

## Energy Generation and Efficiency

### Description

Under Title IX of the Agricultural Act of 2014, commonly known as the Energy Title, USDA has several authorities that encourage the adoption of renewable energy and energy efficiency technologies. In addition, Title II (the Conservation Title), allows USDA to support a variety of energy efficiency improvements on farm operations through NRCS's EQIP. Together, these authorities and programs provide a tremendous opportunity to reduce GHG emissions from energy generation and use throughout rural America.

This building block has four separate parts:

1. Energy efficiency improvements on farm operations through EQIP's National On-Farm Energy Initiative (NOFEI);
2. Energy generation, energy efficiency improvements, and bio-based products;
3. Energy efficiency improvements in rural housing; and
4. Utility-scale energy generation and efficiency improvements.

Each of these parts is discussed in more detail below:

1. *Energy efficiency improvements on farm operations through the National On-Farm Energy Initiative*

Through the EQIP-NOFEI, NRCS provides financial assistance for site-specific energy audits and installation of energy efficiency measures for stationary farm equipment and building systems. Energy audits estimate the type and amount of fuel and electricity used at the farm level by specific equipment and systems. The baseline information is then used to recommend specific technologies and practices that can improve the energy efficiency of those systems. Efficiency improvements can be achieved on a farm by:

- Increasing efficiency of equipment, such as motors, pumps, or lighting;
- Decreasing consumption of energy through improvements of building heating, cooling, and ventilation systems;
- Avoiding the use of energy through better control of systems using timers, sensors, and variable speed drives; and,
- Change in management or timing of farm equipment operations.

2. *Energy generation, energy efficiency improvements, and bio-based products*

RBS has several programs that help reduce GHG emissions. The biggest RBS program included in the building blocks framework is the Rural Energy for America Program, which utilizes energy efficiency and renewable energy technologies to reduce emissions. Projects use solar, wind, geothermal, biomass, hydro, and other eligible commercially available technologies to generate low carbon and zero emission renewable energy. REAP provides grants and guaranteed loans for energy efficiency projects, lighting upgrades, retrofits, and process improvements.

In addition to REAP, other programs that can support this building block include:

- The Advanced Biofuel Payment Program, which provides incentive payments for producers of biodiesel, biogas, and other advanced biofuels that are alternatives to fossil fuels;
- The Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program, which provides loan guarantees for companies commercializing products using renewable biomass in their production;
- The Repowering Assistance Program, which provides incentive payments to eligible biorefineries using renewable biomass to replace fossil fuels; and
- The Business and Industry Guaranteed Loan Program, which may also provide loan guarantees for energy projects that reduce GHG emissions.

3. *Energy efficiency improvements in rural housing*

USDA's Rural Housing Service (RHS) offers a variety of programs to build or improve housing and essential community facilities in rural areas. USDA's Single Family Housing (SFH) Section 502 programs provide direct loans or loan guarantees to help low- and moderate-income rural Americans buy safe, affordable housing in rural areas. The SFH programs encourage energy-efficient building methods and technologies in several ways. First, they require new construction funded under the programs to meet current energy and thermal standards (currently the 2009 International Energy Conservation Code). In addition, applicants purchasing homes constructed under a specific energy efficiency program (e.g., Energy Star, LEED, and Challenge Home) may have flexibility to increase the debt- and income-ratio requirements. Finally, the SFH programs provide home repair loans and grants to support energy saving materials, equipment, or construction methods.

In addition to single family housing, USDA's Multi-Family Housing Programs offer loans to provide affordable rental housing for very-low-, low-, and moderate-income residents, the elderly, and persons with disabilities. Direct loans and loan guarantees made through these programs can be used for new construction, renovation, and preservation of multi-family properties, including energy conservation and efficiency features.

A third set of programs provide loans, grants, and loan guarantees for essential community facilities (CF) in rural areas. Priority is given to health care, education, and public safety projects. Typical projects include hospitals, health clinics, schools, fire houses, community centers, first responder vehicles and equipment, and many other types of community facility projects. CF program regulations do not specifically incentivize renewable energy generation and energy efficiency, but these are always eligible loan purposes when part of an eligible project submitted by an eligible borrower. RHS has issued guidance on funding renewable energy systems in relation to essential CF projects.

#### *4. Utility-scale energy generation and efficiency improvements*

The availability of affordable power has been a cornerstone of America's rural development strategy for over 80 years. The Rural Utilities Service (RUS) – successor of the Rural Electrification Administration – has administered programs that provide long-term, low-cost financing for much-needed infrastructure or infrastructure improvements to rural communities as well as limited grant funds for communities with excessively high electricity rates.

The RUS Electric Program (EP) provides capital and leadership to maintain, upgrade, and modernize America's vast rural electric infrastructure. Funds from loans made or guaranteed by RUS are provided to eligible borrowers to finance the new construction or system improvements of electric generation, transmission, and distribution facilities in rural areas. The EP also provides funding to support demand-side management, energy efficiency (EE) and conservation programs, and on-grid and off-grid renewable energy systems under the Energy Efficiency and Conservation Loan Program (EECLP). Additionally, the EP administers for the RUS the High Energy Cost Grant Program (HECGP) which provides grant funds for various projects to reduce the high energy cost at eligible communities.

Under this building block, RUS will target GHG reductions through three major elements:

1. Reductions in emissions from utility-scale energy generation facilities funded through the RUS EP;
2. Demand-side energy efficiency improvements financed under EECLP; and
3. Renewable energy resources financed under HECGP.

First, to support the reduction of GHG emissions from electric facilities owned by RUS borrowers, much of the funding provided by EP is expected to be used to replace the aging fleet of fossil fuel-fired electric generation facilities with generation plants that operate more cleanly and efficiently. The construction of new renewable energy resources and new natural gas-fired combined cycle units are both expected to play an integral role in replacing old coal-fired plants as well as in meeting growth in the demand of electricity. These actions will modify the energy supply portfolio of RUS EP borrowers to include more zero and low GHG-emitting resources.

Second, EECLP provides new financing opportunities for RUS borrowers to invest in renewable energy resources and implement EE programs that directly benefit end users in rural areas. Eligible projects include, but are not limited to, weatherization of buildings, HVAC upgrades, energy efficient lighting, ground source heat pumps, small-scale renewable energy systems, energy audits, and consumer education and outreach programs.

Finally, HECGP is designed to provide adequate and reliable energy services and lower the energy cost of persons in extremely high-energy-cost communities. Under the program, grant funds are provided to entities serving homes and businesses in eligible communities. These funds are used to acquire, construct, extend, upgrade, and otherwise improve energy generation, transmission, or distribution facilities serving the eligible community. Activities that are eligible to receive grant funds include, but are not limited to, new or upgraded electric facilities (generation, transmission, or distribution), natural gas distribution and storage facilities, petroleum product storage and handling facilities, on-grid and off-grid renewable energy facilities, and energy efficiency programs and initiatives.

## CASE STUDY

American Hmong farmers in the Ozarks who purchased outdated poultry operations face high energy costs and struggle to meet performance goals set by their integrators. Their difficulties as new farmers are exacerbated by cultural differences and language barriers that hinder access to USDA services available to help.

A 3-year NIFA Beginning Farmer and Rancher Development grant to improve energy efficiency and farm sustainability provided a springboard for other USDA agencies to formulate a collaborative approach to address the problems of 400 farmers in the region to ensure their long-term viability, and achieve positive environmental outcomes. Within the first 3 months of the grant, NRCS, RD, and FSA State leaders and technical staff participated in five meetings and workshops coordinated by the Hmong National Development, Inc., and their partner, EnSave, Inc., to strengthen support for the Hmong community.

Based on detailed energy audits completed for the first round of Hmong farmers, NRCS EQIP financial resources have been approved to implement facility improvements that will achieve more than 35 percent savings of fuel and electricity use when installed and reduce annual GHG emissions. These facility upgrades will increase production efficiency, resulting in a better financial bottom line.

Over the next few months, Hmong farmers will be helped to diversify their operations using RD grants and FSA loans to expand production of specialty crops and renewable energy and biofuels opportunities of their farms.

USDA agencies are finding creative ways to amplify their assistance for the Hmong by increasing technical assistance through agreements with energy businesses, providing translation services with the help of nonprofit organizations, and expanding recruitment in the Hmong community for agency interns. Expected overall project outcomes include:

- A more vibrant rural community;
- Stimulus for rural businesses providing support green-energy services to agricultural customers;
- Improvement of livestock health and farm biosecurity through improvement of confined feeding operation facilities;
- Increased opportunities to engage farmers as resource stewards;
- Reduction of inherent program barriers by increasing agency interaction and cross-promotion of USDA programs;
- Stronger transparency and coordination of agency funding decisions; and
- A model that can be applied to other USDA initiatives.



Poultry farmer Kao Her houses 235,000 broiler chickens in 6 poultry houses in Noel, MO. Photo courtesy of USDA NRCS.

## Greenhouse Gas Reduction Goal

Goal	GHG Reduction Goal (MMTCO <sub>2</sub> e per year by 2025) <sup>23</sup>
Provide financial assistance for site-specific energy audits and installation of energy efficiency measures for stationary farm equipment and building systems through EQIP-NOFEI.	1.0
RBS - Reduce GHG emissions through:	
<i>Rural Energy for America Program</i>	34.0
<i>Advanced Biofuel Payments</i>	2.9
<i>Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program</i>	3.0
<i>Repowering Assistance Program</i>	0.8
Rural Housing Service	N/A <sup>24</sup>
RUS Electric Program - Reduce GHG emissions through:	
<i>Utility-scale energy generation facilities funded through the RUS Electric Program</i>	16.0
<i>Demand-side energy efficiency programs financed under EECLP</i>	0.5
<i>Renewable energy resources funded through the HECGP</i>	2.0
<b>Total</b>	<b>60.2</b>

<sup>23</sup> For information on how to interpret this goal, see p. 6.

<sup>24</sup> Estimated GHG reductions from RHS programs are not available at this time due to data limitations. As noted below, RHS is exploring how to gather this information.

## Partnership Opportunities

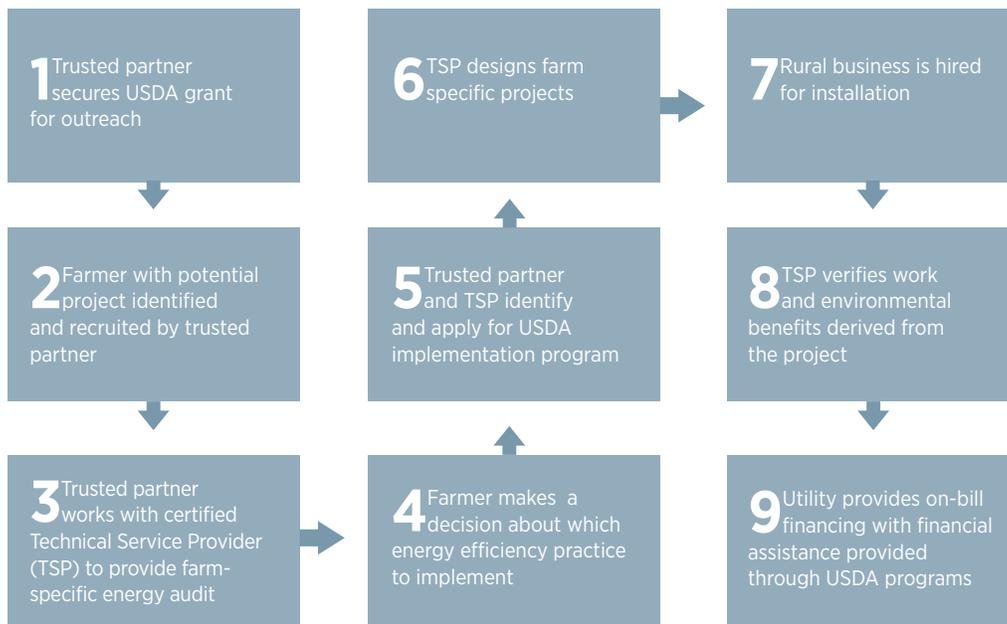
### On-farm Energy Efficiency

Through collaboration, USDA and its agencies can deliver a successful on-farm energy efficiency program that provides:

- Outreach and education to potential recipients;
- Project planning, design, and implementation through qualified local businesses;
- Verification of results for utilities and environmental markets;
- Project oversight to meet industry standards; and
- Energy savings that provides a reasonable return on investment.

Working through an existing relationship that a farmer has with a farm commodity organization or other nonprofit organization helps establish a line of communication that helps with recruitment for program implementation. This “trusted partner” of the farmers can also serve as program recipients and administrators of USDA grants. The figure below shows a pathway for this type of interagency-outside partner cooperation.

## Interagency Model for Energy Efficiency Collaboration



### Notes:

1. A trusted partner is usually a nonprofit organization, commodity group, or farm cooperative.
2. Trusted partners may have established relationships for societal reasons, for instance historically underserved groups, or for economic reasons, such as milk cooperatives.
3. TSPs have been vetted for experience and quality of product by NRCS. An audit can be funded through USDA programs, rural electric cooperatives, or State agency programs, but must meet established standards.
4. The energy audit provides a sound basis for economic and environmental decisions.
5. USDA agencies have a variety of opportunities to structure cooperation to support a farm implementation. An interagency framework for cooperation is being developed.
6. Agencies can streamline and simplify the process by adopting the same design requirements.
7. Opportunities for creation of rural business and job creation are strengthened when USDA provides consistency between programs, and effective delivery of financial assistance through grants, payments, or loans.
8. Agencies will cooperate to increase quality control, program integrity, and reporting of environmental benefits.
9. Recipient pays back loan through on-bill financing engaging utility providers and State agencies with regulatory oversight.

NRCS and RD have executed a Memorandum of Understanding that establishes a structure to coordinate energy efficiency activities. Cooperation is intended to:

- Offer interchangeable on-farm energy audits through REAP, EECLP, and EQIP.
- Offer a coordinated response to clients for energy efficiency upgrades and energy-producing installations involving the installation of digesters and gasifiers.
- Establish collaboration with training and outreach.

### **Energy efficiency improvements in rural housing**

There are several opportunities to partner with other public, nonprofit, and private organizations to improve the energy efficiency of rural housing. For example, RUS is exploring partnerships with:

- Rural utilities to expand energy efficiency loans for multi-family properties;
- The Regional Rural Development Centers (funded through NIFA) to provide outreach to rural communities on residential energy retrofits; and
- EPA, ENERGY STAR, and the Partnership for Sustainable Communities to work with communities on smart growth principles and fund outreach for residential energy retrofits.

### **Utility-scale energy generation and efficiency improvements**

The RUS EP maintains a variety of mechanisms to encourage outreach and maintain partnerships with rural electricity stakeholders. The Office of Loan Origination and Approval includes three teams of General Field Representatives (GFR), which assist borrowers with the development of loan applications, support materials, and the submission of loan applications. By maintaining relationships across the country, the GFRs serve as the local information conduit for borrowers and headquarters staff.

The EP also maintains a relationship with RD State offices. The RD State offices, along with the GFRs, are the local resources for providing outreach and delivering information about Electric Program initiatives as well as for providing feedback from both existing and potential borrowers and on events that may impact the Electric Program at the State level.

Electric Program outreach efforts and partnerships extend beyond those involved with the GFRs and RD State offices and directly meeting with individual borrowers:

- EP staff regularly attend annual and semi-annual meetings organized by rural electric stakeholders to exchange information and educate attendees.
- The RUS accountant staff organizes and hosts a seminar twice a year to give updates on the EP and to educate the borrowers on new policies, procedures, and programs.
- The EP also maintains a strong relationship with the National Rural Electric Cooperative Association, an organization that represents the interests of over 900 electric cooperatives in the United States.
- The EP participates in the Federal Smart Grid Task Force to ensure awareness, coordination, and integration of the diverse activities of the Federal Government related to smart grid technologies, practices, and services. The Task Force is composed of 11 Federal agencies including USDA. The Task Force will promote the modernizing of the electrical grid and foster projects to demonstrate new technologies that improve grid functions.
- EP staff provide outreach to inform and support potential borrowers as they become familiar with EECLP, including presenting at national conferences and meetings of key electric sector stakeholders.

**3-Year Work Plan  
FY 2016**

Action	Lead USDA Agency(s)
Develop a baseline data collection plan for Multi-family Preservation and Revitalization Demonstration Program and Farm Labor Housing that apply for funds and receive points for green building techniques. These data will help determine the amount of energy savings and associated GHG emissions reduction as a result of this initiative.	RHS
Roll out a national multi-family energy efficiency study and pilot energy efficiency retrofits in 3 RHS-financed properties. Use pilot to identify most cost-effective energy efficient improvements in various climates and property types, as well as exploring funding options to finance improvements such as partnerships with cooperatives to utilize EECLP.	RHS, RUS
Roll out new eTool for Capital Needs Assessment. This tool will facilitate data queries on housing trends related to materials and technology, energy efficiency improvements to properties, and construction cost comparisons and analysis.	RHS
Explore inclusion of incentives to encourage inclusion of energy efficiency improvements across the RHS loan, grant, and guarantee portfolio.	RHS
Explore tracking of number of single family direct loans that include green or energy efficiency features along with loan performance.	RHS
Explore tracking of CF loans that include energy efficiency features in essential community facilities.	RHS
Develop training for RD field staff on energy efficiency requirements and opportunities across the RHS portfolio.	RHS
Market energy efficiency incentives available through RHS programs to owners/purchasers and other stakeholders.	RHS
Emphasize renewable energy and energy efficiency programs and educate both existing and potential new borrowers on the types of programs and funding under the RUS EP.	RUS
Prioritize, for timely consideration and approval, loan applications for new renewable resources, demand-side energy efficiency programs, and system improvement projects at existing facilities that are needed to meet environmental compliance standards.	RUS
Identify potential rural electric cooperative to develop an agricultural energy efficiency program with on-bill financing program.	RUS
NIFA, NRCS, RBS, and RUS collaborate on a pilot to deploy the Partner Collaboration Framework to a targeted agricultural segment.	NRCS, RBS, RUS, and NIFA
Analyze and refine framework for interagency communication and program delivery for energy efficiency improvements.	NRCS, RBS, RUS, and NIFA
Identify and pilot additional interagency coordination projects. Existing State projects which need additional financial and technical support include those in Colorado, Florida, Alabama, and Puerto Rico. StrikeForce counties offer additional potential for collaborative efforts.	NRCS, RBS, RUS, and NIFA
Support REAP and building block implementation through research and data related to biomass feedstock production and harvest.	ARS, NIFA

**FY 2017**

Action	Lead USDA Agency(s)
Analyze completed interagency projects for potential renewable energy installation and distributed energy projects.	NRCS, RBS, RUS, and NIFA
Increase implementation rate of energy efficiency projects through expanded technical assistance.	NRCS
Support REAP and building block implementation through research and data related to biomass feedstock production and harvest.	ARS, NIFA

**FY 2018**

Action	Lead USDA Agency(s)
Increase implementation rate of energy efficiency projects through expanded technical assistance.	NRCS
Support REAP and building block implementation through research and data related to biomass feedstock production and harvest.	ARS, NIFA