

## 1. Executive Summary

The *Energy Conservation Outreach and Technology Transfer to Socially Disadvantaged, Limited Resource or Beginning Farmers and Ranchers or American Indian Tribal Members* was a three-year collaborative project undertaken by the National Association of Resource Conservation & Development Councils (National Association), local Resource Conservation & Development Councils (RC&Ds), the Natural Resources Conservation Service (NRCS) and EnSave, Inc.(EnSave) to address the lack of participation by minority farmers in the National On-Farm energy initiative.

The goal of the project was to enhance AgEMP development infrastructure by establishing a strong network of local energy data collectors to serve these minority farmer communities, provide energy audits free of charge to minority farmers as part of the training process, and educate minority farmers about energy efficiency opportunities on the farm and the range of state and federal programs that can provide financial assistance for energy efficiency.

Specific goals and objectives of the project were to:

1. Design an energy audit data collector training plan
2. Market opportunity to RC&D Council Areas and the Minority and Limited Resource Farmers and Ranchers within those communities (and others if necessary)
3. Enroll trainees in 4 regions
4. Develop training schedule for program regions
5. Conduct training
6. Deliver project reports
7. Deliver project evaluation
8. Deliver final report

Each of these deliverables was achieved. The program received additional time from USDA NRCS to allow the program to fulfill its deliverables and a geographic scope shift was necessary to complete the project. The loss of federal funding for the RC&D program and subsequent reorganization or elimination of many RC&D councils delayed the start and subsequent momentum of the project. The economic downturn also reduced the availability of anticipated cash matching funds, requiring a reorganization of the plans to obtain the match. Through the course of the grant, the National Association received approval to switch the location of Hispanic farmers from Texas to Puerto Rico. While Texas struggled to find an appropriate RC&D council due to the contraction of local councils, Puerto Rico had a track record of prior success and so NRCS agreed to switch the geographic focus. As a value-added component, the program created two Spanish-language publications addressing best practices for irrigation and coffee

processing in Puerto Rico. These documents can be utilized by NRCS to provide technical assistance to farmers within Puerto Rico and other Spanish-speaking farmers in the Caribbean region.

The primary beneficiaries of the project are minority farmers. Before the program, each of the target areas lacked a network of data collectors able to develop Agricultural Energy Management Plans (AgEMPs), as well as a lack of awareness among farmers and some NRCS field staff about the benefits and opportunities of AgEMPs. In addition to the fourteen farmers who directly benefitted by receiving an AgEMP, several hundred additional farmers attended the workshops to learn about federal opportunities for energy efficiency such as EQIP, Rural Development's Rural Energy for America Program (REAP) and Farm Security Administration's loans. The nineteen data collectors trained through this program have an opportunity to earn supplemental income and serve their local community. When implemented, the energy efficiency projects identified through the AgEMPs will benefit the producers with lower energy costs, and will also benefit local equipment vendors who sell and install the equipment.

## 2. Introduction

The Minority and Limited Resource Farm Program was designed to empower four historically-underserved farmer groups to improve their energy management. The grant focused on Native Hawaiians in Hawaii, Hopi and Navajo Native Americans in Arizona, Hispanics in Puerto Rico, and African-Americans in Alabama and Georgia. The National Association of Resource Conservation & Development Councils led the grant through close collaboration with local RC&D councils in each targeted area, assisted by EnSave, Inc. as a technical resource. The National Association of RC&D Councils represents over one hundred locally-led RC&D councils throughout the United States, and has spearheaded relationships with several federal agencies. EnSave is a leading designer and implementer of agricultural energy efficiency programs, working nationally with several utility companies, state agencies, and industry groups to deliver energy savings to America's agricultural sector. They are also a technical service provider for CAP 128 and have delivered thousands of AgEMPs since 2008.

As a result of the program, the NARC&DC delivered four energy data collector trainings that trained a total of nineteen people to assist with on-farm data collection to support the delivery of Agricultural Energy Management Plans (AgEMPs). As part of the training, the program also delivered fourteen AgEMPs to farms who volunteered to serve as a data collector training site. The program delivered energy education to dozens of socially disadvantaged farmers in the four targeted regions through a series of workshops organized by state RC&D councils. These workshops educated farmers about the energy use on their farms and informed these farmers of the financial opportunities for energy efficiency that exist through NRCS, Rural Development, Farm Security Administration and local state/local agencies.

This project helped set a framework for how to engage more socially disadvantaged communities in NRCS' National On-Farm Energy Initiative, using a collaborative approach between local agricultural organizations, business, and NRCS. The program also established a network of data collectors who can help support these underserved communities by assisting with delivery of AgEMPs.

Business and academic relationships facilitating the project included several partners who contributed both financial resources and in-kind support. The NARC&DC worked closely with EnSave, a long-time

collaborator, to design the scope of the data collector training plan and conduct both the data collector training and energy training. The NARC&DC fostered relationships not only among local RC&D councils who served as champions and coordinators of the project, but among other local organizations such as Universities.

Funding for the project was provided as cash and in-kind match from EnSave, Tuskegee University College of Agriculture, Environment and Nutrition Sciences Program, the Puerto Rico Department of Agriculture, local RC&D Councils in the states of HI, AZ, TX, GA, AL and the territory of Puerto Rico and others. NRCS provided a grant of \$246,712.00, of which, since we were in the historically underserved and limited resource pool we were required to match \$123,356.00. However, the NARC&DC and its partners were able to come up with a higher match and leverage a match of \$165,750.64 in cash and in-kind funds.

Below, we have provided a discussion on the achievement of each deliverable:

#### Goal 1: Design an energy audit data collector training plan

The program delivered four energy data collector training presentations. For each training, EnSave created a syllabus, agenda, PowerPoint presentation, and binder of training materials, and delivered each training through a combination of classroom instruction and on-site farm demonstrations. The trainings covered the following topics:

- Requirements of the AgEMP
- Five steps of an energy audit
- Data collection materials and protocol
- Site visit supplies and tools
- Biosecurity considerations
- Equipment and technology basics (lighting, heating cooling, milk harvest, milk cooling, motors, etc.)
- AgEMP overview
- Energy savings opportunity examples

#### Goal 2: Market opportunity to RC&D Council Areas and the Minority and Limited Resource Farmers and Ranchers within those communities (and others if necessary)

The National Association worked with its local councils in each of the four targeted areas to select a council willing to take on the responsibilities of coordinating the grant activities at the local level. Primary responsibilities included working with EnSave to select training farms and trainees, publicizing the workshops locally, coordinating the logistics of the workshops, and introducing the project at each workshop. RC&D council partners included Big Island Resource Conservation & Development Council (Hawaii), Little Colorado River Plateau Resource Conservation & Development Area (Arizona), Puerto Rico Department of Agriculture/University of Puerto Rico (Puerto Rico) the Alabama Association of RC&D Councils/Tuskegee University (Alabama), and Fort Valley State University (Georgia).

#### Goal #3: Enroll trainees in 4 regions

EnSave provided a job description for the data collector to each local partner, who then used the document to recruit local personnel who would be a good fit for the data collector training. EnSave followed up with each interested candidate to discuss the position further, and provided each candidate with a written agreement outlining the data collector's roles and responsibilities. Each trainee executed this document prior to the training.

#### Goal #4: Develop training schedule for program regions

The RC&D local partners worked to schedule each workshop, typically scheduled immediately prior to the data collector training. They publicized each workshop and worked closely with EnSave to invite local NRCS representatives and personnel from other USDA agencies to each workshop. USDA personnel were invited to explain their financial assistance programs to the audience. Where applicable, local University Extension and state agency staff were also invited to provide an update on financial assistance offerings.

For the data collector training, EnSave coordinated with each training farm to schedule the training at a time convenient for the farmer. EnSave secured a classroom location for each training and communicated the training schedule and agenda to the participating farmers and data collector trainees.

#### Goal #4: Conduct training

The program delivered four workshops in each of the targeted regions, and also delivered a data collector training. The workshop was typically a half-day event, with trainings taking place over two-four days. Agendas for each workshop and data collector training are included in the Appendix.

#### Goals #5-7: Deliver project reports, project evaluation, and final report

The program has provided periodic status reports, and has provided its final project evaluation within this final report.

### 3. Background

NRCS' National On-Farm Energy Initiative offers financial assistance for site-specific energy analysis through an AgEMP, coupled with financial assistance to implement technologies and practices recommended in the analysis. While the initiative itself is fairly new, participation mirrors that of other NRCS programs in that limited-resource and minority farmers are often underrepresented as participants despite historically underserved payment rates that reduce the financial burden of participation. When limited-resource producers lack basic information about how to manage their energy use and how to access funding to help them save energy, they lose an opportunity to improve their operation and become more viable in the long-term. Limited-resource producers are also disproportionately affected by high energy prices, as they have fewer financial resources to begin with. When looking at conservation practices for limited-resource farmers, energy efficiency should be one of the first choices as the implementation of energy efficient equipment can bring near-immediate cost savings, especially when coupled with USDA financial assistance.

This project sought to address the lack of awareness of energy programs for limited-resource producers by bringing information about funding opportunities directly to the community through workshops, and training a local cadre of people to support delivery of AgEMPs.

The lack of limited-resource producer participation in the national on-farm energy initiative has several effects. The environment suffers when a farm uses more energy than necessary and generates air pollution and greenhouse gas emissions from excess energy use. The farmer suffers economically when they pay for excess energy use and are not able to invest as much in expanding the farm, improving production efficiency, or other growth activities. Finally, the community at large suffers when a limited-resource farm is no longer a part of a community due to operating costs (such as energy) that are too high.

Typically, limited-resource producers may become aware of offerings like the national on-farm energy initiative through their local NRCS office, if they happen to enter the office and engage with NRCS in the first place. They may be less likely to learn of an opportunity because they are less familiar with federal agencies and therefore not privy to the same information as farms with more resources. There are few resources for farms to learn about energy management on the farm because NRCS does not have the long-standing technical background in energy to begin educating farmers about energy within the broader community.

The project brought the education about energy management directly to the farm by having local RC&D councils advertise an educational event and recruit area farmers to attend each event. The RC&D had an established level of trust within the community which lent credence to its promotion of the workshop. Further, the project provided education and training on the variety of federal opportunities for energy efficiency, and provided a context for understanding how energy is used on the farm and which energy efficiency measures are best suited to the farm. EnSave recruited representatives from NRCS, Rural Development, FSA, and sometimes state organizations so that participating farmers received programming information from multiple agencies. To support the anticipated influx of interest in AgEMPs from farmers learning about their availability, the project also trained multiple data collectors in each area to fulfill this demand for on-farm data gathering to support delivery of AgEMPs.

This project addressed the natural resources concerns of energy and air quality. Air quality is a direct consequence of energy generation and utilization, as emissions from electricity generated at the power plant and fuels used on the farm contribute to air quality problems. The project served a diverse set of agriculture through the four geographic regions, including greenhouses (Hawaii), cattle and sod (Arizona), irrigated field crops and coffee (Puerto Rico), and poultry (Alabama/Georgia). The programming is transferable to all sectors of agriculture that use a significant amount of purchased energy in farming operation. These types of farms are primarily livestock, irrigated field crops, and greenhouses.

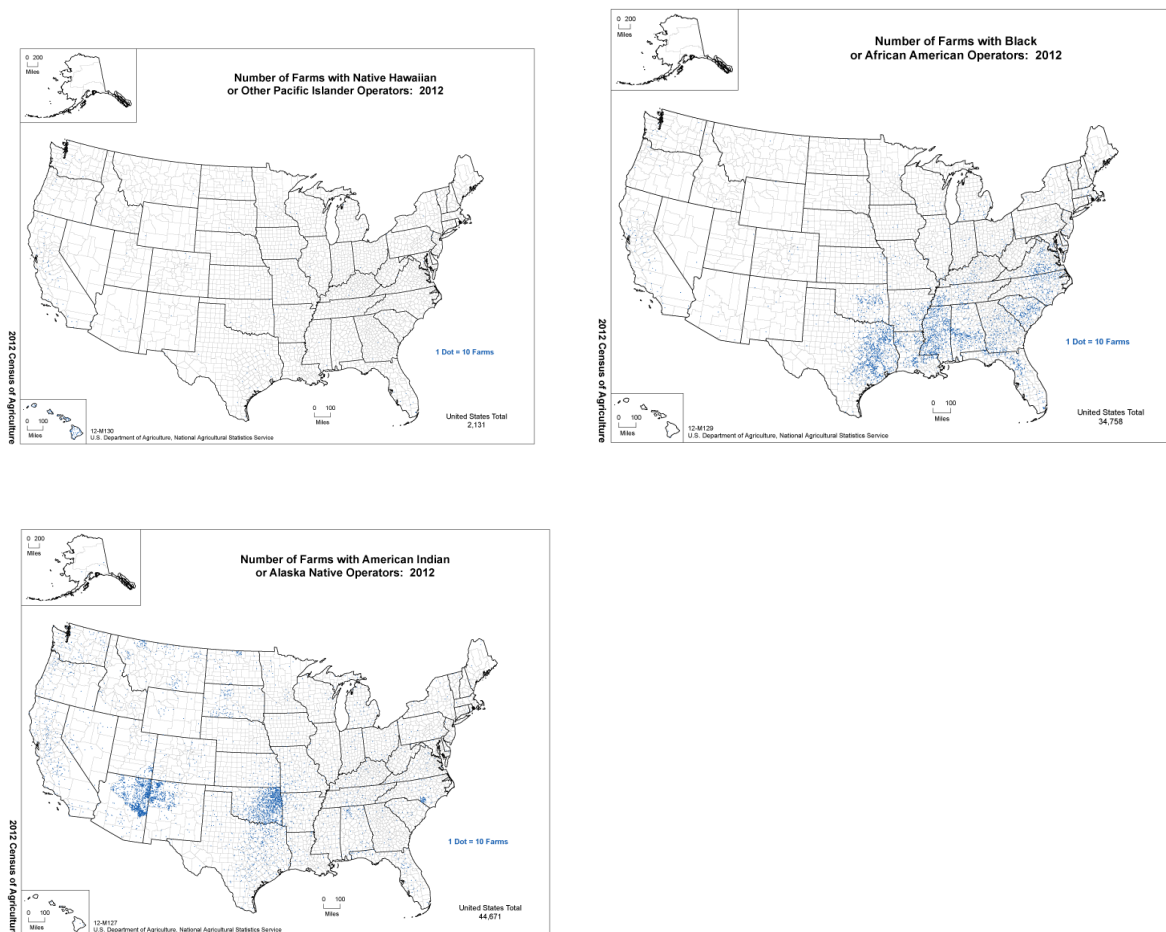
## 4. Review of Methods

### Project Innovation

The primary project innovation was working within the local community to bring about education on energy efficiency. Using EnSave as a technical expert, the program engaged local partners to promote the energy efficiency workshops and recruit participants for the energy data collector training. The most successful events, in Puerto Rico and Alabama, used RC&D relationships to delve deeper into the local community and build successful partnerships. In Puerto Rico, the partners leveraged relationships through the University of Puerto Rico and a local marketing agency to promote the program widely and ensure strong participation from farmers. In Alabama and Georgia, the local RC&D used relationships with Tuskegee University and Fort Valley State University to ensure a well-attended forum.

### Maps

The maps below show the density of farms with Native Hawaiian, Black or African American Operators, and American Indian or Alaska Native producers. These maps show that the four project areas have concentrated numbers of the limited-resource producers targeted by the grant. While there is no USDA map showing the density of Hispanic farmers in Puerto Rico, the 2012 Census of Agriculture shows that 98.4% of Puerto Rico producers report being of Hispanic or Latino origin.



## Schedule of Events and Project Activity Locations

### Workshops/Data Collector Trainings

State	Location	Date
Hawaii	Hilo, HI	August 24 – 26, 2012
Arizona	Holbrook, AZ	July 8-10, 2013
Puerto Rico	Ponce, PR	November 18-20, 2015
Alabama/Georgia	Tuskegee, AL	July 11-12, 2016

### Data Collectors Trained and Audits Completed

State	Data Collectors Trained	Audits Completed
Hawaii	3	1
Arizona	2	3
Puerto Rico	4	6
Alabama	10	2
Georgia	0	2
Totals	19	14

## Lessons Learned

This project presented several lessons learned:

1. Locally-led organizations are critical to mobilizing an underserved community

The National Association of RC&D Councils and EnSave relied heavily on local RC&D councils and other community partners to market the workshops and the training opportunity to the local community. The RC&Ds are already fixtures within the community and know many of the local agricultural producers. Future events focused on energy efficiency should engage local organizations who are familiar with serving socially disadvantaged farms.

2. On-Farm Energy Initiative can better accommodate unique needs of the population

The Hopi and Navajo producers conducted a very different type of farming than the other three areas, as the producers maintained subsistence agriculture that was not intended for commercial development. Because of the small scale of this agriculture and the correspondingly low energy use, the Hopi and Navajo producers are not necessarily well-served by an AgEMP focused on retrofits of mechanized equipment.

Puerto Rico has a sizable coffee growing and processing industry, representing a significant amount of energy use and energy savings potential. Coffee growing is not replicated elsewhere in the United States except for Hawaii, and there are significant differences between the production in those areas. Puerto Rico NRCS has already taken the important step of offering EQIP financial assistance for coffee production energy practices. Similarly, the irrigation in Puerto Rico is different than in other regions due to water sources and pumps being municipally owned. NRCS can take these

regional differences into account when structuring financial and technical assistance for energy efficiency.

### 3. Energy training for NRCS staff can be improved

Now that these minority farmers are more aware of the opportunities for energy efficiency, it is important for NRCS field staff to navigate and support producers in these efforts. Some NRCS field staff in the project areas attended the data collector trainings or workshops to obtain a greater understanding of the organization of an AgEMP and what types of practices are recommended. Especially given the traditional barriers minority farms face when accessing NRCS programs, it is important for NRCS staff to be well-versed in the National On-Farm Energy Initiative. If farmers feel the information presented is contradictory or confusing, they can decide not to participate and forego the significant energy and environmental benefits of energy efficiency. Concurrent to this program, we are pleased to see many NRCS staff actively engaging farmers in the National On-Farm Energy Initiative. In particular, Georgia is moving forward with implementing energy practices for farmers who had previously received AgEMPs, which will result in tangible energy and cost savings for these farms.

## 5. Quality Assurance

### Site Description

The characteristics of the fourteen sites chosen for the on-farm data collection represented a full diversity of agricultural types. We provided trainings and AgEMPs for greenhouses (Hawaii), cattle and sod (Arizona), coffee and irrigation (Puerto Rico) and poultry (Alabama and Georgia).

### Sampling Design & Procedures

Data collection for each of the fourteen participating farmers was undertaken in two stages. First, EnSave contacted each farmer to conduct an initial interview to collect basic information about the farm. Farmers were required to submit twelve months of fuel usage history to EnSave, and sign an agreement allowing EnSave and data collector trainees on to the farm. Farms were also provided with a scope of work describing the audit process. The second stage of the data collection took place during the training sessions, where information gathered during the initial interview was verified on-site and corrected where necessary. Data collected on-site was recorded on printed form and included information about lighting, ventilation, heating, cooling, motors, space heating, and additional energy-using equipment. The Arizona farms were Landscape AgEMP and information was collected about cropping practices.

EnSave recorded the contact information for each data collector and saved his or her profile in its database for future assignments.

### Sample Analysis and Quality Control

EnSave's engineering department conducted an energy analysis using its FEAT™ software package. Energy savings algorithms used by FEAT have been reviewed as part of utility sponsored energy efficiency programs administered by EnSave, and have been updated to reflect the most current energy efficiency technologies.



## Data Analysis, Review & Reporting

EnSave engineers took the baseline energy use information collected during the initial interview and site visit and used FEAT to calculate potential recommendations. The engineers used manual calculations for custom equipment and situations not available through FEAT. They used this data to develop a report compliant with the AgEMP criteria in place during the time the audit was developed. Each AgEMP contained the following elements:

- Summary of the facility's location, production level, any unusual factors that affect energy use, and any energy efficient measures already in use;
- Summary of the site's energy use over one year, broken down by month and type of usage;
- Summary of how much money the producer could save if the recommended measures were implemented;
- List of recommended measures, including annual estimates of kWh and Btu savings, annual cost savings, cost of measure installation (if known), and payback in years;
- Narrative summary of the recommendations made through the audit, including descriptions of each technology;
- Measure information sheets- a detailed description of each recommended technology and the benefits of installation
- "Best practices guide" brochure

## 6. Findings

Below are the quantitative findings of our programs compared to our original goals:

1. Design an energy audit data collector training plan: Complete; 4 training plans developed
2. Market opportunity to RC&D Council Areas and the Minority and Limited Resource Farmers and Ranchers within those communities (and others if necessary): Complete
3. Enroll trainees in 4 regions: Complete; 19 individuals trained as data collectors; over 100 limited-resource producers attended sessions about energy management and funding opportunities
4. Develop training schedule for program regions: Complete; 4 training schedules complete
5. Conduct training: Complete, 4 multi-day trainings conducted with combination of classroom sessions and field demonstrations
6. Deliver project reports: Delivered progress reports and a final report as needed
7. Deliver project evaluation: Delivered project evaluation within the final report
8. Deliver final report: Complete

The project identified 1,412 MMBtu in energy savings and \$42,879 among the fourteen audits completed in the program. Three of these audits were Landscape AgEMPs with no energy savings identified. These audits can be used to access NRCS EQIP funding through CPS 374, 670 and 672.

## 7. Conclusions & Recommendations

This project was a strong success and met all its goals. Throughout a challenging period for the RC&D councils, this project demonstrated the RC&Ds' ability to partner with government and private sector partners to improve lives and natural resources management in the communities they serve. As stated above, we recommend that NRCS take a more customized approach to participation in the national on-farm energy initiative when working with historically underserved populations.

As a result of this program, there is an expanded infrastructure of energy data collectors ready to serve these underserved communities with AgEMPs. Underserved producers are also now armed with information about on-farm energy management, as well as information on how to access National On-Farm Energy Initiative, other USDA programs such as REAP.

Community leaders in each of the targeted regions are now more engaged in the importance of farm energy issues, and aware of the federal programs that can assist them in applying for programs. We encourage NRCS to continue more direct outreach to underserved communities, to help engage producers who might not otherwise encounter NRCS. By working with community partners, private industry, and the Resource Conservation & Development councils, NRCS can advance its services to historically underserved producers and help them achieve success within the National On-Farm Energy Initiative.

The project highlighted the intra-agency collaboration that has been the hallmark of Secretary Vilsack's Building Blocks for Climate Smart Agriculture and Forestry. Each workshop included personnel from USDA Rural Development as well as NRCS, supporting collaboration with other agencies that can assist farmers with energy management.

## Appendices

Within the appendix, we have included the following documents for each training location:

- Flyers/materials publicizing each event
- Agendas for each training and workshop
- Energy education workshop presentation slides
- Data collector training presentation slides
- AgEMPs for each training farm

Within the Puerto Rico materials, we have also included copies of Puerto Rico irrigation and coffee best practices guides.