



Communities Tackling Vermont's Energy Challenges

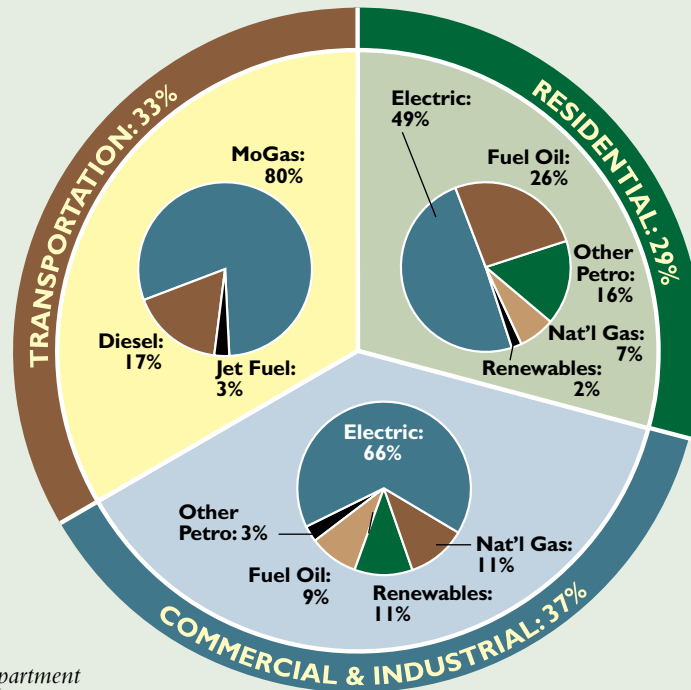
From Ideas to Action:
Implementing Clean Energy Strategies

April 2011



Vermont's Energy Mix

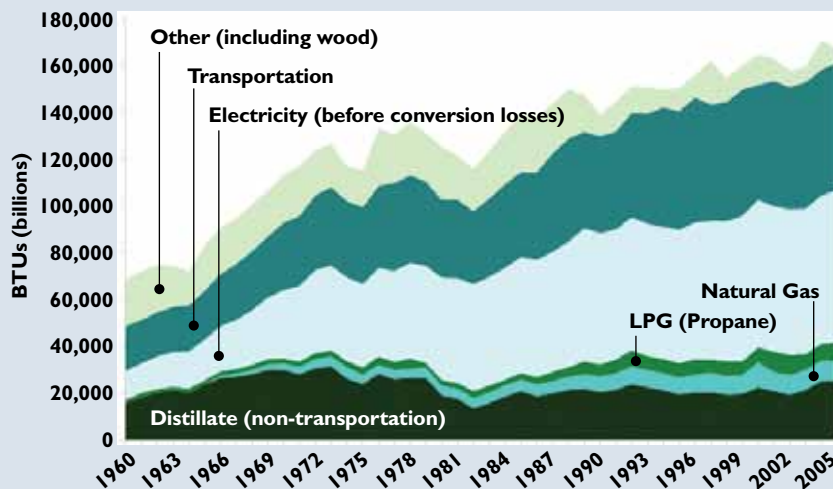
Vermont's heaviest energy use is in commercial and industrial enterprises and the transportation sector. Without a significant shift in the way that Vermont uses energy and the sources by which we obtain it, the state will fall short in meeting its energy efficiency, renewable energy and climate action goals.



Source: Vermont Public Service Department

Vermont's Energy Consumption By Category

Vermont's energy consumption has risen significantly from 1960 to 2005, most notably in the transportation and electrical sectors. Without reducing consumption and increasing investments and activity in conservation and efficiency, it's likely those numbers will continue to rise.



Source: Vermont Public Service Department

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From Ideas to Action: Implementing Clean Energy Strategies

Table of Contents

Chapter I. Intro	Page 3
Map of Clean Energy Implementation Projects Across Vermont	Page 4
Chapter II. Community Engagement Case Studies	
School Energy Literacy Curriculum — Cabot	Page 5
Keeping Up With the Jones' on Energy-Savings Opportunities — Essex	Page 6
Community Energy Fair — Hardwick	Page 7
Process for Kingdom Community Wind Project — Lowell	Page 8
Energy Challenge: Collaboration, Outreach & Education — Rutland County	Page 9
Sustaining a Strong Community Energy Committee — Waterbury	Page 10
Chapter III. Efficiency and Conservation Case Studies	
Creative Energy Efficiency Financing — Brattleboro	Page 11
Town Street Lighting Initiative — Hartford	Page 12
Energy Efficiency Standards in Zoning Bylaws — Hinesburg	Page 13
An Energy Consumption Challenge — Middlebury	Page 14
21st Century “Barn Raising” for Energy Efficiency — Middlesex	Page 15
Change-a-Light Campaign — Poultney	Page 16
Piloting PACE — Putney	Page 17
Community Energy Mobilization Project — Ripton	Page 18
Button Up Vermont Energy Education Program — Statewide	Page 19
School Energy Management Program — Statewide	Page 20
Historic Structure Weatherization Retrofit — Thetford	Page 21
Chapter IV. Renewable Energy Case Studies	
Renewable Energy Co-Op — Addison County	Page 22
Carbon Harvest Landfill Gas-to-Energy Project — Brattleboro	Page 23
Water Filtration Plant Powered by Water — Bennington	Page 24
Solar Hot Water Challenge — Chelsea/Tunbridge area	Page 25
Craftsbury Academy Biomass Boiler — Craftsbury	Page 26
Wastewater Treatment Plant's Combined Heat and Power Project — Essex Junction	Page 27
Solar Farm — Ferrisburgh	Page 28
Energy Education and Classroom Innovation Through Service Learning — Jericho	Page 29
Middle School Solar Project — Marlboro	Page 30
Community Renewable Energy Project — Montpelier	Page 31
Solar Power Purchase Agreement — Starksboro	Page 32
Group Net Metering — Underhill	Page 33

Chapter V. Transportation and Land Use Case Studies

High School “Eco Driving” Program — Colchester Page 34
 Expanding Transit: A New Rural Commuter Line — East Montpelier, Plainfield, Marshfield Page 35
 Hinesburg Rides: Creative Community Transportation Solutions — Hinesburg Page 36
 Anti-Idling Initiative — Middlebury Page 37
 Smart Commute — Upper Valley Page 38
 Farm to Foodbank: An Energy-Saving Success Story — Warren. Page 39

Chapter VI. Waste Reduction Case Studies

Reducing and Recycling Construction and Demolition Debris — Chittenden County Page 40
 Energy Efficiency Through Solid Waste Hauling — Westford Page 41

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APRIL 2011

Communities Tackling Vermont's Energy Challenges

From Ideas to Action: Implementing Clean Energy Strategies

Communities and motivated citizens across the State of Vermont are undertaking projects and programs to save energy, transition to renewables and reduce greenhouse gas emissions. *Communities Tackling Vermont's Energy Challenges*, an accompanying document to the *Energy Planning and Implementation Guidebook for Vermont Communities*, offers a glimpse at the kind of innovation underway across the Green Mountain State.

One common thread that ties together the more than three-dozen stories in this document is the strong local commitment to a clean energy future. Vermonters are mobilizing in greater number and with more success every year to help their communities, neighbors, schools and local businesses save money, save energy and generate in-state renewable supplies.

Communities Tackling Vermont's Energy Challenges is intended to highlight the kinds of projects communities are undertaking and outline, in short snapshots, some of the key elements that combined to make the projects possible. The case studies described in this document provide insight into the breadth and depth of projects and programs that are changing the face of Vermont. The range of issues that communities are addressing varies widely, but generally fall within five categories. These are:

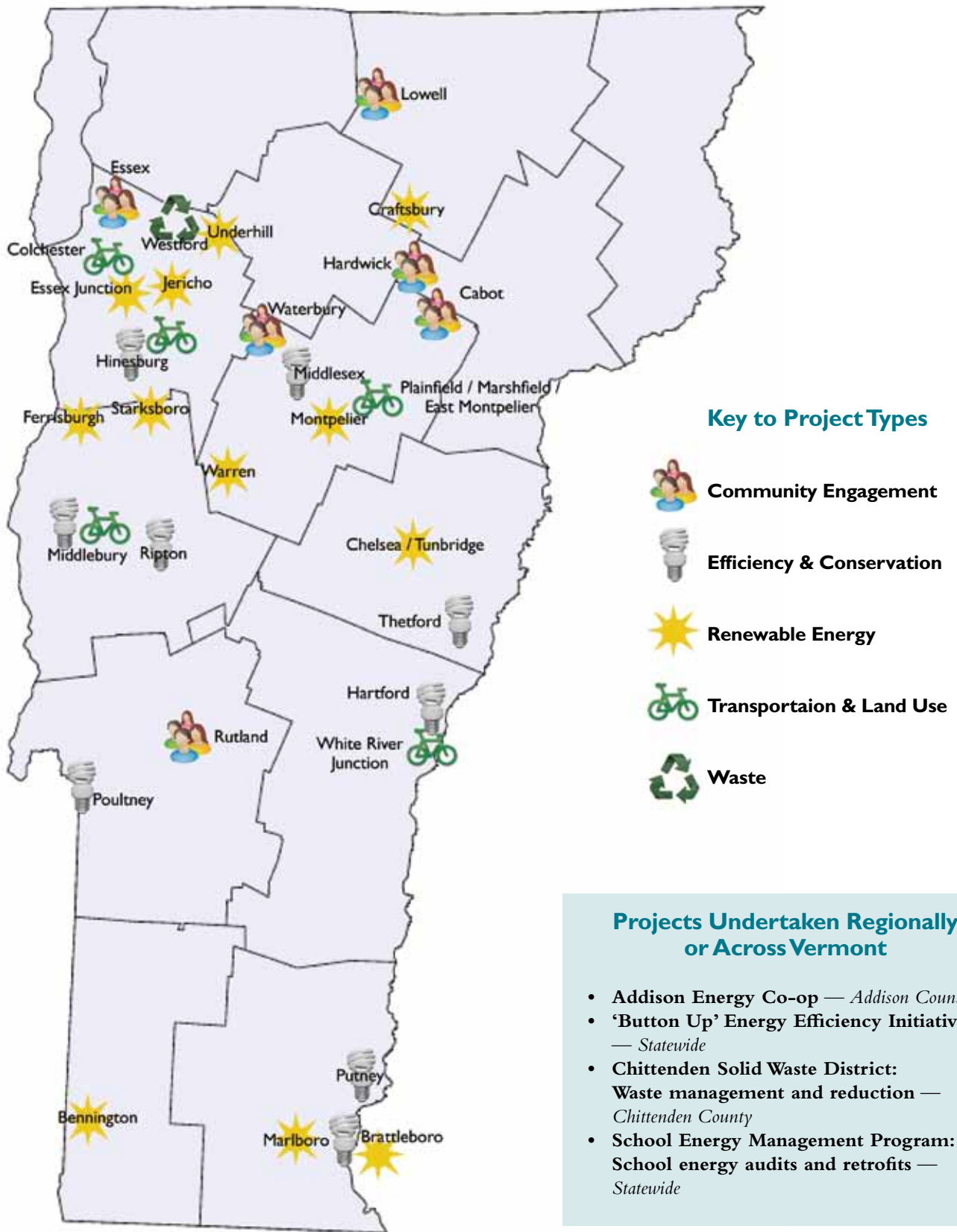
- **Community Engagement**, involving efforts of local officials, including energy committees and planning commissions, and citizens to involve the public in energy planning and implementation strategies, increase awareness about energy issues and opportunities, and promote greater involvement in local energy initiatives.
- **Efficiency and Conservation**, including efforts to save energy, save money or reduce consumption in municipal facilities or operations, as well as policies, programs and incentives to foster greater energy efficiency and conservation in the private sector.

- **Renewable Energy**, including the development or financing of renewable energy facilities by a municipality, either independently or in partnership with private energy developers, and local policies that promote or guide private renewable energy generation within the community.
- **Transportation and Land Use** policies, programs and investments that promote energy efficient “smart growth” development patterns, incorporate efficiency measures and renewable energy opportunities into site development, provide transportation options for bicyclists, pedestrians and transit riders and help keep farm and forest land open and available for cultivating food, fuel and other important community needs.
- **Waste Reduction** management practices aimed at maximizing energy efficiency and avoiding waste.

There are far more examples of innovative initiatives underway than highlighted in this document. These examples are a reflection of the kinds of different approaches communities and interested individuals can take. Some projects are led by the municipality or are in partnership with the municipality; some are championed by grassroots leaders or undertaken in collaboration with a state agency or private partners. Together, however, they are indicative of the different strategies needed to reduce our energy consumption and transition away from a fossil fuel based economy. These case studies demonstrate that strong local energy plans and engaged and knowledgeable citizens are essential to transforming creative ideas into action.

NOTE: If you have a story to share — a “model” for what other Vermonters might do to address energy issues — we hope you will share that with us. This publication will be available online at: www.vnrc.org, www.vecan.net or www.vlct.org and we will add more case studies intermittently. Please be sure to contact us so that we might share your success stories with others interested in taking on a similar initiative. Email jmiller@vnrc.org or call 802-223-2328.

Clean Energy Implementation Projects Across Vermont



II. Community Engagement Case Studies

Cabot School Energy Literacy Curriculum

Community Profile:

- Cabot
- 2008 Population: 987
- Located about 20 miles northeast of Montpelier, on the edge of the Northeast Kingdom, Cabot is a rural farming community known for a collective of dairy farms that share its name. The Cabot School sits close by the town green and is a center of community life.



Outcomes:

- The VEEP project with Cabot School reduced the school's annual electricity usage by 10% per year since 2003. More importantly, 10 years worth of Cabot students have had the opportunity to get engaged with energy and take leadership by promoting energy efficiency and renewable energy in their communities.



Overview:

- For a decade now, the Vermont Energy Education Program has worked with the teachers and students of the Cabot School to bring energy literacy into the classroom. Wanting to engage students in energy education, VEEP worked closely with teachers from Cabot School to create interactive hands-on projects. VEEP has come into the classrooms and provided materials, curriculum and training, and in-class workshops for teachers.
- Engaging students in an energy literacy program was the goal of the project, so the program focused on having the students fully involved in the learning process. Projects included building solar concentrators, creating CO₂ balloons, replacing incandescent light bulbs with CFLs, and weatherizing houses for local farmers. Hands-on projects engaged the students while they learned about more sustainable energy products and approaches.

Keys to Success or Lessons Learned:

- What made this project so successful was the fact that it involved hands-on projects that managed to engage students more successfully than other programs. Students were able to physically learn the differences between conventional methods of obtaining energy and new sustainable methods.
- Working with an entire school ensures multiple years of energy education exposure for students. The projects within the program can be adapted for different age groups resulting in a greater breadth of understanding and learning.

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II. Community Engagement Case Studies

Keeping-Up With the Jones' on Energy Saving Opportunities

Community Profile:

- Essex
- Population: approximately 19,000
- Essex, the second largest municipality in the state, is home to the state's largest employer, IBM's Microelectronics Department. The town strives to be sustainable and to maintain a vibrant, walkable community.

Overview:

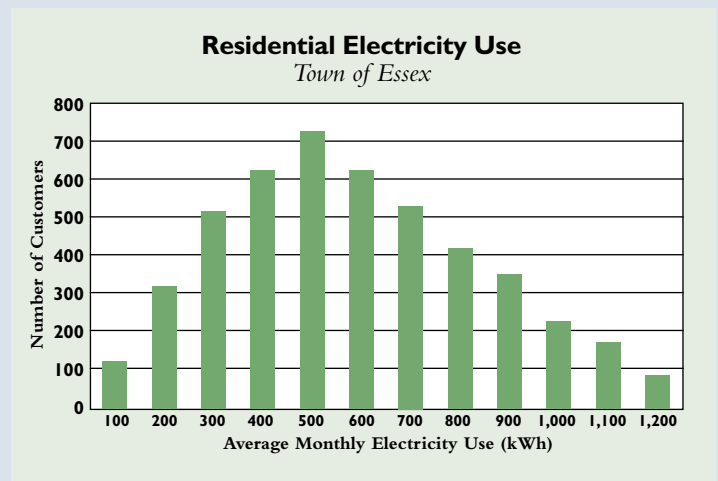
- In conjunction with the Essex Energy Committee's sale of 20,000 CFL's, the Committee also wanted to raise individuals' awareness of their energy consumption by giving them a tool to compare their energy consumption with the average household consumption in the community.
- The Committee contacted Efficiency Vermont and got the electricity usage data by household (with all the individual residence data removed).
- Then the Committee created a graph and published it in the local newspaper, the Essex Reporter, and encouraged citizens to look at the graph and see where their energy consumption fell compared to the average household's consumption.
- The newspaper article encouraged people to go the Energy Committee's website and Efficiency Vermont for ways to save energy, and also encouraged them to buy CFL's from the Energy Committee's sale.

Outcomes:

- The Energy Committee did not track energy consumption or CFL sales after the article because short-term energy use trends can be affected by weather and other factors. However, the article helped to boost CFL sales and definitely raised awareness.

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II. Community Engagement Case Studies

Hardwick Energy Fair

Community Profile:

- Hardwick
- 2008 Population: 3,207
- Rural and picturesque Hardwick sits at the edge of Vermont's Northeast Kingdom. Historically a farming and sugaring town, many locals continue to operate business in a similar fashion. Residents still follow the distinct New England lifestyle by supporting the general store, town meetings, and seasonal festivals.

Overview:

- The Hardwick Energy Committee has worked hard to help Hardwick citizens be more sustainable and supportive of the local economy. One of Hardwick's success stories was a partnership among the Energy Committee, the local Transition Town group and the Center for an Agricultural Economy in co-hosting a sustainable living and agriculture fair. The fair's emphasis was on local food and energy and environmental education, with a goal of highlighting a strong link between the issues. Over 1,000 people attended the daylong event.
- Organizers partnered with local forestry students to offer booths focusing on food, energy, education and sustainability. Local farms promoted the benefits of homegrown fare. The local food co-op tagged all the food it sold with the names of the farms from which it originated. There were several environmental education groups that engaged people in learning about the amount of energy needed in a household, including the Vermont Energy Education Program bike that people could ride to highlight the difference between powering a CFL light bulb versus a regular light bulb.

Outcomes:

- Between 1,200 and 1,500 people attended the daylong event and learned about the meaning of sustainability and how it relates to food, energy and the economy.
- While it is more difficult to measure the impact of a fair, organizers undertook a follow-up survey on town meeting day. Survey results demonstrated that education and information helps. Many respondents noted that the fair had helped shape their thinking or that they had made some lifestyle changes because of what they learned.



Keys to Success or Lessons Learned:

- Piggybacking where possible adds power! Holding the sustainability fair in conjunction with Hardwick's annual 'spring fair' drew many more people. This unique partnership helped organizers make a connection between food, energy and sustainability, which are often separate issues in people's minds. Organizers said making different connections proved pivotal to their ability to attract so many people. (Weaving in fun — like music and door prizes — also helped.)
- Advertising was extremely important to the fair's success. Organizers postered, emailed and used social media to reach out to Vermonters in Hardwick and beyond.

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Other Communities With Similar Projects:

- Northeast Kingdom Energy Fair, Lyndonville, VT — Lorna Higgs, NVDA — lhiggs@nvda.net
- Solar Fest, held in Vermont but targeted region-wide — <http://solarfest.org>
- Waterbury LEAP's Annual Energy Rally — www.waterburyleap.org

II. Community Engagement Case Studies

Process for Kingdom Community Wind Project in Lowell

Community Profile:

- Lowell
- Population: approximately 750
- Overview: Lowell, located in the Northeast Kingdom, is a small community noted for its working farms and large tracts of forestland. Route 100 and the Missisquoi River run through a broad valley that separates the Cold Hollow range of the Green Mountains to the west from Lowell Mountain, which straddles the town's eastern boundary.

Overview:

- As of 2010, there have been no new large-scale wind developments in Vermont since Green Mountain Power (GMP) sited 11 towers in Searsburg in 1997. In an effort to bring more renewable energy online, the GMP proposed a large wind project in Lowell in 2009.
- The community did not immediately welcome GMP's project, but after many meetings with the community and an extensive outreach campaign, the town voted 342-114 in favor of supporting the Kingdom Community Wind (KCW) project on a 3-mile stretch of the Lowell Mountain Range.
- If the permits are secured, the project could be up and running as early as late 2012. All the power will go to Vermonters – GMP customers and Vermont Electric Co-Op (VEC) members. GMP will own the project, but will supply a portion of the energy to VEC at the same cost as they charge their customers.
- The proposed 20 or 21-turbine wind farm will have a capacity of up to 63 megawatts, which can generate approximately 156,000 megawatthours of renewable energy.
- The turbines will be sited on private property that has been maintained as a timber farm for generations. The persistent west-northwest winds that blow perpendicular to the ridgeline are ideal for wind generation. In addition, the project will upgrade existing transmission lines and substations, rather than building everything brand new.
- Aesthetics, environmental impacts and public health issues are of concern to many community residents and residents of neighboring towns, as is often the case when large wind projects are undertaken. To acquire the necessary permits, KCW must address many of these issues, including impacts on habitat and native species.

Outcomes:

- The KCW project is a good example of the kind of process that is necessary when large-scale developments are proposed. The project's host community, the Town of Lowell, had a voice in the project from the beginning.

- GMP reached an agreement with local officials to pay the Town of Lowell a minimum annual payment of \$400,000 (to increase by \$32,500 every 5 years), which is comparable to the Town's current municipal budget. In addition to the \$400,000, if the project exceeds 36 megawatts in nameplate capacity, then GMP will annually pay the Town \$5,000 for every additional megawatt of capacity in excess of the 36 megawatts. If all 20-21 turbines are approved, and capable of generating 63 megawatts a year, the Town could potentially receive \$535,000 annually, which could result in approximately \$15 million over 25 years.
- In addition, GMP is creating a KCW "Good Neighbor Fund" that will go to the towns that are within a 5-mile radius of the project — Albany, Eden, Craftsbury, Irasburg, and Westfield. The payments to each town will be based on the wind farm's production, and the acreage each town has within the 5-mile radius. However, no matter what, each town will receive a minimum of \$10,000 a year. If the wind farm produces 149,000 mWh per year, payments to towns would be: Albany - \$54,030, Craftsbury - \$26,171, Eden - \$59,855, Irasburg - \$10,000, and Westfield - \$10,000.



Keys to Success or Lessons Learned:

- Listening to and working to address community concerns. GMP held many meetings with area citizens to explain the details of the proposed project, answer questions and attempt to address concerns.
- GMP also hired local former dairy farmers, Andy and Gert Tetreault, to help build public support for the project locally.
- Proponents worked to provide information and context about big wind, including organizing two field trips for 40 concerned and interested citizens to the nearby Lempster Wind Farm in New Hampshire.

Contact:

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II. Community Engagement Case Studies

Rutland County Energy Challenge Harnesses Collaboration, Outreach & Education

Community Profile:

- Rutland County
- 2009 population: 63,014
- Rutland County is Vermont's second most populous county. The City of Rutland is a central hub for commerce and employment. Twenty-seven towns include historic hamlets, highly productive agricultural lands, winter and summer resort areas and significant forested areas in the Green and Taconic Mountains.
- Groups Responsible: Sixteen businesses, non-profit organizations, and municipal energy coordinators facilitated by the Rutland Regional Planning Commission.



employs volunteers to make energy-saving retrofits, including installing low-flow showerheads, water heater tank wraps etc, in willing neighbors' homes.

Regular editorials and newspaper articles also helped build public awareness about the Energy Challenge and promote pride in Rutland County's role in leading Vermont's energy transformation.

Overview:

The Rutland County Energy Challenge is a collaborative effort committed to seeing Rutland County lead Vermont and the nation in energy solutions.

The Challenge's purpose is to:

- reduce the costs of energy use through efficiency and conservation,
- increase use of renewable forms of energy, and
- serve as a model for the rest of Vermont and the country.

In response to a regional forum about energy issues held in September 2009, the Rutland County Energy Challenge was created as a venue for collaboration and communication about the myriad ways to reduce Rutland County's reliance on fossil fuels. From the beginning, a major goal included establishing the region as the statewide leader in energy transformation. Diverse stakeholders—including the electric utility, local businesses, the Rutland Herald and active citizen volunteers—saw the opportunity to set goals, build a coherent message and achieve measurable results across all sectors.

Organizers of the Challenge set a 2010 goal for a 10% increase in all energy efficiency services and products sold in Rutland County, including energy-efficient lightbulbs, EnergySTAR appliances, furnace tune-ups, and residential energy audits. Organizers wanted to, as easily as possible, measure their success. Their approach to measuring savings was made possible largely because Efficiency Vermont tracks each of these categories.

To help accomplish their goals, Challenge organizers reached out to energy coordinators or established energy committees in each town to support their effort. They also harnessed existing programs, including the Vermont Community Energy Mobilization Project, which is a program that trains and

Outcomes:

- Volunteers worked in 200 Rutland County homes to install energy-saving devices, as well as identified homes that could benefit from a professional energy audit.
- The Challenge has helped to promote the work of — and create work for — Home Performance contractors, local fuel dealers, and plumbers by tapping into their needed services.
- The Public Building Energy Program is offering a professional energy audit on one municipal building in every town.
- Increased public awareness about and engagement in energy-saving opportunities. For example: CVPS includes information about the Energy Challenge in each Rutland County residential electric bill several times each year.

Keys to Success or Lessons Learned:

- Reach out to diverse stakeholders and invite them to talk and to participate. In Rutland County, dozens of town selectboards, businesses, and organizations pledged to support the goals of the Challenge by considering energy-saving opportunities and by engaging employees and constituents.
- Organizers created a steering committee that meets regularly to keep things moving forward and keeps partners abreast of project developments.
- Develop measurable goals, track progress and report on progress.
- The Energy Challenge is bolstered by a U.S. Department of Energy grant to NeighborWorks of Western Vermont to create an innovative program to guide homeowners through the energy retrofit process. The highly-competitive \$4.5 million grant was awarded in part because of the Energy Challenge's record of collaboration.

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II. Community Engagement Case Studies

Sustaining a Strong Community Energy Committee

Community Profile:

- Waterbury
- 2008 Population: 5,384
- Waterbury, in central Vermont, is composed of a village within a town, each its own municipality. The comprehensive plan for Waterbury is a vision for both the town and the village.

Overview:

- Waterbury LEAP (Local Energy Action Partnership) was created in 2007 and is one of the most active town energy committees in Vermont. LEAP's mission is to engage the community in reducing carbon emissions and promoting energy efficiency and the use of renewable resources.
- Waterbury LEAP is fueled by the energy and ideas of local volunteer members. It supports town leaders and municipal government whenever it can, but is not a town or village government committee.
- Waterbury LEAP's mission is to:
 - support reductions in man-made emissions that contribute to global climate change;
 - assist individuals and organizations to make positive changes towards reducing fuel bills and to produce more energy locally;
 - strive to be a model for what small towns in the U.S. and elsewhere can do to address the global climate crisis.
- Waterbury LEAP is an independent organization. In this respect, it can be more flexible and responsive when opportunities arise, help the town when it can, and pursue those priorities and projects that are important to it without the oversight of the municipal government or the voters. LEAP recognizes that town officials have a lot on their plates, and something that is a high priority to LEAP might not be a high priority to local government.

Outcomes:

- LEAP has a very strong relationship with town officials. It communicates regularly with the Selectboard, Planning Commission, Conservation Commission, and the School Board. It also works with other Waterbury non-profits. LEAP also initiates and carries out projects on its own, or in partnership with other organizations such as the Vermont Energy & Climate Action Network and Efficiency Vermont.

Keys to Success or Lessons Learned:

- Organize an event to identify interested folks and help kick things off. In March 2007, interested citizens organized a local 'Step It Up' event. 125 people attended, 60 people signed up saying they wanted to help Waterbury become

more energy efficient, and LEAP was born.

- Build a strong email distribution list. Email is the best way to connect with a large group of folks. Gather emails all the time from 'like-minded' folks. Write your emails carefully and make them brief, relevant, and periodic.
- It's critical to decide on a clear mission and structure. What are you trying to accomplish, and who is responsible? It helps to have core group of folks (5+) who can be counted on to show up and help.
- Attend as many town events as possible and be visible. LEAP has had displays at town fairs, farmers markets, Home & Garden shows, July 4th parades, and other activities.
- Pick a few projects that are tangible, useful and measurable. Complete the projects, and report success widely. You may find that more people want to join your effort.
- Run efficient meetings. The quickest way to sap an organization's energy and enthusiasm is to hold long meetings where no decisions are made. Each meeting should have an agenda. The chair should keep discussion on topic and on time. Start and finish the meeting on time, and clarify 'to do's' at the end.
- Everybody can benefit from the work of an energy committee. Inform individuals, businesses, schools, social organizations and the municipality about your work and its benefits. The more constituencies involved in your work, the more support you'll receive.
- Don't be afraid to ask for ideas and support. Waterbury LEAP has never had anyone in the environmental and energy community turn down a request for suggestions or support.
- Involve town leaders. Always invite town leaders (Selectboard, planning commission, town manager) to your events, and give them updates on your progress.
- Pace yourself, and take the long view. Don't take on more than you and your fellow volunteers can accomplish. Plan reasonable, achievable goals for the next couple of years. Build on your successes, and celebrate your achievements.



Contact:

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III. Efficiency and Conservation Case Studies

Creative Energy Efficiency Financing in Brattleboro

Community Profile:

- Population: approximately 12,000
- Brattleboro is the first major town over the Vermont border on Interstate 91. It is a regional employment and commercial center, with a mix of a rural landscape, a commercial strip along Route 5, and a lively downtown with many urban amenities.



Overview:

In 2002, Brattleboro joined the Cities for Climate Protection Campaign, which requires cities to commit to significantly reducing their carbon emissions. The Town of Brattleboro set a goal of reducing overall emissions by 10% below 2000 levels by 2010, with a 20% reduction for municipal buildings and operations.

Brattleboro Climate Protection (BCP) proposed that the town contract with an ESCO (Energy Services Company) to help meet its emission reduction goals. The National Association of Energy Services Companies defines an ESCO as “a business that develops, installs, and finances projects designed to improve the energy efficiency and maintenance costs for facilities – generally over a seven to 10 year time period.”

The town manager was very supportive of the project, so a small group of BCP members, in partnership with Efficiency Vermont and Siemens, began conducting preliminary studies of 15 municipal and public school buildings.

BCP presented the findings to the town Selectboard, and with the Board's approval sent Requests for Proposals to 10 ESCOs.

Both Siemens and Honeywell replied to the RFPs. BCP interviewed both companies, and in the end chose Honeywell based on its direct answers to their questions.

In March 2006, Honeywell made a presentation at Brattleboro's representative Town Meeting. The project focused on 15 municipal buildings and was approved unanimously.

Following the town's approval, Honeywell did an investment grade audit, and then presented its findings to the Selectboard and School Board. The bodies approved the project in February 2007. The Town entered into a performance contract with Honeywell, in which the projected energy savings are used to help pay for the cost of the project over the loan period.

The project is being funded through a municipal lease provided by Citibank, which offered the lowest interest rate over a 15-year term.

Since 2007, Brattleboro has made improvements to the walls, windows, lighting, and boilers in 15 of its municipal and school buildings. Overall, the buildings now use approximately 17%

less energy.

Brattleboro is continuing to make improvements, including: installing more fuel-efficient boilers in the Municipal Center, replacing parking garage lights with LEDs and streetlights with higher efficiency bulbs, and revamping its entire wastewater treatment plant. The plant will use methane capture for electricity and heat for the sludge digesters. The town hopes for it to be

a net-zero building.

Outcomes:

- A 17% decrease in energy use for 15 municipal and school buildings overall (comparing 2000 energy use to 2008 energy use).
- Projected savings when all projects are complete:
 - 48,387 gallons of fuel oil
 - 449,781 kWh of electricity
 - Cost savings - \$131,804
 - 746 tons of CO₂ (a 22% reduction)
- Increased community awareness about energy efficiency and how it can save money.

Keys to Success or Lessons Learned:

- ESCOs are generally more expensive than hiring different contractors for every step of a project, because an ESCO commits to do the whole project start to finish. Brattleboro chose an ESCO because the project involved a large number of buildings, and because the performance contract model allowed the project to be completed as one package, using the projected energy savings to pay part of the cost of the loan. With a smaller project, a community would likely save money by hiring contractors on its own without using an ESCO, since ESCOs charge a premium price for their services.
- Financing a project through a performance contract with an ESCO can be an effective way to complete energy efficiency projects without a large capital outlay in institutions, campuses, businesses, and larger municipalities. Since the energy savings are guaranteed by the ESCO, the municipality or business assumes little risk, and the ESCO provides service from start to finish.

Contact:

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III. Efficiency and Conservation Case Studies

Hartford Town Street Lighting Initiative

Community Profile:

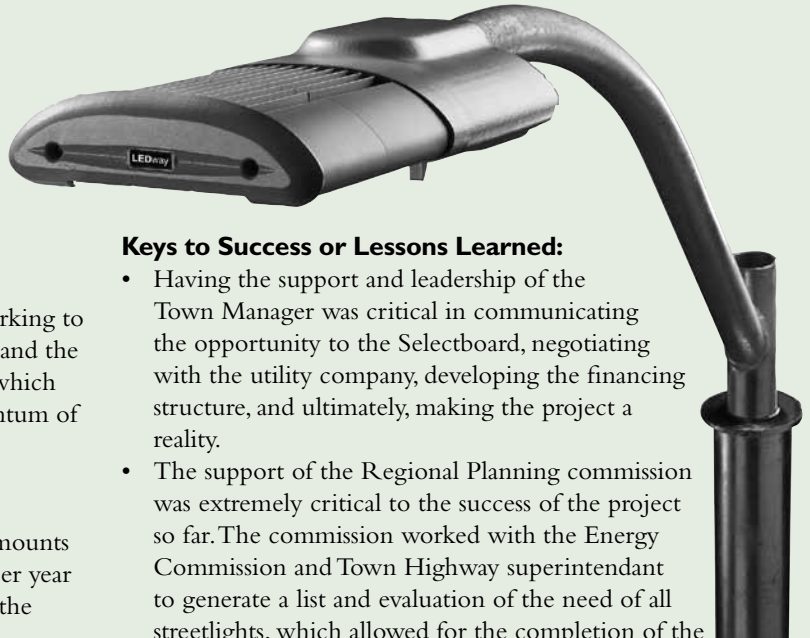
- Town of Hartford
- Population: 11,500
- Located in the Upper Valley of eastern Vermont, Hartford is a crossroad for recreation and commerce. Situated close to the New Hampshire border, Hartford is a gateway for Vermont with excellent transportation options.
- Groups Involved: The Town, the Hartford Energy Commission, a Town appointed voluntary group working to promote local, sustainable energy efficient solutions, and the Two Rivers–Ottawaquechee Regional Commission, which provided the list of streetlights and drove the momentum of the project.

Overview:

- Recognizing that town streetlights consume great amounts of energy and exact a high cost — up to \$120,000 per year — the Town of Hartford looked into alternatives to the current street lighting system.
- Town staff, the regional planning commission and the Town Energy Commission started first by analyzing the town's streetlight network. In a technical evaluation process, the team identified about 40 percent of streetlights which seemed to serve no useful purpose (and even detracted from safety due to the increased glare from the lights) and could be removed.
- After identifying a targeted array of streetlights to remove, the team hosted three public hearings to hear from residents on the idea. In some cases, residents made strong cases for keeping the lights on but in the end, however, it made sense to turn off or remove the majority of the lights that had been originally identified for removal.
- With the help of a consultant, the Town put out a Request for Quotation for bid pricing on different manufacturer's lighting products. The team evaluated the available lighting technologies and the approximate cost and chose one bidder to implement the project.
- The town anticipates the conversion of the light fixtures will take place sometime in Summer 2011.

Outcomes:

- The end result of the project will be a significant cost benefit for the town. In total, the replacement with energy efficient LED fixtures (with dimming ability) and removal of excess streetlights will save the town about \$64,000 per year.



Keys to Success or Lessons Learned:

- Having the support and leadership of the Town Manager was critical in communicating the opportunity to the Selectboard, negotiating with the utility company, developing the financing structure, and ultimately, making the project a reality.
- The support of the Regional Planning commission was extremely critical to the success of the project so far. The commission worked with the Energy Commission and Town Highway superintendant to generate a list and evaluation of the need of all streetlights, which allowed for the completion of the first phase.
- Soliciting bids beyond the power company enabled the team to select the best option for the town, not necessarily going with what the power company offered.
- Working closely with the power company early in the process allowed the town to understand the opportunities and constraints involved in the conversion to LEDs. Ultimately, the town decided that owning and maintaining the fixtures, versus rental (which is the current arrangement) is more cost effective and beneficial to the town.
- A \$50,000 incentive from Efficiency Vermont helped draw down the cost of the replacement project for the town and change its payback term from 5.7 years to 4 years.
- Go for what you want, you might just get it!

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Other Communities With Similar Projects:

- Thetford, Fairlee, Rockingham, Chelsea and several other Vermont towns

III. Efficiency and Conservation Case Studies

Energy Efficiency Standards in Zoning Bylaws

Community Profile:

- Hinesburg
- Population: approximately 4,600
- Hinesburg, located in fast-growing Chittenden County, has long sought to maintain its historic settlement pattern of a compact village surrounded by farm and forestland. Home to the successful NRG Systems, the town has also supported a variety of energy efficiency and renewable energy initiatives.

Overview:

- In 2005, Hinesburg was updating its town plan. The town's priority was to realize its smart growth goals and make changes to its zoning and subdivision bylaws that would promote and require compact, high-density development in the village. As part of the town plan discussion, the community's interest in encouraging energy efficiency, conservation, and renewables also arose.
- Beginning in 2007, many members of the community began voicing support for requiring and incentivizing energy efficiency in the town's zoning and subdivision bylaws.
- The community's interest in such measures was piqued and supported by NRG Systems, a local renewable energy company; local green builders, including Chuck Reiss, who developed a net-zero subdivision; and the Vermont Green Building Network.
- The community decided on three energy efficiency requirements for new buildings: (1) that residential buildings be built to Energy Star standards, (2) that non-residential site plan applications complete a LEED scorecard, regardless of whether LEED certification is sought, and (3) that non-residential structures greater than 6,000 sq. ft. get at least 10% of their energy from renewable sources or be LEED certified.
- In addition, the community included provisions to ensure small wind turbines are allowed.
- And, finally, the community agreed to grant density bonuses (allowing a developer to construct more units than normally allowed on a parcel of a given acreage) in exchange for developers incorporating green building practices into their construction. These bonuses are also available to projects that incorporate renewable energy technologies as well as projects that include smaller sized dwelling units, as smaller homes require less construction material and, as such, translate into a smaller energy footprint.
- In 2009, the Selectboard passed the energy efficiency standards in the zoning bylaws.



Outcomes:

- It works! All construction since the regulations passed has gone smoothly and has had no problems meeting the regulations.
- Kinney Drugs, as one example, is building a new pharmacy in Hinesburg and has chosen to do a LEED certified building. It will be the first LEED certified Kinney Drugs.
- Hinesburg will have a smaller carbon footprint due to its stricter building standards.
- Community members, who build new structures, will save money in the long run, even though energy efficiency and conservation measures may cost more up-front.

Keys to Success or Lessons Learned:

- It is easier to pass policies that incentivize green building, rather than policies that require it. However, incentives need to be real and substantial if the community actually wants developers to build greener in order to receive the incentives. Good incentives for building structures to become more energy efficient include: more flexibility in development, and anything that will result in the developer being able to make more money.
- If a community decides to go with requirements instead of or in addition to incentives, it should try to tie the requirements to available tax credits to offset the additional costs of energy efficient building.
- Hinesburg is in the process of altering one of the energy efficiency requirements. Instead of requiring commercial buildings to get 10% of their energy from renewable sources, the town is considering requiring that new commercial building meet Efficiency Vermont's "Core Performance Standards" which deal with the energy efficiency of the building itself.

Contact:

Alex Weinhagen, Director of Planning and Zoning for Hinesburg, hinesburgplanning@gmavt.net, 802-482-3619

III. Efficiency and Conservation Case Studies

Middlebury Unplugged: An Energy Consumption Challenge

Community Profile:

- Middlebury
- 2007 Population: 6,373
- Located in Addison County's Champlain Valley, Middlebury is probably best known as the home of Middlebury College — an internationally renowned liberal arts school. The bustling regional center is full of shops, businesses, and architecturally distinguished buildings.
- Groups Involved: Vermont Community Foundation, Middlebury Energy Committee and Efficiency Vermont.

Overview:

- In 2009 the Vermont Community Foundation piloted an energy challenge for 14 local businesses in Middlebury. After applying for and receiving a grant of \$10,000 from the Vermont Agency of Natural Resources, VCF supplemented the project with \$1,000 and advanced the challenge. The goal of the project, called Middlebury Unplugged, was not only to encourage businesses to reduce their electricity use, but to set an example for others on how saving energy benefits both the environment and people's pocketbooks.
- For three months, the 14 businesses competed to reduce their energy consumption by the greatest percentage. Each business was given an energy monitor provided by Energy, Inc. that provides real-time information on electrical consumption. The monitor used — the TED 5000 — updates automatically every second, allowing participating businesses to see how much electricity they are using at all times. Businesses kept this monitor by their cash registers so customers could also view the information.
- The winning business was determined by which one had the greatest overall percentage decrease in its electricity bill. The winning business benefited in two ways: a lower energy bill and recognition for their business in the *Addison Independent* and *Vermont Business Magazine*.
- In the summer of 2010, six nonprofit organizations throughout Addison County participated in a second round of the "Unplugged" challenge. Along with having the energy monitors, these organizations worked with Middlebury Unplugged coordinators — as well as partners from the Middlebury Energy Committee and Efficiency Vermont — to identify areas of potential energy savings and prioritize the implementation of improvements. Each month, participants came together to share their successes and challenges, learn from others (including guest speakers), and discuss related topics, such as composting and calculating carbon footprints.

Outcomes:

- The majority of local businesses consumed less energy while educating themselves and their customers — through the project's website, posters, local media etc — on the benefits of reducing energy usage. By the end of the project, the top five businesses had reduced their energy bills by an average of 17% and saved a total of 3,262 kWh, equivalent to roughly six months of electricity in an average Vermont home.
- The top five businesses reduced their electric bill by about \$20 per month. The average utility bill was less than \$120 a month, so the savings were significant.
- The Rainbow Room won the challenge by reducing their energy use by 38%, conserving over 1,400 kWh from the previous year. This saved the company \$177.
- The six nonprofit organizations that participated in Round II of Middlebury Unplugged committed to carrying out over 40 energy- and cost-saving measures, from replacing inefficient lighting and boilers to improving their building's insulation.



Keys to Success or Lessons Learned:

- The energy monitors were key to success. The efficiency and speed with which they recorded and displayed the data to staff and customers extended the breadth of the project from just the 14 businesses involved in the challenge to an entire community. The size and convenience of these monitors was pivotal to educating residents on the importance and ease of reducing energy consumption.
- Assistance and support from both the ANR and local partners — including Efficiency Vermont, the Middlebury Energy Committee, and the local utility Central Vermont Public Service — were pivotal to the project's success.
- Personalized, consistent support from program coordinators, along with an emphasis on energy savings and efficiency beyond electrical use, educated participants and motivated them to take action.

Contact:

Vermont Community Foundation
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III. Efficiency and Conservation Case Studies

21st Century Barn Raising Improves Municipal Energy Efficiency at School

Community Profile:

- Middlesex
- 2008 Population: 1,872
- Middlesex, situated along the Winooski River in central Vermont, was historically a farming town with two small mill villages. In recent decades, the town has become a bedroom community of Montpelier where people enjoy a rural setting.
- Groups Responsible: The Middlesex Energy Team, an active volunteer group interested in improving energy usage and increasing community involvement in energy solutions. MET partnered with Central Vermont Community Action Council's EnergySmart team and Rumney Memorial School – the Town's K-6 elementary school that functions as a center of community activity.

Overview:

- Interest in helping homeowners and the community save money by saving energy catalyzed the creative idea to mimic the old-time 'barn raising' model and harness volunteer sweat equity to undertake a significant weatherization project at the local elementary school. The Middlesex Energy Committee and school officials identified significant energy saving opportunities at the school, as well as the chance to educate people on how their houses work in regards to energy usage and insulation. The project was strongly aided by a \$12,000 grant from the Agency of Natural Resources 'Climate Change Grant Program.'
- Over a sizzling two-day period in June 2009, 18 volunteers worked under the supervision of four weatherization crew leaders from the Central Vermont Community Action Council. Digging under the existing insulation in the hot attics of Rumney School, they plugged air leaks before adding a new layer of cellulose insulation. Led by certified energy efficiency auditor Paul Zabriskie, the volunteers rotated ½ hour shifts up in tight quarters to keep the project momentum and share the workload.
- The project aim was not only to reduce energy costs for the school, but also to demonstrate to the community the potential savings that can be achieved from retrofitting their own homes. The project was a teaching mechanism that served as a functional learning experience for both the volunteers and Middlesex residents.



Outcomes:

- The retrofitting saved the school approximately 2,000 gallons of fuel oil a year – about a third of its previous usage, which saved several thousands of dollars.
- The local volunteers understand where to find the best bang for the buck in energy retrofits, have the experience and skills to take on similar projects in their own homes, and can share what they learned with their neighbors.
- An estimated 22 tons of carbon emissions are being saved each year.

Keys to Success or Lessons Learned:

- A key team of players was created. A certified energy auditor planned and supervised the retrofit, working closely with the pivotal project champion — the school principal — as well as a dedicated crew of professionals and volunteers.
- The project was affordable. A large number of committed volunteers made the most expensive piece of many weatherization projects — labor — inexpensive. Creative financing strategies and bulk purchasing of supplies also proved pivotal.
- Celebration and thanks! A celebratory barbeque was held after the project as a way to drive the point that this was a community event – a 21st century barn raising!

Contact:

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III. Efficiency and Conservation Case Studies

Poultney Change-a-Light Challenge

Community Profile:

- Poultney
- 2009 Population: 1,525
- Balancing its historic past and acceptance of modern technology and life, Poultney offers a variety of activities and experiences for visitors and residents alike. The Village of Poultney is listed in the National Registry of Historic Places and is a popular tourist destination.
- Groups Involved: The Town of Poultney, Williams Hardware (the local hardware store), Green Mountain College, and the Energy Star Change a Light, Change the World campaign.

Overview:

- In October 2003, Efficiency Vermont challenged the residents of the Town of Poultney to replace at least one incandescent light bulb with a compact fluorescent light bulb (CFL). The town, a local hardware store (Williams Hardware), an environmental class at Green Mountain College, and the Energy Star 'Change a Light, Change the World' campaign joined together to promote the use of energy-efficient CFLs.
- Bob Williams, owner of Williams Hardware, applied for a donation of 1,500 free CFLs from the True Value Corporation, which has a retail value of \$15,000. After being awarded this donation, the Westinghouse Lighting Corporation also provided another 1,500 CFLs at discounted prices. The challenge was centered at Williams Hardware where Poultney citizens went to receive their CFLs.
- While Williams Hardware worked on distributing and selling CFLs, students from the Green Mountain College's "Energy and the Environment" class with professor Dr. Steve Letendre helped track the participation in the challenge. They also surveyed the town's attitudes toward efficient lighting and aided in spreading the word about the challenge. These students hung posters and banners around town, as well as delivered CFLs door-to-door to those confined to their house.
- With the news of the challenge spreading, Governor Douglas issued a proclamation to challenge every Vermonter to change a light like in Poultney. This proclamation grabbed the attention of the news media, with the story running in every major daily newspaper in Vermont. As a result, thousands of Vermonters heard the story of Poultney's challenge, and the use of Efficiency Vermont's instant lighting coupons increased across the state.

Outcomes:

- With 1,127 households involved in the Poultney light challenge, 96% of all households changed a light bulb to a CFL. 1,500 CFLs were distributed to residents for free and another 1,500 were sold at discounted prices from the Westinghouse Lighting Corporation. For every free CFL Williams Hardware distributed for free, the store sold an average of 3.4 CFLs. Williams Hardware sold over 3,000 CFLs during the challenge.
- For the community as a whole, it saved \$30,904 annually and \$197,786 over the lifetime of the bulbs they changed. With CFLs using 66% less energy than incandescent lights, over 777 tons of CO₂ emissions were eliminated with this project. This quantity is equivalent to removing 155 cars from the road!



Keys to Success or Lessons Learned:

- The combination of organizations and people that were involved with this project was extremely important to the success of the challenge. The momentum given to the project from Efficiency Vermont was crucial to the initiation of this project. Having a strong support from the local hardware store and local students helped make the challenge well known to Poultney residents to have the most penetration.
- The fact that the project was simply to have citizens replace a light bulb helped the project reach so many households. The simplicity of changing a bulb increased the participation levels.

Contact:

Efficiency Vermont, efficiencyvermont.com, 888-921-5990

Other Communities With Similar Projects:

- Middlebury: 72 Hours of Light
- The Manchester Challenge

III. Efficiency and Conservation Case Studies

Piloting PACE in Putney

Community Profile:

- Putney
- Population: approximately 2,600 people
- Putney, in southeastern Vermont just north of Brattleboro, is a lively rural community, with several innovative schools, and is home to many writers, artists, and craftspeople.
- Groups Responsible: The Putney Energy Committee (PEC) with the support of the town.

Overview:

- PEC was originally formed back in 1977 and was one of the first community energy groups in Vermont. The group was appointed by the Putney Selectboard and recognized by then Governor Richard Snelling. The group currently consists of approximately 12 community members.
- The goal of PEC is to diminish the effect of climate change by creating new ways of saving energy and reducing Putney's energy usage and carbon footprint through recycling, conservation, and the replacement of non-renewables with renewable energy sources. PEC decided that one way to implement its goals was to advance the clean energy financing tool called PACE (Property Assessed Clean Energy) to make it easier for local homeowners to invest in energy efficiency and renewables.
- From the beginning, PEC received strong support for PACE from the community members, the town Selectboard and the town manager, all of whom have been instrumental to moving the program forward. PEC helped raise and sustain this support through an extensive education campaign that involved multiple mediums, including: PEC's website, email, letters to the editor, flyers and events.
- Putney voted unanimously to create a 'clean energy assessment district' at the 2010 Town Meeting Day. Creating a defined 'district' is the first essential step for a PACE program to move forward.
- Putney was then awarded a grant of \$80,000 from Vermont's Clean Energy Development Fund (part of the American Recovery and Reinvestment Act). The grant was awarded in large part because of Putney's willingness to create a pilot PACE program and share lessons learned, resources and information with other Vermont communities interested in moving PACE forward. Putney is also a community that has demonstrated consistent support and implementation of clean energy improvements.
- Putney is planning to use the grant money to provide loans to homeowners in the community wishing to weatherize homes or install renewable energy sources, such as solar hot water or solar electric.



Outcomes:

- Through PACE and the Clean Energy Development Fund, Putney will have more solar and photovoltaic projects and more renewable energy in general, including micro-hydro and wind. Additionally, PEC hopes that members of the community take advantage of PACE to better insulate their homes and businesses.
- More than a dozen homeowners and businesses have expressed interest in the PACE program and hope to make PACE-funded improvements soon.
- Overall, PEC has raised awareness throughout Putney about the need to conserve energy and ways of going about doing so.

Keys to Success or Lessons Learned:

- Becoming a PACE community takes hard work and perseverance. The community's approval at Town Hall Meeting Day was just the first step in implementing and sustaining PACE. Now the PEC and the community must plan exactly how they will go about using their grant award, how they will sustain the program, how they will overcome some federal stumbling blocks that arose in the last year and how they can get more homeowners in the community to sign-on.

Contact:

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III. Efficiency and Conservation Case Studies

Ripton Community Energy Mobilization Project

Community Profile:

- Ripton
- 2008 Population: 586
- Located in the Green Mountain National Forest in central Vermont, Ripton is a small bedroom community of Middlebury.
- Groups Responsible: Efficiency Vermont, which provides energy audits for Vermont residents, in partnership with the Ripton Energy Assistance Program (the local energy committee).

Overview:

- The Vermont Community Energy Mobilization project was a pilot project to help local residents learn about how to improve home energy efficiency and to achieve direct energy savings through the installation of energy-saving products in residents' homes. Efficiency Vermont and local energy committees partnered to implement this project with 15 groups covering approximately 30 communities over a two-year period. Ripton was one of the pilot communities in the first year.
- Ripton's project involved 25 volunteers helping 60 local households (both single-family homes and apartments) make energy efficiency improvements. Volunteers conducted "home energy visits" wherein volunteers upgraded 30 percent of all households in Ripton with energy efficiency measures. Volunteers were trained to make strategic suggestions to residents as well as to directly install small energy-saving products — for no-charge — including aerator/flow restrictors, low-flow showerheads, compact fluorescent bulbs and programmable thermostats. They also helped insulate hot water tanks and hot water piping. In the 60 residences, a total of 623 measures were installed.
- The project aimed at helping low-income residents, but all households were able to participate.
- Volunteers also made suggestions for larger investments and energy-saving products, such as ENERGY STAR products.

Outcomes:

- This project helped Ripton residents save 39,588 kilowatt hours over 1 year — equating to a combined annual savings of \$5,744.

Keys to Success or Lessons Learned:

- The number — and commitment — of volunteers was extremely important to the success of the project. The Ripton energy coordinator, Warren King, called people asking if they wanted a home visit, which turned out to

be the most successful approach. Ripton's small size also made it easier, with small-town acquaintances and fewer homes to tackle.



- With the financial backing of Efficiency Vermont, Energy Federation Inc. supplied the equipment for the installments, which was extremely reliable and efficient. This allowed for more home visits at convenient times. The project coordinator could order supplies at the beginning of the week and receive the shipment three days later. This allowed for accommodating scheduling for home visits.
- This turnkey program tapped into the significant local civic interest in energy issues — as well as our human instinct for neighborliness — to create a formula for success.

Contact:

Warren King, Ripton Energy Assistance Program
kinglet@together.net

Paul Markowitz, VCEM coordinator: paul@markowitzvt.com

Other Fun Facts about VCEM:

- In the small town of West Haven, population 275, under the leadership of the town coordinator Linda Garrison, 1 out of 5 homes received energy-saving retrofits.
- Over 5% of homeowners who participated in the VCEM program have moved ahead with comprehensive energy improvements under the Home Performance with ENERGY STAR program. This compares with a statewide average of under 1%.
- 98% of participants would recommend a home energy visit to a friend and 62% took additional steps to improve efficiency after receiving a home energy visit.
- Over two years, the program achieved 598 MWH in electrical savings and 1,758 MMBTUs in thermal savings or the equivalent of 12,720 gallons of #2 fuel oil.
- The program was implemented in both 2009 and 2010 over a four-month period.
- Over a two-year period, 500 volunteers conducted over 1,200 visits.

III. Efficiency and Conservation Case Studies

Button Up Vermont: Energy Education Program

Community Profile:

- State of Vermont
- Population: 621,760
- Groups Responsible: Button Up was led by Central Vermont Community Action Council, in partnership with Efficiency Vermont, and engaged local town energy committees, educational centers, and other community groups to deliver the workshops locally.

Overview:

- The 'Button Up Vermont' program was a series of two-hour workshops in 2008-2009 on the fundamentals of building heat loss and opportunities for saving energy. In communities all across Vermont, energy committees and civic groups organized the workshop for interested residents, distributed educational materials, worked with local retailers to provide discounted weatherization materials, and publicized the program in their communities.
- Button Up developed and trained presenters (BPI-certified auditors) to deliver PowerPoint presentations, conducted regional informational sessions for local community partners, prepared guidance documents for presenters and local organizers, and implemented a statewide outreach and media campaign to publicize the program.
- According to workshop participants, the Button Up Vermont program was extremely successful. Nearly 100 percent of respondents — 99 percent — rated the workshop either as excellent, very good, or good in a survey of the program. In a follow-up survey conducted four months after the completion of the workshops, 22% of survey respondents said they had made major efficiency improvements to their homes that included air sealing and/or insulation.

Outcomes:

- Over a two-year period, Button Up Vermont resulted in educating over 4,000 Vermonters on energy saving opportunities in their homes through the delivery of 180 workshops. Button Up also prepared a how-to video on air sealing in the attic and basement.



Keys to Success or Lessons Learned:

- Providing the resources and coordination to make local execution as seamless as possible, including a prepared PowerPoint presentation, educational materials, and guidance documents for local groups.
- Raising awareness and encouraging public participation. A key piece of this was by conducting a statewide media campaign that complemented the outreach efforts of local groups.

Contact:

Paul Markowitz, Energy Project Specialist
Central Vermont Community Action Council
paul@markowitzvt.com, 802-229-6307

Current Program

CVCAC is no longer coordinating the Button Up program on a statewide basis. However, they have prepared a list of trained presenters and guidance documents that they can share if you are interested in hosting a workshop.

I hope the state can continue running this program. It may even take a few years for people to understand how valuable this program is.

---- Local Button Up Organizer, Pownal

III. Efficiency and Conservation Case Studies

A Tale of 10 Schools Working to Save Energy

Community Profile:

The 10 schools highlighted here were located across Vermont in small and large communities. They requested and received a walk-through energy assessment by the Vermont School Energy Management Program (SEMP), which targeted energy savings through improved operation and maintenance as well as facility improvements.

Overview:

SEMP provides services to schools at no charge as a program of the Vermont Superintendents Association. Upon request of school administrators, SEMP's program director will perform a walk-thru energy assessment of the school building(s) and generate a written report on the findings. Over the past five years alone, the program has visited 341 school buildings and generated 262 reports.

The assessment includes recommendations for no cost/low-cost operation and maintenance measures that schools can take as well as delineating more capital intensive measures. On average, 35 recommendations for improvements were made at each school building studied. The report is often used as a roadmap for the school's energy reduction efforts.

With support from the High Meadows Fund, a program evaluation was undertaken to examine 10 of the schools that were visited by the program in recent years to determine the outcome of the visits and reports.

Outcomes:

The study showed the following:

- The schools studied implemented 76% of the recommended operational changes and 67% of the more capital-intensive measures. Adopted operational recommendations included: tracking energy use, changes in scheduling of HVAC systems, reducing on-time for plug loads etc. Higher cost measures included: lighting improvements, boiler controls, demand controlled ventilation, and envelope improvements.

- The schools experienced electrical savings of 17% for a total of 1.2 million kWh for dollar savings of about \$144,000.
- Their fuel savings of 18% were the equivalent of 52,436 gallons of fuel oil (actual fuel type varied) for the 10 schools.
- Most of the energy savings came from low cost or no cost measures.

Keys to Success or Lessons Learned:

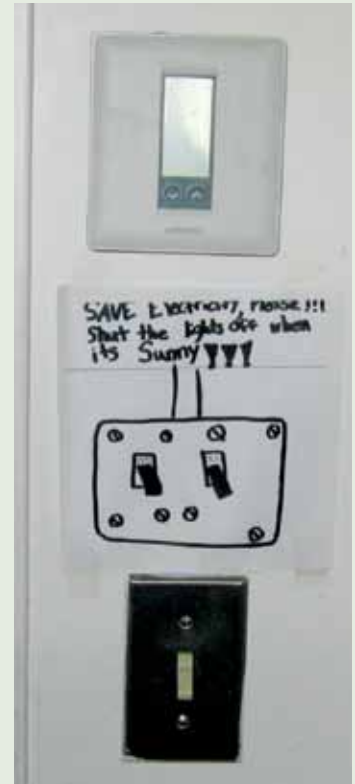
- Schools are the largest buildings in most Vermont towns. Energy-saving and educational opportunities around energy and greenhouse gas reduction strategies at schools are significant. Community energy committees and passionate people can play a powerful role in spurring efforts around efficiency and other energy improvements in school buildings. That starts with discussing the need for energy efficiency with school officials and helping to instigate an energy saving program at their local facilities. SEMP is a great partner in this arena, as they offer energy assessments at no cost to the schools.

Contact:

Norm Etkind, SEMP Director
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Other Communities With Similar Projects:

- Brattleboro Union High School, Robert Clark, Facility Manager
- Woodstock Elementary School, Karen White, Principal
- South Burlington High School, John Everitt, Superintendent



III. Efficiency and Conservation Case Studies

Thetford's Historic Structure Weatherization Retrofit

Community Profile:

- Thetford
- 2000 Population: 2,617
- Thetford is composed of five villages Thetford Hill, Thetford Center, Post Mills, North Thetford, and Union Village. There is a strong ethic of both natural and architectural resource preservation to help preserve the town's character.
- Groups Responsible: Sustainable Energy Resource Group, Thetford Energy Committee, Thetford Center Community Association, citizen volunteers, funders, and many more.

Overview:

The Thetford Center Community Center is an historic schoolhouse that serves as a location for many different events including community suppers and town recreation activities. A partnership between the Sustainable Energy Resource Group (SERG) and the Thetford Energy Committee catalyzed the weatherization project, which started in 2009 and took a year to complete. Because the TCCC is an historic building, the groups engaged historic preservation experts early on, including the Preservation Trust of Vermont and Division of Historic Preservation, to assess and design energy efficiency implementation strategies. The success of the project relied on many volunteer hours and funding from a variety of sources.

Outcomes:

- Anticipated overall energy savings from the building weatherization are over 70%. This was achieved by performing the following work:
 - Reducing air leakage by almost 80%, as demonstrated by blower door tests from 5,886 CFM 50 before work to 1,200 CFM 50 at the completion of the project.
 - Installing 2" of foam insulation on basement walls, 16" of cellulose in the attic and dense-packed cellulose in the walls.
 - Installing curtain drain to keep moisture out.
 - Restoring parts of the foundation that were failing.
 - Installing 150 CFM bath fan with motion controls to ventilate building when in use and help maintain healthy indoor air quality.
 - Installing a new high-efficiency sealed-combustion furnace, which will further reduce fuel use and assure proper ventilation of combustion gases and more.
- An historic preservationist trained volunteers to weatherize the building's windows onsite. This both improved the building's efficiency by reducing leaks and taught volunteers to do the same work on their home's windows.

- The building gets far more use from the community as a result of this effort because the retrofit made the space more comfortable.
- This project serves as a model for how other Vermont communities can make energy efficiency improvements on beautiful, old buildings while preserving their historic nature.



Keys to Success or Lessons Learned:

- The support of the Thetford Selectboard, as well as generous support from a variety of organizations and individuals, was vital to the success of this project, including:
 - The Thetford Center Community Association, which helped support, promote, fundraise for and generate the people power to undertake the effort by leading the volunteer recruitment.
 - The 59 volunteers who donated more than 500 hours of labor!
 - The Thetford Energy Committee, which lent organizational support during the entire project.
 - Donations from private and public organizations (Ben & Jerry's, New England Grassroots Environment Fund, Preservation Trust of Vermont, Vermont Department of Environmental Conservation), local businesses and private individuals.
- The volunteers received technical assistance from energy efficiency experts as they undertook their work to ensure they were making the improvements correctly.
- The project leaders consulted with historic preservationists to take historic concerns into consideration while making efficiency improvements.

Contact:

Robert Walker (SERG), SERG@valley.net, 802-785-4126

IV. Renewable Energy Case Studies

Renewable Energy Co-Op

Community Profile:

- Addison County
- Population: 36,617
- Addison County is one of Vermont's quintessential rural, farming regions.

Overview:

The Acorn Renewable Energy Co-op is a member-owned energy cooperative, based in Middlebury, Vermont. The Co-op serves all of Addison County's 23 towns, and has expanded membership to Rutland and Chittenden counties. Founded in June 2008, the Co-op seeks to help members reduce their dependence of fossil fuels by expanding access to affordable renewable energy sources through bulk purchasing. Its 175 residential, commercial and institutional members steer the Co-op through a democratic decision-making process.

Outcomes:

- The Co-op's first initiative was bulk purchasing of wood pellets for its members. Since then, it has created a market for local pellet producers to sell to and now procures its pellets exclusively from Vermont Wood Pellet, LLC. The success of the pellet initiative has led the Co-op to expand to other renewable energy sources, including solar domestic hot water and photovoltaic systems.
- The Co-op also recognizes the importance of building energy efficiency and encourages members to weatherize their homes as a first step towards energy sustainability. It partners with a number of state and local organizations to help members with efficiency installations and supports member advocacy for establishing Property-Assessed Clean Energy (PACE) districts in their towns.
- Another benefit to members is the Co-op's "Partners and Affiliates Program" through which members can receive discounts with local businesses on renewable energy systems, installations, fuel purchases and many other products and services.
- The Co-op also has an extensive online directory of local and statewide energy efficiency and renewable energy businesses and resources, available on its website (www.acornenergycoop.com).
- A very successful initiative has been the Energy Education Program, supported by the Addison County Regional Planning Commission and the Addison County Economic Development Corporation. This monthly series holds



presentations at the Middlebury library on various topics including weatherization, solar systems and group net metering. Recent events have attracted significant attendance.

- Since operation began in 2008, there have been a number of exciting accomplishments. Five solar hot water systems have been installed, 440 tons of both bagged and bulk pellets have been sold, and four bulk pellet storage systems are being tested in addition to two existing bulk delivery customers already in place.

Keys to Success or Lessons Learned:

- Extensive community engagement and mutually beneficial partnerships with local businesses, institutions and regional entities are key to success.
- In order to grow local renewable energy businesses (e.g., wood pellet manufacturers) it is helpful to organize and build a market for them to sell to. Co-ops are a successful model for raising awareness and building consumer demand.
- The primary challenges have been increasing understanding of the need and benefit for weatherization and for finding ways to make renewables as affordable as possible. Moreover, it is difficult recruiting new members and working with a limited budget. The majority of the work of the Acorn Co-op is conducted by volunteer members on the board of directors and by one part-time staff person.

Contact:

Greg Pahl, Acorn Renewable Energy Co-op, gpahl@sover.net, www.acornenergycoop.com

IV. Renewable Energy Case Studies

Carbon Harvest Landfill Gas-to-Energy Project in Brattleboro

Community Profile:

- Brattleboro
- Population: 12,005
- Brattleboro, located along the Connecticut River, is the oldest town in Vermont. Brattleboro is a vibrant arts community, with notable organizations in the area including the Vermont Theater Company, Commons, and the Brattleboro School of Dance.

Overview:

Don McCormick, president of Carbon Harvest Energy, has a visionary business model. His landfill-gas-to-energy project in Brattleboro is one-of-a-kind in the United States. Methane gas from the landfill runs a generator to produce electricity while the heat from this process is trapped and will be used to run a greenhouse and aquaculture. The greenhouse will produce over 20,000 pounds of food a year and the 30,000-gallon aquaculture will host tilapia. This will give the region fresh, local food even in winter. The project entails rebuilding and retooling America's first landfill-gas-to-energy facility installed in Brattleboro in 1983. "We don't need to go looking for new resources, some already exist and we simply have to use them better," said McCormick.

Carbon Harvest Energy has also partnered with UVM's Rubenstein School of Environment and Natural Resources and the Vermont Sustainable Jobs Fund to research algae. In this project, McCormick hopes to use the algae for three purposes: 1) to feed the fish, 2) to produce biodiesel, and 3) to filter the combustion gasses from the generator. When the system is finished it will be a closed cycle. For example, the fish waste will be used to fertilize the hydroponic food and algae, and carbon dioxide from generator exhaust will be harvested to grow algae.

McCormick credited Vermont's "Standard Offer" program for "(making) a project like this feasible." The Standard Offer sets competitive rates for generating up to 50MW of energy from local, renewable sources. "I'm proud of Vermont, and I'm glad to be a business launching out (of it)," McCormick noted.

The project was a truly collaborative effort. McCormick and his staff worked closely with the Windham Solid Waste Management District, Senator Leahy's office, the Town of Brattleboro, the Vermont Economic Development Authority, the Clean Energy Development Fund and Will Raap of the Intervale to make the project possible. Carbon Harvest Energy is also seeking to partner with the Vermont Food Bank to provide them with food from the greenhouse. McCormick anticipates that the project - and the power production - will be online in spring 2011 and that hopefully the project will "inspire people to look at their communities and their resources differently."



Outcomes:

- The project will create roughly 4,000,000-kilowatt hours of electricity per year and power about 450 average Vermont homes.
- The facility will offset approximately 20,000 tons of carbon dioxide a year.
- The project will produce 200,000 pounds of food; Carbon Harvest Energy is making plans to donate a portion of the food to the Vermont Food Bank.
- The project will create 8 jobs in Brattleboro.

Keys to Success or Lessons Learned:

- Carbon Harvest Energy's model of development is to look at the area's local energy resources and local food needs and match them to a project designed to manage waste and pollution. This leads to open, collaborative projects between the company and the municipality.
- The groundbreaking algae research conducted by Carbon Harvest Energy and the University of Vermont could lead to a legacy of job creation in this emerging field.
- The project was able to create a lot of local support because of the level of integration the project has with local businesses and organizations. The hydroponic food will be used to support local businesses including stores, coops, and restaurants. The algae oil will support a local biodiesel company, and when construction begins, Carbon Harvest Energy will use all local engineers, and construction companies. Internships through Marlboro College's sustainable business program and collaboration with UVM's sustainable ag extension program links in students and educators in the area.

Contact:

Don McCormick, President of Carbon Harvest Energy
don@carbonharvestenergy.com, 802-318-4970.

IV. Renewable Energy Case Studies

Powering a Water Filtration Plant with Water Power

Community Profile:

- Bennington
- Population: approximately 15,700
- Bennington, in southwestern Vermont, is one of Vermont's largest towns, providing the amenities of a small city while also providing access to the great outdoors.



Overview:

- Bennington's water filtration plant services 16,000 Vermont residents and processes approximately 2 million gallons of water a day from Bolles Brook.
- A municipality's water treatment costs can account for up to 35% of its budget.
- That's why Terry Morse, Bennington's Water Resource Superintendent, decided that the town's water filtration plant should harness the power of the falling water, already constantly entering the facility, to help offset the plant's electricity costs. The plant could do this by installing a hydropower turbine inside the facility at the point where the water enters the facility.
- The plant began the process of getting a hydropower turbine in 2006 by meeting with consultants and commissioning a feasibility study. They hired Lori Barg from Community Hydro in Plainsfield, Vermont to do the feasibility study, and she determined that it would be worthwhile.
- In 2007, the project's \$160,000 price tag got help from a Vermont Clean Energy Development Fund grant of \$63,000 acquired by Bennington's Community and Economic

Director, Scott Murphy. Overall, the project will take approximately seven years to pay off, but the turbine should last at least 20 to 30 years.

- Soar Technologies, a Washington State based company, helped design and install the project for the facility, which is the first of its kind in Vermont. The installation took place in January of 2010.
- The turbine is small in size, fitting in a space the size of a parking spot, but it generates around 15 kW an hour, which will off-set half of the plant's power needs.

Outcomes:

- The turbine should cut the plant's electricity costs by 50%.
- Since the project is the first of its kind in the state and the region, it can serve as a model and example for other municipalities.

Keys to Success or Lessons Learned:

- Other communities considering undertaking a hydroelectric turbine project should know that the system needs to process 3 million gallons of water a day to make the system affordable, as well as a drop in elevation of 30 feet.
- Working with Soar Technologies, a company that works with these types of systems on a regular basis, was crucial to the success of the project.

Contact:

Scott Murphy, Bennington Community and Economic Development Director, smurphy@bennington.com, 802-442-1037

IV. Renewable Energy Case Studies

Solar Hot Water Challenge

Community Profile:

- Chelsea/Tunbridge and portions of Washington and Vershire
- Population: about 2,550
- Chelsea and Tunbridge rest in the heart of the First Branch of the White River watershed. These two communities are defined largely by their rich agricultural histories and economies. Area residents joined together to create the First Branch Sustainability Network, an active energy committee that focuses on climate action, community resilience and fostering strong local food networks.

Overview:

In 2006, the volunteer members of the First Branch Sustainability Network honed in on one targeted strategy to help residents in Chelsea, Tunbridge and nearby communities to transition off of fossil fuels to more efficient, clean energy sources. Identifying solar hot water as one of the most cost effective, proven technologies, the energy committee put together a 'Solar Hot Water Challenge.' The goals of the challenge were to help homeowners in the region switch out 50 traditional water heaters with new solar systems and create a replicable program they could share. The energy committee met regularly — monthly, semimonthly and then weekly — to put a well thought-out program together.

The energy committee served largely as a facilitator and information conduit. Their primary motivations were to help local residents reduce their greenhouse gas emissions and produce cleaner — and ultimately more affordable — local energy. The committee made it their charge to: 1) make the case for the benefits of switching to solar hot water; and 2) connect community members to the resources needed to undertake the project, including any potential incentives, financing sources and contractors. To that end, the committee hosted four events, offering a Powerpoint® presentation outlining the economics, how the systems works, and the benefits. The committee also secured the support of four contractors who attended each event and agreed to respond to inquiries from interested parties.

Outcomes:

- Fifty traditional water heaters were changed to solar systems. The project's leaders estimated that the change-outs would save about 9,000 barrels of oil and 3,700 tons of CO₂ over 20 years.
- Strong public participation! Over the course of the first year of the challenge about 700 people turned out to learn about the program.
- The 'challenge' helped spur an innovative, homegrown



spinoff. About a dozen homeowners turned to a leader in Tunbridge to help them build their own solar hot water systems — at a far-cheaper cost.

Keys to Success or Lessons Learned:

- The volunteer working team was strong. The committee was comprised of leaders with a range of diverse expertise and each member had a specific role to play and played it well.
- Putting all of the needed information and resources together into one tidy package — and a Powerpoint® — helped make it easier for all involved and helped the committee share the program more widely.
- The timing was good. Energy prices were starting to go up significantly and people were looking for options.
- They secured much-needed funding to pay for materials, food, PR and space rentals from the New England Grassroots Environment Fund and Mascoma Savings Bank.
- The committee set a start and an end date to help avoid burnout and to foster greater focus. The committee worked intensely for about nine months and then took much-needed respite over the summer. In October, the committee regrouped and refocused on its next big project — a Sustainable Energy Fair.
- The energy committee was seen as an impartial party; a messenger without a personal stake in the outcome. The impartiality of the committee seemed to help more people be open to taking advantage of the idea.

Contact:

Contact: Phillip Mulligan, First Branch Sustainability Network — 802-685-7784 or phillip@sover.net

IV. Renewable Energy Case Studies

Craftsbury Academy Biomass Boiler

Community Profile:

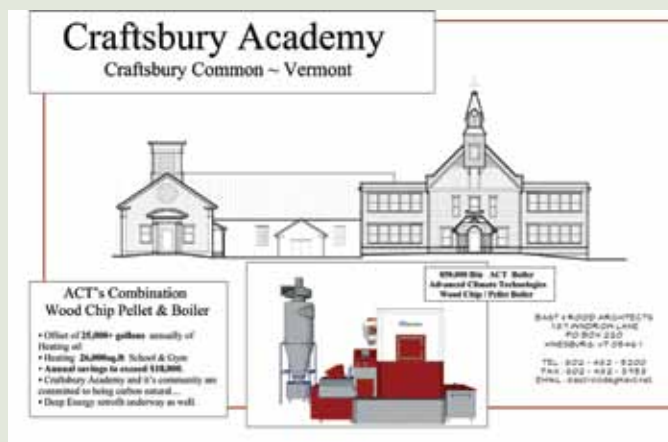
- Craftsbury
- Population: 1,095. School population: 200 students K-12.
- Located in the Northeast Kingdom, Craftsbury still maintains its farming history with family run dairy farms amongst the rolling hills of the town.
- Groups Involved: Craftsbury Academy, K-12 school serving the Craftsbury community, and SunWood Biomass, a private, Vermont-based biomass company.

Overview:

- Craftsbury Academy is the second oldest continuously run K-12 school in the U.S. and serves an average of 200 students. The Town of Craftsbury wanted to consider ways to green the school and save money while being carbon neutral. The town embraced the proposition for there to be a biomass boiler installed in the school that would both help them become more energy independent, reduce their greenhouse gas emissions and support the Vermont economy.
- Wood pellets to be used in this project come from Vermont Wood Pellet in North Clarendon. It's hoped that a new pellet factory anticipated to come online in the Northeast Kingdom will be a local source of fuel once it is up and running.
- This specific boiler, manufactured by Advanced Climate Technologies, is a mature Austrian design now being made in the U.S. It accepts both pellets and wood chips, allowing for greater flexibility in fuel type. It is the first of this type to be installed in Vermont. This is a first step in creating biomass boilers that accept greater varieties of fuel and operate with high efficiencies and the lowest emissions.
- Wood chip boilers are generally more cost effective in larger buildings due to the larger initial capitol investment and, often times, more intensive use, and therefore offer a quicker monetary return. The fuel flexibility of this boiler allows for use of cheaper fuel types and, as such, becomes a strong investment for the school. This type of boiler is hopefully going to lead the way towards other boilers that can use a wider variety of fuel sources.
- The school is currently integrating elements of its new wood heating system into a biomass curriculum as part of its science program. The school also has a unique sustainable forestry program with 100 school owned acres. The program plans to conduct a harvest to be used to produce wood pellets by Vermont Wood Pellet to heat their school.

Outcomes:

- Annual savings are estimated to exceed \$20,000 with an operational cost savings estimated at \$280,653. Over a 15-year period, the anticipated savings is \$280,653.



- The school will reduce its energy costs and help support the local economy by purchasing local wood chips and pellets.

Keys to Success or Lessons Learned:

- Putting forward a solution that offers significant benefits — real cost savings, long-term carbon neutrality and local job creation — makes overcoming potential hurdles easier (like taking a potential risk with innovative technology).
- The boiler that will be installed is a true breakthrough in boiler options, making it an attractive solution. The boiler accepts two types of (woody biomass) fuel, allowing for more flexibility and future diversity in sourcing localized fuel.
- Inspire kids to act on their future and allow their creative, good ideas to inform viable community solutions.

Contact:

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Other Communities With Similar Projects:

- Barre Town School has had a biomass chip boiler for 14 years and has experienced great savings over the years (about \$34,000 saved during the '09/'10 school year).
- Fayston Town Hall installed a fully automated pellet system in the fall of 2010 as part of a top down energy efficiency retrofit and CO₂ Reduction Initiative.
- Over 30 percent of all Vermont public school students attend 46 schools heated by clean burning wood systems. In the 2009/10 school year these schools used a total of 23,271 tons of wood chips, offset a total of 1,425,948 gallons of oil (equivalent), and reduced a total of 15,650 tons of CO₂ emissions, saving taxpayers \$1,746,164 while employing hundreds of Vermonters to deliver local, clean and sustainable wood heat.

IV. Renewable Energy Case Studies

Wastewater Treatment Facility Combined Heat and Power Project

Community Profile:

- Village of Essex Junction
- Population: 8,902 (The wastewater facility also serves the Town of Essex and the Town of Williston, creating a service population of approximately 25,000).
- Essex Junction, an incorporated village within the Town of Essex, is home to IBM's Microelectronics Department, one of the state's largest employers. The village strives to be sustainable and to maintain a walkable community.

Overview:

- Many wastewater facilities produce waste methane gas as a part of their anaerobic digestion process. Methane gas is 20 times more harmful than carbon dioxide, but can be trapped and used to produce heat and electricity. If the gas is not used, then the facility must simply burn it.
- In Essex Junction, the idea of using the methane for a combined heat and power project (CHP) to help run the existing facility first originated in 1992. Project proponents saw an opportunity to save energy, save money and reduce one of the most potent greenhouse gas emissions. To proceed, however, the Village required the project to meet a certain economic threshold, which was a return on the initial investment of less than 7 years.
- The total project had a fairly heavy price tag — \$303,000. To make the project economically feasible, facility leaders undertook value engineering and worked diligently to obtain essential funding from Efficiency Vermont, the Biomass Energy Resource Center, NativeEnergy, and the U.S. Department of Energy.
- A local Vermont company, Northern Power Systems, installed the 80% efficient combined heat and power system, which was a retrofit/upgrade to the existing plant. The new system, installed in 2003, uses two 30 kW micro-turbines and a heat recovery system.

Outcomes:

- The CHP project is saving the facility about 412,000 kWh annually, or 36% of its old energy usage. It also continues to save the facility about \$37,000 in electrical costs per year.
- The system allows the facility to use almost 100% of its waste methane gas as renewable fuel, and thus prevents the release of 600,000 pounds of CO₂ emissions that would result yearly if the facility still relied on the local power plant for all of its energy.
- The project won the 2003 Vermont Governor's Award for Environmental Excellence and Pollution Prevention.



- This facility, one of the first smaller wastewater facilities to install a CHP system, now provides a model for other small wastewater facilities to be greener and more sustainable.

Keys to Success or Lessons Learned:

- Taking on a new and innovative project can take years. Making a solid economic case and securing sufficient funding and technical support can make all the difference. In this case, securing the support of the municipality, which was willing to embrace a new and promising solution, was pivotal.
- One essential key to this project's success were project champions, who did the work to make the economic and environmental case.

Contact:

Essex Village Water Quality Superintendent James Jutras, ejctwwtf@sover.net or 802-878-6943 ext. 201

Other Communities with Similar Projects:

- Lewiston New York Wastewater Treatment Facility
- Upgrade to the Brattleboro Wastewater Treatment Plant is under consideration to help save energy and dollars.
- Upgrade to South Burlington Airport Parkway Facility to include CHP.
- Minnesota – Albert Lea Wastewater Treatment Plant – uses four 30 kW microturbines to generate electricity and thermal energy for the facility.
- Portland, OR – Columbia Boulevard Wastewater Treatment Plant – uses a 200 kW CHP system to produce electricity and thermal energy for the facility.

IV. Renewable Energy Case Studies

Ferrisburgh Solar Farm

Community Profile:

- Vergennes
- Population: 2,741
- Vergennes, the smallest city in Vermont by population, is home to four schools, a library, and an opera house. The city boasts a newly revitalized downtown, a great view of Vergennes Falls, a historic city hall and a bustling farmer's market.

Overview:

Ernest Pomerleau, President and CEO of Burlington-based Pomerleau Real Estate, served on the Governor's Climate Commission. He had an interest in developing renewable energy, so when Vermont's "Standard Offer" program came along, he grabbed the opportunity. The Standard Offer, passed by the Vermont Legislature in 2009, offers competitive, long-term contracts for producing clean, local energy from renewable sources. The program offers 30 cents per kilowatt-hour for solar projects; a price the Pomerleau team attributed to making the project financially viable.

The project team worked with Vermont Energy Investment Corporation, Alteris Renewables, and Draker Laboratories among others, to move the project forward. The project's price tag was about \$5-\$6 million; a cost met primarily by the developer and supplemented by loans guaranteed by the USDA Rural Development Fund and the Vermont Economic Development Fund. A good deal of that investment went to hiring local businesses that helped with engineering, permitting, financing, construction and maintenance.

Outcomes:

- The 1-MW solar farm, which came online on November 30, 2010, will power the equivalent of approximately 170 average Vermont homes per year. The eight acres of close to 4,000 solar panels are shaped like the State of Vermont!
- The project is located adjacent to Vergennes Union High School, and a partnership was formed between the school and the Ferrisburgh Solar Farm. The site will be monitored so students can observe the technology at work, and curriculum is being developed for science classes.
- The project's location along Route 7 makes it very visible. The hope is that others will see that solar works in Vermont and this will help to make similar projects a reality.



- The visible location also has the potential to bring tourism to the area. People visiting the site to see the project and read the informational kiosk will likely stop to eat at area restaurants and shop with local vendors.

Keys to Success or Lessons Learned:

- Pomerleau recognized how important it was to garner community support for the project. The team reached out to the community and answered questions and concerns as they popped up, leading to what project manager Brian Waxler described as "99% of people in the community supporting the project."
- Working closely with the Public Service Board contributed to a permitting process that was quick and amiable.
- The employees at Pomerleau were excited to try their hand at something they had never done before, and really saw the project as a learning experience. That attitude carried them through the process, and resulted in significant personal growth for the entire team.

Contact:

Brian Waxler, Principal, Executive Vice President of Pomerleau Real Estate, bwaxler@vermontrealestate.com

IV. Renewable Energy Case Studies

Energy Education and Classroom Innovation Through Service Learning

Community Profile:

- Jericho/Underhill Vermont
- 2000 Population: Jericho: 5,015, Underhill: 2,980
- Groups Responsible: Patty Brushett, a seventh-grade social studies teacher, a student sustainability team, the BRMS assistant principal, the Jericho Energy Task Force and Vermont Energy Education Program.



an anticipated lifespan of over 40 years). The school board specifically requested that students remain involved in the project, as experts on the project and key resources.

- VEEP also supported the student team, called Sustainability is Our Mission (SOM), by helping them strengthen their proposal as well as teaching them about electricity, how it's generated and what sources we use in Vermont.

Overview:

- As an offshoot of several successful sustainability projects aimed at Zero Waste — an intensive recycling program, an anti-idling campaign and others — a group of 7th grade students at Browns River Middle School (BRMS) put their shoulders behind a strategic climate action goal — changing the parking lot lights to solar. It was a multi-year effort, where the students made a compelling case, and in 2010, Brown's River Middle School approved a plan for new solar powered lights in the parking lot. The approved design was anticipated to save the school money and improve the quality of exterior lighting at the school thanks to the efforts of the students, a committed teacher and with support from the Vermont Energy Education Program.
- The students met with lighting designers, learned about the issues and considerations the school must consider for lighting parking lots and debated the pros and cons of different options. This was key to the project's success, and the end result was that the students put forward a set of design recommendations for solar lighting in the BRMS parking lot.
- These recommendations were brought to the community, through a presentation at the Jericho Energy Task Force's May meeting. After significant discussion and analysis of alternative options, costs, benefits and drawbacks, the project moved forward.
- With the backing of the Task Force and VEEP, the students went to the Chittenden East School Board with their presentation and their ideas. They got the full support of the board to incorporate their recommendations and hire a lighting designer to get solar lighting installed at the school.
- The school board formally gave the project the go-ahead in January 2011 — amending the design to incorporate LEDs as the primary light source as well as solar lighting. The lighting is expected to be installed later in 2011 (with

Outcomes:

- The new system will save the school significantly on energy costs compared to the existing system and will improve light quality and visibility.
- The change-out will save about 8,500 kwh annually, equivalent to avoiding over 6 metric tons of CO₂ from going into the atmosphere, which is the approximate annual electricity use of a household.

Keys to Success or Lessons Learned:

- The Chittenden East School District applied for a zero interest bond for qualified school construction projects for several projects for BRMS, Camels Hump Middle School and Mount Mansfield Union H.S. Part of that funding went to support the solar parking lot project.
- Despite that fact that other alternative solutions would have been financially comparable, the school chose to go down this road largely because it was a student-driven initiative, which also offered GHG benefits.
- Students learn valuable lessons by solving real problems and working with community partners. This is a project that is likely none of the participants will forget.
- With the right support and resources, students can be drivers of change in a community, not just recipients of knowledge.
- Working with an entire community ensures buy-in and breaks down traditional barriers between students, teachers, and community groups.

Contact:

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www.veep.org

IV. Renewable Energy Case Studies

Marlboro Middle School Solar Project

Community Profile:

- Marlboro
- Population: 978
- Marlboro is nestled in the rolling hills and farm fields outside of Brattleboro. The town is home to both the Southern Vermont Natural History Museum and Marlboro College, which each summer hosts the Marlboro Music School and Festival.



Overview:

- During a yearlong study of energy in his 7th and 8th grade science class, teacher Tim Hayes challenged his students to do something related to energy consumption; to take hands-on action. In a town meeting-style format, the students discussed the kinds of projects they might undertake and decided on a project aimed at helping the school secure photovoltaic solar panels to generate electricity.
- The students sought the support of the town energy committee and school board and moved forward on the initiative.
- The solar project was integrated into the students' course work. They broke into different groups; some working on how to make the project financially feasible while others analyzed the technology of PV (including buying equipment — switches, a DC/AC inverter etc — and creating their own system to power a lightbulb as an experiment on how electricity worked).
- After an analysis showed that the project would offer the school significant energy-generating benefits and would be financially feasible, the students worked with the school to take the next step. The school put the project out to bid. A local resident won the bid and led the work to install the panels.
- The students hosted an evening event where they invited parents and community members to learn about and celebrate the project. At the event, they dedicated the system to Tom Simon, the chair of the local energy committee, who had been a huge inspiration and support mechanism for the students in the effort.

Outcomes:

- The solar panels installed on the school will generate about 2,000 kWh of electricity annually. That equates to a yearly emissions reduction of about 1.1 metric tons of carbon.
- To deepen their understanding of the project — and energy — there was an ongoing analysis of the system woven

into the students' curriculum. The students monitored and measured what the panels were producing, through a meter installed in their classroom and gained an understanding of what the class was using compared to what the panels were producing. Harnessing their math skills, the students learned that the classroom was using significantly less energy than the PV panels put out.

- The support of the community was great and helpful. The visibility of the project helped elevate community awareness.
- The students were available and willing to speak with anyone who wanted to know about their project; their hope was to share their story and be a model to others.

Keys to Success or Lessons Learned:

- The students applied for a grant of \$12,000 from the Agency of Natural Resources 'Community Climate Change Grants Program' and were successful in securing the funding. The grant was 'instrumental' to the viability of the project.
- The support of the local energy committee and the School Board was key.
- Get your kids to do something! Makes science and learning relevant. Motivating kids and giving them a sense of responsibility creates a win-win situation for all. According to teacher Hayes, education by demonstration and implementation is a powerful thing.
- Efficiency first! Prior to undertaking the solar project, there was an effort to reduce electricity use across the school. The students undertook a school-wide campaign to replace incandescent light bulbs to CFLs. Students sold CFL bulbs and did a serious overhaul of their science classroom, where they turned off or removed many lights. With an energy monitoring tool, the students calculated that their energy efficiency efforts cut electricity usage by over 60 percent.

Contact:

Tim Hayes, tjhayes@sover.net, 802-254-2668

Other Communities With Similar Projects:

- Waterbury LEAP, the energy committee, worked with their local elementary and middle schools to get solar panels — and an ensuing curriculum — at the school: www.waterburyleap.org
- With the support of Sen. Bernie Sanders, the local energy committee, the Clean Energy Development Fund and Green Mountain Power, there is an effort afoot to develop the largest solar project on a Vermont school — a 116-kilowatt array — at the Camels Hump Middle School in Richmond. The project is scheduled to be installed in Spring 2011.

IV. Renewable Energy Case Studies

The Montpelier Community Renewable Energy Project

Community Profile:

- Montpelier
- Population: approximately 8,000
- Montpelier, the nation's smallest capitol, is a center for government, commerce, industry, services, and entertainment.

Overview:

- Montpelier has committed to reduce the greenhouse gas emissions and fossil fuel consumption of the city, its citizens, and its businesses by 80% by 2030.
- One of the key steps the city is taking to reach this goal is the construction of a state-of-the-art district heating facility. The project would be developed in partnership with state government and provide heat to the Montpelier State Building Complex and to the core district of the Montpelier community. The project would be powered by locally sourced, renewable, and sustainably harvested wood chips. Exploration of a combined heat and power plant and a district heating system began in the early 1990s with several technical reports evaluating the technical feasibility of district heat in the Montpelier. The project has advanced and the work guided with strong involvement of community members. Many experts in the energy field have had leadership roles and been very involved over the years as well.
- Funding for the project feasibility studies came through \$25,000 and \$75,000 grants from the Clean Energy Development Fund, as well as through a bond re-vote by the city of Montpelier for \$250,000.
- Funding for the implementation of the project is coming from a variety of sources including state and local governments, but the funding that has caused the most excitement is \$8 million dollars from the U.S. Department of Energy, as part of the American Recovery and Reinvestment Act.

Outcomes:

- The project will be developed in phases, with the initial phase to supply heat to a complex of state buildings, including the State House, the Montpelier High School, Elementary School, City Hall, Fire Station and Police Station. Subsequent phases would reach out to other state and municipal buildings. There is also an interest in serving businesses and residences in the downtown core and pairing the project with the clean energy financing program called PACE (Property Assessed Clean Energy).
- The initial phase of the project will displace over 300,000 gallons of fuel oil with locally sourced, renewable, and sustainably harvested wood chips. This will prevent nearly \$1 million annually from leaving the Vermont economy for distant fossil fuel. Now the fuel will be acquired locally and



the money will remain in the local economy.

- A district heat system is more efficient and has fewer emissions than many small, dispersed sources of heat. In Montpelier's case, this will result in reducing health-threatening emissions by replacing many older boilers with a single, new, well-controlled highly efficient central boiler.
- The project will support local jobs in the forest products industry and related activities, while supporting the development of an important infrastructure that will enable other similar projects to succeed.

Keys to Success or Lessons Learned:

- The energy advisory committee for the project, consisting of many dedicated energy experts over the years, has been imperative in working to make this project a reality.
- Having a strong and diverse group of innovative and enthusiastic partners is crucial. This project a partnership between the city of Montpelier and Vermont state government, with strong support from the community and the Legislature.
- This project was first envisioned in 1990 as a district-wide combined heat and power facility. Projects of this magnitude can take many years to implement and are subject to changing technical, economic and political realities.
- There are many technical and economic considerations in developing a district energy project. Identification of the facilities to be served, the routing of the underground heat distribution piping, whether or not to include the generation of electricity. All these considerations require rigorous technical, economic and policy review before a thoughtful final decision can be made. If successful, the benefits of district heating should be stable and predictable heating prices on into the future and knowing that monies spent on heating are supporting the local economy directly.

Contact:

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www.montpelier-vt.org/group/99.html

IV. Renewable Energy Case Studies

Starksboro's Solar Power Purchase Agreement

Community Profile:

- Starksboro
- Population: approximately 2,000
- Starksboro is a rural agricultural community located on the western slopes of the Green Mountains, not far from Burlington. A historic village is home to the Town's civic buildings – including the school, town offices, and post office – as well as a handful of small businesses and several homes.

Overview:

- Starksboro decided it wanted to power its municipal buildings and Robinson Elementary School with clean, renewable and affordable energy. Starksboro chose to achieve this goal by creating a solar power purchase agreement.
- A Solar Power Purchase Agreement is a financial arrangement in which a third-party developer (in this case AllEarth Renewables) owns, operates, and maintains the photovoltaic system, and a host customer (in this case the Town of Starksboro) agrees to site the system on its property. After a predetermined period (in this case 5 years) the host would purchase the system's electric output from the solar services provider.
- Starksboro sited its 25 AllSun Solar Trackers in a portion of a cornfield that is adjacent to Robinson Elementary and its municipal buildings. Nineteen of the solar trackers will power the school and the other 6 will power the town's municipal buildings.
- Each solar tracker is capable of producing 4 kilowatts, making the project a 100-kilowatt project in total.
- At the end of the 5-year period, Starksboro will have the option of buying the PV system at fair market value, or renewing the power purchase agreement with AllEarth Renewables at its depreciated value (estimated to be 30% of the initial cost).
- This project is an excellent use of Vermont's group net metering program, which allows several energy users to group together to use a single renewable energy system.



Outcomes:

- The project will produce 141,000 kWh per year. Over the 25-year life span of the system, it is projected to produce 3.5 million kWh of clean renewable energy.
- It costs Starksboro nothing to install the system, and they have a fixed rate of \$0.19 per kWh for the first 5 years, which is possible because Green Mountain Power pays a \$0.06 premium on solar power.
- In addition, Starksboro will make one cent off of each kWh the system produces, and will get a check at the end of each year for the power produced.
- If Starksboro chooses to buy the system at the end of 5 years for fair market value, it will cost far less than buying a brand new system, pay for itself in less than 13 years, and result in the town paying a highly reduced cost for power.
- AllEarth Renewables will also benefit by receiving the Vermont Business Solar Tax Credit.

Contact:

Caleb Elder, Starksboro Energy Committee,
calelder@gmail.com, 802-777-0156

Other Communities With Similar Projects:

- Many communities are looking into implementing solar power purchase projects. Some private organizations, like Yestermorrow Design/Build School in Waitsfield, have already harnessed a Power Purchase Agreement to bring solar to their doorstep.

IV. Renewable Energy Case Studies

Group Net Metering in Underhill

Community Profile:

- Underhill
- Population: approximately 3,000
- Underhill, in eastern Chittenden County, is a small rural community at the base of Mt. Mansfield.

Overview:

- Steve Webster and his wife, Barbara Yerrick, in an effort to be more sustainable, decided to install a solar photovoltaic (PV) system on their barn roof, as well as a solar hot water heater.
- Because the couple only use about 1,800 kWh per year and because the PV system produces around 12,000 kWh annually, the couple decided to share the electricity they are generating with one other household and a small business, and thus started a group net metering project.
- With group net metering several households or businesses share the electricity produced by a set of solar arrays, and the kWh usage portion of the customers' electricity bills are reduced by the amount of electricity the solar arrays produce. The customers still pay the other portions of the bill, such as monthly service charges, and pay the system owners for the kWh's they've used that month. However, if the system produces more electricity than the customers use in a month, then the customers can "carry over" the credits for any excess kWh's for up to a year and apply those credits to future bills.
- The net metering group was so happy with their system that Steve and Barbara decided to expand the project, and have added five solar trackers from AllEarth Renewables. The trackers turn to follow the sun through the day for maximum electricity production. In total, six households and a small business now share in the group net metering project, which will hopefully produce around 40,000 kWh per year, enough energy to cover most of their electricity needs.



- The couple found the additional people to participate in their net metering project by sending out emails to the community. The response was extremely positive, and many additional households were interested. However, the couple could only accommodate so many solar arrays on their property. On a positive note, others in the community have been inspired by the project, and Steve has already heard word about another group of people considering a group net metering project.

Outcomes:

- The project will provide renewable and sustainable electric power for six households and a small business.
- In addition, the project sets an example for the community and others across the state.

Keys to Success or Lessons Learned:

- A contract should be drawn-up among all members of the net metering project, so that all participants know all the details of the project, and their responsibilities as a part of it.

Contact:

Steve Webster, swebster@sbschools.net, 802-652-7282 or 802-318-2362

V. Transportation and Land Use Case Studies

Colchester High School's "Eco-Driving" Program

Community Profile:

- Colchester
- Population: Over 17,000 residents.
- Located in Chittenden County, just to the north of Burlington on the shores of Lake Champlain, Colchester boasts a mix of businesses, housing, and recreation. Colchester has a strong commitment to public education and to reducing resident's energy consumption and bills.
- Groups responsible: The Town of Colchester, Colchester Energy Task Force (CETF), Colchester School District, local nonprofit Community Climate Action, and the University of Vermont Transportation Research Center.

Overview:

Transportation is one of Vermont's most energy-consuming sectors. To help save energy, fuel costs and reduce greenhouse gas emissions, the CETF partnered with the high school to create an energy-conscious drivers education curriculum. Called "Eco-driving," the program encourages students to adopt a set of easy driving habits to save fuel by avoiding jack-rabbit starts, driving a continuous speed, avoiding revving and braking, and reducing average driving speed. The focus of the program is both short-term actions, including conscientious driving techniques including unnecessary vehicle idling as well as life-style changes, including choosing a more fuel efficient vehicle and living closer to work.

Part of this project also encouraged the school district to purchase a hybrid technology to replace their conventional car for use in the school's popular driver's education program. The results look promising as the "Eco-Driving" program offered by the school will prove to save fuel for the school and future drivers of Colchester.

Outcomes:

- Classroom and hands-on experience of new drivers to both a hybrid car and to a specific eco-driving skills encourages a life-long ethic about conservation and saving energy.
- A community-wide "eco-driving" initiative helped to raise broad public awareness of the benefits of energy conservation.
- The estimated gas savings from the program and the vehicle equates to about 267 gallons per year per hybrid vehicle.



Keys to Success or Lessons Learned:

- The CETF was tasked with suggesting how to use Colchester's one-time infusion of ARRA funds (\$72,000). The CETF wanted to use the funds to invest in a project that was publicly visible and would save taxpayers money.
- Getting support from all parties involved, including the school district manager, driver's education instructors and the town Select Board was key.
- The school needed to replace one of its fleet vehicles. The town and school district showed leadership in leveraging the ARRA seed funding to make the investment in a hybrid over a conventional vehicle purchase.
- The hybrid Prius best performs and gets the highest miles-per-gallon in city driving conditions (where most of the driving education occurs). The efficiency of the Prius (50 mpg or better) is at least double the efficiency of the retired fleet vehicle.
- As a result of this project's success, one other benefit is that the community now wants to undertake more greening activities that save energy and money.

Contact:

Debra Sachs, Community Climate Action, 802-658-8487, DSachs@fando.com

V. Transportation and Land Use Case Studies

Expanding Transit: A New Rural Commuter Line

Community Profile:

- Population: East Montpelier (2,731), Plainfield (1,333), Marshfield (1,586)
- Overview: Located just outside the capital city of Montpelier, the small, rural communities of East Montpelier, Plainfield and Marshfield are defined largely by their rich agricultural heritage and stunning landscapes as well as by strong community engagement. All three communities boast active energy committees, which are undertaking energy-saving and energy-innovating projects and working in increasingly closer coordination with each other.

Overview:

- In 2009, the Energy Committee Chairs of East Montpelier, Plainfield and Marshfield began discussions with the Green Mountain Transit Agency (GMTA) on starting a new commuter route from Montpelier to Marshfield, in part to help save energy and reduce the use of fossil fuels.
- The timing was serendipitous. GMTA had undertaken a survey and determined that the time was right to move from a subsidized van pool model to a full commuter route. The transit agency then applied for and was awarded a federal Climate Mitigation and Air Quality (CMAQ) grant; a three-year demonstration grant by the U.S. Department of Transportation, administered by the Vermont Agency of Transportation.
- After approximately a year of public education and hosting informational meetings, an article went to the voters on Town Meeting Day, March 2, 2010. Each community needed to approve an essential 20% local match on the grant. Despite some reluctance, centered largely on the potential impact to property taxes, voters in each town overwhelmingly voted to make an annual \$8,333.33 contribution.
- GMTA wasted no time, beginning its service in late April 2010. Rural Community Transportation, a transit provider in St. Johnsbury, chose to partner with GMTA, expanding the original route from Montpelier to Marshfield all the way to St. Johnsbury!

Outcomes:

- The US 2 commuter offers convenient and affordable service to Twinfield Union School, Goddard College, Union Institute, the Community College of Vermont and the Plainfield Health Center, along with connections to Montpelier, St. Johnsbury, and other GMTA commuter routes like the Link Express and Waterbury Commuter. Since the commuter launched in April 2010, ridership

averaged over 41 riders a day. In January 2011, the commuter served over 50 riders a day. All ridership numbers exceeded first-year estimates of 38 trips per day.

- By more people choosing to take the bus, the service is helping to save approximately 2,600 gallons of gasoline per month.
- Expanding public transportation services is especially important given the recent economic downturn. Using the commuter option can save passengers thousands of dollars per year and keep people employed by helping them travel to outside jobs, while simultaneously preserving the tax bases of their towns.



Keys to Success or Lessons Learned:

- Linking the enthusiasm and volunteer support of dedicated grassroots groups with a forward-thinking transportation agency, state agencies and local leaders can manifest important results.
- The support of the select boards as well as the efforts of the energy committees was key to building the necessary public interest in the commuter line expansion. Energy committee leaders engaged town planning and conservation commissions, the Plainfield Area Community Association, local employers, health care providers and local residents before a vote on the project was needed.
- Incorporating elements, like a Park and Ride and a shelter, made using the bus more viable and attractive for people. In this case, transforming an empty gravel lot into a Park and Ride facility didn't take a lot of investment and committed volunteers made a huge difference.
- Securing federal funds to support the launch of the transit line expansion was key, helping to minimize the local financial burden and proving an important selling point.

Contact:

- Bob Atchinson, Plainfield Energy Coordinator, 802-479-4326, Robert.Atchinson@state.vt.us
- Tawnya Kristen, Green Mountain Transit Agency, 802-223-7287 TKristen@gmtaride.org

V. Transportation and Land Use Case Studies

Hinesburg Rides — Creative Community Transportation Solutions

Community Profile:

- Hinesburg
- 2008 Population: 4,629
- Hinesburg is a small town in southern Chittenden County that has long wrestled with how to manage residential growth in this rapidly growing corner of Vermont. Traffic and transportation issues are a significant challenge in the once rural bedroom community.
- Groups Responsible: Hinesburg Rides, a program of the Hinesburg Community Resource Center, in conjunction with the town, and aided by Karla Munson a former member of the Village Steering Committee.



Overview:

- In 2006, a convergence of several factors combined to make finding alternative transportation solutions a priority for the community, including a desire for more sustainable transportation options, an interest in better coordinating and utilizing existing transportation services – such as specialized buses – and a motivated and engaged community.
- To best understand the community's transportation needs and desires, a survey was sent out to all residents and a meeting of key stakeholders convened to analyze the needs, options and possible solutions. A federal "United We Ride" grant from the Vermont Agency of Transportation allowed the town to hire a consultant to conceptualize transportation solutions that would work well for the community.
- Three solutions were identified, culminating in the formation of the "Hinesburg Rides" program. The primary goal of Hinesburg Rides is to minimize the number of single-passenger trips in cars and establish a connected and sustainable community. There are three components to the program that address multiple transportation needs. The Volunteer Driver Program provides rides for the elderly and disabled to local appointments and errands by volunteer drivers using their own cars. The Rideshare Program provides opportunities for community members to share the use of a car for commuting. The third program, Employer Partnership/Public Transit Program works with local businesses to facilitate low-cost, alternative commuting options for employees such as vans and carpooling, all leading to public transit.
- The program is built on the framework of a robust website that facilitates carpool matching and access to other programs for interested commuters.

Outcomes:

- Since the volunteer driver program offered its first ride in March 2008, it has provided 360 rides for 70 residents.
- The rideshare program is successfully connecting commuters and helping to reduce carbon emissions, protect the environment and reduce Hinesburg's traffic congestion. Over 100 people are now registered in the Hinesburg Rides database and are better able to find carpooling opportunities, including spontaneous ones.
- The 'Employer Partnership/Public Transit Program' has worked with various Hinesburg employers and local transportation providers to get Hinesburg and surrounding towns' residents to work. There are many elements to this successful program but, as one example, NRG Systems has committed to providing the town's matching capital costs of obtaining two, 28-passenger buses.
- The three parts of Hinesburg Rides combine to provide sustainable and community-based transportation by offering commuters choices for getting where they need to go. With help from grants, including a Transportation Action Grant to create the website and commuter-matching database, the program manages to provide citizens with convenient sustainable transportation options at minimal cost.
- The community as a whole spends less time in single-passenger car trips, which decreases harmful emissions.
- Hinesburg Rides also helped to catalyze a new commuter line that will offer local residents an alternative commuting option, and anticipated to begin in early 2012.

Keys to Success or Lessons Learned:

- Hinesburg Rides receives essential financial support from SCHIP (Shelburne, Charlotte, Hinesburg Interfaith Projects) grants, the town, and private donations.
- It's hard to get people to change their behavior and carpool or take the bus, but persistence pays off. If you create a program that is easy to use, affordable and convenient, people will take advantage of it.
- Heavy marketing is needed to ensure the public knows the program is available (and word of mouth helps a lot!).
- Having wonderful volunteers is a necessity; without them, a program like the successful volunteer driver program wouldn't be possible.
- Having the support of the town is key, as is the support of other transportation providers, employers, and the community.

Contact:

Karla Munson, karlamunson@hinesburgrides.org
802-482-2778

V. Transportation and Land Use Case Studies

Anti-Idling Initiative in Middlebury

Community Profile:

- Middlebury
- Population: approximately 8,200
- Located in Addison County's Champlain Valley, Middlebury is probably best known as the home of Middlebury College — an internationally renowned liberal arts school. The bustling regional center is full of shops, businesses and architecturally buildings.
- Groups Responsible: The Middlebury Area Global Warming Action Coalition (the local energy committee), the Town of Middlebury, the Middlebury Police Department and Middlebury Public Works.



Overview:

- In 2002, Middlebury implemented a Town Climate Action Plan to reduce its carbon footprint by 10% within 10 years. The plan reported that transportation was a major contributor to the town's carbon footprint, so the town held a Transportation Brainstorming Session for stakeholders and the public to identify measures to take. The group decided that an anti-idling policy was a concrete initial step.
- Idling for even 10 seconds uses the energy equivalent of driving one mile in traffic.
- The Middlebury Area Global Warming Action Coalition (MAGWAC), an ad hoc citizens group working to help meet Middlebury's carbon reduction goals, led the effort to institute a voluntary anti-idling policy.

- MAGWAC's strategy included: having local health officials endorse the policy, going to Selectboard meetings to establish a presence there, using sample resolutions from VECAN and idlefree.vt to help draft the Middlebury resolution, working with town and regional planning & public works officials, having a presence at all major town events to educate the public, and using local media outlets — letters to the editor, town website, etc.
- The town and Selectboard responded to MAGWAC's campaign, and approved the policy in 2007, which urges drivers to refrain from idling their engines for more than 3 minutes except in emergency situations, below freezing weather, and several other special situations.

Outcomes:

- Middlebury's anti-idling campaign has helped to educate the public about this important issue and raise awareness about fossil fuel consumption. It has also helped to demonstrate that there are little things we can do everyday to lessen our carbon footprint.
- While estimates on GHGs avoided or gas saved have been harder to measure, there was noticeably improved air quality in public spaces.

Contact:

Laura Asermily, Project Coordinator, lasermily@yahoo.com, 802-388-9478, www.idlefreevt.org

Other Communities with Similar Projects:

- Burlington is the only town in Vermont with an anti-idling ordinance that is enforceable by law, and compliance is mandatory, not voluntary.
- Brattleboro has a policy very similar to Middlebury's.

V. Transportation and Land Use Case Studies

Smart Commute Upper Valley

Community Profile:

- Greater Upper Valley Region of VT and NH
- Centered in the core towns of Lebanon and Hanover, NH, and Hartford and Norwich, VT.
- Total population is roughly 160,000; at least 25,000 individuals live in the four core towns. Workplaces participating in this project have over 10,000 employees collectively.
- Located on the New Hampshire-Vermont border, Lebanon is home to two major medical centers and is adjacent to Hanover, home of Dartmouth College. It is the Upper Valley region's most congested area and is clearly its job center.
- Groups involved: The City of Lebanon, the Upper Valley Transportation Management Association (UVTMA) — a project of Vital Communities that works to reduce reliance on single occupancy vehicle commuting, the Upper Valley Trails Alliance (UVTA) — a group dedicated to promoting active transport, and Upper Valley Rideshare — a carpool matching service that operates under the non-profit bus transit provider Advance Transit.

Overview:

- In 2010, the UVTMA secured two grants to develop workplace-based sustainable commuting programs with 15 employers. A U.S. Department of Energy "Energy Efficiency and Conservation Block Grant" (EECBG), passed through the City of Lebanon, enabled the UVTMA to work with the UVTA and Upper Valley Rideshare to focus on commuting in the NH Route 120 corridor. The High Meadows Fund of the Vermont Community Foundation allowed for this work to be extended to five Vermont-based employers.
- In 2007, daily traffic counts along the Route 120 corridor rose to over 24,000 vehicles per weekday. With the two medical facilities planning expansions, the number of cars on the road is predicted to increase. The project is two-fold in its approach: to develop commuting programs with employers and to improve and promote mobility options for all commuters.
- The project is divided into three focus areas: workplace campaigns, events and promotions, and corridor improvements. The UVTMA starts workplace campaigns with a workplace commuter habits survey to establish baseline data on commuting and to identify barriers to and opportunities for more sustainable travel. Each business takes the survey each year to track changes over time. The UVTMA uses this information to work with each business to create transportation demand management (TDM) projects that reduce vehicle miles travelled (VMT). Examples of TDM commuting options are carpools, vanpools, walking, biking, transit, and telecommuting.

- The events and promotions portion of the project focuses on direct employee engagement through marketing and on-site workplace events. The project is leveraging the success of the Way to Go commuter challenge by getting businesses to compete against one another in the week-long event. Additionally, the project is engaging the public and employees through attractive marketing materials.
- Corridor improvements are aimed at improving infrastructure for bicyclists and pedestrians within the corridor. The UVTA installed bicycle, pedestrian and trail signage and created an online, interactive trail finder map to aid those interested in walking or biking where they need to go.

Outcomes:

- The benefits of changing our transportation habits and network often take longer to realize and can be difficult to measure. For this project, the UVTMA can determine how many people started carpooling, walking, biking, taking transit, and telecommuting for work at each employer. The survey data also captures travel distance and vehicle efficiency, among other points, and can be used to model emissions reductions, avoided gasoline consumption, and cost savings.
- The enthusiastic and broad participation in the Route 120 corridor project will likely have a positive impact on the region's efforts to reduce VMT and greenhouse gas emissions as well as to promote non-drive alone solutions.
- The goal of the project is to achieve a conservative 2.5% modal shift away from drive-alone use. If the 2.5% shift is achieved, commuters will avoid burning 114,000+ gallons of gas per year and save over \$300,000 in fuel costs annually.

Keys to Success or Lessons Learned:

- It is important to address an issue such as congestion from a multi-modal standpoint to increase the level of service for all mode users.
- The participation of some of the region's largest businesses helped engage the most frequent users of the corridor. Project organizers hope this targeted approach will raise the needed awareness to shift habits and, as such, begin to have recognizable impacts on how area commuters get to work and beyond.

Contact:

UVTMA, Gabe Zoerheide, 802-291-9100 ext. 111
gabe@vitalcommunities.org

V. Transportation and Land Use Case Studies

Farm to Foodbank: An Energy-Saving Success Story

Community Profile:

- Warren
- Population: approximately 1,700
- Warren — home to Sugarbush Ski Resort — is located at the southern end of the Mad River Valley. It is a small rural town known for its beautiful countryside, outdoor recreation and historic village center.

Overview:

- About 80% of the energy used in the U.S. food system goes towards processing, packaging, transporting, storing and preparing food. That means most of the energy in our food system is not expended on actually growing food. In fact, on average, produce in the U.S. travels anywhere from 1300–2000 miles from farm to plate; most of it being shipped in gas-guzzling trucks.
- With approximately 1.2 million acres of farmland in Vermont to rely on, the Vermont Foodbank decided it wanted to reduce its food miles by sourcing more fresh produce from farms in Vermont.
- In 2009, the Vermont Foodbank purchased the 20-acre Kingsbury Farm from the Vermont Land Trust for \$225,000. A generous anonymous donor covered the entire purchase price.
- The VLT continues to hold a conservation easement on the property, which requires that the land be kept in agricultural production.
- The Foodbank improved the farm's infrastructure by reinvigorating the farm's soil, installing two solar trackers from AllEarth Renewables to provide the farm's electricity, and by installing energy efficiency measures in the farm's buildings. Those projects were made possible by grants from Jane's Trust and The Lattner Foundation.
- The Foodbank is also in the process of renovating and weatherizing the 100-year-old farmhouse on the property for its offices, with funding from the Vermont Housing and Conservation Board.



- The Foodbank is now leasing the land to a farmer, Aaron Locker, who is paying for the land in crops. He's required to pay the Foodbank with 40,000 lbs. of food annually, and can sell anything he grows in excess of that.

Outcomes:

- The Foodbank is very excited about this project. Not only is it reducing its carbon footprint by sourcing food from a farm a short distance from its shelves in Warren, but it's also providing their customers with high quality, fresh, nutritious produce.

Keys to Success or Lessons Learned:

- A hard working, dedicated, and talented farmer is a must for an innovative project like this to work.
- To keep the project's carbon footprint low, there must be a need in the community for foodbank-sourced food, and the farm must be relatively close to local food shelves.

Contact:

John Sayles, jsayles@vtfoodbank.org, 802-477-4101

VI. Waste Reduction Case Studies

Reducing and Recycling Construction and Demolition Debris

Community Profile:

- Chittenden County
- Population: 157,000 (18 member cities and towns: urban, suburban and rural)
- Chittenden County is located in northwestern Vermont between Lake Champlain and the highest peaks of the Green Mountains. The County's nearly 350,000 total acres have a rich diversity of landscapes: forests, farms, water bodies and small cities. The county has the largest Vermont municipality – the City of Burlington, which is home to the state's largest higher education institution, health care facility, and private sector employer and is nationally recognized as having outstanding quality of life.

Overview:

- Chittenden Solid Waste District (CSWD) has an initiative to reduce waste and encourage recycling, reduction and reuse of construction and demolition (C&D) debris (which comprises about ¼ of landfilled material from Chittenden County generators).
- Recycling, reducing and reusing C&D debris is a policy of the district. It provides member municipalities with brochures outlining how and why to reduce, reuse and recycle C&D debris. Member municipalities are encouraged to distribute the brochure along with all issued building and zoning permits, and developers/applicants are then encouraged to dispose of waste appropriately.
- CSWD provides tools and assistance in setting up waste reduction programs.
- By July 2011 CSWD will expand what they accept at their drop off centers to include recycle asphalt shingles (trial basis), plastic film/pallet wrap, and clean drywall.

Outcomes:

- Increased awareness of ways to reduce C&D debris waste.
- Reduction of C&D debris landfilled.
- CSWD annual report shows tonnages of material landfilled over the last decade, including break out of C&D waste. The outreach efforts (and the recession) have resulted in recent reduction of tonnages of C&D debris being landfilled.



- According to StopWaste.org, the avoided methane emissions and reduced energy consumption from recycling about 95% of C&D materials from the construction of a 2,000 square foot home is the equivalent of taking one car off the road for a year, or avoiding 5.7 metric tons of CO₂ emissions.

Keys to Success or Lessons Learned:

- A combination of convenient, efficient and cost-effective infrastructure; thoughtful policies; and proactive education and outreach programs maximizes waste reduction and diversion of materials from trash towards reuse and recycling.
- Municipalities should participate in the education and outreach effort by sharing information about reuse and recycling of C&D waste at the beginning of a project so that developers and builders can plan accordingly.
- For more information about reducing, reusing and recycling, contact your area solid waste district — <http://www.anr.state.vt.us/dec/wastediv/solid/swmdlist.htm>

Contact:

Marge Keough, CSWD Outreach Coordinator
mkeough@cswd.net, 802-872-8100 ext 234

VI. Waste Reduction Case Studies

Energy Efficiency through Solid Waste Hauling

Community Profile:

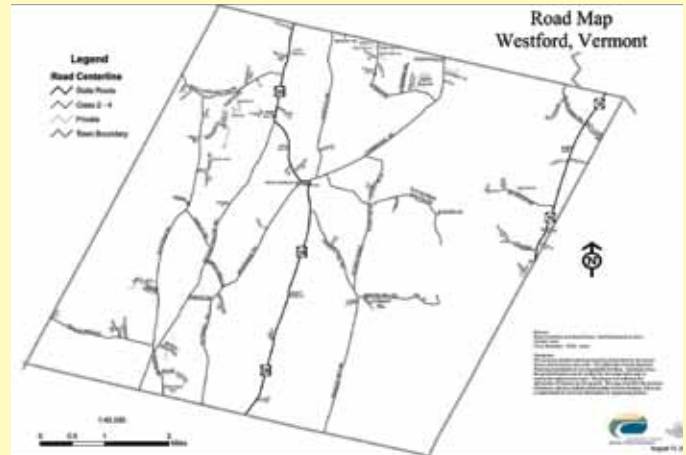
- Westford
- 2008 Population: 2,229
- Westford is located on the northern edge of Chittenden County. It is composed of both rural areas and a small town center that supports small-scale commercial uses. According to 2000 U.S Census information there were 750 housing units in Westford.

Overview:

- As a service to all its residents and businesses, Westford contracts with a single waste hauler to pick up all trash in the municipality. The town chose to go with a single hauler, instead of several, in an effort to reduce impacts on its rural highway system (mostly dirt roads), which helps reduce the economic and energy-intensive cost of maintaining those roads.
- Westford produces about 1,000 tons of refuse per year and 250 tons of recycling. In 2008, the Selectboard appointed a committee to evaluate the current method of trash hauling and to see if it could be done cheaper by the town. The cost to residents, which is paid by the town and included in property taxes, is \$20.83 per month or \$188,000 per year (including recycling pick up). This is for weekly pick up of trash and bi-monthly recycling pick up.

Outcomes:

- The town offers a contract for hauling services from a large contiguous area. This is a cost benefit to a hauler because there are less unproductive miles between pickups, resulting in a more efficient system of pick-up, less fuel consumed and lower personnel expense per stop. The fuel burn rate for pick up is 10 gallons per hour of truck use. Having a more efficient system and route reduces fuel costs for the hauler and reduces greenhouse gas emissions.



- The hauler has lower administrative, postage and paper costs resulting from sending one bill to the town instead of one to each resident and business owner who receives the service.
- The town's highway maintenance needs are lessened with fewer heavy trucks using its system; resulting in a reduction in use of fossil fuels.
- The town was able to negotiate the lowest cost per resident for combined recycling and waste pick up in Chittenden County (January 2009).

Keys to Success or Lessons Learned:

- The selectboard was willing to look outside the box in an effort to reduce highway maintenance costs, which also has the added benefit of reducing greenhouse gas emissions from both town vehicles and trash haulers.
- Put a waste hauling contract out to bid to enable negotiation of a low price and good service.

Contact:

Westford Selectboard, selectboard@westfordvt.us, 802-878-4587

Conclusion

As *Communities Tackling Vermont's Energy Challenges* highlights, motivated citizens across Vermont are undertaking innovative projects and programs that are conserving energy, saving money, transitioning to renewables and reducing greenhouse gas emissions. Person-by-person, project-by-project, Vermonters are helping to pave the way toward the clean energy future that times demand.

Beyond the efforts highlighted here, there are many additional examples of innovative community action and, thankfully, every day there are more.

The work Vermonters are doing in their communities is where the rubber hits the road; it is where good ideas are turned into reality.

Vermont has the opportunity to lead the nation in charting a path towards a future built upon energy conservation, efficiency and clean, renewable resources. Each individual story, each community example, adds up to the total picture of what's possible and, increasingly, practical.

It is our hope that these stories will inspire and motivate Vermonters to take action. And it is our hope that we can play a part in that effort by partnering with communities on energy planning and implementation efforts as well as highlighting the promise of on-the-ground action by sharing success stories more broadly.

So, if you have a story to tell — a “model” for what other Vermonters might do to address energy issues — please do share that with us. Email jmiller@vnrc.org or call 802-223-2328. This publication will be available online at: www.vnrc.org, www.vecan.net or www.vlct.org and we will add more case studies on a regular basis to celebrate the kind of energy action underway — and necessary — to realize a clean, energy efficient 21st century.



Got good ideas?

Write down — and share — your clean energy innovation story!

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Share your good ideas with the Vermont Natural Resources Council by calling 802-223-2328 or email jmiller@vnrc.org.

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Common Sense Solutions for a Changing Vermont

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