



## ACEEE Forum on Energy Efficiency

November 16, 2005

Taking Energy Efficiency "*Thru The Farm Gate*"

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### Taking Energy Efficiency "*Thru The Farm Gate*"

- What and Where are we now w/energy efficiency??
- How did we start??
- What tools do we use to achieve results??
- New Construction
- Livestock operation audit/efficiency rec./efficiency process improvement recommendation
- 9006 Successful Federal Grant Audit/Analysis



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## **Taking Energy Efficiency “Thru The Farm Gate” Where are we now??**

- There is no shortage of meetings or ideas.
- Current products & technology enables more efficient ways of doing most processes.
  - Modern technology/computers allow precise management and control of just about all processes.
- Equipment (motors, lights, machines, controls) a lot more efficient than even a few years ago.
- There are different programs and information available to assist in implementation of more efficient equipment.



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## **Taking Energy Efficiency “Thru The Farm Gate” Where we started??**

- Prescriptive rebates to help offset incremental cost of installing efficient equipment.
- Incent builders, equipment dealers, electricians, contractors etc.
- Website with Energy Efficiency Information with typical savings information.
- How do you effectively implement efficiency ideas and use of better equipment to achieve greatest impact???



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## Taking Energy Efficiency "Thru The Farm Gate" Tools used to achieve results

- Education
- Promotion of financial benefits of being more efficient.
- Work with network of equipment dealers, contractors, electricians, Universities, Iowa Energy Center, etc.
- Developed multiple energy audit tools and procedures
- Provide accurate information on savings, short term and long term.
- Custom Calculations Rebates/Incentives specific to individual farm business operations
- 9006 Federal Grant Program
- New construction energy analysis



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## Taking Energy Efficiency "Thru The Farm Gate" -New Construction-

Proposal For:   
 Date: August 5, 2005  
 Project Description: 2,400 hd new finisher

### New Construction Efficiency Comparison

Recommended Energy Efficient Measures:

Measure	No. Of Units	Estimated installed cost/unit	Total installed cost	Available Incentive per unit/unit	Total Available Incentive per Measure	Total installed cost minus incentive	Total kWh Used	Annual Cost of Operation	Estimated kWh Savings per unit	Total kWh Saved	Annual Dollar Savings
<b>Std./Existing</b>											
<b>Lighting</b>											
Incand. Fixt. - Rim Lighting	60	\$ 15.25	\$ 915.00			\$ 915.00	6,670	\$ 501.50			
CFL Fixtures - Rim Lighting	6	\$ 35.00	\$ 210.00	\$ 20.00 /unit	\$ 120.00	\$ 90.00	981	\$ 75.25			
Ventilation											
PH Fan -	12	\$ 500.00	\$ 6,000.00			\$ 6,000.00	15,062	\$ 1,218.50			
End Wall Fans -	4	\$ 500.00	\$ 2,000.00			\$ 2,000.00	11,082	\$ 875.50			
<b>Recommended</b>											
<b>Lighting</b>											
CFL Fixtures - Rim Lighting	66	\$ 35.00	\$ 2,310.00	\$ 20.00 /unit	\$ 1,320.00	\$ 990.00	1,629	\$ 126.25	\$ 25.50		\$ 480.50
CFL Fixtures - Rim Lighting	6	\$ 35.00	\$ 210.00	\$ 20.00 /unit	\$ 120.00	\$ 90.00	981	\$ 75.25	0.0		\$
Ventilation											
PH Fan -	12	\$ 600.00	\$ 7,200.00	\$ 75.00 /unit	\$ 900.00	\$ 6,300.00	37,130	\$ 2,943.50	\$811.0		\$ 783.00
End Wall Fans -	4	\$ 500.00	\$ 2,000.00	\$ 75.00 /unit	\$ 300.00	\$ 1,700.00	9,050	\$ 713.50	293.0		\$ 293.00

Total Standard Project Cost:	\$ 9,250.60	Total Recommended Project Cost:	\$ 12,197.60	Rec. Project Incremental Cost:	\$ 2,947.00
Incentive Amount:(If Any)	\$ 160.00	Incentive Amount:(If Any)	\$ 2,560.00	Total Annual kWh Savings:	17,093 kWh
Net Standard Project Cost:	\$ 7,090.60	Net Recommended Project Cost:	\$ 9,637.60	Total Annual Dollar Savings:	\$ 1,538.35
Total Annual kWh Usage:	55,501 kWh	Total Annual kWh Usage:	38,408 kWh	Based on Avg. Elec. Cost of:	\$ 0.090 /kWh
Total Annual kWh Cost:	\$ 4,995.05	Total Annual kWh Cost:	\$ 3,456.70	Energy Eff. Payback in Years:	1.7
		Est. kWh Savings:(If Any)	17,093 kWh		
		Est. Cost Savings:(If Any)	\$ 1,538.35		



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## Taking Energy Efficiency "Thru The Farm Gate" -New Construction-Summary

1. Standard building specs. 55,501kWh  
\$4,995 @ \$.09
2. Energy Efficiency recommendations 38,408kWh  
\$3,457 @ \$.09
  - Compact Fluorescent Lights(@2hrs op./day)
  - Fans w/better CFM/watt(24" fans 13 to 15)
  - Incremental cost \$2,547.00
  - 30% Energy Savings (\$1538.00)
  - Payback 1.7yrs.



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## Taking Energy Efficiency "Thru The Farm Gate" -Existing As Audited-

Process Description		No. of gear./motors	H.P.	Phase	Volt Rating of Actual	Amp Rating of Actual	Watt Rating of Actual	% Load	KW	hrs./day	# days /year	hrs. used/ year	Total kWh/year	Comments
P well		1	1.5	1	240			90%	0.8	6.0	365	2190	1,853	water for hog production
Space Heater(room)		1		1	115	3		75%	0.2	9.0	120	1152	263	space heater in. Farm building
Estimator micro-lood		4		1	115	10		100%	0.0	24.0	180	4320	173	Controls speakers
Space Heater(production area)		4		1	115	4.5		55%	1.0			1152	1,115	Heats production area as needed (6)
Dustbin controler motors		8	0.5	1	115	6		75%	3.5	1.0	365	365	1,284	turns ventilation curtains
Pig feed delivery rollers		4	0.75	1	230	5.5		85%	3.9			465	1,703	8000 lbs pig 725 lbs feed/hr
Ventilation Fans		16		1	240	2		90%	5.9	24.0	351	8424	49,423	Pa Fans
Powerwashers		1	16	1	240			80%	8.5		60	60	513	wash/disinfect between groups
<b>Total kWh</b>													<b>56,476</b>	
Lighting - Description		No. Fixtures	No. Lamps/fixture	Lamp Type (Watt, and kind, Fluorescent)	Watts/ Lamp	Watts/ Fixture	KW	hrs./day	# days /season	hrs. used/ season	Total kWh	Comments		
Area lights open rm		3	1	inc	100	100	0.3	1	365	365	109.5			
Security Light		1	1	MV	175	175	0.175	1	4380	766.5	766.5	yard light on pole		
Production room lights		56	1	inc	100	100	5.6	2	365	730	4088	Work lights over pens		
<b>Total kWh</b>												<b>4984</b>		
<small>Hrs. of equipment operation were obtained and calculated from customer consultation and industry averages. **Actual usage will vary from year to year. No quantities are made or implied as to future or current usage.</small>														
<b>Ag Rep:</b>											<b>Total kWh's</b>	<b>61,440</b>		
											<b>Total Cost \$</b>	<b>5,627.93</b>		



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## Taking Energy Efficiency "Thru The Farm Gate"

### -Possible Efficiency Recommendation-

ALLIANT ENERGY		Account Name & Address											
Date of Audit	10/17/2008	Description: Audit for possible energy efficiencies and tax exemption											
Type of Audit	Efficiency/Tax Exempt												
Account No.	11-11-1111-11												
Meter No.	22-****	Rate: .410											
Process Description	No. of pwr./motors	H.P.	Phase	Volt Rating or Actual	Amp Rating or Actual	Watt Rating or Actual	% Load	KW	hrs./day	# days /year	hrs. used/ year	Total kWh/ year	Comments
1 5" well	1	1.5	1	240		90%	0.8	0.6	365	2190	1,653	water for hog production	
2 Space Heater(ign. room)	1		1	115	3	75%	0.2	0.8	120	1152	253	Keeps generator rm. from freezing	
3 Eastroom micro-cool	4		1	115		100%	0.0	24.0	180	4320	173	Controls sprinklers	
4 Space Heater(production area)	4		1	115	4.5	65%	1.0	1.0	1152	1152	1,115	Heats production area as needed (R)	
5 Curran controller motors	8	0.5	1	115	8	75%	3.5	1.0	365	365	1,284	Runs ventilation curtains	
6 Flex feed delivery augers	4	0.75	1	230	3.8	85%	3.9				465	1,793 1800-33434775#feedhd	
7 Ventilation Fans	16		1	240	2	90%	5.9	24.0	351	8424	49,493	1/2 Pwr Fans	
8 Downwashfans	1	16	1	240		80%	8.6				80	613 wash/standoff between groups	
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
											Total kWh:	56,476	
Lighting - Description	No. Fixtures	No. Lamp/s/ fixture	Lamp Type (HP/L.H.D./Compact, Fluorescent)	Watts/ Lamp	Watts/ Fixture	KW	hrs./day	# days	hrs. used/ season	Total kWh	Comments		
1 Area Lights (gen. rm)	3	1	Compact F1	33	33	0.099			365	25,185			
2 Security Light	1	1	HPB	100	100	0.1			4380	438	yard light on pole		
3 Production room lights	26	1	Compact F1	28	28	1.268	2	365	730	945.24	Work lights over pens		
4													
5													
6													
										Total kWh:	1493		
<small>**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.</small>										<b>Total kWh's: 57,880</b> <b>Total Cost \$: 5,301.78</b>			

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## Taking Energy Efficiency "Thru The Farm Gate"

### -Possible Process & Efficiency Recommendation-

ALLIANT ENERGY		Account Name & Address											
Date of Audit	10/17/2008	Description: Audit for possible energy efficiencies and tax exemption											
Type of Audit	Efficiency/Tax Exempt												
Account No.	11-11-1111-11												
Meter No.	22-****	Rate: .410											
Process Description	No. of pwr./motors	H.P.	Phase	Volt Rating or Actual	Amp Rating or Actual	Watt Rating or Actual	% Load	KW	hrs./day	# days /year	hrs. used/ year	Total kWh/ year	Comments
1 5" well	1	1.5	1	240		90%	0.8	0.6	365	2190	1,653	water for hog production	
2 Space Heater(ign. room)	1		1	115	3	75%	0.2	0.8	120	1152	253	Keeps generator rm. from freezing	
3 Eastroom micro-cool	4		1	115		100%	0.0	24.0	180	4320	173	Controls sprinklers	
4 Space Heater(production area)	4		1	115	4.5	65%	1.0	1.0	1152	1152	1,115	Heats production area as needed (R)	
5 Curran controller motors	8	0.5	1	115	8	75%	3.5	1.0	365	365	1,284	Runs ventilation curtains	
6 Flex feed delivery augers	4	0.75	1	230	3.8	85%	3.9				465	1,793 1800-33434775#feedhd	
7 Ventilation Fans	16		1	240	2	90%	5.9	24.0	351	8424	24,746	1/2 Pwr Fans	
8 Downwashfans	1	16	1	240		80%	8.6				80	613 wash/standoff between groups	
9 Ventilation Fans-Downward	8		1	240	2	90%	2.0	12.0	351	4212	12,373	1/2 Pwr Fans shut off when curtains open	
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
											Total kWh:	44,103	
Lighting - Description	No. Fixtures	No. Lamp/s/ fixture	Lamp Type (HP/L.H.D./Compact, Fluorescent)	Watts/ Lamp	Watts/ Fixture	KW	hrs./day	# days	hrs. used/ season	Total kWh	Comments		
1 Area Lights (gen. rm)	3	1	Compact F1	33	33	0.099	1	365	365	25,185			
2 Security Light	1	1	HPB	100	100	0.1			4380	438	yard light on pole		
3 Production room lights	26	1	Compact F1	28	28	1.268	2	365	730	945.24	Work lights over pens		
4													
5													
										Total kWh:	1493		
<small>**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.</small>										<b>Total kWh's: 45,606</b> <b>Total Cost \$: 4,168.39</b>			

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## Taking Energy Efficiency "Thru The Farm Gate" -Possible Process & Efficiency Recommendation-

1. Existing 61,440kwh \$5,628.00  
(This usage tied to the meter)
2. Initial Rec 57,880kwh \$5,302.00 (\$326 savings 6%)
3. Efficiency w/process improvements  
45,506kwh \$4,168.00 (\$1,460 savings 26%)
4. Other possible savings, TOD rate, Sales tax exemption.

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## Taking Energy Efficiency "Thru The Farm Gate" 9006 Grant Energy Audit - Existing System

ALLIANT ENERGY		Account Name & Address		Farmer, Bob Anytown, USA		Page 1 of 1								
Date of Audit	8/26/2008	Description												
Type of Audit	Grain Dryer Usage	Grain audit - dryer kWh usage for USDA Grant App.												
Account No.		Rate: BTD												
Meter No.														
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	0	0	86	147	Used during grain fill - Bin is filled w/tractor auger
2 30' Dryer bin fans	3	10	1	230	60	80%	29.3	24	22.8	0	0	503	15,838	3 fans have all run during drying process
3 8' dry bin unbind auger	1	7.5	1	230	40	85%	7.8	0	0	0	181	1,257	cycles on/off as grain dries - 5,000 bu left in bin	
4 8' dry grain transfer auger	1	7.5	1	230	38	75%	6.6	0	0	0	181	1,054	cycles on/off as grain dries transfers grain to storage bins	
5 Paration fan for 30' drying bin	1	7.5	1	230	40	80%	7.4	0	0	0	250	2,136	runs during fill plus 2 days after - fan as needed	
6 48' bin grain spreader	1	1	1	230	8	75%	1.4	0	0	0	98	98	cycles on/off w/yr unbind during fill	
7 48' bin roof auger	1	2	1	230	12	75%	2.1	0	0	0	68	140	cycles on/off w/yr unbind during fill	
8 8' unbind auger - 48' bin	1	6	1	230	28	80%	6.2	0	0	0	0	0	0	bin is fullways not used during this audit period
9 8' bin operation	1	3	1	230	17	80%	3.1	0	0	0	158	495	runs during fill plus 2 days after - fan as needed	
10 8' bin spreader	1	0.75	1	230	6.9	75%	1.2	0	0	0	32	38	cycles on/off w/yr unbind during fill	
11 8' unbind auger - 36' bin	1	3	1	230	17	80%	3.1	0	0	0	0	0	0	bin is fullways not used during this audit period
12 30' bin operation	1	2	1	230	12	80%	2.2	0	0	0	103	412	runs during fill plus 2 days after - fan as needed	
13 8' bin unbind auger - 30' bin	1	2	1	230	12	85%	2.3	0	0	0	25	68	bin capacity 15,000 bu/aud not during this audit period	
14 Grain spreader - 30' bin	1	0.5	1	115	9.8	80%	0.9	0	0	0	48	43	cycles on/off w/yr unbind during fill	
15 24' bin operation/chemical bins	2	1.5	1	230	10	80%	3.7	0	0	0	46	164	runs during fill plus 24 hrs	
16 8' unbind auger - 24' bin/24' chem	2	2	1	230	12	80%	4.4	0	0	0	0	0	0	bin fullways not used during this audit period
17 24' bin grain spreaders	2	0.5	1	115	9.8	80%	1.8	0	0	0	8	12	cycles on/off w/yr unbind during fill	
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	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	0	0	
<b>Total kWh</b>													<b>2190</b>	
Lighting Description	No. Fixtures	Lamps/ Fixture	Lamp Type (HPS, HID, Incand, Fluorescent)	Watts/ Lamp	Watts/ Fixture	KW	Hrs./day	# days	Hrs. used/season	kWh/season	Comments			
1 Yard light used during drying season	1	1	Mini/Top	200	200	0.25	0	20	100	34.5	Control on at night during harvest			
0	0	0												
0	0	0												
0	0	0												
<b>Total kWh</b>											<b>34</b>			
<b>Total Process kWh's</b>											<b>21935</b>			

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## Taking Energy Efficiency "Thru The Farm Gate" 9006 Grant Energy Audit - Proposed System

Date of Audit: 8/31/2016		Account Name & Address: Farmer, Bob		Page 1 of 1										
Type of Audit: Grain Drier Upgrade		Description: Grain audit - drier kWh usage for USDA Grant App - Proposed new drier												
Account No.:		Anytown, USA												
Meter No.:		Rate: \$1/p												
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	230	12	12	80%	2.2	0	0	58	147	Used as seen holding ahead of drier - Bin is filled tractor in
2 30' Drier bin fans	1	10	1	230	230	60	60	80%	9.8	24	1	24	235	Eliminated where drier's fan used for aeration
3 30' holding bin unload auger	1	7.5	1	230	230	40	40	85%	7.8	0	0	150	1,173	cycles on/off as new drier needs 5,000 bu left in bin
4 30' dry grain transfer auger	1	7.5	1	230	230	38	38	75%	6.8	0	0	225	1,475	cycles on/off as grain drier transfers grain to storage bins
5 Transfer bin fan hood/blowers	1	1.8	1	230	230	40	40	80%	7.4	0	0	107	1,229	Runs during fill plus 2 days after - when as needed
6 48' bin grain spreader	1	1	1	230	230	8	8	75%	1.8	0	0	34	131	cycles on/off and/or unload during fill
7 48' bin roof auger	1	2	1	230	230	12	12	75%	2.1	0	0	35	197	cycles on/off and/or unload during fill
8 48' unload auger - 48' bin	1	6	1	230	230	28	28	80%	6.2	0	0	4	0	bin is fullness not used during this audit period
9 30' bin spreader	1	3	1	230	230	17	17	80%	3.1	0	0	107	390	Runs during fill plus 2 days after - when as needed
10 30' bin spreader	1	0.75	1	230	230	6.9	6.9	75%	1.2	0	0	45	64	cycles on/off and/or unload during fill
11 30' bin spreader - 30' bin	1	3	1	230	230	17	17	80%	3.1	0	0	0	0	bin is fullness not used during this audit period
12 30' bin spreader	1	3	1	230	230	12	12	80%	2.2	0	0	103	227	Runs during fill plus 28 hrs after - when as needed
13 30' bin unload auger - 30' bin	1	2	1	230	230	12	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	115	0.8	0.8	80%	0.9	0	0	87	60	cycles on/off and/or unload during fill
15 24' bin spreader (identical to 14)	2	1.5	1	230	230	10	10	80%	3.7	0	0	33	121	runs during fill plus 24 hrs
16 24' bin unload auger - 24' bin (identical to 15)	2	2	1	230	230	12	12	80%	4.4	0	0	0	0	bin fullness not used during this audit period
17 24' bin grain spreaders	2	0.5	1	115	115	0.8	0.8	80%	1.8	0	0	0	18	cycles on/off and/or unload during fill
18 New Grain Drier	1	34.8	1	230	230	200	200	80%	36.8	0	0	269	9,773	to replace 27 bhp blower @ 10bpm
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	0	
0	0	0	0	0	0	0	0	0%	0	0	0	0	0	
<b>Total kWh</b>													<b>15204</b>	
Lighting - Description	No. Fixtures	Lamp/ Fixture	Lamp Type (HPS, HID, Incand, Fluorescent)	Watt/ Lamp	Watt/ 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	34.8	Turned on at night during harvest			
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	0	0	0	0	0	0				
<b>Total kWh</b>											<b>35</b>			
Total kWh											<b>15,238</b>			
Existing kWh/yr											<b>21,935</b>			
New Process kWh/yr											<b>15,238</b>			
New System Savings											<b>6,697</b>			
Ag Rep											<b>30 % Savings</b>			

## Taking Energy Efficiency "Thru The Farm Gate" 9006 Grant Energy Audit - Proposed System Summary

- Existing 21,935kwh \$1,974.00  
(This usage tied to the meter)
- Efficiency w/process improvements  
15,238kwh \$1,371.00 (\$603 savings 30%)
- Other savings, 30+% savings on LP Gas
- Faster harvest, better grain quality, improved profitability, room for expansion
- \$9,370 Grant



## **Taking Energy Efficiency “Thru The Farm Gate” Where do we go from here??**

- Energy Efficiency is one piece of the energy puzzle.
- Payback generally quicker, do first.
- Hasn't been much emphasis in Ag market in the past. There is a lot of potential!!
- Challenges
  - Change way of thinking. (Customers, builders, designers, equipment dealers)
  - Not always the most glamorous. Generally small piece of operation.
  - Would like to be able to offer to more farms and businesses.



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## **Taking Energy Efficiency “Thru The Farm Gate”**

*Thank You!! Have an Energy Efficient Day!!*

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