materials and the existing furniture, equipment and supplies that are currently located in or around the building you are set to work on. In the case of the Becket Fire Station and Ambulance Garage, both fire trucks and ambulances needed to be parked outside during construction, a problem when outside temperatures fall below a certain level, as certain medical supplies and fire fighting supplies must be stored a proscribed temperatures.

8. In the case of the highway garage, a significant amount of design time was lost to making a determination as to whether the existing building could support the added weight of new layers of roofing and insulation applied to the exterior.

9. Murphy's Law: In any construction project, if it can go wrong, it often will. The bids will come in too high and you have to rebid the job. The weather will be uncooperative. The suppliers will send the wrong product. The architect wants more money to revise the plans. The construction contractor doesn't understand how to fill out the wage reporting documents. The change orders will take the project over budget. Etc., Etc. Some or all of these things occurred in both of Becket's energy efficiency projects...but we worked around everything that came up, and both projects have been very successful.

10. Funding agencies often assign project managers who, while frequently classroom certified in LEED and other green building technologies, may have very little exposure to real world construction and construction management. This can be both a challenge and an learning opportunity for the project manager on the ground, and it underscores an important concept in successful project management: it takes a team of allied professionals, as well as great patience and communication skills, to get the job done.
Personal Interview:
James McGrath, CPRP
Park, Open Space, and Nat. Res. Program Manager
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Do you currently have an active energy or climate action committee in your community?
The Green Commission was started in 2008. The mayor at the time, Mayor Ruberto, was really interested in making Pittsfield “green” and sustainable. It was established as an advisory board to the Mayor.

Does the committee:
- **Oversee the Green Communities requirements?**
  I oversee that. The Commission is advisory. It’s made of mostly citizens appointed by the Mayor and approved by City Council. The municipal staff on the commission does the heavy lifting. You can find all this on the website. Our meetings are televised.
- **Conduct community outreach and education?**
  See code I sent.

Would it be possible for you to share a copy of the Energy Reduction Plan (to reduce fossil fuel energy use by 20% within 5 years) your community submitted to qualify as a MA Green Community? Whole application.

Have you submitted a progress report to the MA Department of Energy Resources (DOER)? If so, could we obtain a copy?
I’m working on that. I’m still waiting for data from some people.

Renewable Energy Bylaw
Has your municipality passed a bylaw to enable commercial scale solar or wind power in your community? If so, could you forward a copy?
The process is a special permit in all districts besides neighborhood business district. Commercial solar is classified as a “quasi-public utility.”

We don’t have anything specifically geared toward wind. Most of our land with wind potential is state forest or watershed land where we wouldn’t want to site projects.

Grant funding
Has your community received grant funding for energy efficiency, renewable energy, community education or other projects through the Green Communities grant program or other grant funds?
- Could you describe those projects or forward a copy of the grant award?
  We received $256,632 from the first round of Green Communities funding. We were one of the first communities. We used that money to install an energy management system (EMS) at City Hall that basically allows us to “über control” the heating and cooling in this building.
  In round 2 we received $92,787 to fund a heating system conversion from electric to high-efficiency natural gas in the Lichtenstein Art Center. Berkshire Gas gave us $4000 for that project; WMECO gave us $40,000.

  **Other sources**: EECBG program was part of Obama’s stimulus package: $189,000.
For Powering Pittsfield we hired a consultant who received funding from the Barr Association. CET was our “energy concierge.” We went down North St. into every business and helped them do energy audits and make improvements. We also did MassSave to get people home energy audits. Unfortunately we have no idea whether people sealed the deal and actually made the improvements.

**What is the status of the energy efficiency/renewable projects receiving grant funding?**
See “Greening of Pittsfield” Report.

**Do you have other municipal or other commercial scale renewable energy or energy efficiency projects on the horizon in your community or nearby?**
If yes:

*Could you describe those projects?*
We just finished Solarize Mass with Lenox. It was very successful.

We’re looking at a second phase of Powering Pittsfield. Berkshire Gas and Western Mass Electric (WMECO) are interested in funding it again, but they want more control over the program. We saw the program as a success, and we learned a lot, but they’re really concerned with the numbers.

Powering Pittsfield is our most significant effort. There’s a lot of outreach and education associated with it. We pay some pretty high utility rates because of our old building stock. It’s about energy efficiency, but it has strong economic development and stability undertones.

**Do you think the Green Communities program has been successful? Helpful?**
It’s done a lot of things. It has legitimized that Pittsfield is a leader in sustainability. It alerts the public. It’s a state program, and we’re joining with other communities across the Commonwealth. A lot of people like the warm and fuzzy aspect.

We sold it on the financial support. We’ve gotten a third of a million dollars through it. Pittsfield likes to play nice with the state: if they’re offering a program, we’ll do it. We’re seen as a progressive community. We write good grants, and we’ve been able to show that we can pull it off.

We have a good team. We have a lot of people who care about it, creative people. We get a lot of support from the mayor; we’re actually given the opportunity to do this stuff.

I think I’ve done a fair job with it, but I’d really like to see a full-time position happen. I need to say hey, this person has the potential to bring in a couple hundred thousand dollars of grant money. BRPC could do this like they do for conservation.

**What kind of community response have you seen?**
There’s a real receptiveness to green and sustainability. It’s not like Northampton or Burlington, VT. At its backbone Pittsfield is a blue-collar mill town. There’s a process we have to go through to educate people. Our messaging has to be right on target. How do we reach that single mom who’s got three kids and just bought her starter home? How do we talk to her about energy efficiency when what she’s thinking about is how to pick up her kids?

**Is there anything else you would like to share about your successes or challenges with your energy projects?**
First we’re focusing on what we’ve got going on at the municipal level, and then we’ll branch out to the rest of the community.
Our big challenges are the age of our building stock and our socio-economic level. We need staff time, resources, and support. We need leadership out of City Hall from the Mayor. We’re hoping to get a full-time sustainability coordinator to run Powering Pittsfield and do the Green Communities annual reporting, etc. I spend maybe 20% of my time on this, but we could have someone spend all their time on this.

**What would you like to see from the Berkshire regional energy plan?**
It will document the goals and objectives and will give weight to grant proposals I write. Half of what I do is reference other things that say we should be doing it.

Some of the energy plan’s recommendations will be for things at the top level, but there’s a lot we can do out of an office like this. Grassroots things like a more robust home solar program.

It’s been a long time since we’ve had a regional energy plan. The field, the technology, the urgency is more dire.
Personal Interview:
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Assistant Assessor/IT Technician
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Do you currently have an active energy or climate action committee in your community? When was it formed?
After the Selectmen voted to join the Cities for Climate Protection Campaign in 2001, the COOL (CO2 Lowering) Committee, a group of volunteer residents, was formed to help implement Williamstown’s Climate Action Plan. The original goal of achieving 10% emissions reduction below 2000 level by 2010 was accomplished, I’m sure. But they were also incorporating community energy use.

Does the committee:
   Oversee the Green Communities requirements?
That would be me and the Town. I'll be overseeing the inventory. The decisions are entirely made by the Town, but we had an informal town discussion to get the ball rolling.

Would it be possible for you to share a copy of the Energy Reduction Plan your community submitted to qualify as a MA Green Community?
Yes, sent to you.

Have you submitted a progress report to the MA Department of Energy Resources (DOER)? If so, could we obtain a copy?
Submitted on Friday, but the energy use data sheet I sent you has more information. There’s also a lot in MassEnergyInsight as well.

Grant funding
   For what renewable energy and energy efficiency projects did your town receive funding from the Green Communities grant program?
In 2010 we received $142,000 to fund energy conservation measures at several municipal buildings, the installation of a 6 kW solar PV array at the Cemetery office building, and an energy education and outreach program.

   What is the status of the energy efficiency/renewable projects receiving grant funding?
Solar PV array on Cemetery building was installed in August, and it turned we could do 9.75 kW.

   Has your community received grant funding from other sources?
DPW solar array used some balance money leftover ($3900) from Commonwealth Solar. We’ve gotten a lot of National Grid incentives for relamping, Town Hall improvements, etc.

Do you have other municipal or other commercial scale renewable energy or energy efficiency projects on the horizon in your community or nearby?
If yes:
   Could you describe those projects?
PV at the landfill is always going to bantered around. We just talked about it again, and see the article in Municipal Advocate. Power purchasing agreements are also being talked about. We have DPW, library, and elementary school panels. Elementary school panels aren’t actually that efficient, so those are likely to be improved.

**Do you think the Green Communities program has been successful? Helpful?**

I think the concept is excellent, but I think the execution needs improvement. Concept is to reduce carbon footprint, but the way the Act is structured, measures success is by consumption reduction, and it puts renewable energy in a separate category for reporting.

Williamstown was ahead on energy reduction, so we’ve already squeezed all the blood from the rock. We are a small town that has certain large energy uses. 30% of our total town energy usage is the Williamstown Elementary School, 30% from municipial vehicles, and a large percentage (~18%) from water pumps. If you break down reducing our use 20%, we need to get a lot out of those three. The Elementary School was ahead of things, has solar panels. Vehicles over 8500 pounds and emergency response vehicles, police cars are exempt from the fuel efficient purchasing policy, but they account for a large proportion of our energy use. So to make a big dent in say diesel fuel, what do we have to do? Buy smaller vehicles where we can, but if we start cutting services, that’s not what it’s supposed to do.

DOER is reconstructing mid-stream based on feedback and evaluation. Our utilities companies load the data into MassEnergyInsight, but the source of generation is behind the meter. I would have to go back into all the pre-loaded data and account for all the renewable energy. I’m not going to do that. I think the best thing would be to have the utilities do it.

I also have an issue with DOER’s response when we modify our projects. We’re trying to reduce our energy use and our carbon footprint, and if we change things in the course of the project and don’t update DOER, they push back a bit. But so far so good.

Green Communities is supposed to be a collective. The idea is that we’re all working together, but it’s not pushing that. It’s called Green Communities, but it’s more Green Community if I’m focused on our own energy use, why would I hook up with Hancock? Towns like New Ashford, Hancock, they get left behind. We’re lucky because we have high tax rates, so we can be a leader.

How can we best service our entire constituents with this money? And that’s reducing the Town’s budget and the expenses of energy use, and then everyone gets the savings in a lower tax rate. See use and cost table I sent you. Costs drive most of the decisions.

**What would you like to see come out of a regional energy plan for Berkshire County?**

I would like to see projects that envelop more people that use the power of purchasing. BRPC could go to the utilities companies and say, hey, we want to do this. Have a plan, a solution, e.g. a certain kind of renewable project and get the answers for the towns, do the legwork. It’s not like Boston who can do everything on their own. BRPC could really help with the smaller communities. Not just compiling data, for example the landfill project, PV arrays, wind farms, ways to pool together a third-party lease. They did something like that with a seven building project, and I thought that’s fantastic. Check out what Franklin County government does, pooling together their 25 communities to have a greater impact.

BRPC could do analysis on the energy use from the different departments. I do that for Williamstown. I look at the energy use and if anything doesn’t make sense I talk to the department and turn the data into action items. BRPC could do this, especially for smaller communities who don’t have the staff, if they got permission to access data.
**Green Communities Regional Coordinator**

**11-30-12**

**Telephone Interview:**
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**Could you tell me a little about your work? What kind of progress have you seen? Common successes and challenges?**

In 2008 the Green Communities Act provided funding for municipalities if they met five criteria to support energy efficiency and renewable energy generation. I help municipalities understand what the five criteria are and how they can achieve them. I am the liaison between Boston and the municipalities. I’ve been here for three years, since the program was started. Before that I was a self-employed computer guy and a Selectman in Belchertown. I was born and raised in Pittsfield.

The state is divided into four regions with a regional organizer for each. 106 of the 351 municipalities in the state are in the Western Region, which I coordinate. Massachusetts is the first and maybe the only state to have the Department of Energy and the Department of Environmental Protection under the same Secretary, in the Executive Office of Environmental Affairs. DEP and DOER are sister organizations. DEP had already divided the state into four regions with an office in each, so DOER decided to do it the same way. I have an office at the DEP in Springfield, but I spend a lot of my time out in the municipalities.

Early on DOER engaged with regional planning agencies like BRPC. I spent the first year going to lots of town meetings, Selectmen meetings. I was primarily doing outreach and education.

By now most municipalities have heard of the Green Communities program. Next month I have 4-5 different appointments lined up. Sometimes it’s a group of citizens who get together and why we aren’t doing this. I suggest they put together a committee, and then I go talk to them about the five criteria and we decide whether to move forward.

Once a year we help municipalities become new Green Communities, and once a year we help current Green Communities get more money. I help with grants and paperwork.

**I’ve heard from several Green Communities that there is a lack of staff time, someone able to go out to all the Green Communities who is well-versed in the grant opportunities, community outreach, as well as renewable energy and energy efficiency projects. In some communities town officials are overseeing program, and they already have full-time jobs, but it’s really not something that can be fully managed by volunteer-based citizen committees. What have you heard and seen from the communities you’re working with?**

I have not said no to any town that’s asked for help. And as a matter of fact, I’ve offered to help a number of towns that said no thank you. Stockbridge and Lee were 80% through, and the town chose not to go forward. Washington and Lee rejected the stretch code (the 5th criterion to become a Green Community), and Stockbridge couldn’t find a way to make the criteria 1 zoning happen. I don’t know why North Adams hasn’t finished it; they already have the stretch code. Blandford in the next county had a lot of controversy.
Criterion 5 is that all new construction must reduce lifetime energy costs. Then you ask, how do we comply with that? The state building code was being updated, and there’s a part of the code for energy. In revising that we made a compromise with 2 versions, so there’s an optional “stretch code” for the building code that municipalities can adopt that’s a bit more energy efficient.

What kind of working group have you seen being the most effective in working toward Green Communities designation?
The most successful structure of work on Green Communities I’ve seen is a combination of municipal involvement and volunteer involvement. There is a finite number of municipal employees and what they can do, so you augment with citizens. A citizen committee, plus 1 or 2 municipal employees like representatives from the DPW or School Board worked really well in Belchertown.

What other municipalities in Berkshire County are working on the Green Communities designation?
Adams is close. Dalton has considered it, but they’re not very far. Lee might reconsider it. Otis is active in green activities, but not necessarily interested in becoming a Green Community. Florida and Hancock are too small. There was no one really there to talk to about it. I’m surprised I didn’t get further with Lanesborough. I couldn't find the right person to talk to.

Green Communities program focuses on municipal energy reductions, doesn’t say anything about residential energy use. Some communities, Williamstown, Lenox, which had pre-existing environmental committees, have incorporated residential energy programs and community outreach and education into their Green Communities work. Are you seeing much of that or is residential energy use an area that the Green Communities program doesn’t really address. Is there a need for something else, another program?
The legislation is designed to work primarily with municipalities. We thought, we have lots of municipal buildings that could be improved a lot and no money to do it with. So that’s the primary function and primary goals.

The money can be used for residential initiatives, and municipalities are doing that. There was just an article about Chesterfield in the Hampshire Gazette. They’re running a program to do MassSave audits and get insulation done, and if it costs more than what MassSave covers, they’ll give you up to $1000. That’s using Green Communities money.

Is there anything else you’d like to share about the Green Communities program?
I personally believe in this whole program. I was doing it in Belchertown before I got hired to do it. I’ve seen it work for tiny towns and for large communities. When people get together it works. This isn’t an unfunded, state-run program. The community makes their own decisions.
Appendix C: Complete Survey

Date:  
Location: 

Berkshire Regional Energy Plan Survey

The Berkshire Regional Planning Commission (BRPC) is developing an energy plan for Berkshire County. We are gathering input from residents to assess attitudes toward energy use and production in the County as part of the Sustainable Berkshires Initiative. Our aim is to determine what role energy efficiency and renewable energy projects would play in our energy future in Berkshire County. Your answers are extremely important to the project. Thank you for your time.

1. The regional energy plan will look at our current energy supply and use, and look for ways in which we can continue to meet our energy needs for the future. In thinking about meeting future energy needs in your home or business, how important is each of the following to you?

   1 - NOT IMPORTANT AT ALL  
   2 – NOT VERY IMPORTANT  
   3 - IMPORTANT  
   4 - VERY IMPORTANT

   | Increase conservation and efficiency         | 1 | 2 | 3 | 4 |
   | Increase energy generation within the county | 1 | 2 | 3 | 4 |

2. Below is a list of reasons that have been suggested for increasing energy efficiency and renewable electricity generation in the Berkshires.

Please rate the following choices based on their importance to you.

   1 - NOT IMPORTANT AT ALL  
   2 – NOT VERY IMPORTANT  
   3 - IMPORTANT  
   4 - VERY IMPORTANT

   | Regional Energy Independence | 1 | 2 | 3 | 4 |
   | Job Creation                | 1 | 2 | 3 | 4 |
   | Climate Change Mitigation   | 1 | 2 | 3 | 4 |
   | Reduced Air and Water Pollution | 1 | 2 | 3 | 4 |
Section 1: Electricity Generation in Berkshire County

3. How much of our electricity do you think currently comes from renewable sources? (circle one)
   a. 0-25%
   b. 25% - 50%
   c. 50% - 75%
   d. 75% - 100%

4. How much of our electricity would you like to see come from renewable sources? (circle one)
   a. 0-25%
   b. 25% - 50%
   c. 50% - 75%
   d. 75% - 100%

5. On a scale of 1 to 4—1 meaning strongly oppose, 4 meaning strongly support—how do you feel about each of the following energy sources as means of energy production for Berkshire County, regardless of where the energy is generated?

   1 - STRONGLY OPPOSE
   2 - MILDLY OPPOSE
   3 - MILDLY SUPPORT
   4 - STRONGLY SUPPORT

   If answer is 3 or 4, ask: on the same 1-4 scale, how would you feel about the development of a __________ project in Berkshire County?

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass (burning wood or other plant-matter)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>No Opinion</td>
</tr>
<tr>
<td>Coal Power</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>No Opinion</td>
</tr>
<tr>
<td>Hydropower</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>No Opinion</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>No Opinion</td>
</tr>
<tr>
<td>Nuclear Power</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>No Opinion</td>
</tr>
<tr>
<td>Solar Power</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>No Opinion</td>
</tr>
<tr>
<td>Waste-to-Energy (combustion of municipal waste)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>No Opinion</td>
</tr>
</tbody>
</table>
Wind Power – single turbine

Wind Power Farm – many turbines

8. Have you seen any of the renewable energy projects in Berkshire County (i.e. Jiminy Peak wind turbine, the wind farm in Hancock or solar array in Pittsfield’s William Stanley Business Park)?
   □ Yes
   where: ________________________________
   □ No

9. If so, what do you think of the projects you are familiar with?
   □ I like them
   □ I do not like them
   □ I am indifferent

Please explain:

Personal Information

Gender (please circle one):
   Male
   Female

Age (please circle one):
   Under 18
   18-25
   26-35
   36-45
   46-55
   56-65
   66+

Town of Residence: ________________________________
Appendix D: Verbal Survey Results

"I do not know enough about sorry to say, but I do know a lot of money is being spent on this project." (regarding Jiminy Peak Wind project)
N. Adams, Female, age 26-35, 11/9/12

N. Adams, Male, age 18-25, 11/9/"I think it is wise to try to use as much renewable energy as possible. We have to sustain the Earth."

“We would love to see more clean energy initiatives - water, wind, solar. Better for our families, our communities, our planet!”
and
“I know some residents feel the turbines/windmills are an eyesore and “ruining the landscape” but my family and I believe that these sort of energy initiatives are working towards protecting and preserving said landscapes!”
N. Adams, Female, age 25-35, 11/9/12

“I think they work.” (regarding renewable energy projects)
N. Adams, Male, age 66+. 11/9/12

“I have nothing negative to say about any of these choices because I am not familiar with how each and every one of these choices are efficient or not efficient. I do know coal. I was told and read about it not being a good choice.”
Adams, Female, age 26-35, 11/9/12

“I feel like hydropower should be more widely used.”
and
“I do not know a whole lot about the projects to make an informed decision.” (regarding renewable projects)
North Adams, Female, age 18-25, 11/9/12

“I thought windmills would be a good idea, but not here.”
and
“Bird migrations - it’s very disruptive. Solar power would be better.”
and
“No windmills here - no coal burning.”
Stockbridge, Female, age 56-65, 11/11/12

“We should aim to use build lots of small scale projects (eg. wind mills on homes like on sailboats).”
and
“No nuclear, no gas, no coal, no air pollution, **no fracking!**”
and
“I support locally produced energy.”
Lenox, Female, age 36-45, 11/11/12

“I see the wind power and I think oh, it’s good it’s wind, not coal, not nuclear, it’s wind not oil; it’s wind”

“People have been using windmills forever, it’s just metal now.”
Williamstown, Female, age 56-65, 11/17/12

“We shouldn’t be polluting our water or our air for that matter - it’s not right.”
Great Barrington, Female, age 18-25, 11/23/12

“We should make all our own electricity.”
Great Barrington, Male, age 46-55, 11/23/12

“I think they are necessary.” (wind turbines)
Great Barrington, Female, age 36-45, 11/23/12

“There just not a good fit here.” and “They’re so ugly.” (wind turbines)
Lenox, Male, age 46-55, 11/23/12

“People don’t seem to like them out here - they cause a lot of problems for the environment.”

“I don’t see why they have to be so big....”

They’re too noisy - I’ve had neighbors complain.”
Lenox, Female, 26-35, 11/23/12

“All those terrible things happening in NY - we don’t want them here.” (fracking and natural gas)
“We need more offshore wind.”

“We can’t expect tourists to come visit our mountains if we put these big machines on top of them.”
Lenox, Female, 46-55, 11/23/12

“Lots of people don’t like them but I think they look nice.”
Great Barrington, Female, 56-65, 11/23/12

“We should import only what’s necessary in terms of electricity. We should be doing all we can.”
Lenox, Female, 18-25, 11/23/12
“I don’t really know the difference between a lot of these - but I think the new ones are good if they can work well.” (renewables)

Great Barrington, Male, 66+, 11/23/12

“I think they’re beautiful.” (wind turbines)

“We definitely need more wind.”

“We need to be saving more energy - I think we use too much.”

“For now - we'll need more in the future when everything else runs out!”

Great Barrington, Male, 36-45, 11/23/12

“On public land - where its not disruptive.” (on where we should place turbines)

“We can’t put them on every mountain you know.”

Great Barrington, Male, 46-55, 11/23/12

“They don’t bother me. I don’t pay much attention.”

Great Barrington, Female, 56-65, 11/23/12

Q: How much of our electricity do you think currently comes from renewable sources?
“ I don’t have much of an idea but I would think at least some.”

Q: Have you seen any renewable energy projects?
“Not in Berkshire County but I’ve seen them in other places. Sort of majestic I think...and definitely necessary if we were going to stop using oil and coal.”

Great Barrington, Female, 46-55, 11/23/12

Q: What do you think of the projects you are familiar with?
“I think wind energy is good. I’ve seen the wind farms out in California, that’s the place for them. They are in big wastelands out there. The Berkshires don’t have that type of land. Here they are eyesores and ruin our ridges.”

Adams, Male 26-35 (32), 11/11/12
“I don’t think we’ve come up with a good safe way to do it yet.” (regarding nuclear)

“We’ve got a lot of wind and I don’t think it’s so bad on the environment”

“I’d love to know the numbers, like the solar, and what it’s generating”

**Pittsfield, Male, 46-55, 11/11/12**

Q: How important is it to increase energy generation within the county?

“If it’s cheaper for everyone then I support it - whatever is cheaper for everyone.”

“I know people who work at Jiminy that say it runs of regular electricity and doesn’t actually produce electricity itself”

**Pittsfield, Male, 26-35, 11/11/12**

“Let me just start by saying, solar panels and wind power are awesome”

“Honestly, I think it’s natural.” (about climate change)

“Nuclear if it goes bad, it goes real bad”

“Coal has never been a good idea; now it’s just people being lazy and not wanting to solve our problems”.

**Pittsfield, Male, 46-55, 11/11/12**

(Referring to global oil use) “The oil reserves are like a soda cup - one of these days, we’re going to get that slurpy sound when the straw hits the bottom”

(re: regional energy independence) “That’s a stupid, dangerous idea. Energy has to be a natural, international concern. The whole earth has to be energy efficient and stable, or none of it is.” “watching out for your corner of the world was fine in the 1800s.”

“I’m in favor of fracking. Even if it fucks up everyone’s water. We need to do something.”

(re: commercial scale Wind Farms) “I hate it, but its necessary”

“They depress me every time I notice them, but I still wouldn’t oppose it at all”.

**Pittsfield, Male, 66+, 11/11/12**

“Not in my lifetime” (about wanting 100% electricity from renewable sources, but not thinking it was possible)

**Pittsfield, Male, 66+, 11/11/12**