House Calls in the Boondocks: the Trouble with Farm Energy Audits

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About the National Center for Appropriate Technology (www.ncat.org)

• National nonprofit organization started in 1976.
• Programs: Sustainable Agriculture and Sustainable Energy.
• ~ 80 full-time employees in 7 offices.
NCAT is a “how to” organization, with programs in sustainable energy and sustainable agriculture.
We do energy audits and studies: irrigation systems, farms, and all kinds of industrial facilities.
We do energy-related training.

First graduating class of Energy Educators, trained through NCAT’s Energy Training for Agriculture Professionals program. (October 2009)
We create high-quality publications.
We run ATTRA (www.attra.ncat.org): The National Sustainable Agriculture Information Service.
Our vision: A food system that is more secure, more resilient, more healthy, and more environmentally benign.

Energy intensive food system

Cheap fossil fuel and fertilizer

Security problems
- Peak Oil?
- Food vs. Fuel?
- Cost spikes

Health problems
- Obesity
- Diabetes
- Food-borne illness

Environmental problems
- Soil erosion
- Loss of biodiversity
- Greenhouse gases

Health problems
- Obesity
- Diabetes
- Food-borne illness
Our goal should not simply be making agriculture more energy efficient.

“Building Farm Energy Self-Sufficiency”: How useful are farm energy audits and DIY tools?

Research funded by the USDA Risk Management Agency.
Research methods

• Published statistics and reports when available and reliable.
• Written comments from over 100 farmers and ranchers in Arkansas, Indiana, Iowa, Kansas, Missouri, Montana, and Wisconsin. In-depth interviews with 12 of these producers.
• Interviews: About 20 utilities, audit providers, agencies, nonprofits.
Included profiles of 8 audit programs and providers

• Alliant Energy Agricultural Energy Efficiency Program (Interstate Power & Light)
• Efficiency Vermont
• EnSave, Inc.
• Farm Energy Partners Network Energy Audit Program (Maine)
• Focus on Energy Agricultural and Rural Business Program (Wisconsin)
• Massachusetts Farm Energy Program
• Pacific Gas & Electric Company
• Southern California Edison: Agricultural Energy Efficiency Program and Ag Efficiency Plus Pump Test Program
What is an energy audit?

• A study of energy usage, for the purpose of saving energy and money.
• Coined during the 1970s, still unfamiliar to many people.
• Albert Thumann, *Handbook of Energy Audits* (1979)

1. Description of current (baseline) energy usage, based on inspection, survey, or inventory of energy-consuming processes & equipment.

2. Description of possible changes (measures) that could reduce energy consumption and/or cost. (ECOs and ECMs)
Types of audits (terminology varies widely)

- “Walk-through” audit (Thumann: Level 1): Visual inspection, consumption data compared to industry averages or benchmarks.

- “Standard” audit (Thumann: Level 2): “More detailed analysis of equipment, systems, and operational characteristics.”

- Level 3: “Includes some computer simulation and a more comprehensive evaluation of energy use patterns.”

- Do-it-yourself audit

- Whole-farm (comprehensive, holistic) vs. operation- or technology-specific audit (single purpose, targeted).

- Environmental audits: opportunities to save water, reduce GHGs, incorporate renewable energy, etc.

- New ASABE standard (summer 2009): minimum and recommended procedures for documenting baseline conditions, presenting recommended alternatives.
Who provides farm energy audits?

- Utilities, usually contracting with third parties (e.g. Alliant Energy, PG&E, Southern Cal Edison)
- For-profit companies (e.g. EnSave, GDS Associates)
- State departments of agriculture (e.g. Kentucky, Massachusetts)
- State energy offices (e.g. Texas)
- Farm organizations (e.g. NC Farm Bureau)
- State public benefit corporations (e.g. NYSERDA, Efficiency Vermont)
- Regional energy organizations (e.g. Northwest Energy Efficiency Alliance)
- Resource Conservation Districts (often in partnership with EnSave)
- Universities (Extension programs)
- Other non-profit organizations (NCAT, Maine Rural partners)
- Independent contractors
What does a farm energy audit cost?

• Simple pump test: a few hundred dollars. (SCE: $320 per test; PG&E: $150-$170 per test)

• Basic farm energy audit suitable for USDA’s Rural Energy for America Program: $1,000 to $2,000.

• Large farm or rural business: as much as tens of thousands of dollars.

• Basically paying for skilled labor. Less expensive “data gatherers” often used to reduce costs.
What is the Rural Energy for America Program (REAP)?

- Administered by USDA Rural Development since 2003.
- Flagship USDA grant and loan energy program: $99 million for FY2010.
- Grants up to 25% of total eligible project costs.
- All rural small businesses are eligible.
What is the role of energy audits in REAP?

- Energy audit required for energy efficiency projects with total eligible costs >$50,000. Also adds 5 points for smaller projects.

- Audit must be “conducted” by a P.E. or CEM. Not required by Rural Development to stamp the audit report, visit the site, or be licensed in that state.

- Does not need to be a “comprehensive” (whole farm) audit.

- “Energy replaced or saved” counts for just 15 out of 130 possible points in a REAP energy efficiency grant proposal.
Some states are doing better than others in competing for REAP funds.

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States are scrambling to create energy audit programs.

• In 2004, ACEEE found just two “audit-only” programs “targeted at, and largely used, by agriculture.” In 2009, NCAT found 27 states.

• However, many programs were inactive or served just a few counties.

• Many states contract with for-profit companies, mainly EnSave, to provide audit services.
Do farms want energy audits?

• Over time, programs that establish a reputation for excellent service can become popular.

• But demand appears to be generally modest at best—often driven by interest in incentive programs.

• “We try to keep up to date and know what we’re doing. We would never pay someone to come out and do that [conduct an energy audit].”

• “I think a lot of farmers maybe feel like when a professional comes out that they’re telling them how to run their operation.”

• “I have been in this business since 1977 and I have learned things by the seat of my pants. And in some ways that’s better than having someone try to tell you what to do.”

• 12 out of 12 farmers interviewed said they would rather use a do-it-yourself tool than have a professional audit that included a site visit.
Are farms willing to pay for energy audits?

“How much would you be willing to pay for a farm energy audit?”

Are audits effective?

• Solid evidence is hard to come by: free riders, apples and oranges, and heavily dependent on incentives.

• Utility representative: “We used to do farm energy audits but we finally came to our senses and put a stop to it. When I started, we had boxes of audit reports that were completely worthless…They resulted in hardly any measures being implemented at all.”

• ACEEE (2005): “Program reviewers reported few tangible savings resulting from these [audit-only] programs on their own…An audit program without structured follow-up and/or financial incentives will not make its value clear to farmers.”
Reported completion rates are all over the map.

- PG&E: “During the period 2006-2008, approximately 16% of subsidized pump tests led to pump retrofits.”
- NorthWestern Energy (Efficiency Plus Irrigation Project 2003-4): 125 audits resulted in 36 cash incentive offers, of which 22 were paid.
- Alliant Energy: “Maybe 70% of the time. Part of that comes from where you put your efforts...which audits you go on.”
- EnSave Maryland study (2009): “Of 47 producers, 35 (74%) installed audit recommendations.”
- GDS: “Up until the last year or so, our completion rate was very high, around 90 percent, since we worked with projects that were already in the planning stages.”
But agriculture is generally viewed as a tough sector.

Expense is the barrier. The energy savings are generally meager and it doesn’t make sense to bother with it…There’s not much energy there [on farms], and it’s hard to get to it…There’s also tremendous diversity in the operations themselves. They’re all ‘first ones’.”

For our agricultural customers, energy efficiency is not a big deal to them…absolutely not a priority.”

Ag is a hard market to reach…Energy efficiency is not a high priority for these customers…Unless you are very intensive, such as a winery with extensive refrigeration or a tomato processor, energy is a secondary concern.”
Farm energy audits can be compared to doctors making house calls.

<table>
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<th>House Calls</th>
<th>Farm Energy Audits</th>
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<td>Health</td>
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**Similarities**
- Individualized, one-on-one
- Professional service
- High quality
- Relatively expensive
- Not practical for broad public campaigns

**Differences (farm energy audits)**
- Lower demand for services
- Lower rate of follow-through
- Greater travel and logistical challenges
- Greater challenges of trust and credibility
There are many lower-cost alternatives.

• ebates
• demonstrations
• pilot projects
• workshops
• websites and on-line tools
• educational publications
• toll-free technical assistance lines
Can self-help tools substitute for an on-site visit and audit by an energy professional?

- Read our report “Farm Energy Calculators: Evaluations and Recommendations.”

- The producers in our study found most tools user friendly and liked using them, but tended to use the tools in a casual and exploratory way.

- Tools have a hard time accounting for the complexity of farming operations, including reliable cost estimates, and encouraging innovation. In all these ways (and others) they are inferior to an on-site audit.

- As tools get more complicated, more comprehensive, and more specific in their recommendations, they run into daunting problems of usability, liability, and maintenance.

- When appropriately focused and skillfully designed, agricultural energy calculators are promising awareness and educational tools that perform some tasks extremely well and deserve further exploration and development.”
Recommendations to USDA

1. De-emphasize the role of energy audits in REAP, consistent with maintaining appropriate accountability.

2. Give more weight to energy savings in REAP scoring.
   - Or strengthen other USDA programs that are less focused on rural development.

3. Better coordination among USDA agencies offering energy-related programs.
   - Keep your eyes on the prize: energy-related security, health, and environmental benefits—not just energy conservation.
4. Imitate the tactics of successful energy efficiency programs working in rural America:

- Strongly involve equipment dealers, installers, and integrators.
- Involve established and trusted information sources, such as Extension and agricultural organizations.
- Use rebates and other targeted incentives that are inexpensive to administer.
- Use phone and e-mail assistance, “walk-through” audits, and other alternatives to a full-blown audit with a site visit and written report.
Thank you for your attention!

NCAT:  www.ncat.org or 1-800-ASK-NCAT

ATTRA:  www.attra.org or 1-800-346-9140

Mike Morris: mikem@ncat.org or 919-251-9680

Farm Energy resources:  www.attra.org/energy
(including both reports discussed in this presentation)