



ACEEE Forum on Energy Efficiency

November 16, 2005

Taking Energy Efficiency *“Thru The Farm Gate”*

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

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.

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.
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- How do you effectively implement efficiency ideas and use of better equipment to achieve greatest impact???

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

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

Proposal For:

New Construction Efficiency Comparison

Date: August 5, 2005

Project Description: 2,400 hd new finisher

Recommended Energy Efficient Measures:

	Measure	No. Of Units	Estimated installed cost/unit	Total installed cost	Available Incentive per animal/unit	Total Available Incentive per Measure	Total installed cost minus incentive	Total kWh Used	Annual Cost of Operation	Estimated kWh Saved per unit	Total kWh Saved	Annual Dollar Savings
	Std./Existing											
	Lighting											
1	Incand. Fixt. - Rm-Lighting	60	\$ 15.75	\$ 945.00			\$ 945.00	6,570	\$ 591.30			
2	CFL Fixture - Nite Lights	8	\$ 38.20	\$ 305.60	\$ 20.00 /ght	\$ 160.00	\$ 145.60	981	\$ 88.30			
3												
4												
5												
	Ventilation											
1	Pit Fan -	12	\$ 500.00	\$ 6,000.00			\$ 6,000.00	35,962	\$3,236.59			
2	End Wall Fans -	4	\$ 500.00	\$ 2,000.00				11,987	\$1,078.86			
3												
4												
5												
	Recommended											
	Lighting											
1	CFL Fixture - Rm-Lighting	60	\$ 38.20	\$ 2,292.00	\$ 20.00 /ght	\$ 1,200.00	\$ 1,092.00	1,226	\$ 110.38		5343.6	\$ 480.92
2	CFL Fixture - Nite Lights	8	\$ 38.20	\$ 305.60	\$ 20.00 /ght	\$ 160.00	\$ 145.60	981	\$ 88.30		0.0	\$ -
3												
4												
5												
	Ventilation											
1	Pit Fan -	12	\$ 600.00	\$ 7,200.00	\$ 75.00 /fan	\$ 900.00	\$ 6,300.00	27,150	\$2,443.52		8811.9	\$ 793.07
2	End Wall Fans -	4	\$ 600.00	\$ 2,400.00	\$ 75.00 /fan	\$ 300.00	\$ 2,100.00	9,050	\$ 814.51		2937.3	\$ 264.36
3												
4												
5												

Total Standard Project Cost: \$ 9,250.60
Incentive Amount:(If Any) \$ 160.00
Net Standard Project Cost: \$ 7,090.60
Total Annual kWh Usage: 55,501 kWh
Total Annual kWh Cost: \$ 4,995.05

Total Recommended Project Cost: \$ 12,197.60
Incentive Amount:(If Any) \$ 2,560.00
Net Recommended Project Cost: \$ 9,637.60
Total Annual kWh Usage: 38,408 kWh
Total Annual kWh Cost: \$ 3,456.70
Est. kWh Savings:(If Any) 17,093 kWh
Est. Cost Savings:(If Any) \$ 1,538.35


Rec. Project Incremental Cost: \$ 2,547.00
Total Annual kWh Savings: 17,093 kWh
Total Annual Dollar Savings: \$ 1,538.35
 Based on Avg. Elec. Cost of: \$ 0.090 /kWh
Energy Eff. Payback in Years: 1.7

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.

Taking Energy Efficiency "Thru The Farm Gate"

-Existing As Audited-



ALLIANT ENERGY

Account Name & Address : [Redacted]

Date of Audit : 10/17/2005
 Type of Audit : Efficiency/Tax Exemp
 Account No. : 11 11 111 1111 11
 Meter No. : ** *** **

Description : Audit for possible energy efficiencies and tax exemption

Process Description	No. of pcs./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
5" well	1	1.5	1	240			90%	0.8	6.0	365	2190	1,853	water for hog production
Space Heater(gen. room)	1		1	115	3		75%	0.2	9.6	120	1152	253	Keep generator rm. Frm freezing
Edstrom micro-cool	4		1	115		10	100%	0.0	24.0	180	4320	173	Controls sprinklers
Space Heaters(production area)	4		1	115	4.5		55%	1.0			1152	1,115	Heats production area as needed (8hr)
Curtain controller motors	8	0.5	1	115	6		75%	3.5	1.0	365	365	1,284	Runs ventilation curtains
Flex feed delivery augers	4	0.75	1	230	5.8		85%	3.9			465	1,793	1800hd/bldgx775#feed/hd
Ventilation Fans	16		1	240	2		90%	5.9	24.0	351	8424	49,493	Pit Fans
Powerwashers	1	16	1	240			80%	8.5			60	513	wash/disinfect between groups
												Total kWh :	56,476

Lighting - Description	No. Fixtures	No. Lamps/Fixture	Lamp Type (HPS,HID,Incand, Fluorecent)	Watts/Lamp	Watts/Fixture	KW	hrs./day	# days	hrs. used/ season	Total kWh	Comments
Area lights gen. rm	3	1	Inc	100	100	0.3	1	365	365	109.5	
Security Light	1	1	MV	175	175	0.175			4380	766.5	yard light on pole
Production room lights	56	1	Inc	100	100	5.6	2	365	730	4088	Work lights over pens
										Total kWh	4964


** 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.		Total kWh's:	61,440
		Total Cost \$\$ \$	5,627.93



Taking Energy Efficiency "Thru The Farm Gate"


-Possible Efficiency Recommendation-

		Account Name & Address : 											
Date of Audit : 10/17/2005		Description : Audit for possible energy efficiencies and tax exemption											
Type of Audit : Efficiency/Tax Exemp													
Account No. : 11 11 111 1111 11													
Meter No. : ** ** *		Rate : 410											
Process Description	No. of pcs./ 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	6.0	365	2190	1,853	water for hog production
2	Space Heater(gen. room)	1		1	115	3	75%	0.2	9.6	120	1152	253	Keep generator rm. Frm freezing
3	Edstrom micro-cool	4		1	115	10	100%	0.0	24.0	180	4320	173	Controls sprinklers
4	Space Heaters(production area)	4		1	115	4.5	55%	1.0			1152	1,115	Heats production area as needed (8m
5	Curtain controller motors	8	0.5	1	115	6	75%	3.5	1.0	365	365	1,284	Runs ventilation curtains
6	Flex feed delivery augers	4	0.75	1	230	5.8	85%	3.9			465	1,793	1800hd/bldgx775#feed/hd
7	Ventilation Fans	16		1	240	2	90%	5.9	24.0	351	8424	49,493	Pit Fans
8	Powerwashers	1	16	1	240		80%	8.5			60	513	wash/disinfect between groups
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
Total kWh :												56,476	
Lighting - Description	No. Fixtures	No. Lamps/Fixture	Lamp Type (HPS,HID,Incand, Fluorecent)	Watts/ Lamp	Watts/ Fixture	KW	hrs./day	# days	hrs. used/ season	Total kWh	Comments		
1	Area lights gen. rm	3	1	Compact Fl	23	23	0.069	1	365	365	25.185		
2	Security Light	1	1	HPS	100	100	0.1			4380	438	yard light on pole	
3	Production room lights	56	1	Compact Fl	23	23	1.288	2	365	730	940.24	Work lights over pens	
4													
5													
6													
Total kWh										1403			
** 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.										Total kWh's: 57,880			
										Total Cost \$\$ \$ 5,301.78			



Taking Energy Efficiency "Thru The Farm Gate"

-Possible Process & Efficiency Recommendation-

		Account Name & Address : 											
Date of Audit : 10/17/2005		Description : Audit for possible energy efficiencies and tax exemption											
Type of Audit : Efficiency/Tax Exemp													
Account No. : 11 11 111 1111 11													
Meter No. : ** * * * *		Rate : 410											
Process Description	No. of pcs./ 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	6.0	365	2190	1,853	water for hog production
2 Space Heater(gen. room)	1		1	115	3		75%	0.2	9.6	120	1152	253	Keep generator rm. Frm freezing
3 Edstrom micro-cool	4		1	115		10	100%	0.0	24.0	180	4320	173	Controls sprinklers
4 Space Heaters(production area)	4		1	115	4.5		55%	1.0			1152	1,115	Heats production area as needed (8n
5 Curtain controller motors	8	0.5	1	115	6		75%	3.5	1.0	365	365	1,284	Runs ventilation curtains
6 Flex feed delivery augers	4	0.75	1	230	5.8		85%	3.9			465	1,793	1800hd/bldgx775#feed/hd
7 Ventilation Fans	8		1	240	2		90%	2.9	24.0	351	8424	24,746	Pit Fans
8 Powerwashers	1	16	1	240			80%	8.5			60	513	wash/disinfect between groups
9 Ventilation Fans-Controlled	8		1	240	2		90%	2.9	12.0	351	4212	12,373	1/2 Pit 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. Lamps/Fixture	Lamp Type (HPS,HID,Incand, Fluorecent)	Watts/ Lamp	Watts/ Fixture	KW	hrs./day	# days	hrs. used/ season	Total kWh	Comments		
1 Area lights gen. rm	3	1	Compact Fl	23	23	0.069	1	365	365	25.185			
2 Security Light	1	1	HPS	100	100	0.1			4380	438	yard light on pole		
3 Production room lights	56	1	Compact Fl	23	23	1.288	2	365	730	940.24	Work lights over pens		
4													
5													
6													
Total kWh										1403			
** 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.										Total kWh's: 45,506			
										Total Cost \$\$ \$ 4,168.39			




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.

Taking Energy Efficiency "Thru The Farm Gate"

9006 Grant Energy Audit - Existing System

		Account Name & Address : Farmer, Bob										Page 1 of 1		
		Anytown, USA												
Date of Audit : 6/9/2005		Description : Grain audit - dryer kWh usage for USDA Grant App.												
Type of Audit : Grain Dryer Usage														
Account No. :														
Meter No. :		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 during grain fill - Bin is filled w/tractor auger
2 30' Dryer bin fans	3	10	1	230		50		85%	29.3	24	22.5	540	15,836	3 dryer fans all run during drying process
3 6" dryer bin unload auger	1	7.5	1	230		40		85%	7.8	0	0	161	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	161	1,054	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	290	2,136	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	68	94	cycles on/off w/dryer unload during fill
7 48' bin roof auger	1	2	1	230		12		75%	2.1	0	0	68	140	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	158	495	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	32	38	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	190	419	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	48	43	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	45	164	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	6	12	cycles on/off w/dryer unload 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	
Total kWh												21901		
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.										Total Process kWh's = 21,935				



Taking Energy Efficiency "Thru The Farm Gate"

9006 Grant Energy Audit - Proposed System

ALLIANT ENERGY		Account Name & Address : Farmer, Bob										Page 1 of 1		
		Anytown, USA												
Date of Audit : 6/9/2005		Description : Grain audit - dryer kWh usage for USDA Grant App. - Proposed new dryer												
Type of Audit : Grain Dryer Usage														
Account No. :														
Meter No. :		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 au
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/hailed 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			



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.



Taking Energy Efficiency *“Thru The Farm Gate”*

Thank You!! Have an Energy Efficient Day!!