Appendix 5

Wind Farm Building Energy Survey

Wind Farm Building Energy Survey

Customer: Pacific Power Wind Farm Operations
Project: Production Efficiency Energy Savings Potential Study
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Site Location: Wyoming, Washington, Oregon
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1. Overview

This report provides an estimate of energy savings potential for the facilities at twelve wind farms operated by PacifiCorp. The survey was conducted as part of the 2024-2025 Biennial Conservation planning process.

The purpose of the survey is to gather information sufficient to identify opportunities to reduce facility energy use. The buildings are typically small offices, shop space, and storage buildings located near groups of wind turbines in Wyoming, Washington, and Oregon. Occupancy is low and intermittent. The primary activities are servicing wind turbines, collecting data, and managing communication equipment. Square footage ranges from approximately 2,500 sf to 8,000 sf (with the exception of a single 20,000 sf unheated storage building). Aerial images of two typical sites are given in Appendix 1.

There are a total of 28 buildings, of which 15 are used for storage with very little occupancy and in some cases no heating or cooling. Of the remaining 13, 6 have LED lighting and 7 use fluorescent lighting. Retrofitting to LED lighting is an opportunity for these. Switching is manual in most cases; changing to occupancy sensing control is an opportunity in 12 instances.

The main building at 7 sites is heated with propane. The balance is electric resistance. All but one building have programmable thermostat control. 11 sites have cooling for the office, again, all but one with programmable thermostats. Water heating is electric in all cases.

2. Savings Potential Estimate

Savings estimates for changing from fluorescent to LED lighting in 6 buildings, together with adding occupancy sensor control to existing or newly retrofitted LED lighting in 19 buildings, are given in Table 1. Methods of estimation are described in section 4.

Table 1. Lighting Savings Estimate

	Wind Farm	LED Savings (kWh)	Sensor Savings (kWh)	Total Savings (kWh)
1)	Glenrock-Rolling Hills	644	5,493	6,136
2)	Seven Mile Hill 1 and 2		4,875	4,875
3)	Dunlap		2,860	2,860
4)	High Plains and McFadden Ridge		3,250	3,250
5)	Foote Creek Rim	283	129	412
6)	Ekola Flats			
7)	TB Flats 1 and 2			
8)	Cedar Springs 2			
9)	Pryor Mountain		6,141	6,141
10)	Marengo 1 and 2	2,059	936	2,995
11)	Leaning Juniper	13,728	6,890	20,618
12)	Goodnoe Hills		2,824	2,824
	Total	**16,714**	**33,398**	**50,111**

kWh savings from upgrades to LED	16,714
kWh savings from occupancy sensors	33,398
	50,111
Washington allocation rate	7.5%
kWh savings allocated to Washington	**3,758**

Savings is low primarily because the majority of the buildings are occupied so little of the time – an hour or two per week. Weekly hours for the more frequently occupied spaces were cited at 20, 40, or 60 hrs/wk. Since most of the lighting is already LED, potential savings from LED retrofits is limited.

The prospect of converting electric resistance heat to heat pump was considered. It must be taken into account that 9 of the 12 sites are in Wyoming, which features long, cold winters with heavy, drifting snow. The COP advantage of a heat pump is compromised at cold temperature. The units would have to be amply sized, equipped with backup resistance heat, and protected from drifting snow. Further study of individual cases may be of value, particularly for the three Washington sites, but a blanket recommendation to install heat pumps is not warranted without a lifecycle study of cost-effectiveness, including maintenance cost.

Savings was estimated for changing from electric resistance water heating to heat pump water heating. The assumptions and calculation method is given below. If all twelve sites were to convert to heat pump water heating, annual savings is estimated at 8,387 kWh. Applying the 7.5% Washington allocation factor, the savings allocated to Washington come to 629 kWh/year.

3. Description of the Process

Information was collected from the site supervisors in the following manner:

- Preliminary data was received from PacifiCorp on the structures at each wind farm.
- A survey was constructed to elicit further detail. A copy for each site was pre-populated with available information initially provided by PacifiCorp.
- Surveys were distributed by the Director of Compliance, Permitting, and Safety to the 8 site supervisors who oversee the 12 wind farms.
- Responses were collected and data was tabulated to calculate potential energy savings opportunities at each site. All survey responses are given as Appendix 2 below.
- Working assumptions were invoked to calculate savings estimates. Details can be found in Section 4.

4. Savings Calculation Method

Fluorescent-to-LED Lighting Upgrades

It was assumed that the buildings with significant occupancy having fluorescent lighting will be converted to LED lighting. It was not assumed that storage buildings with no occupancy or only an hour or two per week would be retrofitted. Baseline Lighting Power Density (LPD) for fluorescent was assumed to be an average of 1.1 watts per sq ft the mix of office and shop space types. It was assumed that LEDs would bring the LPD down by 50%.

Given the weekly hours of operation provided by site supervisors and an assumption of 52 weeks/yr operation, total savings came to 16,714 kWh for retrofitting 6 buildings at 4 sites. Leaning Juniper, in Gilliam County, Oregon, alone accounts for 82% of this savings.

Savings were estimated using the following formula:

kWh savings = building sf x 1.1 watts/sf x annual operating hours x 0.5

Occupancy Sensors

Each building with manual lighting control, not counting storage and outbuildings with no significant occupancy, was assumed to add occupancy sensors to supersede manual switching. It was assumed that this method of control would reduce lighting usage by 50%. This 50% factor was applied to existing LED lighting as well as the 6 buildings with fluorescent lighting, assuming that the conversion to LED lighting has been completed. LPD for all LED lighting was assumed to be half the 1.1 watt/sf fluorescent baseline, so 0.55 watt/sf. Weekly runtime estimates from site supervisors were used together with an assumed 52 weeks/yr to estimate annual hours of operation. The formula is:

Savings = building sf x (1.1 watt/sf x 0.5 to get LPD) x 0.5 savings factor

The 50% savings factor is somewhat larger than the value published by Regional Technical Forum for occupancy types Open Office (15%), Assembly (25%), Industrial (25%), and Storage (50%). We think this assumption is warranted because activity in a wind farm office is not typical of usual open office space, nor are the O&M (shop-type) spaces typical of industrial manufacturing. Much of the activity happens outside at the turbines.

Heat Pump Water Heaters

Heat pumps water heaters (HPWH) can meet water heating needs using approximately one-third of the energy used by electric resistance water heating. As HPWHs are gaining in popularity and becoming more available, we estimated the savings from changing to heat pump water heating at all 12 sites.

It isn't clear how much hot water per day is needed at a site. The assumption 0.4 x 50 gallons was used as a starting point. Heating setpoint was assumed at 115°F, with incoming water temperature assumed to be 50°F as a year-round average. The heat pump was assumed to have an effective COP of 2.75.

Water usage/day	50	gal
Fraction which is hot	0.4	
Hot water usage/day	20	gal
Day/yr	260	
Hot water usage/year	5,200	gal
Temperature rise, F	65	115 F discharge temp - 50 F inlet temp
Specific heat of water	1	Btu/lb deg F
Weight of water	8.34	lbs/gal
Btu put into water	2,818,920	Btu
Electric efficiency	0.8	includes assumed standby heat loss
Electric consumption	1,033	kWh per year per water heater
HPWH effective COP	2.75	
Energy input	300	kWh per year per water heater
Standby loss factor	0.9	
Energy input w/ standby	334	kWh per year per water heater
Energy savings	699	kWh per year per heater
Total for all 12 sites	8,387	kWh savings if all 12 sites change from electric resistance to heat pump water heater
WA Allocation factor	0.075	
WA annual savings	629	kWh savings allocated to Washington if all 12 sites convert to HPWH

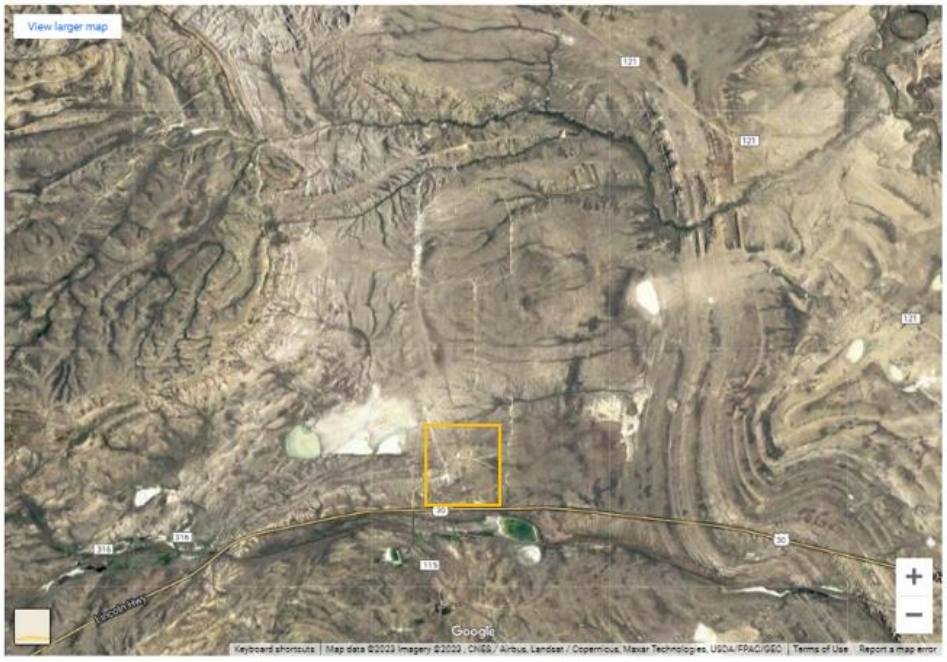
If all 12 sites were to convert to HPWH, annual kWh savings is estimated at 8,387 kWh. Applying the WA allocation factor of 7.5%, savings allocated to Washington would be 629 kWh.

5. Summary and General Recommendations

In general, opportunities for savings energy at wind farm facilities are rather limited due to their characteristic small buildings with light occupancy, already using LEDs. We conclude with some specific recommendations, followed by more general recommendations, savings for which can only be estimated with detailed specific information about individual cases.

- Replace fluorescent lighting with LED in all buildings having significant occupancy. In particular, prioritize Leaning Juniper, since it has most of the savings potential.
- Replace manual switching with occupancy sensor controls for interior lighting.
- One site, Marengo, does not have a programmable thermostat for heating. Look into this.
- Seal any cracks or gaps, especially around doors where seal material has deteriorated. Wind-driven infiltration is a very significant heating and cooling load.
- Consider adding insulation where feasible.
- Shade metal buildings with vegetation to reduce cooling load.
- Make sure air compressors are switched off during non-business hours so they do not feed leaks all night. A programmable timer can be added to the circuit for this purpose.
- If exterior lighting is switched by photocell, but continues to operate all night even though not needed, consider adding a timer along with the photocell.
- Consider trying out a heat pump water heater at a site with the largest hot water usage.

Appendix 1. Aerial View of Typical Sites



Seven Mile Hill near Hanna, WY

Marengo 1 and 2 near Dayton, WA

Appendix 2. Survey Responses

Survey responses are included below:

Wind Farm O&M Buildings Survey

Name of Wind Farm: Glenrock/Rolling Hills

Site Contact: Casey Collins

Please complete this survey only for those buildings that are normally occupied and lit

	O&M Shop/Office	Hi Bay Shop	Mine Shop/Office	Mine Well Pump House
Building Type:	*O&M Shop/Office*	*O&M Shop/Office*	*Storage Building*	*Other*
BASE LOADS				
Building square footage	5,000	20,000	3,500	2,500
Type of interior lighting	*LED*	*LED*	*(Select from list)*	*(Select from list)*
Interior lighting control type	*Manual*	*Manual*	*(Select from list)*	*(Select from list)*
How many emergency lights are always on?	0	0		
Total hours of lighting operation per week	60	5		
Is building heated?	☑ Yes ☐ No	☐ Yes ☑ No	☑ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Electric Resistance*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*Photocell*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of wall insulation	Unknown	Unknown		
Is ceiling or roof insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation	Unknown	Unknown		
How well are the doors sealed?	*Well Sealed*	*Quite Leaky*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☑ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*Reciprocating Piston*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				
FREE RESPONSE				
Is there anything else you'd like to share related to the building's energy usage or savings potential?				

Wind Farm O&M Buildings Survey

Name of Wind Farm: Seven Mile Hill

Site Contact: Todd Looney

Please complete this survey only for those buildings that are normally occupied and lit

	O&M Building	Storage Building	Building 3	Building 4
Building Type:	*O&M Shop/Office*	*Storage Building*	*(Select from list)*	*(Select from list)*
BASE LOADS				
Building square footage	6,250	600		
Type of interior lighting	*LED*	*LED*	*(Select from list)*	*(Select from list)*
Interior lighting control type	*Manual*	*Manual*	*(Select from list)*	*(Select from list)*
How many emergency lights are always on?				
Total hours of lighting operation per week				
Is building heated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Electric Resistance*	*Electric Resistance*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☐ Regular ☑ Programmable	☑ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*LED*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*Timer*	*Manual*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of wall insulation				
Is ceiling or roof insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation				
How well are the doors sealed?	*Well Sealed*	*Well Sealed*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*Reciprocating Piston*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				
FREE RESPONSE				
Is there anything else you'd like to share related to the building's energy usage or savings potential?	Need occupancy sensors.			

Wind Farm O&M Buildings Survey

Name of Wind Farm: Dunlap

Site Contact: Aron Anderson

Please complete this survey only for those buildings that are normally occupied and lit

	O&M Building	Building 2	Building 3	Building 4
Building Type:	*O&M Shop/Office*	*(Select from list)*	*(Select from list)*	*(Select from list)*
BASE LOADS				
Building square footage	5,500			
Type of interior lighting	*LED*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Interior lighting control type	*Manual*	*(Select from list)*	*(Select from list)*	*(Select from list)*
How many emergency lights are always on?	0			
Total hours of lighting operation per week	40			
Is building heated?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Propane*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*Timer*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Electric Resistance*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☑ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of wall insulation	R-19			
Is ceiling or roof insulated?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation	R-19			
How well are the doors sealed?	*Well Sealed*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☑ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*Reciprocating Piston*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				

FREE RESPONSE	
Is there anything else you'd like to share related to the building's energy usage or savings potential?	Well house is roughly 6'x6', heat set to 40 F, air tight. Shop heaters are always set on 50F. New walk door seals installed 2022, LED lights throughout office.

Wind Farm O&M Buildings Survey

Name of Wind Farm: High Plains/McFadden Ranch

Site Contact: Aron Anderson

Please complete this survey only for those buildings that are normally occupied and lit

	O&M Building	Storage Building	Building 3	Building 4
Building Type:	*O&M Shop/Office*	*Storage Building*	*(Select from list)*	*(Select from list)*
BASE LOADS				
Building square footage	*6,250*	1,200		
Type of interior lighting	*LED*	*LED*	*(Select from list)*	*(Select from list)*
Interior lighting control type	*Manual*	*Manual*	*(Select from list)*	*(Select from list)*
How many emergency lights are always on?	0	0		
Total hours of lighting operation per week	40	1		
Is building heated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Electric Resistance*	*Electric Resistance*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☐ Regular ☑ Programmable	☑ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*Timer*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of wall insulation				
Is ceiling or roof insulated?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation				
How well are the doors sealed?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☑ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*Reciprocating Piston*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				
FREE RESPONSE				
Is there anything else you'd like to share related to the building's energy usage or savings potential?				

Wind Farm O&M Buildings Survey

Name of Wind Farm: Foote Creek Rim

Site Contact: Aron Anderson

Please complete this survey only for those buildings that are normally occupied and lit

	O&M Building	O&M Storage	Building 3	Building 4
Building Type:	*O&M Shop/Office*	*Storage Building*	*(Select from list)*	*(Select from list)*
BASE LOADS				
Building square footage	*11,250*	2400		
Type of interior lighting	*LED & Fluorescent*	*Fluorescent*	*(Select from list)*	*(Select from list)*
Interior lighting control type	*Manual*	*Manual*	*(Select from list)*	*(Select from list)*
How many emergency lights are always on?	0	0		
Total hours of lighting operation per week	15	1		
Is building heated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Propane*	*Propane*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☐ Regular ☑ Programmable	☑ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*Timer*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of wall insulation				
Is ceiling or roof insulated?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation				
How well are the doors sealed?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☑ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*Reciprocating Piston*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				

FREE RESPONSE

Is there anything else you'd like to share related to the building's energy usage or savings potential?

Wind Farm O&M Buildings Survey

Name of Wind Farm: Ekola Flats

Site Contact: Todd Looney

Please complete this survey only for those buildings that are normally occupied and lit

	O&M Building	Oil Containment	Building 3	Building 4
Building Type:	*O&M Shop/Office*	*Other*	*(Select from list)*	*(Select from list)*
BASE LOADS				
Building square footage	*7,760*	450		
Type of interior lighting	*LED*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Interior lighting control type	*Occupancy Sensor*	*(Select from list)*	*(Select from list)*	*(Select from list)*
How many emergency lights are always on?				
Is building heated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Gas*	*Electric Resistance*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☐ Regular ☑ Programmable	☑ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*LED*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*Motion Sensor*	*Motion Sensor*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of wall insulation				
Is ceiling or roof insulated?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation				
How well are the doors sealed?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☑ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*Reciprocating Piston*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				

FREE RESPONSE	
Is there anything else you'd like to share related to the building's energy usage or savings potential?	Occupancy sensors are the way to go. The amount of time lights are left on when you are out of the office but not for the day. You also don't have the chance pf leaving them on. The sensors need to be in all rooms including restrooms.

Wind Farm O&M Buildings Survey

Name of Wind Farm: TB Flats 1 and 2

Site Contact: Jesse Solas

Please complete this survey only for those buildings that are normally occupied and lit

	O&M Building	Containment Building	Auxillary Building	Substation Control
Building Type:	*O&M Shop/Office*	*Storage Building*	*O&M Shop/Office*	*Substation Control*
BASE LOADS				
Building square footage	*5,000*	3,500	2,500	1,750
Type of interior lighting	*LED*	*LED*	*LED*	*LED*
Interior lighting control type	*Occupancy Sensor*	*Manual*	*Manual*	*Manual*
How many emergency lights are always on?	14	0	0	0
Total hours of lighting operation per week				
Is building heated?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
What type of heat?	*Propane*	*Electric Resistance*	*Electric Resistance*	*Electric Resistance*
What type of heat thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☑ No	☑ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*LED*	*(Select from list)*	*LED*
Exterior lighting control type	*Photocell*	*Photocell*	*Manual*	*Photocell*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☐ Yes ☐ No	☐ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No
R value of wall insulation			Spray foam	
Is ceiling or roof insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation	Blown insulation	Blown insulation	Spray foam	
How well are the doors sealed?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*Rotary Screw*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				
FREE RESPONSE				
Is there anything else you'd like to share related to the building's energy usage or savings potential?				

Wind Farm O&M Buildings Survey

Name of Wind Farm: Cedar Springs

Site Contact: Brian Hail

Please complete this survey only for those buildings that are normally occupied and lit

	Building 1	Building 2	Building 3	Building 4
Building Type:	*O&M Shop/Office*	*O&M Shop/Office*	*(Select from list)*	*(Select from list)*
BASE LOADS				
Building square footage	*6,750*	2,000		
Type of interior lighting	*LED*	*LED*	*(Select from list)*	*(Select from list)*
Interior lighting control type	*Occupancy Sensor*	*Occupancy Sensor*	*(Select from list)*	*(Select from list)*
How many emergency lights are always on?				
Total hours of lighting operation per week				
Is building heated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☐ Regular ☑ Programmable	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*LED*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Propane*	*Electric Resistance*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of wall insulation				
Is ceiling or roof insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation				
How well are the doors sealed?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☑ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*Reciprocating Piston*	*N/A*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?	N/A	N/A		
FREE RESPONSE				
Is there anything else you'd like to share related to the building's energy usage or savings potential?				

Wind Farm O&M Buildings Survey

Name of Wind Farm: Pryor Mountain

Site Contact: Tommy Lauhoff

Please complete this survey only for those buildings that are normally occupied and lit

	Oil Containment	O&M	Outbuilding	Building 4
Building Type:	*Other*	*O&M Shop/Office*	*Other*	*(Select from list)*
BASE LOADS				
Building square footage	*400*	2,800	3,125	
Type of interior lighting	*LED*	*LED*	*Fluorescent*	*(Select from list)*
Interior lighting control type	*Manual*	*Timer*	*Manual*	*(Select from list)*
How many emergency lights are always on?	several	several	0	
Total hours of lighting operation per week	5	168	0	
Is building heated?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Electric Resistance*	*Propane*	*Electric Resistance*	*(Select from list)*
What type of heat thermostat?	☑ Regular ☐ Programmable	☐ Regular ☑ Programmable	☑ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☐ Yes ☑ No	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☐ Programmable	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No
R value of wall insulation				
Is ceiling or roof insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation				
How well are the doors sealed?	*Well Sealed*	*Well Sealed*	*Quite Leaky*	*(Select from list)*
Water heater type (electric or gas)	☐ Electric ☐ Gas	☐ Electric ☑ Gas	☑ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*(Select from list)*	*Reciprocating Piston*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				

FREE RESPONSE

Is there anything else you'd like to share related to the building's energy usage or savings potential?

Water heater in outbuilding could be updated.

Wind Farm O&M Buildings Survey

Name of Wind Farm: Marengo 1 and 2

Site Contact: Carlon Hargraves

Please complete this survey only for those buildings that are normally occupied and lit

	O&M Building	Building 2	Building 3	Building 4
Building Type:	*Other*		*(Select from list)*	*(Select from list)*
BASE LOADS				
Building square footage	*1,200*			
Type of interior lighting	*Fluorescent*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Interior lighting control type	*Manual*	*(Select from list)*	*(Select from list)*	*(Select from list)*
How many emergency lights are always on?	6			
Total hours of lighting operation per week				
Is building heated?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☑ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of cooling thermostat?	☑ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*Motion Sensor*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of wall insulation	R-18			
Is ceiling or roof insulated?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
R value of roof/ceiling insulation	R-18			
How well are the doors sealed?	*Well Sealed*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☑ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				
FREE RESPONSE				
Is there anything else you'd like to share related to the building's energy usage or savings potential?				

Wind Farm O&M Buildings Survey

Name of Wind Farm: Goodnoe Hills

Site Contact: Jerald Smith

Please complete this survey only for those buildings that are normally occupied and lit

	O&M Building	Garage	Garage	Building 4
Building Type:	*O&M Shop/Office*	*Storage Building*	*Storage Building*	*(Select from list)*
BASE LOADS				
Building square footage	*3,375*	1,800	625	
Type of interior lighting	*LED*	*LED*	*LED*	*(Select from list)*
Interior lighting control type	*Manual*	*Manual*	*Manual*	*(Select from list)*
How many emergency lights are always on?	0	0	0	
Total hours of lighting operation per week	50	20	20	
Is building heated?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☐ No
What type of heat?	*Propane*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*LED*	*LED*	*(Select from list)*
Exterior lighting control type	*Manual*	*Manual*	*Manual*	*(Select from list)*
Is there a pump house that is heated?	☑ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of heat?	*Electric Resistance*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☑ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No
R value of wall insulation	Unknown	Unknown		
Is ceiling or roof insulated?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☐ No
R value of roof/ceiling insulation	Unknown	Unknown		
How well are the doors sealed?	*Well Sealed*	*Well Sealed*	*Quite Leaky*	*(Select from list)*
Water heater type (electric or gas)	☑ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				

FREE RESPONSE

Is there anything else you'd like to share related to the building's energy usage or savings potential?

Upgrade to heat pump style water heater. Insulate ceiling of garage. Add heating and cooling to garage/storage building. Insulate storage building.

Wind Farm O&M Buildings Survey

Name of Wind Farm: Leaning Juniper

Site Contact: Jerald Smith

Please complete this survey only for those buildings that are normally occupied and lit

	O&M	Garage	Carport for Oil	Building 4
Building Type:	*Other*	*Storage Building*	*Other*	*(Select from list)*
BASE LOADS				
Building square footage	8,000	5,000	6,000	
Type of interior lighting	*Fluorescent*	*Fluorescent*	*Fluorescent*	*(Select from list)*
Interior lighting control type	*Manual*	*Manual*	*Manual*	*(Select from list)*
How many emergency lights are always on?	0	0	0	
Is building heated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No
What type of heat?	*Propane*	*Propane*	*(Select from list)*	*(Select from list)*
What type of heat thermostat?	☐ Regular ☑ Programmable	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is building cooled?	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No
What type of cooling thermostat?	☐ Regular ☑ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Is there exterior lighting?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No
Type of exterior lighting	*LED*	*LED*	*(Select from list)*	*(Select from list)*
Exterior lighting control type	*Manual*	*Manual*	*(Select from list)*	*(Select from list)*
Is there a pump house that is heated?	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☐ No
What type of heat?	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
What type of thermostat?	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable	☐ Regular ☐ Programmable
Are walls insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No
R value of wall insulation	Unknown	Unknown		
Is ceiling or roof insulated?	☑ Yes ☐ No	☑ Yes ☐ No	☐ Yes ☑ No	☐ Yes ☐ No
R value of roof/ceiling insulation	Unknown	Unknown		
How well are the doors sealed?	*Well Sealed*	*Well Sealed*	*(Select from list)*	*(Select from list)*
Water heater type (electric or gas)	☑ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas	☐ Electric ☐ Gas
EXTRA CREDIT - OTHER LOADS				
Type of air compressor	*(Select from list)*	*(Select from list)*	*(Select from list)*	*(Select from list)*
Are there air leaks that get fed all night?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Would a timer control be of help?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is welder electronic or old transformer type?	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer	☐ Electronic ☐ Transformer
Does welder get left on a lot when not in use?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If so, about how many hours per week?				
FREE RESPONSE				
Is there anything else you'd like to share related to the building's energy usage or savings potential?	Would like to close & insulate carport. Upgrade to heat pump style water heater.			

Appendix 3. Summary of Initial Data About the Buildings

Si	Project	Site Supervisor	Number of Structures	Type of Structure	Year	Owne	Energy Servic	Notes/Actions Already Taken and Dates (ie lights upgraded; HVAC updated; insulation; etc)
1	Glenrock-Rolling Hills	Casey Collins	6	O&M Office / Shop	2008	Owned	Rocky Mtn Power	Lights upgraded 2017 (shop) & 2022 (office), Chlorinator repair 2020, OH shop door replacement 2022
				Hi Bay Shop	1980's			Lights upgraded 2021, Door repairs 2020-2022 - This building is only used for storage and not heated
				Mine Office / Shop				HVAC repairs made 2019 - this building only used for storage - was heated and used during repower 2019
				Mine Storage shop				na - This building only used for storage - not heated
				mine pump house				na - This building is never used - not heated
				mine DJ3 well pump house				New well pump, control boxes and load out pump motor 2020 - Very small building - very rarely used
2	Seven Mile Hill 1 and 2	Todd Looney	O&M building	Steel building	2008	Owned	CP&L	LED Lights throughout office area 2022, programable thermostat 2018.
			Storage building	Pole barn				
3	Dunlap	Aron Anderson	O&M building	Steel building	2010	Owned	P&L and Amerigas	LED lights throughout office 2022, programmable thermostat 2018, exterior building lights LED and new timers 2019
4	High Plains and McFadden Ridge	Aron Anderson	O&M building	Steel building	2010 & 2022	Owned	CP&L only	LED lights throughout office 2022 and pole barn, programmable thermostat 2018, exterior building lights LED and new timers 2019
			Storage building	Pole barn				
5	Foote Creek Rim	Aron Anderson	O&M building	Steel Building X 2	1999	Leased	P&L and Amerigas	LED lights throughout O&M shop 2021, programmable thermostats 2018, new windows throughout O&M 2021, new shop heaters 2021, exterior building lights LED and new timers 2019
			Storage building	Steel Building X 2				
6	Ekola Flats	Todd Looney	O&M building	Pole barn	2020	Owned	P&L and Amerigas	LED lights throughout the O&M, lights are motion activated and on timer to shut off after no activity. Programable
			Storage building	Pole barn				
7	TB Flats 1 and 2	Jesse Solas	5	O&M Building	2020/2023	Owned	Plains Power and	O&M: Blown insulation in attic, Drop ceiling, LED lights throughout, progammable thermostats, two zones in office area and two zones in shop. 2 Propane HVAC units in office area serviced yearly. Two gas blower heaters; Containment Building:Blown insulation in attic, LED lights throughout. Two electric baseboard heaters. Auxillary Building: Spray foam insulation, LED lighting, electric blower heater. Substation Contol buildings (2): Modular pre fab building. LED lighting. Electric HVAC
				Containment Building				
				Auxillary Building				
8	Cedar Springs 2	Brian Hail	2	Steel	2020	Owned	Douglas, WY	auto shut off light switches in all rooms in both buildings Nest temperature units installed, insulated doors and rollups, LED light in shop area and all exterior lighting is LED.
9	Pryor Mountain	Tommy Lauhoff	3	Metal Building	2020	Owned	Big Horn REA	One outbuilding has minimal use and is a wood frame, metal skinned building that came with the purchase of land. This outbuilding was built in the late 1990's and includes two electric wall heaters that need to be updated. The water heater is also outdated and could be updated using an on demand heater. There is no air conditioning in the outbuilding. The outbuilding shop area needs to be concreted, insulated and a new bay door needs to be installed. The O&M and oil containment are metal buildings and were constructed in 2020. I do not see a lot of upgrade opportunity in these buildings, however there is an emergency lighting system that I would like to change to where there is not always one light on in each room/hallway of the building.
				O&M Shop/Office				
10	Marengo 1 and 2	Carlon Hargraves	O&M building	Metal Building	2008, 2012, 2022	LEASED. BROUGHTON LAND COMPANY	PACIFIC POWER	1- A/C Replacement - 2015 (New unit is an "E.E") 1-Pole Barn has no elctricity. The New Pole Barn is insulated but only has heaters
			2 Pole buildings	Pole barn				
11	Leaning Juniper	Jerald Smith	O&M building	o&m with garage	2008	Owned	Snohomish PUD	Lights are fluorescent. Would like to change to led. Insulated garage with heating and exhaust fan for cooling. There is a carport storage area outside for oil containment. Would like to see it enclosed and insulated. The oils and liquids need to be brought into shop during winter to keep from freezing. hvac with programmable thermostat.
			Garage	Garage				
			Carport for Oil					
12	Goodnoe Hills	Jerald Smith	O&M building	Steel prefab	o&m and garage 2008. garage 2 2021	Owned	lickitat County PU	Light fixtures changed to led in o&m and both garages in 2021. One garage insulated. No heating or cooling in either garage. One garage constructed in 2021. Hot water tank changed in 2020.Older hvac unit with programmable thermostat.