Energy From Agriculture: New Technologies, Innovative Programs & Success Stories

“NRCS Programs Supporting Energy Conservation”

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21st Century Challenges – Agriculture

• Maintain healthy, productive, privately owned “working lands”
• Contribute to clean water and air, healthy habitat, open space, and other environmental amenities
• Sustain an economically viable agriculture
• Solutions that fit a diverse agriculture sector (in terms of operations, experience, objectives, etc.)
Agriculture – Meeting The 21st Century Challenges

Application and operation of science-based, site-specific conservation systems through:

– Focused strategies
– Innovative conservation technologies and approaches
– Progressive planning and implementation
– Adaptive management
– Expanded and new partnerships
– Informed landowners as decision-makers
Many conservation practices/systems help farmers and ranchers reduce energy consumption while conserving soil and water resources

- Crop Residue Management (Reduce trips across fields)
- Irrigation Water Management (Reduce pumping of water)
- Nutrient Management (Reduce fertilizer inputs)
- Pest Management (Reduce pesticide inputs)
- Drainage Water Management (Reduce energy consuming water management)
- Rotational Grazing (Reduce energy used in production)
Types of Conservation Programs in the 2002 Farm Bill

“Conservation Portfolio”
- Technical Assistance
- Easement Programs
- Cost-Share Programs
- Stewardship Program
- Grants for Innovation
<table>
<thead>
<tr>
<th>Funding Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discretionary Funds</td>
<td>$1,005,963</td>
</tr>
<tr>
<td>Mandatory Funds</td>
<td>$1,797,910</td>
</tr>
<tr>
<td>NRCS Reimbursables</td>
<td>$55,070</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$2,858,943</strong></td>
</tr>
</tbody>
</table>
NRCS Programs that Support Energy Conservation Include:

- Conservation Technical Assistance (CTA) Program
  - Grazing Lands Conservation Initiative
  - Highly Erodible Lands Compliance
- Environmental Quality Incentives Program (EQIP)
  - EQIP Conservation Innovation Grants (CIG)
- Agricultural Management Assistance (AMA) Program
- Conservation Security Program (CSP)
- Resource Conservation & Development (RC&D) Program
- Plant Materials Program
**Funding for Energy Related Program Activities**

**Fiscal Years 2002-2005**

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQIP</td>
<td>Obligated $697,000,000 and paid out $273,000,000 in energy related practices</td>
</tr>
<tr>
<td>CIG</td>
<td>$4,600,000 for energy related grants</td>
</tr>
<tr>
<td>CSP</td>
<td>$5,300,000 in energy enhancements</td>
</tr>
<tr>
<td>CTA</td>
<td>$143,000,000 to energy related technical assistance</td>
</tr>
<tr>
<td>RC&amp;D</td>
<td>$23,000,000 addresses energy related issues under the land management element of the RC&amp;D statute</td>
</tr>
</tbody>
</table>

*Funding amounts are estimates and can overlap other resource concerns*
Conservation Technical Assistance Program (CTA)

• Principal NRCS funding source for developing, transferring, evaluating, and improving conservation technologies
  – eFOTG
  – Technical Manuals and Handbooks
  – Technical Information
  – Technical Evaluations
CTA (continued)

- Pays the costs of training, and other activities associated with operating a nationwide field delivery system.
- The primary source of conservation and area-wide planning, and specialized technical assistance
- Provides technical assistance to help clients with energy conservation activities and plans
  - Energy estimator
  - Energy audits
Linking CTA Program Conservation Planning to NRCS Farm Bill Conservation Programs

**KEY:**
- CP – Conservation Planning
- RWA – Rapid Watershed Assessment
Environmental Quality Incentives Program (EQIP)

- The conservation cost-share “work horse” in the NRCS tool box
- Approximately $1 billion in 2006. Typically a 50-75% cost-share rate; or incentive payments
- Practices and rates determined on state and county level
- Automated application evaluation and ranking tool being implemented
EQIP National Resource Priorities

- Water Quality
- Water Quantity
- Critical Wildlife Habitat
- Air Quality
- Erosion/Sediment Control

Energy conservation is considered a component of all priorities and is an appropriate use of EQIP funds.
EQIP Energy Conservation

- Reduced tillage was applied on 1.1 million acres in FY 2005.
- University of Nebraska information shows that eliminating one disk ing operation could save 0.74 gallons of fuel per acre.
- This equates to a fuel reduction of 814,000 gallons, and estimated cost savings of $1.8 million at $2.25 per gallon.
Energy Conservation Results – When conservation practices are applied

Success stories for EQIP:

• Iowa irrigator cuts energy use by 50% when a low pressure irrigation system was installed
Energy Conservation Results – When conservation practices are applied

Success stories for EQIP:

- West Virginia solar pump for livestock watering system resulting in no power charges and $15,000 in capital expense
Energy Conservation Results – When conservation practices are applied

Diesel Engine Replacement Program in California

- NRCS offers cost-share incentives through EQIP to growers in California who live in areas classified by EPA as Severe or Extreme Non-Attainment for ozone.
- NRCS replaces older diesel engines which emit high levels of Nitrogen Oxide (NOx) with new certified diesel engines and electric motors. The diesel engine to be replaced must be a currently functioning stationary inefficient diesel engine used for pumping irrigation water.
- The replacement engine must meet California Air Resources Board’s TIER II emission requirement level for NOx.
- Diesel engines 50 horsepower (HP) and above are eligible.
New Energy Initiative: EQIP

- Cost of some practices has escalated because of increases in cost of steel, concrete, and pipe.
- NRCS will develop a list of material-based structural practices that have increased at least 20% between 2002 and 2004.
- For fiscal year 2004 and earlier contracts, NRCS will offer a one-time opportunity to receive an energy incentive to complete the practices between March 2 and June 30, 2006.
- Amount of the increase will depend on number of practices and nationwide cost; will be announced when the initiative is announced to the public.
- Uses prior year funds; increases will be automatic in ProTracts; offer is not retroactive.
Conservation Innovation Grants (CIG)

• A competitive grants program that funds the development (not research) and adoption of innovative conservation approaches and technologies
• All projects must involve EQIP-eligible producers
CIG (continued)

- In 2004 and 2005, CIG funded a number of energy-related projects.
- Examples: anaerobic digesters, on-farm solar and wind technologies, energy audits
Success Stories for CIG:

- Iowa Soybean Association project:
  - Iowa producers have used remote sensing with replicated strip trials and/or guided stalk nitrate sampling to evaluate their own nitrogen (N) needs and new management approaches.
  - The majority have found they can maximize profit and reduce N losses to the environment by applying far less fertilizer and adopting different application strategies.
  - The energy savings are quantified from the reduced fertilizer use.
For FY 2006, NRCS will be soliciting for some specific technologies or approaches identified as critical agency needs.

Energy-related technologies will be a part of this solicitation:

- Improved on-farm efficiency through innovation such as:
  - Renewable energy sources (wind or solar),
  - Methane recovery, etc.
- Development and adaptation of on-farm energy audits such as:
  - Automated self energy audit technology,
  - Energy audit worksheets,
  - Compilation of on-farm energy audits and audit processes.
Conservation Security Program (CSP)

• Rewards producers who are applying and documenting high levels of conservation
• Ability to earn payments by adding and/or expanding conservation activities
CSP (continued)

CSP statute included energy as an authorized priority.

- CSP plans to offer 7 conservation enhancements on energy:
  1. Energy Audits
  2. Recycling On-Farm Lubricants
  3. Reduced Soil Tillage Intensity and Frequency
  4. Use of Manure, Legumes and Other Nutrient Sources
  5. Renewable Fuel
  6. Renewable Energy Generation
  7. Energy Use Reduction
1. Energy Audits

- $500 one-time payment offered
- Provides a baseline of annual energy use in farming or ranching operation
- Identifies management opportunities on the farm or ranch
- Estimates payback period for installation of suggested changes
1. Energy Audits (continued)

• Energy Audits may be performed by:
  – Utility Companies
  – State Agencies
  – Qualified Consultants

• Self-audit procedure under development but will not receive payment

• Documentation: Audit receipt and baseline summary page
2. Recycle all on-farm lubricants

- Lubricating oil for
  - Tractors
  - Gasoline/diesel motors for pumps or fans

- Burning is not considered recycling

- Payment: $200 per year for 100% recycling

**Documentation:** purchase and recycling receipts
3. Reduced Tillage Operations - Soil Tillage Intensity Ratings (STIR)

- STIR is a sub function of RUSLE 2 and SCI
- Lower STIR Ratings correspond with higher energy enhancements per acre per year:
  - <60 (Conservation tillage) $0.50
  - 60-30 (No-till) $0.70
  - <30 (Perennial crop) $0.90
4. Use of Legumes and Manures

- Annual legumes in rotation:
  $0.20 per acre

- Perennial legumes in rotation:
  $0.70 per acre

**Documentation:**
Crop Records
4. Use of Legumes and Manures (continued)

- 90% of crop nutrient needs from organic sources requires more than just manures
- $0.90 per acre
- Documentation: Farmer or consultant certification
5. Renewable Fuel - Biofuels purchase for farm operations

- Payment based on actual BIO portion of purchased blends - $25 increments for each 100 gallons of actual bio-fuel portion.

- e.g. B20 = 20% biodiesel,
  E85 = 85% ethanol:

- 1000 gal. B20 = (1000)x(0.2) = 200 gal bio diesel = $50 payment.
- 1000 gal. E85 = (1000)x(0.85) = 850 gal ethanol = $200 payment.
6. Renewable Energy Generation

- Payment based on kilowatt-hour (kWh) generated - $2.50 for each 100 kWh
- Amount generated must be documented
- Contact utilities before installing system
7. Energy Use Reduction

- Requires energy audit to establish baseline. Payment based on actual percent energy reduction.
  - 5% = $100 flat rate
  - 10% = $200 flat rate
  - 20% = $500 flat rate
- Based on grid energy and stationary equipment
- Utility receipts required for payment documentation
Management Intensity (MI)

Through the implementation of CSP, NRCS has developed the concept of promoting more intensive management (i.e., management intensity) as a way to provide incentives for producers to do additional conservation activities.

Typical MI activities are:
- Split rate nitrogen application
- IPM techniques for pest management
- Specialized wildlife habitat management

NRCS is planning to incorporate MI components into other programs, beginning with EQIP over the next few months.
Resource Conservation & Development (RC&D) Program

- NRCS will begin training partners on tools and methods to conduct farm energy audits as part of the NRCS FY2006 cooperative agreement with NARC&DC.
- Developing outreach materials to encourage energy conservation
Success stories for RC&D:

- Lawrence County Energy Conservation Project of the Wabash Valley Resource Conservation and Development (RC&D) demonstrates how pressure diagnostic technology detects air leakage in homes.
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