Renewable Energy Opportunities And Related Training

Gro-WA Work Component N

Introduction

Renewable Energy has been an area of focus for the Mobilize Maine asset-based planning process in northern Maine since 2010 (http://www.gro-wa.org/aroostook-renewable-energy-analysis) and recent planning efforts in renewable energy in Washington County (http://www.gro-wa.org/washington-county-energy-planning) provide region-wide context. The review of renewable energy options included solar, geothermal, hydro/tidal, wind and biomass. More than 20 "working group" meetings have been held over the past three years discussing different renewable energy options with more than 60 energy-related businesses eventually participating in those discussions.

The underlying assumption is that expanded investment and deployment of renewable energy, if found to be cleaner and more affordable than existing fuels and systems, would benefit Maine residents and businesses, who currently rely on fossil fuels for heat and electricity to a much greater extent than the average American or the average New Englander.

Work group meetings (http://www.gro-wa.org/renewable-energy-training-workgroup-members) examined investments, challenges, and opportunities – real and anticipated – in relation to renewable power, its sources, networks, mechanical systems, costs, and workforce requirements. These working groups are made up of businesses and individuals that are directly involved in the energy fields and who were able to bring their expertise and perspective to particular energy topics.

With low median income and a high energy cost burden Washington County is working on alternatives on many fronts including public-private sector planning, private sector investments and innovations, and exploration of technical and policy solutions.

Planning, research and model policy development efforts include:

- Washington County Energy Initiative in 2012 including Policy Options for Municipal/County refinement and adoption
- Down East Maine Renewable Energy Working Group: Findings and Recommendations Report in 2014
- Affordable Heat Consortium 2013 and on-going
- Acadian Internship Program in 2011

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Findings

Woody biomass is a sustainable feedstock for wood pellet and wood chip heating applications based on current wood harvesting volumes, although there will continue to be competing demand for the material from the paper-making industry. Wood pellet manufacture is highly dependent on forest harvest and milling operations.

Oil is currently the primary heating fuel in over 70% of the homes and businesses in the region – and is one of the most expensive forms of heating options.

Wind energy, as it relates to large commercial wind turbines, has significant potential in both Washington and Aroostook counties. Improvements in turbine technology have resulted in areas of the region that had been considered "marginal" now being seen as good locations for turbine placement. In Aroostook, this potential is seriously compromised due to the lack of direct connection between the Aroostook power grid and the New England power grid (NEPOOL) (all electric transmission is currently connected to the New Brunswick grid). Mid-size wind turbines (100kW to 250 kW) could have considerable application provided that the primary barrier of a lack of turbine development and production can be overcome. The economics of small wind turbine use (<100 kW) is highly dependent on location and purpose.

Electric energy from tidal sources holds promise as evidenced by the first commercial grid connection established by Ocean Renewable Power Corporation in 2012 (http://www.orpc.co/newsevents_pressrelease.aspx?id=b%2bat7%2bmVnTg%3d). Though in its infancy as to design, efficiency and application, the technology holds promise in Washington County and Alaska, that is working to address the inherent challenges of the salt water environment and its impact on turbine design and maintenance.

Solar power has limited utility due to its (relatively) high cost. The most common utilization is the installation of solar panels to heat hot water for domestic household use.

Likewise, geothermal HVAC has had limited application in the region due to high buy-in costs. Heat pumps, however, have seen a considerable increase in homeowner and small business installations due, in part, to a Maine state rebate program.

Lower natural gas prices and rebate programs for heat pumps have slowed conversion to pellet fuels. However, the spikes in natural gas prices seen in the winter of 2014 are indicative of a highly volatile market with tight supplies across North America.

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Most households will not be able to afford the more sophisticated alternative heating options due to the frontloaded expense of equipment and installation.

The Northern Maine Community College's (NMCC) "Northern Maine Center for Excellence in Alternative Energy Training and Education" is a powerful addition to renewable energy acceptance and utilization in northern and eastern Maine.

Analysis and Basic Conclusions

- Conversion from primary oil heat to primary wood pellet heating reduces annual heating costs by 35% and supports regional wood pellet production;
- Pellet stoves are more cost-effective than pellet boilers due to substantially lower initial buy-in costs and related Return on Investment (ROI);
- Pellet fuel savings need to have more public awareness, especially on the part of homeowners and small business;
- State and federal policy has not adopted pellet fuels in the renewable energy portfolio;
- Commercial scale wind energy production still has relevance – more so in Washington county than Aroostook – but it remains controversial and dependent on federal and state policy decisions; and their related tax incentives;
- Medium and small wind turbine utilization does not have broad application in the region and is highly dependent on geographic location and purpose;
- Solar panels will continue to have a niche market with domestic hot water application;
- Expansion of programs at NMCC's Alternative Energy Training and Education Center will help both adoption of renewable energy technologies and retention of skilled workers in the region;

The Down East Maine Renewable Energy Working Group examined investments, challenges, and opportunities – real and anticipated – in relation to renewable power, its sources, networks, mechanical systems, costs, and workforce requirements. Their findings (http://www.gro-wa.org/assets/files/renewable-energy/Down-East-Renew-Energy-rpt.pdf) were based on community perception consultations, asset inventories, case studies, impacts assessment, best practice indexing, and contextual research regarding policy and legislation (with emphasis on

LD 1559 & 1085). The topics arising most consistently, urgently, and persuasively throughout all these investigations concerned the linked challenges of **front-end transition costs, market distortion, and fair policy frameworks**.

Suggested Actions

- The Workforce Center of Excellence model currently being initiated for the manufacturing sector in Washington and Aroostook counties should be expanded to the Renewable Energy sector;
- Pellet fuels need ongoing promotion as the region's most viable long-term heating option;
- Forest harvest worker training (which supports the pellet fuel industry) needs to have better alternatives for training and knowledge transfer;
- State energy policy needs to incentivize pellet fuel adoption;
- Further improvement and testing of tidal electrical power options;
- Federal policy makers should be approached about including pellet fuels as part of the national renewable energy portfolio;
- Connecting the electric transmission grid in Aroostook county to the New England power grid should be encouraged and supported at all levels;

Implementation already occurring

- Over the past two years, twenty-five engineers have been trained in renewable energy-related fields through a federal Jobs Accelerator grant from the U.S. Employment and Training Administration;
- An affordable heating study is currently ongoing in Eastport, ME funded by the Maine Technology Institute. The purpose is to explore new methods (retrofit, finance, heating technology) for reducing heating costs for low income Mainers.
- The third annual Biomass Fair will take place April 5th, 2014 at Northern Maine Community College.
- WAGM TV has been doing promotion of pellet fuels and created a series of 5 minute segments to look at different aspects of adoption;

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- Ocean Renewable Power Company (ORPC) in Eastport has installed their TideGen power system to monitor environmental impact and power production;
- A forest industry contractor business training took place in 2013 and is to be held again in 2014;

Washington County received an Energy Efficiency and Conservation Block Grant in May 2009. This grant allowed the County to conduct energy efficiency planning and outreach. In addition to completing Energy Audits for several county buildings [1], funds were used to create a Washington County Energy Initiative - Community Energy Plan (http://www.gro-wa.org/county-energy-plan) with model energy policies (http://www.gro-wa.org/policy-options) for municipal and county review, customization and adoption.

During the summer of 2011 the Washington County Council of Governments sponsored the work of two student interns, Nathan Legere and Enock Zenda, as part of the Acadian Internship Program of the University of Maine School of Forest Resources.

The interns completed research on Renewable Energies & Carbon Reduction Strategies in Washington County. Their final project report can be downloaded here. It includes an overview of **renewable energy sources and their utilization in Maine** including hydroelectric, wind, tidal, solar, biomass, algae and biofuels. They also conducted research on **vehicles that use alternative fuel sources** including personal vehicles and small scale commercial vehicles used by municipalities for public works purposes. Finally their research provides information on the status of state and federal **legislation and incentives** for the use of alternative energy sources as well as **programs to assist municipalities in choosing to implement alternative energy sources**.

The Affordable Heat Consortium is a project of Thermal Efficiency Eastport and Minerva Partners, that sought out collaborators in Washington County (Washington County Council of Governments, Sunrise County Economic Council, Northern Maine Development Commission, the Eastport Energy Committee, and the Design + energy Lab at Harvard's Graduate School of Design) and was successful in obtaining a Maine Technology Institute Cluster Initiative grant.

“Affordable heat” is a major concern in Maine and is firmly anchored to the relatively large and mature domains of renewable energy, clean energy, energy transition, and

[1] County Court House including the Sheriff’s Building and the County Jail, District Attorney’s Office and the Communication building that houses the Washington County Emergency Management Agency (WCEMA) and the offices for the Unorganized Territories and Cooperative Extension.

climate change mitigation. Maine's "affordable heat" infrastructure is currently broad but shallow, with low awareness of overlapping efforts and weak market penetration. Many resources are underutilized. This is a cross-cutting cluster of markets, services, and products that needs to define its interests, articulate its agenda, and convene around a shared action plan.

An "affordable heat" consortium in down east Maine (http://www.gro-wa.org/affordable-heat-consortium) would accelerate the diffusion and deployment of proven heating systems and fuels that would bring cheaper, healthier, and more efficient warmth to non-affluent communities. Such a permanent consortium would serve as a collector and distributor of vertically-integrated heating solutions, ready to feed them into strategies for community-led innovation that deliver guaranteed cash savings, increased comfort during winter, a cleaner environment, and better physical health.

The Affordable Heat Consortium has met once with a 2nd meeting planned in May of 2014.

Additional resource needs

- The development of forest industry recruitment and training programs to ensure that a skilled workforce is available for the state's largest indigenous industry;
- More thorough study and connection of higher education and continuing education resources to renewable energy jobs;
- Electrical power connection completed between northern Maine and the New England Power Pool (facilitates wind development and supports NMCC Wind Power Technology degree program);
- Inclusion of pellet fuels into the U.S. Renewable Energy Portfolio;
- The development of a Woods Harvester training program at NMCC's Alternative Energy Training and Education Center;
- The development of a program that more directly connects regional farming to alternative energy sources;