Agricultural Energy Management Plan

Joe Water
Sprinkle R Farms
123 Waterworks Road
Waterville, USA 00000
(123) 456-7890
Rainville County

Primary Enterprise: Row Crops
Acres: 200
Thursday, December 17, 2015

EnSave
Technical Service Provider TSP-B-09-845
65 Millet Street, Suite 105, Richmond, VT 05477
(800) 732-1399

Thursday, December 17, 2015

Joe Water
Sprinkle R Farms
123 Waterworks Road
Waterville, USA 00000

Dear Mr. Water:

Enclosed is your completed Agricultural Energy Management Plan (AgEMP). This plan has been developed in accordance with *Conservation Activity Plan* Code 122 of the U.S. Department of Agriculture's Natural Resources Conservation Service (USDA NRCS).

Before moving forward with any recommendations in your plan, we encourage you to contact your local USDA NRCS and USDA Rural Development offices to ensure your farm is eligible to apply for any funding available through the NRCS Environmental Quality Incentives Program (EQIP) and the USDA Rural Development Rural Energy for America Program (REAP). Your local USDA NRCS representative at the Easton Service Center (410-822-1577) and USDA Rural Development representatives at the Delaware State Offices (302-857-3580) can assist you with the application process for both programs. In the *Resources* section of this plan, we've also included some helpful information and websites that can lead you to local utility and state programs where additional funding might also be available.

On behalf of all of us at EnSave we want to thank you for the opportunity to help you evaluate your farm's energy consumption and energy saving opportunities. This AgEMP will help you determine the best way for you to increase your farm's energy efficiency and profitability. Even if you are not able to implement all of the recommendations immediately, this report will serve as a useful guide for future decisions and improvements.

I will be calling you in a few weeks to discuss the Plan with you, but in the meantime, please feel free to contact us if you have any questions.

Sincerely,

Kyle Booth, CEM, Engineering Team Lead
EnSave, Inc.
Direct (802) 434-1844
Email - kyleb@ensave.com
TSP 14-9794

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SUMMARY

Overview

EnSave conducted an energy data collection at Sprinkle R Farms, Inc. on Monday, October 26, 2015. This report has been developed with the use of FEAT™, a product of EnSave and provides a plan to increase the facility's energy efficiency. This Agricultural Energy Management Plan (AgEMP) covers the primary energy uses identified for this location.

This report is organized into several sections. The first section summarizes the state of the facility and the overall recommendations, followed by an explanation of the current energy use based on 12 months' usage. The report then provides a description of the equipment evaluated and recommendations for increased energy efficiency. CAP 128 requires a discussion of all energy-using equipment on the farm, even if no cost effective recommendations are found. Therefore your report may contain details about systems analyzed that did not result in energy savings opportunities. Finally, this report includes information sheets with more detail about recommended technologies for your farm, as well as links to various internet resources about funding sources and equipment information. Appendix A includes a summary table of all the recommendations made within the report.

An average electricity cost of $0.44 per kWh for existing electricity use and an average cost of $2.84 per gallon of diesel were used in this report; however, if Sprinkle R Farms, Inc.'s actual costs are different from these documented values, the energy cost savings in this report would vary accordingly.

The >50kW general service three phase rate from Local Utility was used for fuel switching cost savings calculations.

We evaluated five center pivot irrigation systems on the farm. These pivots are supplied with water from two pumping plants. The irrigation systems are located on two separate sites.

Existing energy efficient equipment on the farm includes low pressure pivot design and wobbler nozzles on drop tubes. The producer expressed interest in replacing the existing diesel pumping plants with electric pumping plants. These measures were reviewed and those found to be cost effective can be seen in Table S.1.

Recommended equipment or changes in management may be eligible for federal assistance through USDA NRCS and USDA Rural Development, as well as local assistance through your utility company or state government. The first step after deciding to move forward with any recommendations should be to explore these funding opportunities. Links to these resources are provided at the end of this report. For a current listing of eligible measures applicable to this plan, and to determine if any funding assistance is available, please contact your NRCS representative.

Aerial View

Figures AV.1 and AV.2 provide aerial views of the farm.

Figure AV.1. Grannie's Pumping Plant Aerial View

Figure AV.2. Bonura's Pumping Plant Aerial View

Significant Findings

This report focuses on opportunities for Sprinkle R Farms, Inc. to improve its energy efficiency and prioritizes these opportunities based on simple payback period. Payback periods shown in our analysis may be reduced if financial assistance is obtained through USDA, energy utility rebate program, or other sources. The recommendations identified within the report are for pumping plant fuel switching.

Bottom Line: Installation of all the recommended energy efficient equipment identified within this report will result in annual energy cost savings of approximately $8,116. This represents about 56% of the baseline annual energy costs of $14,506.

ENERGY EFFICIENT EQUIPMENT EVALUATION

Summary of Recommendations

Tables S.1, S.2, and S.3 summarize the benefits for all recommended measures. These tables are presented as required by *NRCS Conservation Activity Plan Code 128*. See Appendix A for a detailed listing of all measures recommended. Energy saving equipment lowers usage costs by performing the same or greater work with lower energy inputs. Detailed explanations of energy efficiency equipment are provided later in this report.

Actual site specific cost quotations may affect payback period and eligibility for the *NRCS EQIP Program*.

Table S.1. Summary of Energy Improvements

	Estimated Reduction in Energy Use			Estimated Costs, Savings, Payback, and Prioritization for Implementation		
Measure	**Electricity Savings (kWh) (Increase)**	**Diesel Fuel Savings (gal)**	**Energy Savings (MMBtu)**	**Energy Cost Savings [b]**	**Implementation Cost [a]**	**Est. Payback in Years [a]/[b]**
Grannie's Pumping Plant Fuel Switch	(20,576)	2,990	345	$5,654	$23,100	4.1
Bonura's Pumping Plant Fuel Switch	(13,415)	1,634	181	$2,462	$31,800	12.9
Totals	**(33,991)**	**4,624**	**527**	**$8,116**	**$54,900**	**6.8**

Note:

1. Estimated useful life for equipment can be seen in each respective section in the report and in the appendix.
2. Totals in the report are rounded after summations. Accuracy of the individual items is calculated to four decimal places and then rounded to the significant digits shown.
3. The proposed fuel switching measures will increase electricity use by approximately 33,991 kWh, but diesel use for these pumping plants will be eliminated.

Table S.2. Overall Energy Savings of Recommendations

Resource Type	Current Use	Current Use (MMBtu)	Savings (Increase)	Savings (MMBtu) (Increase)	Savings (%)
Purchased Electricity (kWh)	3,110	11	(33,991)	(116)	N/A
Diesel (gal)	4,624	643	4,624	643	100.0%
Totals	**N/A**	**653**	**N/A**	**527**	**80.6 %**

Table S.3. Estimated Annual Reduction of Pollutants

		Greenhouse Gas (Estimated Values)			Air Pollutant Co-Benefits (Estimated Values)	
Measure	**Energy Savings (MMBtu)**	**CO_2 (lbs)**	**N_2O (lbs)**	**CH_4 (lbs)**	**SO_2 (lbs) (Increase)**	**NO_x (lbs)**
Grannie's Pumping Plant Fuel Switch	345	42,283.7	1.2	8.2	(28.3)	39.1
Bonura's Pumping Plant Fuel Switch	181	20,510.2	0.6	4.4	(18.6)	19.8
Totals	**527**	**62,793.9**	**1.8**	**12.5**	**(46.9)**	**58.9**

Note:

1. Environmental Benefits are reduction estimates, values are as per http://cometfarm.nrel.colostate.edu/

The measures recommended in this report are based on energy savings analysis, related energy cost savings, and the estimated cost to implement. Simple payback periods (in years) are shown in the respective measure tables.

Simple payback period is equal to the estimated cost to implement ($) divided by the estimated annual cost of energy saved ($/year) and is expressed in number of years. This method does not account for more complex financial considerations such as loan interest and fees, tax rates, depreciation or any other potential cost impacts. When the payback period is less than or equal to the expected useful life (EUL) of the measure (in years), the measure is recommended. Estimated cost to implement an energy saving measure is based on market research; actual costs to your location may vary. The simple payback period can be re-calculated as needed to account for quoted project costs and/or financial assistance.

For the purposes of this report, the following terms are defined as:

- *Recommended* – a measure is recommended for implementation when the estimated energy savings over the expected useful life of the measure exceeds the estimated cost to install the measure.
- *Not recommended* – a measure is not recommended for implementation when the estimated energy cost savings over the expected useful life of the measure is less than the estimated cost to install the measure.
- *Expected Useful Life (EUL)* – the number of years that a measure is expected to remain in service. These values are taken from industry accepted standards such as the Database for Energy Efficient Resources, Technical Reference Manuals and other similar resources. The EUL of most energy efficiency measures ranges from 10 to 20 years.

There may be other factors to consider when making decisions to implement measures recommended or considered in this report. These may include aspects such as operational performance, through-put, operation and maintenance costs, labor costs, livestock productivity, etc. These considerations are beyond the scope of this energy plan. Any new equipment should be properly reviewed for site-specific needs, concerns and applicability.

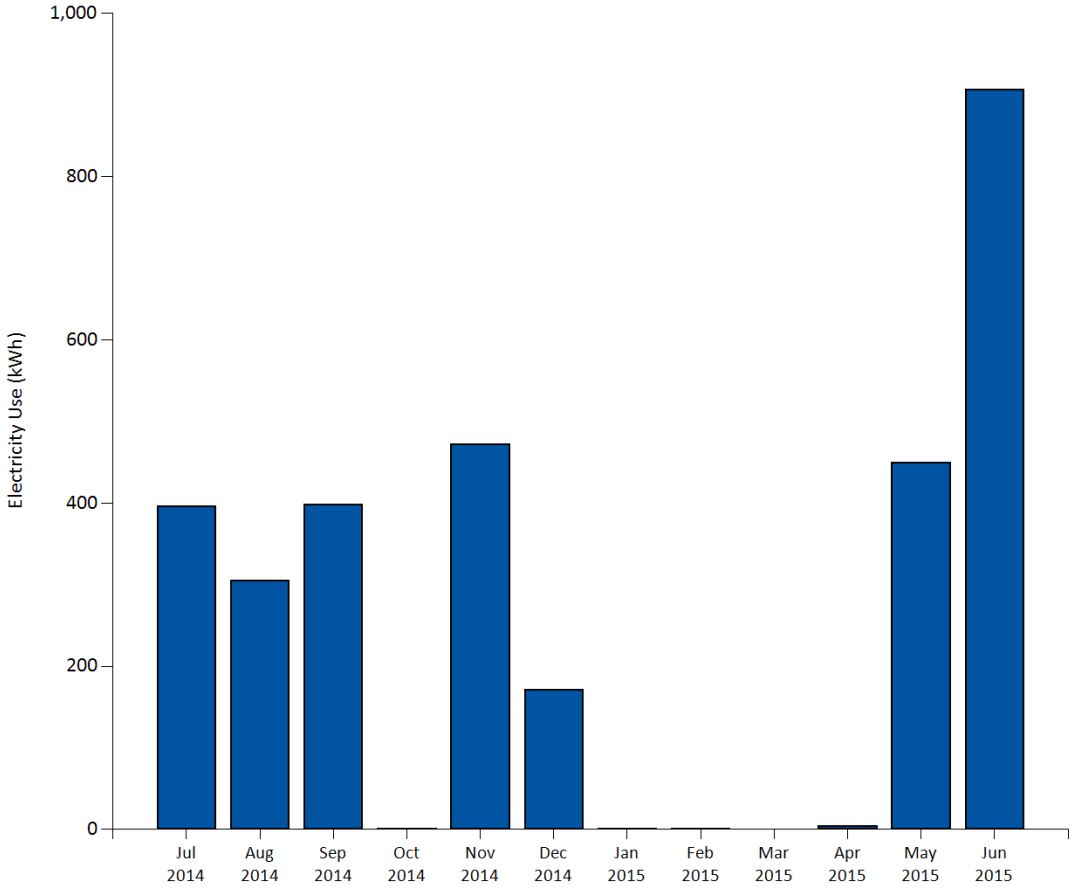
Information on operational schedules and run times is based on input from the producer. Note that savings calculations are based upon on-farm conditions at the time of the site visit. Changes to farm equipment or operation following the time of the site visit are not reflected in this report.

Current vs. Projected Electricity Use

From July 2014 through June 2015, Sprinkle R Farms, Inc. used approximately 3,110 kilowatt-hours (kWh) of electricity. The total cost of electricity was $1,374. Electricity is used solely for pivot locomotion and booster pump motors. The proposed fuel switching measures will increase electricity use by approximately 33,991 kWh.

Peak months correspond with increased irrigation. The actual monthly electricity use is depicted in Figure EU.1.

Figure EU.1. Twelve Month Electricity Use

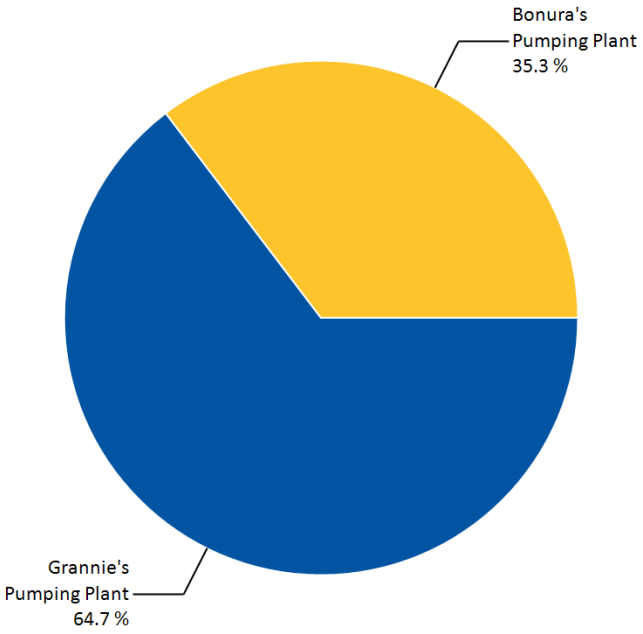


Current vs. Projected Diesel Fuel Use

From July 2014 through June 2015, Sprinkle R Farms, Inc. used approximately 4,624 gallons of diesel fuel. The total cost of diesel fuel was $13,132. Diesel was provided as a lump sum for the year with an estimate for the amount used specifically in the two diesel pumping plants evaluated. A monthly delivery chart is not applicable. The proposed fuel switching measures will eliminate diesel use associated with Grannie's and Bonura's pumping plants.

The diesel fuel use breakdown by measure is depicted in Figure DU.1.

Figure DU.1. Diesel Use Breakdown



Irrigation Pumping Plant

The farm is equipped with two diesel pumping plants that power five center pivot delivery systems. The irrigation systems irrigate a total of 200 acres. Table IR.1 provides details of the fields and crops grown.

Table IR.1. Irrigated Fields

Location / Area Description	Crops Irrigated	Acres Irrigated
Shop Field	Grass	40
Grannies Field	Peanuts	40
North of Barns Field	Peanuts	40
Webber's Field	Grass	40
Bonura Field	Millet	40

Each field is equipped with its own pivot, and only one pivot can run per pumping plant at one time. Grannie's Pumping Plant supplies the pivots at Grannie's Field, Shop Field, and North of Barns Field. Bonura's Pumping Plant supplies water to Bonura Field and Webber's Field.

The irrigation pumping stations at this site were evaluated according to methods included in the Nebraska Pumping Plant Performance Criteria (NPPPC). This evaluation includes calculations based on site-specific information provided by the producer. The steps include determining the following values:

- Total Dynamic Head (TDH), considers all head and pressure values for each system
- Water Horsepower (WHP), a measure of power applied to the water by the pump and motor/engine
- Energy Performance (EP), the energy applied to the water per unit of input energy
- Energy Performance Rating (EPR), the ratio of the Energy Performance for the system as compared to the NPPPC standard which includes standard efficiency assumptions for pumps, engines and motors
- Relative to this site, these standards assume 31% efficiency for diesel engines, 88% efficiency for electric motors, and 75% efficiency for pumps
- Water Performance Rating (WPR), the ratio of the hourly energy rate use divided by the volume of water pumped per hour

Table IR.2 provides details of the current irrigation pumping plants.

Table IR.2. Engine Fuel Irrigation Inventory

Equipment Description	Pump Manufacturer	Pump Model	Pump Type	Motor Manufacturer	Motor Model	Motor HP	RPM Rating	Resource Type	Water Source	Pump Set Depth (ft)	Static Water Depth (ft)	Well / Inlet Diameter (in)
Grannies Pumping Plant	Goulds	8DHHO 15	Turbine	John Deere	6359DF	88	1,800	Diesel (gal)	Well	90	45	8
Bonura Pumping Plant	Goulds	10RJMO	Turbine	John Deere	6059DF001	88	1,650	Diesel (gal)	Well	90	45	10

Pumps tests were performed on both pumping plants using an ultrasonic flowmeter. Table IR.3 summarizes the pump performance.

Table IR.3. Pumping Plant Performance

Pumping Plant Name/Location	Grannie's Pumping Plant (Barn & Grannie's Pivots)	Grannie's Pumping Plant (Shop Pivot)	Bonura's Pumping Plant
Irrigation Type	Pivot	Pivot	Pivot
Pump Type	Turbine	Turbine	Turbine
Power Source (fuel type)	Diesel	Diesel	Diesel
Rated Flow (gpm)	700	700	700
Tested Flow (gpm)	702	729	710
Rated Pump Discharge Pressure (psi)	45	45	45
Tested Pump Discharge Pressure (psi)	42	42	42
Static Water Depth (ft)	45	45	45
Pump Set Depth (ft)	90	90	90
Mainline Diameter (in)	8	8	10
Total Dynamic Head (ft)	170	160	165
Pump Efficiency	70%	68%	79%
Water Horsepower (whp)	30.2	29.4	29.5
Rated Engine HP	88	88	88
Irrigated Acres	80	40	80
Estimated Annual Run Hours	430	220	430
Energy Use (gal)	1,978	1,012	1,634
Estimated Water Application (gal)	18,111,600	9,622,800	18,318,000
Estimated Water Application (ac*in/ac)	8.34	8.86	8.43
Energy Performance (whp-hr/gal)	11.67	11.33	13.17
Water Performance Rating (gal/ac-in)	1.67	1.61	1.43

Notes:

1. The pump curves for both pumping plants are attached to the end of the report.
2. Grannie's Pumping plant has similar operating conditions for the Barn Pivot and Grannie's Pivot. The Shop Pivot was sufficiently different and is shown as a separate performance evaluation.

The producer stated interest in converting the diesel pumping plants to electric. We recommend replacing the existing diesel pumping plants with electric pumping plants. Savings calculations assume a minimum pump efficiency of 75% and a minimum motor efficiency of 94%. Based on water horsepower calculations, it is estimated that a 60 hp electric motor will be sufficient for both pumping plants.

Estimated implementation cost includes cost to install electricity, a 60 hp NEMA Premium Efficiency motor, a new pump, and labor to install the equipment.

Local Utility's three phase general service rate schedule (>50 kW) was used for the fuel switching cost evaluation. The rate schedule includes a $50 per month service charge, $0.092 per kWh energy charge, and $6.16 per kW demand charge.

Figure IR.4 provides a comparison of the existing and projected energy use of the irrigation system.

Figure IR.4. Comparison of Existing and Projected Energy Use

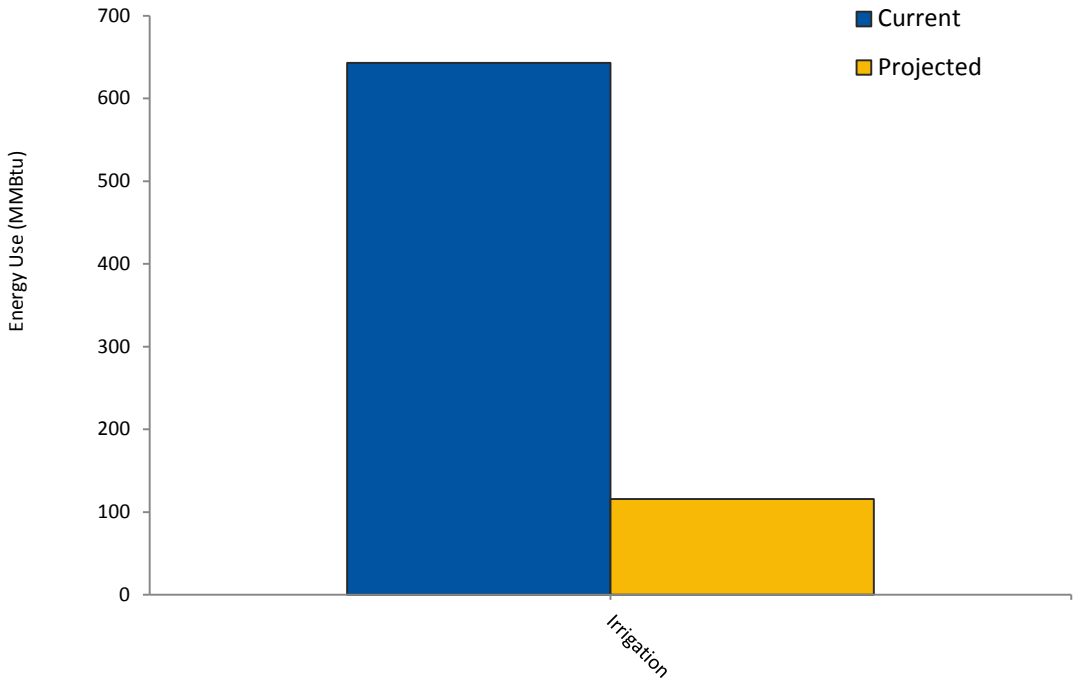


Table IR.5 provides economic details of the fuel switching recommendation.

Table IR.5. Irrigation: Recommended Energy Saving Equipment

Equipment Description	Current Equipment	Recommended Equipment	# to Install	Est. Annual Electricity Savings (kWh) (Increase)	Est. Annual Diesel Savings (gal)	Est. Annual Cost Savings ($)	Est. Implementation Cost ($)	Est. Payback (Years)	EUL (Years)
Grannie's Pumping Plant	John Deere 6059DF001	60 HP electric pumping plant with minimum motor efficiency of 94%	1	(20,576)	2,990	$5,654	$23,100	4.1	15
Bonura's Pumping Plant	John Deere 6359DF	60 HP electric pumping plant with minimum motor efficiency of 94%	1	(13,415)	1,634	$2,462	$31,800	12.9	15
Totals				**(33,991)**	**4,624**	**$8,116**	**$54,900**	**6.8**	

Irrigation Delivery System

Table DS.1 provides details of the center pivot delivery systems.

Table DS.1. Pivot Inventory

Equipment Description	Manufacturer	Total Length (ft)	# Towers	Movement	Pressure (psig)
Shop Pivot	Valley Irrigation	638	4	Electric	42
Grannies Pivot	Valley Irrigation	638	4	Electric	26
North of Barns Pivot	Valley Irrigation	638	4	Electric	26
Webber's Pivot	Valley Irrigation	638	4	Electric	31
Bonura Pivot	Valley Irrigation	638	4	Electric	31

Table DS.2 provides details of the pivot nozzles. The nozzles are fairly new and in good condition.

Table DS.2. Pivot Nozzle Inventory

Equipment Description	Pivot	Manufacturer	Model	Type	Regulator Pressure (psig)	Location
Pivot Nozzles	Shop Pivot	Senninger	IWob UP3	Wobbler	15	Drop Tube
Pivot Nozzles	Grannies Pivot	Senninger	IWob UP3	Wobbler	15	Drop Tube
Pivot Nozzles	North of Barns Pivot	Senninger	IWob UP3	Wobbler	15	Drop Tube
Pivot Nozzles	Webber's Pivot	Senninger	IWob UP3	Wobbler	15	Drop Tube
Pivot Nozzles	Bonura Pivot	Senninger	IWob UP3	Wobbler	15	Drop Tube

The farm is currently operating a low pressure pivot delivery system with drop tube wobbler nozzles, and the existing delivery system is considered energy efficient. There are no recommendations to improve the energy efficiency of the delivery system. Drop tube wobbler sprinklers are also some of the most water efficient sprinkler setups available for center pivot systems.

It was noted during the site visit that there were water leaks on Grannie's Pivot. These leaks should be fixed to minimize water and energy use.

Each pivot is equipped with an end gun, and each end gun has a booster pump. Table DS.3 provides details of the end guns.

Table DS.3. Pivot End Gun Inventory

Equipment Description	Pivot	Booster Size (hp)	Pressure (psig)	Radius (ft)
Booster Pump	Shop Pivot	5	80	108
Booster Pump	Grannies Pivot	5	80	108
Booster Pump	North of Barns Pivot	5	80	108
Booster Pump	Webber's Pivot	5	80	108
Booster Pump	Bonura Pivot	5	80	108

Other Motors and Pumps

The pivots are powered by electric motors, and the booster pumps use electric motors. Due to low energy use, there are no recommendations to increase the energy efficiency of these motors. These motors may operate every day, yet there are three reasons it is not justifiable to replace these motors based on energy savings:

- They do not operate a sufficient number of hours annually to justify replacement. Typically a motor needs to run a minimum of 2,000 hours annually to justify replacement.
- Most of these motors are small, 0.6 hp or 1.2 hp, and do not consume enough energy to justify replacement.
- Some motors run at very low speeds. A slower moving motor uses less electricity than a higher speed motor and does not consume enough energy to justify replacement.

We generally recommend purchasing motors that meet the National Electrical Manufacturers Association (NEMA) Premium® standard. For more information on NEMA Premium®, see http://www.nema.org/Policy/Energy/Efficiency/Pages/NEMA-Premium-Motors.aspx.

Material Handling

There are no activities or equipment at this site applicable to this section.

Crop and Feed Storage

There are no activities or equipment at this site applicable to this section.

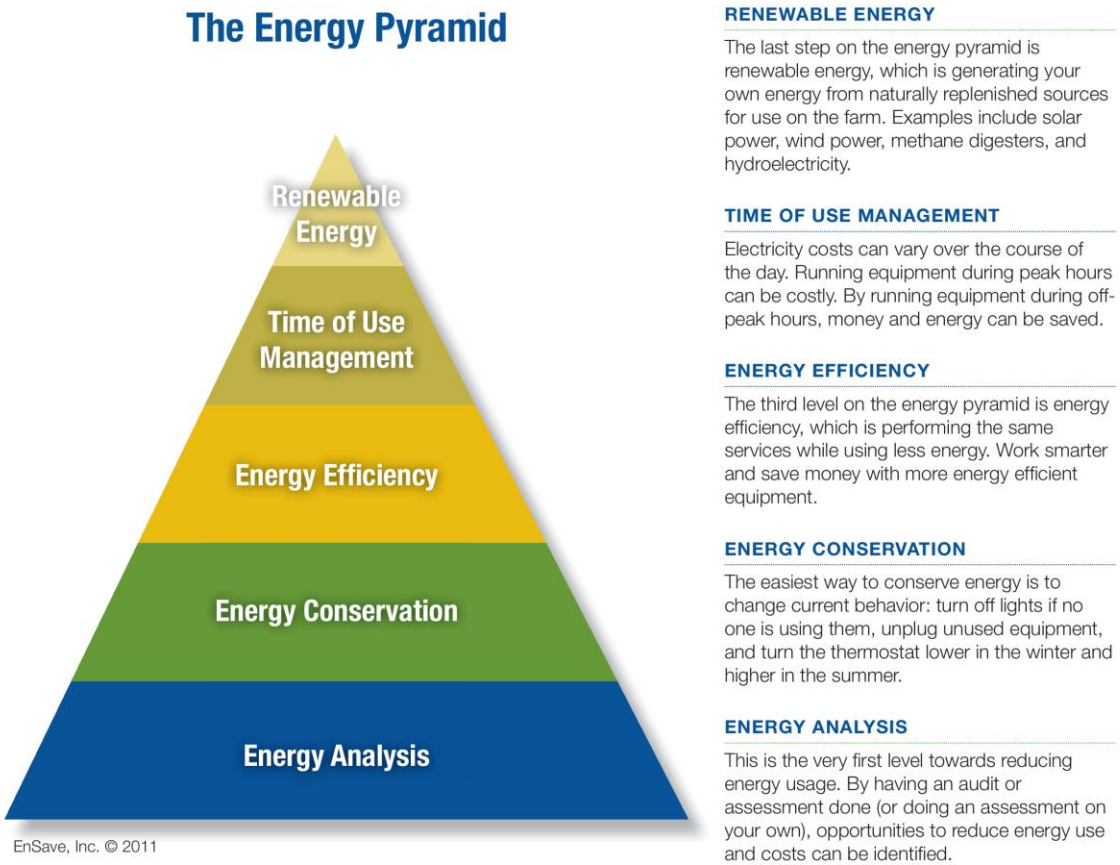
Low Cost Energy Saving Tips

Some energy savings potential requires minimal investment other than labor. Examples include regular pumping plant maintenance, repairing leaks on delivery systems, and replacing worn nozzles.

ENERGY PYRAMID

EnSave uses an energy pyramid as a model to outline the steps necessary for reducing energy usage. Figure EP.1 shows the energy pyramid.

Figure EP.1. Energy Pyramid



The energy pyramid is a concept used to help guide farmers toward energy independence. The energy pyramid has been proven to be very effective, and it serves as a road map to show where a farm is on their way to energy independence.

Sprinkle R Farms, Inc. has done a great job with energy analysis and conservation. The next step for the farm would be to implement the energy efficiency measures recommended in this report.

STATEMENTS AND DISCLAIMERS

Disclaimer

The intent of this energy evaluation is to estimate energy savings associated with recommended energy conservation measures at Sprinkle R Farms, Inc.. This report is not intended to serve as a detailed engineering design document. Detailed design efforts may be required to implement several of the improvements evaluated as part of this Plan. As appropriate, costs for those design efforts are included as part of the cost estimate for each measure.

Energy savings and equipment costs presented in this document are estimates and are based upon information gathered during the process of developing this energy plan. Actual savings and costs may vary from estimates due to a variety of factors including changes in energy usage and energy costs, equipment costs, product availability, and geographic location.

As a result, EnSave, Inc. is not liable if projected energy or cost savings are not actually achieved. All savings and cost estimates in the report are for informational purposes and are not to be construed as a design document or as guarantees. Sprinkle R Farms, Inc. shall independently evaluate any advice or direction provided in this report. In no event will EnSave, Inc. be liable for the failure of the customer to achieve a specified amount of energy savings, the operation of the customer's facilities, or any incidental or consequential damages of any kind in connection with this report or the installation of recommended measures.

Statement of Vendor Neutrality

EnSave's goal is to help our clients save energy and conserve natural resources. EnSave does not represent any equipment manufacturer or dealer. Any quotes or manufacturer literature included in this report are intended as illustrations only.

The presence or absence of any trade or company names in this report should not be interpreted as any reflection on the quality of the company or its products.

RESOURCES

The following resource provides additional information on energy efficient electric motors.

1. *NEMA Premium® Motors*, published by EnSave, Inc.

INTERNET RESOURCES

The following resources provide additional information on ways to save energy at your facility.

1. Florida Department of Agriculture and Consumer Services, Office of Agricultural Water Policy. Best Management Practice Rules, Manuals, and other documents, http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy/Enroll-in-BMPs/BMP-Rules-Manuals-and-Other-Documents

2. University of Florida IFAS Extension. Smart Irrigation Controller Series, http://edis.ifas.ufl.edu/topic_series_smart_irrigation_controllers

3. Department of Agricultural and Biological Engineering, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. 2012. Agricultural Management Options for Climate Variability and Change: High-Residue Cover Crops, http://edis.ifas.ufl.edu/pdffiles/AE/AE48800.pdf

4. FL NRCS Environmental Quality Incentives Program, http://www.nrcs.usda.gov/wps/portal/nrcs/main/fl/programs/financial/eqip/

5. Congressional Research Service. Irrigation in U.S. Agriculture: On-Farm Technologies and Best Management Practices, http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R44158.pdf

6. USDA Farm Service Agency, http://www.fsa.usda.gov

7. Database of State Incentives for Renewables & Efficiency (DSIRE), http://www.dsireusa.org/

8. USDA RD Rural Energy for America Program (REAP) Information, http://www.rurdev.usda.gov/Energy.html

9. Irrigation Training and Research Center, http://www.itrc.org/

Appendix A: Detail Listing of Estimated Annual Energy Efficiency Improvements

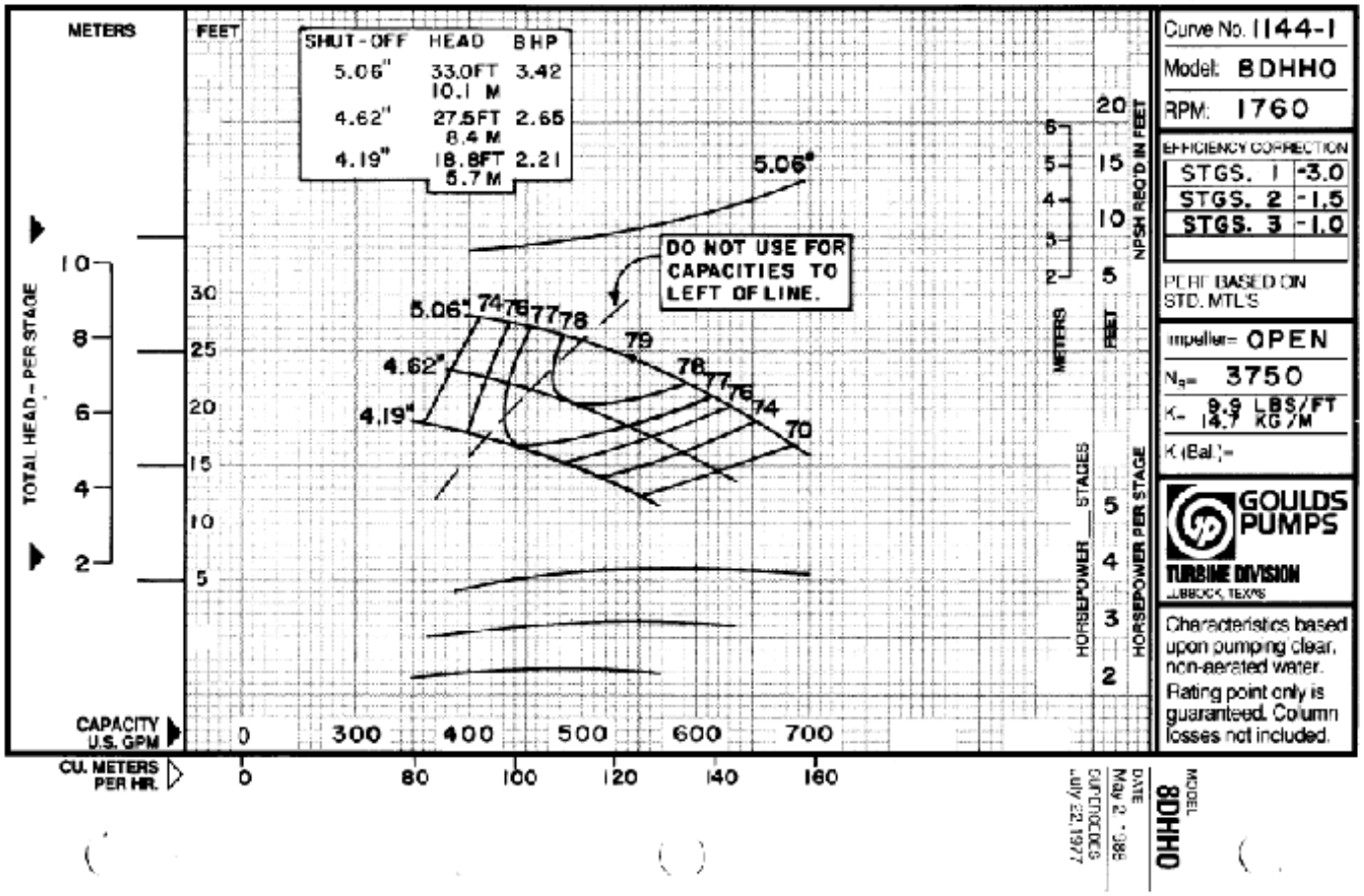
Table A.1 provides a detailed listing of all recommended measures. This is provided for NRCS purposes as needed. Note that for some measures the quantity is in the "# to Install" column and for others it is included in the description of the "Recommended Equipment".

Table A.1. Detail Listing of Estimated Annual Energy Efficiency Improvements

											Environmental Benefits				
				Estimated Reduction in Energy Use			Estimated Costs, Savings, Payback, and Prioritization for Implementation				Greenhouse Gas (Estimated Values)			Air Pollutant Co-Benefits (Estimated Values)	
Location / Equipment Description	Current Item	Recommended Item	# to Install	Est. Annual Electricity Savings (kWh) (Increase)	Est. Annual Diesel Savings (gal)	Energy Savings (MMBtu)	Implementation Cost [a]	Energy Cost Savings [b]	Est. Payback in Years [a]/[b]	Expected Useful Life (Years)	CO_2 (lbs)	N_2O (lbs)	CH_4 (lbs)	SO_2 (lbs) (Increase)	NO_x (lbs)
Grannie's Pumping Plant	John Deere 6059DF001	60 HP electric pumping plant with minimum motor efficiency of 94%	1	(20,576)	2,990	345	$23,100	$5,654	4.1	15	42,283.7	1.2	8.2	(28.3)	39.1
Bonura's Pumping Plant	John Deere 6359DF	60 HP electric pumping plant with minimum motor efficiency of 94%	1	(13,415)	1,634	181	$31,800	$2,462	12.9	15	20,510.2	0.6	4.4	(18.6)	19.8
Totals				**(33,991)**	**4,624**	**526**	**$54,900**	**$8,116**	**6.8**	**N/A**	**62,793.9**	**1.8**	**12.6**	**(46.9)**	**58.9**

Appendix B: Attachments

Grannie's Pumping Plant Pump Curve



Bonura's Pumping Plant Pump Curve