

Survey of Agricultural Energy Efficiency Programs

R. Neal Elliott, Ph.D., P.E.

Industrial & Agricultural Program Director

ACEEE



History of ACEEE Project

- Undertaken to support the deployment of Sec. 9006 of the **2002 Farm Bill**
- Initial survey completed December 2002
- Identified extant programs and strategies
- Applying ACEEE's expertise in program design to recommend actions to USDA for expedited, streamlined, and effective delivery of program funding



Initial Survey Results

- Reviewed 34 Program from 23 entities
- Programs have diverse geographical distribution and funding base
- All programs had undergone or were planned to undergo measurement and evaluation (M&E) review



Themes Found in Initial Survey

- Projects funded through range of strategies – system benefits charge (PBF), utility or state funding.
- Projects focus on electricity, and covered all types of farms, due to similar applications of electricity.
- Dairy farms were a specific focus for.
- Services provided varied from supporting specific product to broad energy efficiency education.



Expanded Program Survey

- Begun in Spring of 2003
- 52 programs surveyed nationwide
- Focus of survey:
 - motivation for the program
 - program description
 - program impacts and success
 - lessons learned
 - recommendations for future programs
- Final report released Spring 2005



Programs by Geographic Focus

Category	Description	Number
national	The program is funded AND implemented at the federal level.	2
regional	The program is funded AND/OR implemented at the regional level. Includes multi-state regional and intra-state regional programs.	19
state	The program is funded AND/OR implemented at the state level.	31

Programs by Market Focus

Category	Description	Number
technology	The program specifically promoting the use of a specific technology or technology type	19
farm-type	The program is specifically targeted at a farm-type (e.g., dairy farms).	2
both	The program is specific in terms of the technology being promoted, as well as the specific farm-type qualification	2
neither	The program promotes multiple measures to multiple farm types.	28

General Area of Focus

Energy Focus	Energy Efficiency	Covers only energy efficiency	28
	Renewable Energy	Covers only renewable energy	2
	Both	Allows for both energy efficiency and renewable energy	22
Ag Focus	Primary	Open only to agriculture and rural businesses.	32
	Included	Agriculture sector may participate in broader program.	20

General Program Approaches

Approach	Description	Number
Audit only	Provides only energy audits.	2
Demonstration	Provide funding for demonstration projects only.	6
Incentive	Provides direct financial incentive – e.g., project grant or loan	11
Education	Offers outreach, information, and education including help-line programs.	10
Incentive & Education	Combined outreach, information, and follow-up direct financial incentive.	18
Tax Related	Tax credits and deductions	2
Load Reduction	Intended to reduce grid stress during high price or demand periods.	3

Lessons Learned

- Most programs are focused on Electricity
- Need clearly defined program goals and objectives
- “Know thy implementer”
- Agriculture-focused and agriculture-included programs both work
- Target program evaluation based on the goals and objectives



Evaluation of Three High Participation Programs

Program	Years Operation	Participation Rate	Total Savings (mill. kWh)
Efficiency Vermont	4	35%	3,000
FarmSave	4	30%	31
Xcel Energy	1	53%	4.1

- *FarmSave* is education-only and others both education and financial incentives
- Vermont has achieved ~100% contact with farmers
- Strong evaluation component is all initiatives
- EnSave runs both *FarmSave* and Xcel



Example: Benefits of Coordination

Georgia Energy Efficiency Programs

- Approach consolidates Ag efficiency & renewable prgrms
- Includes: irrigation, fertilizer, ventilation, dairies, precision Ag, crop drying, and rural housing.
- Offers variety of services
- Unified programs creates communication network
- Implemented through Univ. of GA, with other Ag programs
- Program has substantial standing in the community.
- 1.7 trill-kWh saved with \$1.4 million (since 1984).
- Key benefits: – Unified programs save M&V costs.
 - Identifies and eliminates cross-incentives.



Achieved Program Results

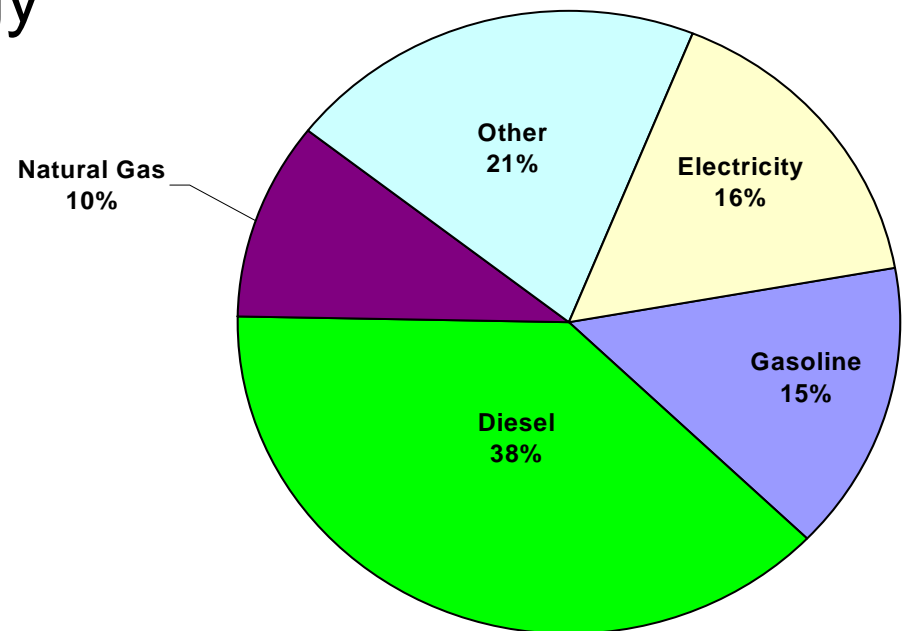
Variable	Number Programs	Minimum Reported	Maximum Reported	Average
Years in operation	24	0	20	4.8
Participation rate	16	0%	88%	14%
Most recent funding (mill. \$/yr)	10	\$ 0.03	\$ 21.00	\$ 3.70
Avg. funding (mill. \$/yr)	16	\$ 0.04	\$ 23.00	\$ 5.00
Estimated savings (most recent year)				
kWh (millions)	8	0.45	792	207.2
dollars (millions)	6	0.07	3.5	1.1
\$/kWh		\$ 0.07	\$ 0.03	\$ 0.02
Cumulative savings since inception				
kWh (millions)	8	0.5	1,400,000	175,381
dollars (millions)	5	\$ 0.09	\$ 79	\$ 30



Need to Expand Scope

- Current almost exclusive electric focus limiting
- Diesel and indirect energy (e.g., fertilizer & feed) more important to most farms and ranches than electricity
- Need to think of alternative funding models to expand scope

**2002 Total Energy = 0.93 TBtu
or \$17.3 Billion**



Conclusions

- Successful program are being run
- Most successful are locally or regionally focused
- Successful leverage local Ag network – address local needs
- Need to develop funding strategies to address non-electric opportunities

