



ACEEE Forum on Energy Efficiency

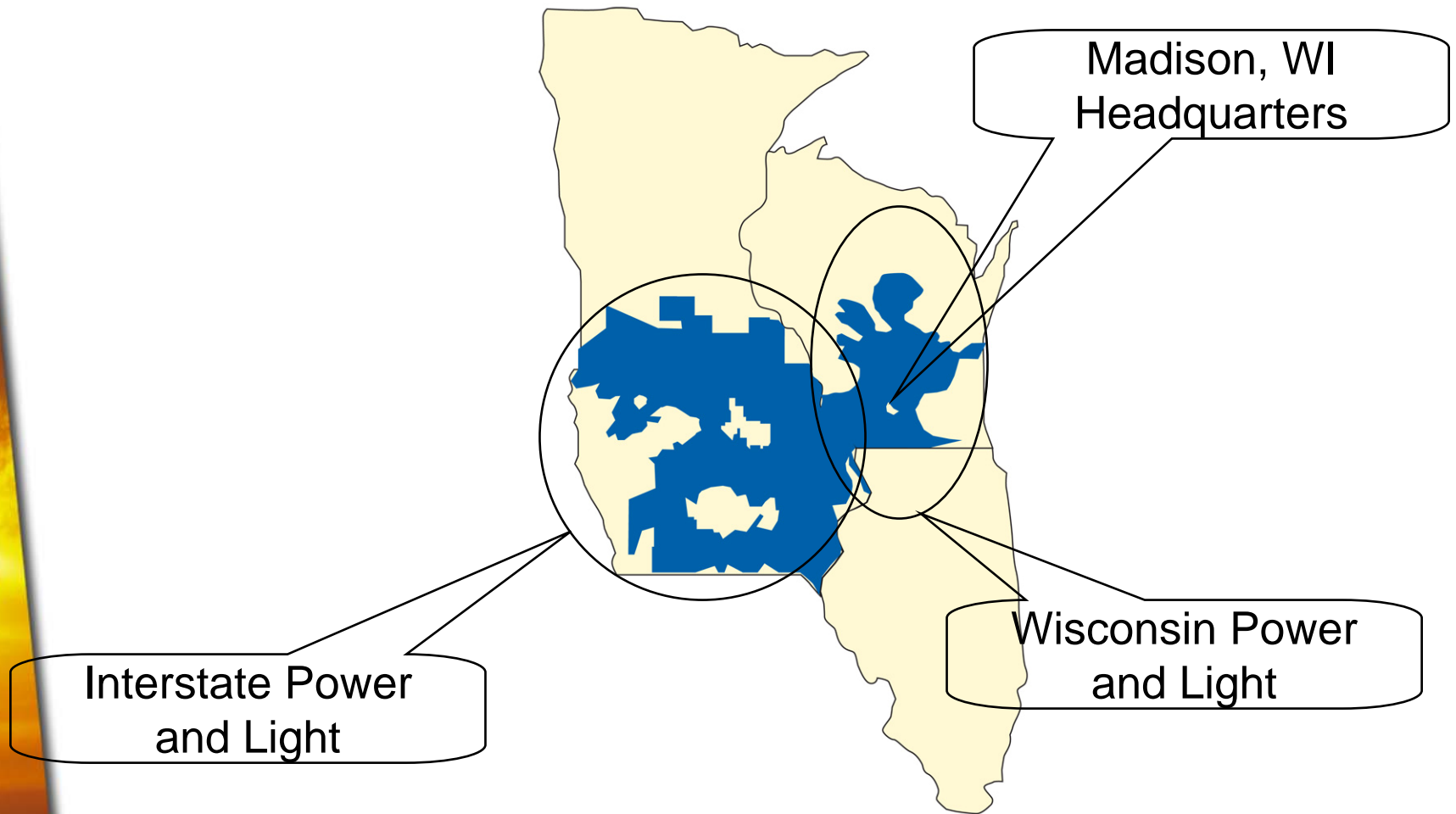
February 21, 2008

Implementing Ag Energy Efficiency with Section 9006

Presentation overview

- Who & where are we??
- How did we start?
- 9006 Where do you start.
- What makes a good project
- 9006 Successful Federal Grant Energy/Analysis
- FAQ's

Who Is Alliant Energy?



How Did We Start (Why?)

- Gently nudged by our regulators.....
- 2005 Less than 10
- 2006 Less than 20
- 2007 83 Grant Applications IA, MN, WI, SD, IL
 - Mostly Grain Dryers
 - A few Renewable's – Small Wind
 - Projects <\$25,000 up to \$500,000
- 2008 MORE!
- Overall Success about 95%

So Where Do You Start

- Project Needs To Save Energy
- Who Qualifies
 - Ag Producer – 50% or more gross income from Ag
 - Rural Small Business – Defined by SBA
- What Qualifies
 - Equipment to replace or improve existing equipment or processes with new.
 - May construct a new facility if used for the same purpose, is approximately the same size.
 - May include land acquisition.
 - Project must be in a rural area and utilize replicable commercially available and feasible technology.

So Where Do You Start

- What doesn't qualify
 - Agricultural tillage equipment
 - Residential construction or improvements
 - Fees associated with application preparation
 - Refinancing
 - *Equipment already purchased or installed*

What Makes Good 9006 Projects

- Lighting conversion and retrofits
 - Excellent energy savings potential up to 75%.
 - Good opportunity to replace deteriorated fixtures, controls, and wiring.
- Ventilation and insulation improvements
 - Swine, poultry, cattle facilities
- Dairy Farm Improvements – *Large potential*
 - VFD Vacuum Pumps
 - Scroll Compressors
 - Plate Coolers and VS milk pump
 - Long Day Lighting
 - Convert from MH to Fluorescent

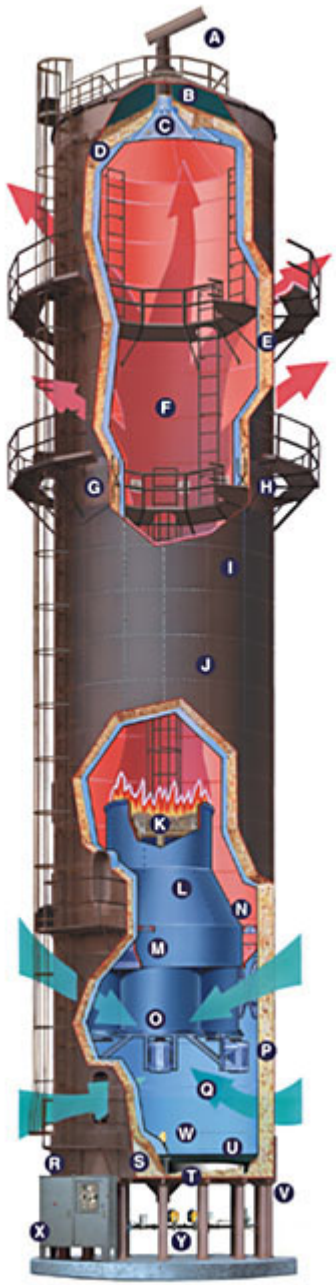
What Makes Good 9006 Projects

- Irrigation conversion
 - Switch from high pressure to low pressure
 - Convert from diesel pumping to electric
 - May have lower BTU savings but significant \$\$ savings
- Refrigeration improvements
 - Grocery stores
 - Lockers and small meat processors
- Grain Drying and handling process improvements
 - Typical improvement of 25-60% for gas fired
 - Natural air drying

What Makes Good 9006 Projects



What Makes Good 9006 Projects



What Makes Good 9006 Projects

Gas-Electric Summary					
Electrical Audit Summary					
	Existing System	Existing System Adjusted to 5pts.	New System		
Calculated drying kWh use	26,975	39,295	28,412	kWh savings	10,883
Drying mos.cost / kWh	\$0.0962	\$0.0962	\$0.0962		
Total electric cost	\$2,595.60	\$3,781.03	\$2,733.87	\$\$ Electric Cost Savings	\$1,047.16
Total bushels dried	314,762	400,000	400,000	% savings	27.70%
kWh cost / bu dried	\$0.0082	\$0.0095	\$0.00683		
Points moisture removed/bu.	3.0	5.0	5.0		
Total pts. removed	944,286	2,000,000	2,000,000		
Bu dried per hr	1,021	704	2,000		
Total drying hours	308	568	200		
kWh / bu. dried	0.086	0.098	0.071		
Bushels dried / kWh	11.669	10.179	14.078		
BTU's / kWh	3412	3412	3412		
BTU's / bu dried	292	335	242		
Total electrical BTU's	92,039,672	134,075,039	96,942,804	Electrical BTU Savings	37,132,236
				% Elect. BTU Savings	27.70%
Gas Audit Summary					
	Existing Audited	Existing Adjusted	New Drying System		
Therms Nat Gas used	25,243.0	46,523.4	24,264.4	Therms Nat Gas Saved	22,259
Cost per Therm	\$ 0.7612	\$ 1.00	\$ 1.00		
Total Gas cost	\$19,213.81	\$46,523.44	\$24,264.44	\$\$ Gas Cost Savings	\$22,259.00
Total bu. Dried	314,762	400,000.00	400,000.00	% savings	47.84%
Gas cost / bu dried	\$ 0.061	\$ 0.116	\$ 0.061		
Points moisture removed/bu.	3.00	5.00	5.00		
Gas cost / pt	\$ 0.020	\$ 0.023	\$ 0.012		
Total pts removed	944,286	2,000,000	2,000,000		
Bu Dried / hr	1,021	704	2,000		
Total drying hrs	308	568	200		
BTU's per hour	8,188,125	8,188,125	12,132,222		
BTU's / therm	100,000	100,000	100,000		
BTU's / bu dried	8,020	11,631	6,066		
Total BTU's	2,524,300,000	4,652,343,998	2,426,444,400	Gas BTU Savings	2,225,899,598
				% Gas BTU Savings	47.84%
Combined Savings Summary			New System Cost(\$\$\$) Savings		
Total Electric & Gas Cost	\$21,809.41	\$50,304.47	\$26,998.31	Total Cost Old System	\$50,304.47
Total Cost / Bu. Dried	\$0.069	\$0.126	\$0.067	Total Cost New System	\$26,998.31
Total Cost / pt moist. rem.	\$0.023	\$0.025	\$0.013	Total Cost Savings	\$23,306.16
				\$\$ Savings / Bu. Dried	\$0.058
Total Electric & Gas BTU's	2,616,339,672	4,786,419,038	2,523,387,204	% Total Cost Savings	46.33%
Total BTU's / Bu. Dried	8,312	11,966	6,308	New System Energy(BTU's) Savings	
Total BTU's / pt. moist. rem.	2771	2393	1262	Total BTU's Old System	4,786,419,038
				Total BTU's New System	2,523,387,204
				Total BTU's Saved	2,263,031,834
				% BTU Savings	47.28%

What Makes Good 9006 Projects

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- Energy audit analyzes actual operation of existing equipment and processes.
- Given that information, adjustment is made to average operational conditions.
- Comparison of adjusted conditions is then made to new equipment and processes.

9006 Successful Federal Grant Energy/Analysis

- Qualified Project Team
 - Qualified independent energy auditor
 - Project manager
 - Equipment supplier
 - General Contractor
 - Others as appropriate
- One individual or entity may serve more than one role
- Authoritative evidence that project team providers have necessary professional credentials or relevant experience to perform required services.

9006 Successful Federal Grant Energy/Analysis

Energy Audit - Backbone of 9006 Application

1. Written report by an independent qualified party
2. Document current energy usage
3. Recommended potential improvements and energy usage and their costs
4. Energy savings from improvements and dollars saved per year
5. Simple payback period in years (total costs divided by annual dollars of energy savings)

9006 Successful Federal Grant Energy/Analysis



Account Name & Address : **Farmer, Bob**

Anytown, USA

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Date of Audit : 6/9/2005

Type of Audit : Grain Dryer Usage

Account No. :

Meter No. :

Description : Grain audit - dryer kWh usage for USDA Grant App. - **Proposed new dryer**

Rate :

810

Process Description	No. of motors	H.P.	Phase	Volt Rating	Actual measured volts	Amp Rating	Actual Measured Current	% Load	KW	hrs./day	# days	hrs. used/season	kWh/season	Comments
1 Grain Spreader for 30' drying bin	1	2	1	230		12		80%	2.2	0	0	66	147	Used as wet holding ahead of dryer - Bin is filled w/tractor a
2 30' Dryer bin fans	1	10	1	230		50		85%	9.8	24	1	24	235	Eliminated w/new dryer-1 fan used for aeration
3 6" holding bin unload auger	1	7.5	1	230		40		85%	7.8	0	0	150	1,173	cycles on/off as new dryer needs- 5,000 bu left in bin
4 8" dry grain transfer auger	1	7.5	1	230		38		75%	6.6	0	0	225	1,475	cycles on/off as grain dries-transfers grain to storage bins
5 Aeration fan for cooling/aeration	1	7.5	1	230		40		80%	7.4	0	0	167	1,229	Runs during fill plus 3 days after - then as needed
6 48' bin grain spreader	1	1	1	230		8		75%	1.4	0	0	95	131	cycles on/off w/dryer unload during fill
7 48' bin roof auger	1	2	1	230		12		75%	2.1	0	0	95	197	cycles on/off w/dryer unload during fill
8 8" unload auger- 48' bin	1	5	1	230		28		80%	5.2	0	0	0	0	bin is full/was not used during this audit period
9 36' bin aeration	1	3	1	230		17		80%	3.1	0	0	96	300	Runs during fill plus 2 days after - then as needed
10 36' bin spreader	1	0.75	1	230		6.9		75%	1.2	0	0	45	54	cycles on/off w/dryer unload during fill
11 8" unload auger- 36' bin	1	3	1	230		17		80%	3.1	0	0	0	0	bin is full/was not used during this audit period
12 30' bin aeration	1	2	1	230		12		80%	2.2	0	0	103	227	Runs during fill plus 36 hrs after - then as needed
13 6" bin unload auger - 30' bin	1	2	1	230		12		85%	2.3	0	0	28	66	bin capacity 15,000/hauled out during this audit period
14 Grain spreader - 30' bin	1	0.5	1	115		9.8		80%	0.9	0	0	67	60	cycles on/off w/dryer unload during fill
15 24' bins aeration(2 identical bins)	2	1.5	1	230		10		80%	3.7	0	0	33	121	runs during fill plus 24 hrs
16 6" unload auger - 24' bins(2 identical)	2	2	1	230		12		80%	4.4	0	0	0	0	bins full/was not used during this audit period
17 24' bis grain spreaders	2	0.5	1	115		9.8		80%	1.8	0	0	9	16	cycles on/off w/dryer unload during fill
18 New Grain Dryer	1	34.5		230		200		80%	36.8	0	0	266	9,773	2-10hp&2-7.5hp Rated @ 190amps
0	0	0		0		0		0%		0	0		0	
0	0	0		0		0		0%		0	0		0	
0	0	0		0		0		0%		0	0		0	
Total kWh													15204	

Lighting - Description	No. Fixtures	Lamps/ Fixture	Lamp Type (HPS,HID,Incand, Fluorecent)	Watts/ Lamp	Watts/ Fixture	KW	hrs./day	# days	hrs. used/season	kWh/season	Comments
1 Yard light used during drying season	1	1	Merc/Vap	250	250	0.25	6	23	138	34.5	Turned on at night during harvest
0											
0											
0											
0											
Total kWh										35	

** Hrs. of equipment operation were obtained and calculated from customer consultation and industry averages. **Actual usage will vary from year to year. No guarantees are made or implied as to future or current usage.

Ag Rep.

Existing kWh's=	21,935
New Process kWh's =	15,238
New System Savings=	6,697

30 % Savings



9006 Successful Federal Grant Energy/Analysis

Energy Audit Presentation

- Situation report
 - Narrative description of the facility, equipment, and/or processes and baseline energy usage.
- Potential improvements
 - List specifically relevant information on all energy saving opportunities and their costs.
- Technical analysis
 - Describe how improvements may or may not affect other associated processes.
 - Estimate energy usage, savings, cost savings from each identified improvement.

9006 Successful Federal Grant Energy/Analysis

Audit presentation cont.

- Potential Improvement Description
 - Narrative describing benefits and savings associated with implementation of project, including nonenergy benefits like reliability and durability.
 - Provide specifications for critical components
 - Provide drawings of project layout and changes
 - Document baseline data compared to projected consumption. Show before and after data in terms of consumption per unit of production etc.
 - Identify significant changes in future related operation and maintenance costs, if any.
 - Describe how outcomes will be measured.

9006 Successful Federal Grant Energy/Analysis



April 12, 2007

Mark Kingland
Alliant Energy
Agricultural Account Rep.
Phone: (641)-422-1759
E-Mail: markkingland@alliantenergy.com

Dear

Thank you for taking advantage of Alliant Energy-Interstate Power and Light Company's Farm Energy Audit program. As we discussed during the audit, this service is available to help you analyze and manage your energy use on the farm and analyze possible energy efficiency improvements.

1. Situation Report:

- 1.1. Current drying operation consists of a 1984 Kan-Sun brand model #1010-84 continuous flow grain dryer. On-site grain storage capacity is approximately 600,000bu. All excess bushels are dried and trucked to off-site storage or to market.
- 1.2. Wet corn is unloaded into a drive over dump pit and elevated directly to the dryer or into a wet holding bin. Corn is then transferred, on demand from the dryer, through a bottom unload conveyor back to the "wet grain leg" and into the top of the dryer.
- 1.3. As corn is dried it is conveyed out of the dryer through an 8" auger to the "dry grain leg" and then distributed into the various storage bins, or hauled to market.
- 1.4. The attached "Usage History Report" shows actual electrical usage for the past 12 months. Corn drying took place during the Oct/Nov billing months (highlighted in blue). Normal electrical usage for non-drying related load, 720 kWh/mo & highlighted in orange, was subtracted from the two months usage leaving an estimated 96,320 kWh's for the purpose of corn drying. Actual cost of electricity during drying period is \$0.0874/kWh.
- 1.5. All motors and processes used for grain drying and storage during the audit period were documented and summarized on the "Existing Systems-Actual 2006" with a total calculated usage of 96,565 kWh. This usage matches the electrical utility meter.
- 1.6. Actual LP Gas usage was 53,453 gallons at a cost of \$1.312/gallon.



9006 Successful Federal Grant Energy/Analysis

1. Energy Efficiency Improvements:

- 1.1. Improvements being considered are a new Meyer brand Model #2400S continuous flow dryer with computerized controls. The proposed dryer is a pressure-heat suction-cool dryer. Drying air is pre-heated with air from the cooling section of dryer. Corn would be transferred partially hot, 92 degree F, out of the new dryer and finish cooling in storage bins. This process allows corn to be transferred out of the dryer at a higher moisture and remaining moisture (approx. 1pts) to be removed during the cooling process. Energy usage and capacities were obtained directly from the manufacture based on conditions specific to the Premier Grain operation.
- 1.2. Currently the transfer processes are running at much less than rated capacity, the new dryer with higher capacity will greatly improve the efficiency of the existing transfer processes.

2. Technical Analysis:

- 2.1. The energy usage for the existing system was normalized for average moisture removal of 5pts and the total number of bushels. Due to dryer than normal corn moisture at the end of last years drying season the last 80,000bu were not dried during the audit period. Typically those bushels would also be dried through the drying system. All involved processes were adjusted accordingly and their associated energy usage documented. The summary is included in the "Existing System Adj. Usage-710,253bu & 5pts" report.
- 2.2. The new dryer and any associated process changes were documented and run times and associated energy usage was then analyzed. The summary and supporting documents are included in the "New System Usage-710,253bu & 5pts" report.
- 2.3. Electrical savings from new system, when converted to BTU's, is 52.25%. Gas savings from new system, when converted to BTU's, is 37.32%. Combined electrical and gas BTU savings is 38.23% (2,613,408,900 Btu's).
- 2.4. Predicted cost savings is 38.82% (\$42,261.95/yr.). Energy comparison of existing system (adjusted to average conditions) and the new system are summarized on the "Elect/Gas Summary report."

3. Improvement Description:

- 3.1. Existing drying system is 20+ years old and has exceeded useful life. New drying system is a pressure-heat suction-cool dryer with the drying air pre-heated with air from the cooling section of dryer. Computerized moisture control removes corn continuously as the corn dries. This is based on actual moisture measurement that continuously adjust output, eliminating over/under drying, improving overall efficiency.
- 3.2. Existing conveyors and support equipment have sufficient capacity, and are currently under utilized, to support the new dryer, so minimal changes will be required to support the new dryer. Any changes are documented and included in the energy calculations for the new system. Increased capacity will also allow more timely harvest, saving lost yield due to field losses.
- 3.3. Baseline energy usage is documented and verified based on actual metered energy usage as referenced above and documented in the attached reports.

9006 Successful Federal Grant Energy/Analysis



Supporting Documents:

Grain Energy Audit

- 1. Site Maps; Old and New**
- 2. Yield Documents**
- 3. Dryer Simulator**
- 4. Electrical statements**
- 5. Gas statements**



9006 Grant Frequently Asked Questions/Tips

- I need to make a down payment or pay for part to hold the current equipment price, can I do that before I apply? *(Can you be here this afternoon?)*
 - NO
- I just bought a new grain dryer, I need an audit to apply for a grant, *(Can you be here this afternoon?)*
 - NO! Absolutely not retroactive.
- Can I include the concrete and 3 phase line extension cost in my project cost? *(Can you be here this afternoon?)*
 - Maybe, but do you want to?

9006 Grant Frequently Asked Questions/Tips

- I can't dry as fast as I can combine so I need a grant to put in a new dryer, ok? *(Can you be here this afternoon?)*
 - Only if it is more efficient than your old one.
- I am going to expand my operation, can I get a grant? *(Can you be here this afternoon?)*
 - Only for replacement of similar size capacity.
- Do I have to go through all this paperwork, can't I just sign somewhere? *(Can you be here this afternoon?)*
- What if I change some components after I have made application? *(Can you be here this afternoon?)*
 - Minor changes are ok



Implementing Ag Energy Efficiency with Section 9006

Thank You!! Have an Energy Efficient Day!!

Questions?