USDA Renewable Energy Programs:
New Tools Help Achieve the 25x’25 Vision

25x’25 Webinar
April 2, 2014
Welcome!

Introduction and Objectives

Ernie Shea
25x’25 Project Coordinator
Webinar Objectives

- Highlight current and new USDA energy and energy efficiency programs
- Examine financing programs available through the Rural Utility Service
- Spotlight NRCS energy conservation programs and tools
- Provide an update on 25x’25’s Energy for Economic Growth Project
Session Leaders

- **Ernie Shea**, 25x’25 Project Coordinator- moderator
- **John Padalino**, Administrator of the Rural Utilities Service (RUS), USDA
- **Todd Campbell**, Energy Policy Advisor
- **Kip Pheil**, Acting Leader, National Energy Technology Team, USDA - NRCS
- **Jerry Vap**, Chair, Energy for Economic Growth Team, 25x’25 Alliance
Webinar Procedures:

- Lines will be muted during presentations to minimize background noise.
- For presenters and Q&A, un-mute by pressing *6.
- Will take questions at the end of the presentations.
- To ask a question, either press *6 to un-mute or use the comment feature to submit a written question.
Growing the Middle Class in Rural America

John Padalino
Administrator
Rural Utilities Service

USDA
Concern for Community

While focusing on member needs, cooperatives work for the sustainable development of their communities through policies accepted by their members.
Rural Relevance
New population patterns emerged following recession

- Yellow: Population decline
- Blue: Population growth, lower than 2 percent
- Red: Population growth, 2 percent or higher
- Green: Urbanized areas
Rural net migration by age group, 2000-2010, for high- and low-amenity counties
High-poverty nonmetro counties increased in number between 2000 and 2007-11

- Blue: High poverty in both periods
- Green: High poverty entrant
- Red: High poverty leaver
Distribution of rural counties by estimated level of child poverty, 2001 and 2012

- Up to 15: 11% (2001), 28% (2012)
- 15 to 20: 18% (2001), 25% (2012)
- 25-30: 19% (2001), 14% (2012)
- Over 30: 33% (2001), 13% (2012)
The Rural and Small Town Way of Life is Worth Fighting For

Statements by People in Rural and Small Town Areas – Values

- The rural and small-town way of life is worth fighting for and protecting: Rated “10” = 65, Rated “8-10” = 80
- Problems in rural and small-town America are ignored while politicians pay more attention to the issues of urban and suburban areas: Rated “10” = 45, Rated “8-10” = 68
- America’s future is weakened by a widening gap between the rich and families struggling to make ends meet: Rated “10” = 40, Rated “8-10” = 60
- The rural and small-town way of life is dying: Rated “10” = 34, Rated “8-10” = 54
- I am worried my children won’t find good jobs and opportunities here and they will have to move too far away: Rated “10” = 29, Rated “8-10” = 44
Energy Efficiency Benefits
Energy Efficiency Benefits
Rural Utilities Service

Efficiency and Conservation Loan Program
expands the ability of the electric program to make loans for energy efficiency activities
- Rate Based Structure
- Energy Service Contracts
- Payment through Electric Bill Financing
- Consumer Loans
<table>
<thead>
<tr>
<th>Type</th>
<th>Tariff-Based Financing</th>
<th>Loan-Based Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferability</td>
<td>Yes—financing is assigned to the meter. This has the potential to overcome the renter-landlord split incentive.</td>
<td>Sometimes—financing is often required to be paid off before sale of property. May be transferred as a lien on the property.</td>
</tr>
<tr>
<td>Debt Classification</td>
<td>Not necessarily classified as debt</td>
<td>Classified as debt</td>
</tr>
<tr>
<td>Regulatory Approval (Utility)</td>
<td>Required</td>
<td>Not required</td>
</tr>
<tr>
<td>Financing Term</td>
<td>Longer financing term, making higher-cost measures or measures with longer payback periods more cost-effective</td>
<td>Shorter financing term, making higher-cost measures or measures with shorter payback periods less cost-effective</td>
</tr>
</tbody>
</table>

Source: ACEEE- On-Bill Financing For Energy Efficiency Improvements
Growing the Middle Class in Rural America

John Padalino
Administrator
Rural Utilities Service

USDA
Agriculture Act of 2014 -Title IX Authorization

- BioPreferred Program: $3 million each year FY 2014-18
- Biorefinery Assistance Program: ($100MFY14, $50M in each FY15,16)
- Repowering Assistance: $12 million available until expended
- Bioenergy Program for Advance Biofuels: $15 million each year FY 2014-18
- Rural Energy for America Program: $50 million each year
- Biomass Research and Development Initiative: $3 million each year FY 2014-18
- Biomass Crop Assistance Program: $25 million each year FY 2014-18
Energy and Bioeconomy Projects

- Energy Efficiency
- Transportation biofuels
- Solid biofuel (pellets) and energy systems
- Anaerobic digesters; biogas
- Geothermal
- Solar – small, large; photovoltaic and thermal
- Wind - small and large
- Hydro - small and large
- Hydrogen production from renewables
- Renewable chemicals and biobased products
• In the past 10 years, REAP has helped more than 14,000 small businesses and agriculture operations install renewable energy systems and make energy efficiency improvements.

• Since 2008, the amount of renewable energy (wind, solar and geothermal sources) generated in the U.S. has nearly doubled, thanks in part to REAP.

• Funded at $50 million per year
Revenues Generated Across the Supply Chain

Revenue to Grower / Harvester: Feedstock value prior to pre-processing

Revenue to Feedstock Depot: Feedstock value at the entrance to the conversion plant

Revenue to IBR Facilities: Values of Biofuel and Bioproduct IBR facilities

Revenue to Product Distributors: Product distribution to end user

Direct Revenue from Supply-Chain Operations (Fixed and Variable Operating Costs): Costs for salaries and wages, raw materials, catalysts and chemicals, insurance, replacement capital equipment, facility maintenance, etc. along the supply-chain that directly contributes to economic value
Biomass Crop Assistance Program

- $25 million for each fiscal year 2014 -2018
- Provides financial assistance to establish, grow and deliver biomass for energy or bio-based products
- For establishment payments,
  - capped rate for perennial crops at $500 per acre ($750 for SSD)
- For matching payments,
  - provides range of not less than 10%, not more than 50% per year
  - $1 for $1 per dry ton is lowered from a maximum of $45 down to a maximum of $20 when biomass is collected, harvested, stored and transported to a conversion facility for bioenergy production
Biomass Crop Assistance Program
Results

- Impact on more than 50,000 acres
- Helped over 1,000 producers establish 7 varieties of dedicated energy crops, including:
  - fast growing trees
  - energy grasses
  - oilseeds
- 11 approved Project Areas
Biorefinery Assistance Program

- Biorefinery Assistance Program - $200 million ($100MFY14, $50M in each FY15,16)
  - Loan guarantees for first-of-a-kind, commercial-scale projects
  - Includes renewable chemical & biobased product manufacturing (up to 15%)

Concentrated algae, ready for extraction at Sapphire Energy, Columbus, New Mexico. (photo credit: Sapphire Energy)

INEOS New Planet BioEnergy facility, Vero Beach, Florida (photo credit: INEOS Bio)

Fully operational community digester, Freemont, Michigan (USDA photo)
Loan Note Guarantees issued:
- Sapphire Energy, Inc., New Mexico: $54.5 million (paid in full)
- INEOS New Planet BioEnergy, Florida: $75 million
- Fremont Community Digester, Michigan: $12.8 million

Conditional Commitments awarded:
- Zeachem, Oregon: $232.5 million
- Fiberight, Iowa: $25 million
- Fulcrum Sierra Biofuels, Nevada: $105 million
- Chemtex, North Carolina: $99 million
NOFA closed January 30, 2014.
• 8 applications received
• $510 million in loan guarantee authority requested
• 4 States: Texas, Louisiana, Georgia, North Carolina
• 5 Technologies
  o 2 Green gasoline, diesel, and advanced aviation from woody biomass
  o Cellulosic ethanol from algae
  o 2 Anaerobic digesters
  o Solid fuel pellets from woody biomass
  o 2 Biodiesel from waste greases and oils
BioPreferred/Biobased Product Marketing

Nearly 1,000 individual products registered

www.biopreferred.gov
USDA Energy Web Portal

Energy Investments Map 2.0

- Interactive
- Research by state or county
- Newly redesigned

More than 14,000 visible energy projects from across USDA Mission Areas

www.usda.gov/energy
USDA Energy Web Portal

Renewable Energy Tool

www.usda.gov/energy
Thank you!

For more information on USDA Energy and Bioeconomy Programs, visit:

www.usda.gov/energy
25x’25 April Webinar
USDA (Renewable) Energy Programs
NRCS Energy Tools – 02 April 2014

Kip Pheil
National Energy Technology Development Team
USDA Natural Resources Conservation Service (NRCS)
Topics - NRCS Tools

- Agricultural Energy – Spheres of Interest
- Technical Staff Structure for Energy Support
- Conservation Practice Standards for Energy
- Energy Analysis Tools – Calculators
  - ECAT / ESAT / Etc.
- On-Farm^ Energy Analysis

^ Farm = Farm, Ranch, Woodlot, Oysterbed, etc.
Agricultural Energy - Spheres

- Energy Needs
- Energy Supply
- Energy Exports

Farmers, Ranchers, other Landowners
Agricultural Energy - Spheres

Energy Needs

Energy Supply

Energy Exports

On-Farm Energy Balance

(none of these lines are as hard as they appear)
Agricultural Energy - Spheres

Diesel/Gasoline ~35%
Synthetic Fertilizer ~30%
Electricity ~20%
Propane / Nat’l Gas ~10%
Pesticides ~5%

U.S. Ag Energy Sources

^ Adapted from Miranowski (2002)
Agricultural Energy - Spheres

Diesel/Gasoline ~35%
Synthetic Fertilizer ~30%
Electricity ~20%
Propane / Nat’l Gas ~10%
Pesticides ~5%

U.S. Ag Energy Sources^  

Renewable Resource Share of total: ~ 3%
Mostly delivered as electricity.

^ Adapted from Miranowski (2002)
Net-Zero Agricultural Operations:

1) Serve energy needs for continued operations with renewable resources.
2) Based on annual average conditions & yield.

In / Out / Uncertain:
- Embedded energy.
- De minimis uses.

Steps to Reach Net-Zero Agricultural Operations:

1) Reduce Energy Needs.
2) Meet those Needs with Renewable Resources.

(definition, boundary, parameters, etc. in flux)
Step 1 to Net-Zero Ag

NRCS Focus
2010 - present

1) Reduce Energy Needs.
(i.e., shrink the demand pie)

(a producer’s energy “pie” varies by enterprise, location, & operation)
Reduce Energy Needs: Build a team.

Farmers, Ranchers, other Landowners

Science & Technology

Energy Tech Team

Tools & Docs

Conservation Practice Standards

State Area Field Office

External Partners

Technical Service Providers

NRCS
CPS\(^\wedge\) for Energy – 2010 Review

Legacy CPS
- Irrigation
- Tillage
- Forestry
- Crops
- Air Quality

Newly Revamped CPS
- Farmstead Energy Improvement (374)

\(^\wedge\) Conservation Practice Standards
CPS^ for Energy – 2010 Review

Legacy CPS

- Irrigation
- Tillage
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Newly Revamped CPS

- Farmstead Energy Improvement (374)

Purpose Statements (typical):

1) Reduce Energy Use (22).

2) Renewable Energy Source or System (18).

Some CPS serve both purposes.

^ Conservation Practice Standards – penultimate goal
Energy Analysis Tools

Reduce Energy Needs:
Build analytical tools.

(make ‘em simple)
Energy Analysis Tools

EUI = Energy Use Index

ECAT = Energy Consumption Awareness Tools

ESAT = Energy Self-Assessment Tools

Enrg Engr = Energy Engineer (or equal)

(make ‘em simple)
NRCS-Sponsored Tools (ECAT)

The Natural Resources Conservation Service (NRCS) has developed four energy tools designed to increase energy awareness in agriculture and to help farmers and ranchers identify where they can reduce their energy costs. The results generated by these tools are estimates based on NRCS models and are illustrative of the magnitude of savings. Please contact your local NRCS office for additional assistance.

**Energy Estimators**
- Animal Housing
- Irrigation
- Nitrogen
- Tillage

**Energy Tools**
- All NRCS Energy Tools
- Energy Estimators
  - Animal Housing
  - Irrigation
  - Nitrogen
  - Tillage
- Other Energy Tools
  - Grain Drying
  - Energy Self Assessment Tools
(see details below)

**NRCS Build-Own-Operate-Maintain**
### ECAT Zip Code Function

<table>
<thead>
<tr>
<th>Tool</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Housing</td>
<td>Weather Data (est. ventilation &amp; heating system run-time)</td>
</tr>
<tr>
<td>Irrigation</td>
<td>Water Required, State Average values Common Crops</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>Typical synthetic fertilizer costs Common Crops</td>
</tr>
<tr>
<td>Tillage</td>
<td>Crop Management Zone Common Crops</td>
</tr>
<tr>
<td>All</td>
<td>Links to local resources (e.g., Extension, NRCS, and others).</td>
</tr>
</tbody>
</table>

*(A Law of Averages: averages can be misleading)*
The results generated by these tools are estimates based on NRCS models …

Illustrate … magnitude of savings possible.

Not intended to provide precise estimates for your … farm:

actual results … depend on … local conditions and operations … soil types, rainfall, slope of land, machinery used, etc.
NRCS-Sponsored Tools (ESAT)

NRCS Fund & Review; Univ. of Wisconsin Build + Operate + Maintain
NRCS-Sponsored Tools (ESAT)

**Conservation Tools**
- Dairy
- Grain Drying
- Greenhouse
- Irrigation
- Lighting
- Livestock
- Maple Syrup
- Potato Storage
- Ventilation
- Water Fountain

**Renewable Tools**
- Biogas
- Biomass
- Solar Electric (PV)
- Solar Water Heating
- Water Pumping
- Wind
NRCS-Sponsored Tools (Grain)

The Natural Resources Conservation Service (NRCS) has developed four energy tools designed to increase energy awareness in agriculture and to help farmers and ranchers identify where they can reduce their energy costs. The results generated by these tools are estimates based on NRCS models and are illustrative of the magnitude of savings. Please contact your local NRCS office for additional assistance.

**Spotlights**

- **Energy Estimator: Animal Housing**
  - The Energy Estimator for Animal Housing tool is designed to enable you to estimate potential energy savings associated with swine, poultry, or dairy cattle housing operations on your farm or ranch. This tool evaluates major energy costs in lighting, ventilation and heating costs for swine and poultry. It evaluates major energy costs with lighting air circulation, milk cooling, water heating and milk harvesting costs for typical dairy. This tool does not provide site specific recommendations.

- **Energy Estimator: Irrigation**
  - The Energy Estimator for Irrigation tool enables you to estimate potential energy savings associated with pumping water for irrigation. NRCS technical specialists developed this model to integrate general technical information farm-specific crops, energy prices, and pumping requirement. This tool does not provide field-specific recommendations.

- **Energy Estimator: Nitrogen**
  - The Energy Estimator for Nitrogen tool enables you to calculate the potential cost-savings related to nitrogen use on your farm or ranch. NRCS agronomists developed this model to integrate general technical information on nitrogen use with farm-specific information on fertilizer types, costs, timing, and placement. This tool does not provide field-specific recommendations.

NRCS Fund & Review; Purdue Build + Operate + Maintain
NRCS-Sponsored Tools (Grain)

Welcome to Energy Estimator: Grain Drying

This tool does not provide operation-specific recommendations … it provides an idea of … energy cost savings … from selecting specific in-bin or high-temperature drying systems. Results should not be construed as actual savings, but only as estimates.
ATTRA Tools (Grain)

More than 20 links to varied calculators (including NRCS).

[https://attra.ncat.org/attra-pub/viewhtml.php?id=304]
Energy Analysis – On-Site Study

On-line Calculators & other Tools provide:

- Landowner ‘what if?’ options.
- Order of Magnitude Estimates.
- Ideas for Energy Upgrades.
- “Stop / Go” results.

Next Step May be An Energy Intervention:

- Contact NRCS.
- Energy Study based on Site-Specific Data
Links …

<table>
<thead>
<tr>
<th>2014</th>
<th>Energy Webinars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 20</td>
<td>Key NRCS Practices: Farmstead Energy, Lighting, and Building Envelope</td>
</tr>
<tr>
<td>May 22</td>
<td>Lighting Systems: Analysis, Performance, and Energy Conservation Opportunities</td>
</tr>
<tr>
<td>Sep 18</td>
<td>Energy Upgrades: Steps to Implement Energy Conservation Opportunities</td>
</tr>
<tr>
<td>Nov 20</td>
<td>Poultry Operations: Broiler and Layer Energy Conservation Opportunities</td>
</tr>
</tbody>
</table>

Replay or Live. (Search: “nrcs energy conservation opportunity webinar”)

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- kenneth.pheil@por.usda.gov
- (503) 310-3037 (m)

site-based analysis; Hells Canyon (2010)
Energy for Economic Growth Project

- Launched in 2011 by the 25x’25 Alliance to explore how incentive policies might be used to accelerate economic development and distributed renewable energy generation through rural cooperatives and other power providers serving rural communities.
Energy for Economic Growth Project - Phase I Accomplishments

- Formed a team of agricultural leaders, rural utility representatives, and renewable energy experts to help guide and direct the project.
- Examined how incentive-based rate structures have been utilized in Europe and other places to accelerate the deployment of distributed energy generation in rural areas.
- Conducted a national review to identify candidate rural utility partners for exploring incentive programs.
- Held a Renewable Energy Study tour in Germany to provide potential utility partners with more information on incentive policies.
Tour Findings

1. The transition from centralized to decentralized generation has created economic, national security, and environmental benefits.

2. Individual energy producers and rural communities have been major beneficiaries.

3. Societal support.

4. Incentive policies were part of a long-range energy security plan.

5. Incentive policies offer transparency, longevity, and certainty.
Energy for Economic Growth Project - Phase II Path Forward

- Initiate dialogues with REC leaders and managers around the role distributed renewable energy production can play meeting member needs and in stimulating community economic development.
- Develop case studies spotlighting innovative rural electric cooperative (REC) renewable energy programs and business models;
- Partner with 6-7 rural electric utilities in piloting renewable energy programs and business models and community dialogue project; and
- Design an information exchange program between U.S. and German energy cooperatives.
25x’25 Role

- Provide expertise to assist in designing and piloting the energy for economic growth business and community engagement models;
- Provide expertise in evaluating the results of the pilot programs;
- Compose and disseminate report describing the project, process, benefits, and challenges;
- Compose case studies to share at utility meetings, dialogues, and webinars;
- Facilitate renewable energy presentations and dialogues at key utility venues; and
- Develop and distribute a “Renewable Energy Toolbox” for use by rural electric utilities.