

1. Cover Page

1.1 Program Title: New Hampshire Farm Energy Initiative

1.2 Program Type: 1. Energy Audits; 2. Energy efficiency related industrial process and control systems; 3. Education, outreach and information programs that promote energy efficiency, conservation, and demand response; and 4. Demand response programs to reduce NH's peak electric load.

1.3 Program Summary: Farmers in NH, and throughout the Northeast, need and want to integrate sustainable energy strategies on their farms but the amount of information available is overwhelming, seemingly contradictory, and often times not geared towards their particular needs. Also, farms could be great locations to produce sustainable energy, but, again, the available farm-specific information and technical services are not present in NH as they are in other states. In order to achieve energy efficiency and increase energy production opportunities among NH's agricultural businesses, the Southern NH Resource Conservation & Development Area Council proposes a two-pronged approach. The first approach is education and outreach about farm energy issues. This education and outreach will be provided to technical service providers who will be trained in Train-the-Trainer workshops. With in-state professionals trained, they will then provide up to 10 workshops to agricultural business owners and operators. The second approach is identifying 25 farms for full energy audits that will provide in-depth, specific information to farmers while providing demonstration sites for other farmers to learn about the energy audit process and achievable results. Without the education and concrete examples, farm energy efficiency and production will not occur in a timely fashion. Without farm energy initiatives, such as this one, greenhouse gas emissions will not be reduced in one of NH's most important industries.

1.4 Low Income Residential Customer qualification: Low income agricultural producers will qualify and encouraged to apply to this program.

1.5 Identification of Applicant Organization: Southern NH RCD Area Council

1.6 Identification of Subcontractors and partners: NH Coalition for Sustainable Agriculture, North Country Resource Conservation & Development, EnSave, UNH Cooperative Extension, Merrimack County Conservation District, and others.

1.7 Authorized Negotiator(s): Southern NH RC&D Area Council

1.8 Projected Energy Savings: Using numbers for a standard audit for a dairy farm (from EnSave), a typical dairy operation would save 45,027 kWh and 456 gallons of propane.

1.9 Projected Greenhouse Gas Emissions Reductions: Using the above mentioned standard dairy audit, the projected reductions for 25 audits are up to 554990.25 Metric Tons. Not all farms will adopt all energy saving measures, but every attendee will be surveyed to assess emission reductions that were self-made after educational workshops. This collaboration will also report sustainable energy generation installed by farmers as a result of this initiative.

1.10 Length of Program: The proposed length of program is two-years from the availability of funds. The first six months to one-year will be to set up farm energy efficiency trainings for farmers and initiate farm energy audits. The last year will be to complete energy audits. The last three months will include follow-up evaluations by mailings, phone interviews, and select on-farm visits. Since agricultural technical service providers will be trained as part of the Train-the-Trainer program, the education and outreach benefits of this project will continue indefinitely.

1.11 Total Program Costs: \$98,263.00

1.12 GHGER Funds Requested: \$87,000.00

2. Executive Summary:

New Hampshire agricultural industries use a considerable amount of energy. Whether it be heating structures, fueling farm equipment, powering irrigation, or transporting their goods to market, farms use energy and emit greenhouse gases. But, NH farmers want to make their operations more energy sustainable yet the process of performing a true assessment of the farm's energy use is daunting. Even more difficult is assessing what energy efficiency or energy producing strategies would be most cost effective for their farm. The Southern NH Resource Conservation and Development Area Council with partners propose to provide a two-pronged approach to achieve better energy efficiency within NH farms: educate 200 farmers about techniques to reduce their energy usage *and* provide professional energy audits that analyze that particular farms energy usage while providing specific, in-depth, realistic solutions to at least 25 NH farms. Each farmer will be asked to make a deposit of \$100 to have the audit completed. This fee will ensure commitment to the project and that the farmer will follow-through on the process. The \$100 will be refunded after the farmer has shown, with documentation, that at least one audit finding has been implemented. If successful, this collaborative group aims to seek additional funds from various entities to provide more professional audits. Follow-up to all 200 participants will occur one-year after project initiation to evaluate energy savings from the project through written evaluations, on-farm visits, and phone interviews.

This project reduces greenhouse gas outputs from an important and growing NH industry, but energy efficiency is also important to the survivability of NH farms. The use of energy from non-renewable fossil fuels opens farmers to multiple risks: financial risk from fluctuating and generally rising costs, various environmental risks from fossil fuel related pollution (carbon dioxide, mercury, etc.), groundwater contamination, and more. Many of these risks can be

reduced to eliminated through changes in equipment, facilities, vehicles, insulation, and appropriate timing of certain farm activities.

The first component of this two-pronged approach is education and outreach to at least 200 current and beginning farmers. These workshops will educate participants on how to conduct a farm energy audit to assess energy use and costs, identify options for change, evaluate risks of maintaining the status quo versus adopting change, and develop a farm energy plan that incorporates learning into actions.

From these education series, farmers will be encouraged to apply to have a complete farm energy audit performed by expert individuals. These audits will look at all inputs and outputs, give concrete energy efficiency solutions, give realistic “pay back” times for energy-related financial investment, and recommend farm energy production project, if applicable. Farms are uniquely positioned to take advantage of renewable energy generation such as wind, solar, or biogas. Implementing these on-farm energy production projects are daunting to the local farmer due to legal and financial risks, not knowing if their farm is a suitable location for farm energy generation, and whether the investment will have a pay off. As a berry farmer member of the NH Coalition for Sustaining Agriculture asked recently, “How do I decide whether an investment in an energy efficient irrigation system will be worth it and will my helpers be able to operate it? Are there other things I should do first to reduce my energy bill?” A dairy farmer considering an anaerobic digestion system countered with, “...the information was confusing, conflicting, and really complicated. There are all sorts of systems and many seem to fail. How do I find my way through this? The investment is huge, but so are the benefits.” NH agricultural industries need the technical input that professional farm energy audits will provide along with the back-up education to choose from their many options wisely.

3. Proposed Work Scope and Schedule:

Listed in the table below is the work scope and schedule for the proposed farm energy awareness series and completion of 25 professionally done farm energy audits. The proposed time-scale for completion of this project is two years from the receipt of funds.

Action Item	Participant Progress	Approx. # Reached
1. Collect and review energy assessment publications and tools, draft materials appropriate to the types and scale of NH farmers and identify five typical farms to pre-test materials.	Test the NH assessment tools and provide team with feedback, both written and verbal. Materials will be tested by using a focus group of up to five agricultural technical service providers and up to five farmers.	5
2. Conducts two Train-the-Trainer workshops. Using a co-learning approach, potential trainers will learn about 1) energy conservation measures, 2) energy assessments and plans, and 3) resources to support energy efficiency, reduction, and generation.	At the end of these workshops, trainers will be more confident about their ability to raise energy assessment issues with farmers and be knowledgeable about energy conservation and generation on the farm. Trainers will be asked to keep a record of how many farmers and other entities they reach out to.	60
3. Work with the Trainers and collaborators to plan, organize, and execute 10 workshops in each NH county. Following the workshops, the team will use evaluations and input to identify 25 farms to perform professional farm energy audits. Each	At the end of these workshops, participants will be knowledgeable about energy conservation practices and the why and how to's of an energy assessment. Those interested in conducting an energy audit and developing an energy plan for their	200

participant will be encouraged to apply for an energy audit.	farm will be identified.	
4. Work with EnSave to complete 25 energy audits on NH farms.	Participants will work with EnSave and other professionals to fully complete a Farm Energy Audit through telephone interviews and on-site visits.	25
5. Conduct final evaluation of the project: workshops, materials, changes made (or not) by farmers and agricultural service providers and why. Calculate energy savings for both workshop attendees and participants in the Farm Energy Audit. Prepare model training program curriculum and guide with final versions of program fact sheets and tools. Farm Energy Audit profiles will be used to promote farm energy conservation and generation to other NH farms.	Complete Project Evaluation Survey by mail with follow-up phone calls to non-respondents. Creation of publications for public dissemination.	260

4. Project Benefits:

This project will give farmers the tools to become more energy efficient and, if applicable, produce energy on their farms using alternative, sustainable, and renewable energy sources. This project benefits everyone by reducing greenhouse gas emissions through more specific, more efficient agricultural practices, increasing food security by increasing farm viability, and giving farmers the knowledge and confidence to produce energy on their farms, where applicable.

4.1 Reduce greenhouse gas emissions from all fuels used to provide electricity, heating and cooling in New Hampshire: Farming is an energy intensive industry. Whether it is a dairy operation, greenhouse business, maple syrup production, or vegetable farm, it uses a lot of energy. The training sessions and farm audits will look at all components: fuels, electricity, heating, cooling, as well as ways to generate energy. Ways to sequester carbon will also be discussed as NH's forests and soils are uniquely positioned to decrease atmospheric carbon, if the benefits outweighed costs.

4.2 Be cost-effective: Nothing is more cost effective than information that is understandable and transferable. This project trains individuals to get energy efficiency out there to a vital economic and cultural sector of NH, engages the agricultural industry that will permeate throughout the community, and give tangible examples of energy efficiency throughout the state in which concrete data can be derived. These audits and information also give farmers the means to seek other funds available through their local utilities and the United States Department of Agriculture, who is emphasizing farm energy efficiency through a variety of programs.

4.3 Reduce New Hampshire's peak electric load: Both educational programs and energy audits address peak electric load and how to schedule practices to avoid high electrical consumption as a cost-saving measure. Energy audits (self or professional) will help identify best practice times and their corresponding cost savings.

4.4 Promote market transformation: NH farms can transform their marketability by generating energy and sequestering carbon. Beyond making their food production more sustainable, NH's agriculture can seize opportunities to incorporate renewable energy sources to enhance the grid and decrease their dependence on fossil fuels.

4.5 Promote innovative technologies: Besides energy efficiency, there are many innovative technologies that will help farmers produce energy. The problem is moving beyond the barriers of lack of knowledge, lack of expert advice, and worries about financial and legal issues. Energy audits will help farmers decide if the innovative technologies may work for them.

4.6 Promote economic development: According to the *2007 Census of Agriculture*, the number of NH farms from 2002 to 2007 has increased by 24% and a Market Value of Production has increased 37% in the same time frame to an astounding \$199,051,000. NH agriculture is growing and, if it becomes a focus of the Public Utilities Commission and other interested parties, this increase can become sustainable, energy efficient, and even increase opportunities for NH to generate its own energy.

4.7 Promote energy cost savings: This project will promote energy cost savings by analyzing the inputs and outputs of agricultural businesses. New technologies will be suggested, timing of practices to save energy will be analyzed, insulation, changes to more efficient fuels, and all practices that could save energy will be discussed in both educational workshops *AND* farm energy audits.

4.8 Promote collaboration and provide useful information for future program evaluation and improvement: This is the heart of this proposal- collaboration, partnerships, and building a community around energy efficiency. In the workshops and the close-contact with the farmers receiving audits, reducing energy inputs and creating energy will be what the farming community wants to do and knows where to get the factual, unbiased information. Even after this grant, the Trainers will still be promoting energy efficiency and recommending strategies, technology, and funding mechanisms.

4.9 Otherwise be consistent with the public interest and the purposes of RSA 125-O:19.

This grant application not only aims to reduce the current greenhouse gases emitted by NH farms, it aims to improve the survivability of NH farms. Not only will this project reduce emissions, it will help stop the loss of agricultural farms by making farms more financially stable and less likely to sell their land to development. This could not be better explained than in the *New Hampshire Climate Action Plan*,

“A significant source of emissions not addressed in the EPA inventory was the conversion of agricultural and forested lands to other uses. This conversion, resulting from development associated with New Hampshire’s rapid rate of population growth, provided a steady contribution of greenhouse gas emissions. ... This land use conversion has caused the release of an additional 0.35 MMTCO₂e per year, driven largely by the complete clearing of 5000 acres of forest land each year**. A significant factor not addressed by these figures is the permanent loss of the sequestration potential of these natural lands as the capacity to store carbon naturally in the soil and forests is lost (NHDES, 2009, p 23).”

5. Measurement and Verification:

Relating back to the Work Scope and Schedule, below is how each step will be measured and verified.

1. Collect and review energy assessment publications and tools, draft materials appropriate to the types and scale of NH farmers and identify five typical farms to pre-test materials.

Measurement: Review materials with five different farms for feedback and revision. Measurement will come from verbal and written critiques of current and created materials.

2. Train-the-Trainer Workshops

Measurement: 60 trained “Trainers” capable of disseminating information to the agricultural industry. Within three months of the end of the workshops, “Trainers” will be queried by e-mail, mail, and/or telephone asking how many individuals they have reached. If possible, trainers will be

asked to submit reports of energy efficient changes made as a result. Anticipated 60% response rate from the trainers.

3. Agricultural Industry Workshops

Measurement: Up to five workshops reaching 200 agricultural industry owners or operators.

Within three months of the end of the grant, each participant will be queried by e-mail, mail, and/ or telephone asking for changes they made to their farms to save or generate energy. A form will be produced asking for specific information, such as energy use pre and post workshops. A report will be generated calculating approximate energy savings due to the new awareness.

4. Professional Farm Energy Audits

Measurement: The 25 farms chosen for Professional Farm Energy Audits will undergo the full audit. Within three months before the end of the grant, farmers will be asked to compare inputs and outputs before and after the audit. Specific changes will be tracked and a report calculating approximate energy savings or energy generation will be drafted.

Budget:

This budget involves three basic items: funds for trainings, funds for the energy audits, and coordination of all efforts. Please see the Requested Budget in the Attachments for more detail. Coordination of the entire project is the largest component. Hence, the largest part of the budget is the *Wages & Benefits* sections, combined. It will be the coordinator's responsibility to schedule trainings, market the program, review and modify energy efficiency/ generation materials, and evaluate the program performance. SNHRC&D will hire a coordinator for these efforts, as funds become available. This project will take considerable outreach to farmers and technical service providers. Some of this is matched as *Applicant In-Kind Contribution* by SNHRCD and its

collaborators.

The next largest component is the ***Contracted Labor & Services***, primarily through EnSave. We are pleased to bring EnSave to New Hampshire to provide specialized energy conservation and assessment training. We have allocated \$6,000 to cover their costs of workshop preparation, delivery, and follow-up consultation. A summary of EnSave's expertise is attached to their collaborator letter. They have developed and conducted the kind of training we need with our mix of learners and are nationally recognized for this work. To make this initiative successful, the project team needs their specific expertise to create a Farm Sustainable Energy infrastructure in New Hampshire.

EnSave will also conduct the 25 farm energy audits. We have allocated \$1500 per audit for a total of \$37,500. A sample Dairy Audit is included with EnSave's summary of expertise in the Attachments. In order to review the applications received for a full energy audit, a small Advisory Committee will be established, which will be given a small honorarium to review and approved applications.

The ***General Overhead & Profit*** section includes registration fees for workshops. It was the project team's belief that a small registration fee is required for people to commit to attending and to partially off-set the costs of publications, mileage, and other fringe costs. Ten county workshops will be conducted. A \$500/ per county honorarium has been budgeted to facilitate each of the local meetings with \$500/ per county budgeted for appropriate facilities to hold each workshop.

Other costs will include materials and supplies, including: displays/ exhibits, 300 handout and worksheet packets; and workshop supplies (badges, flip charts, markers, etc). While most communication will be via e-mail, we are estimated significant postage to mail invitations and evaluations. Postage will is budgeted at \$630 (1500 pieces @ \$0.42).

Since this project is a new initiative that is building a new type of informational infrastructure, the administrative costs are high. But, as the infrastructure increases, technical service providers are trained, and there are concrete examples of how energy efficiency and generation can help the NH farmer, it will be shown how cost effective this project is.

7. Applicant Qualifications:

The **Project Leader** Hollie Umphrey is the Coordinator for the Southern NH Resource Conservation and Development Area Council, a non-profit organization that aims to protect natural resources, raise awareness of the benefits and value of farming, preserve family farms and rural character and develop and disseminate related education information and training. SNHRC&D has ten years of grant management and fiscal agent expertise and a solid record of financial accountability.

Project Advisor Lynda Brushett is a tree farmer, agricultural business development specialist and the facilitator of the NH Coalition for Sustaining Agriculture since its inception in 1994. She provides the organizational support that enables the diverse members of the Coalition to work together on multi-disciplinary issues confronting NH agriculture by coordinating where their organization's work of connects to a common issue and keeps everyone focused on project outcomes.

Technical advisor Craig Metz, CEO, EnSave, an agricultural energy specialist will work with the Project team to design and lead two Train the Trainer programs to teach participants the skills, information, tools, and resources needed to communicate with farmers about energy issues and actions. EnSave will also conduct the 25 professional farm energy audits to selected recipients.

Additional collaborators will include UNH Cooperative Extension, Merrimack County Conservation District, Cheshire County Conservation District, the Northeast Organic Farming Association-NH, the USDA Natural Resources Conservation Service, and others.

Attachments

A. Requested Budget

B. Default Values for Estimating GHG Emissions Reductions Based on Energy Savings

Letters of Support (as Attachments)

A. Southern NH RC&D (Cover Letter)

B. EnSave Letter, Services Summary, and Sample Audit

C. North Country Resource Conservation and Development Area Council, Inc.

D. NH Coalition for Sustaining Agriculture

E. Merrimack County Conservation District