United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS

# Energy From Agriculture:

## New Technologies, Innovative Programs & Success Stories

"NRCS Programs Supporting Energy Conservation"

**Thomas W. Christensen**
**Deputy Chief for Programs**

St. Louis, Missouri
December 14, 2005

# 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

# NRCS Conservation Practices/Systems

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

# Fiscal Year 2006 Funding Levels
(Dollars in thousands)

| | |
|---|---|
| Discretionary Funds | $1,005,963 |
| Mandatory Funds | $1,797,910 |
| NRCS Reimbursables | $55,070 |
| **Total** | **$2,858,943** |

## Conservation Driven – Program Fueled

# 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

| | |
|---|---|
| EQIP | Obligated $697,000,000 and paid out $273,000,000 in energy related practices |
| CIG | $4,600,000 for energy related grants |
| CSP | $5,300,000 in energy enhancements |
| CTA | $143,000,000 to energy related technical assistance |
| RC&D | $23,000,000 addresses energy related issues under the land management element of the RC&D statute |

*Funding amounts are estimates and can overlap other resource concerns

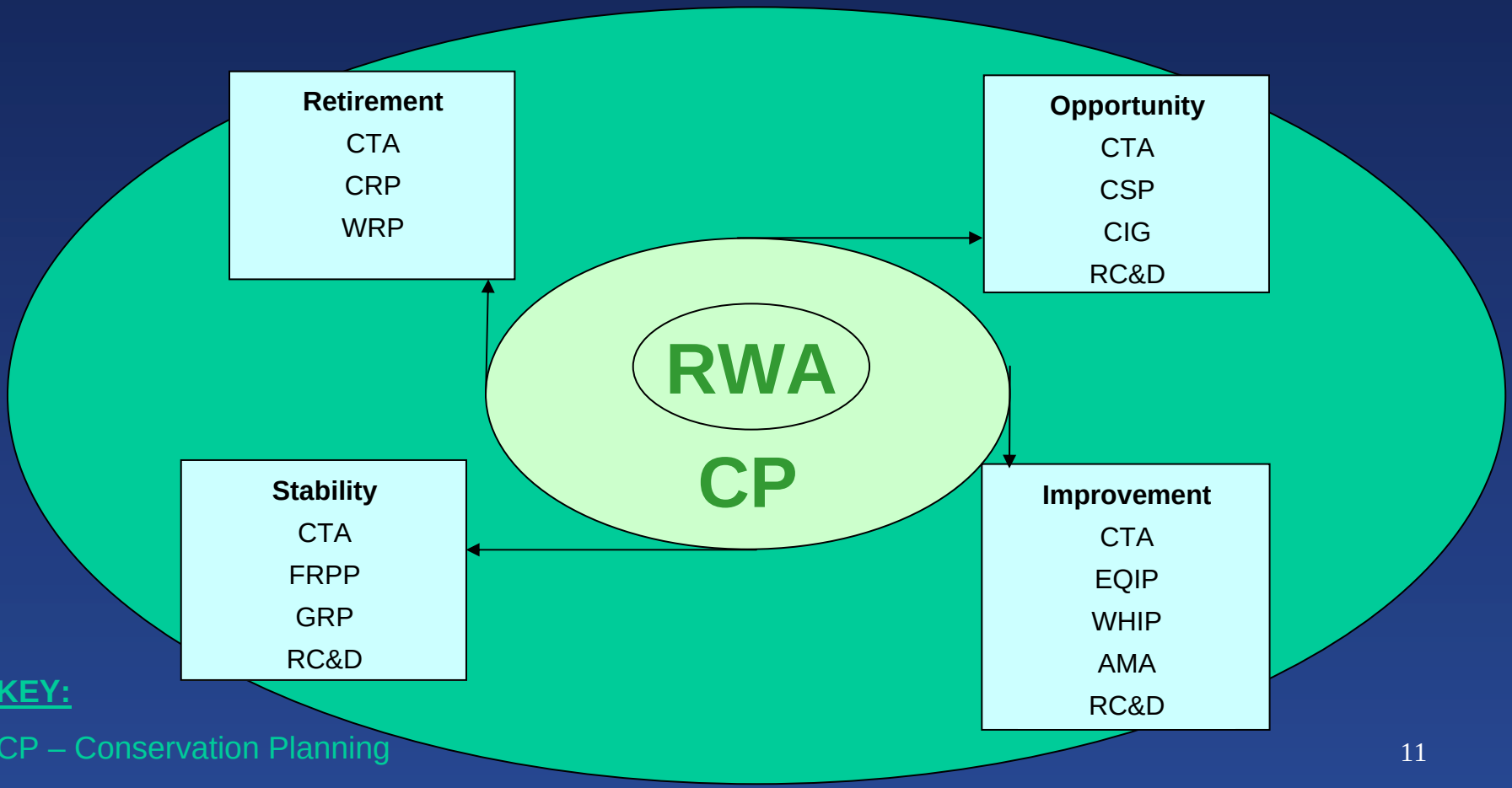
# Conservation Technical Assistance Program (CTA)

- 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 disking 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 inefficent 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

# CIG (continued)

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

# CIG (continued)

- 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

*2004 Participants*

# 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

# RC&D (continued)

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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