WELCOME

TOWN OF BLACK DIAMOND

Serving Our Community

INTRODUCTION

- Why and how did we start
- Data Tracking
- Prioritizing
- Planning & Budgeting
- Projects
- Savings

Why & How did we start?

- Our Motivation – personal & financial
- A desire to improve the operation and protect our natural environment, to reduce operating costs.
- Where did we start – By looking at the operation!

What are the deficiencies, what can we reduce, what will effect our operation, what will effect our equipment and building maintenance what will effect our environment?

How did we start!

- Simple answer – reducing the utility consumption will effect all areas of the operation and the environment!
- Set a goal - start simple
- TRACK your DATA – Utility consumption, facility usage, equipment maintenance, equipment operating hours. If you do not know what you are using how will you know if the changes you are making have an effect!

How did we start!

- Education and staff involvement – training
- The first project undertaken was simple – train the staff to one simple project in facility usage " If the facility is not in use do NOT turn it on" This goes for lights, furnaces, equipment if no one is in the facility why is it operating?
- Then other low hanging fruit was looked at – night setback thermostats, timers, motion sensors – these are all inexpensive to have installed to give you better control on when equipment is operating

Prioritization!

- Life cycle analysis – How long is your equipment expected to last – how old is it now, how much is it being used, when should it be replaced?
- This goes for your building as well!
- By knowing this information will start putting the plan together – do long range planning.
- Now the financing starts – do the items that need to be replaced first as the priority

Planning & Budgeting

- We all know how difficult it is to get money for a large project, how limited grants are becoming – you cannot rely on them to accomplish your goals. When they are available pursue them!
- Now that you have timelines when things need to be replaced – take a look at how many years that is, price out the replacement with a high efficiency unit – add 15%.

Planning & Budgeting

- Now divide that cost by the number of years, and put that in reserves annually.
- It is much easier to convince council to put a smaller amount in reserves annually if they know what it is for.
- You can also do a project easier by breaking them up over a few years.
- Do not try to start all the reserves at once, add projects each year – explain what they are and when they need to be replaced.

Planning & Budgeting

- Now that the equipment is in a schedule to be replaced you can look at upgrades.
- Look for items that still may have some life in them but may not meet your needs, or exceed your needs. Lighting is a good example. The Oilfields Regional Arena has had 2 lighting retrofits, the first was taking the 4 – 40 watt tube fixtures and replacing them with a reflector and 2 T8s. The second was to LED

Planning

- The first retrofit was all undertaken at one time, the second was done in phases. When replacing the lights over the ice – this took a number of years – we do not have as many lights as most rinks 18, (average is 45). Bring the companies out with samples (at least 2) so you can try them – put them beside 2 fixtures, measure the light level – below and half way between – make sure you are getting as good or better – try before you buy!

Planning

- It took time to find lights that could give us 1 for 1 replacements. Tell the contractor what you want and make them show you it will work whenever possible
- For an arena the refrigeration system is the area you can have the largest effect on your operation. What is your ice thickness, how warm are you keeping the air temperature in the ice area, is your system operating properly.

Planning

- Start with forgetting what everyone did in the past – remove "that's the way we've always done it" Look at how thick you need to keep your ice to operate, lower the air temperature over the ice surface.
- Adjust you ice temperature to your building conditions.
- Your refrigeration contractor should be able to help you on the system operation.

Planning

- For ours we have changed the temperature going to the cooling tower, changed the expansion valve and added controls. With monitoring the ice thickness, insulating in the building and controlling the heat over the bleachers and temperatures for the ice we have a cumulative reduction in refrigeration system operating hours of 9,823.7 over 20 years. This has saved the cost of one compressor overhaul.

Planning

- A good maintenance program is also an important part, this will ensure that you will get the full usage of your equipment for it's full life expectancy.
- Get involved with opportunities when they come available. This can be grants, partnerships, demonstration projects.

Planning

- Work with council to create a green fund.
- This is cost saving measures that are implemented by the Town of Black Diamond from green projects. The savings from these projects in subsequent years are put in reserves. These savings can then be used to update those green projects or undertake new green projects. Our definition of Green Project – assist with sustainability & reduction of operating costs.

Planning

- The project must fall in one of the following categories;

1. Reduce greenhouse gas emissions
2. Reduce consumption of natural resources
3. Reduce Water consumption
4. Reduction of waste materials

Our definition of sustainability; To make human economic system last longer & have less impact on ecological system

Planning

- We will pursue efficiencies in our operation that will also help with the environmental impact. What we do today will determine the outcome for future generations. The benefits to alternative energy is - what is produced can be used on site with out paying for distribution fees, it helps reduce operating costs. It is not a quick payback but it starts paying back instantly, and helps lower our carbon footprint.

Projects

The first involvement in alternative energy was a 1.82 kilowatt Solar system at the hockey arena in 2007 with the Alberta Solar Municipal Showcase. The next was a vertical axis wind turbine (demonstration project) then a regular wind turbine (demonstration project). We then added a second solar system which started at 1.41 kilowatts then upgraded the next year to 4.83 kilowatts. The third project was the installation of a 4.83 kilowatt reflector solar system on the Town office. The fourth project was a 10 kilowatt solar system on the Arena roof. The last solar system was added in 2016 to the roof of the Outdoor arena

Projects

The funding for alternative energy started with the Alberta Municipal Solar showcase which covered 75% of the installation – project was for 1 kilowatt – we installed the maximum the inverter would handle. Wind turbines were demonstration projects so 60% of the costs were covered.

The first Sunergy solar system cost was covered by the Town of Black Diamond, this was budgeted for 3 years, with the drop in the price of solar it was completed in 2 years. At that time we were paying 9 cents per kilowatt + transmission & distribution costs for electricity.

Projects

The 10 kilowatt system (2 – 5 kilowatt systems) were done with a partnership with Bullfrog Power who covered 50% of the installation, our portion was covered from solar reserves and the green fund.

The Town office solar system was covered entirely by a grant.

The Last Solar system had 16.5% covered by a grant and the remainder from the green reserve

Projects - Alternative Energy

Solar panels on Roof of The Oilfields Regional Arena

Projects - Alternative Energy

Vertical Axis Wind Turbine on the roof of the Oilfields Regional Arena

Projects - Alternative Energy

Regular style wind turbine beside the Scott Seaman Sports Rink

Projects - Alternative Energy

Reflector Solar System on the Black Diamond Town Office

Projects - Alternative Energy

Solar System on the Scott Seaman Sports Rink

Projects - Alternative Energy

Black Diamond Municipal Alternative energy production									
	Raum	Windterra	Solar	Sunergy South	Office 10k	Sunergy Center	Sunergy North	Solar Edge	Total
Year	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours
2007			321						**321**
2008		9	2,507						**2,516**
2009	68	40	2,711						**2,819**
2010	63	34	2,484						**2,581**
2011	129	42	2,705	906					**3,782**
2012	166	43	2,600	2,992					**5,801**
2013	124	22	2,601	5,473	6,167	147			**14,534**
2014	82	23	2,565	6,376	6,304	4,929	6,911		**27,190**
2015	144	35	2,686	6,970	6,504	4,891	7,408		**28,638**
2016	191	34	2,602	5,956	6,224	4,803	6,997	2,126	**28,933**
2017	183	43	2,529	5,579	6,109	5,865	6,973	6,590	**33,871**
2018	92	26	2,385	5,387	5,740	6,001	6,498	5,689	**31,818**
Total	**1,242**	**351**	**28,696**	**39,639**	**37,048**	**26,636**	**34,787**	**8,716**	**182,804**

Alternative Energy Annual Production

Projects - Alternative Energy

All our alternative energy is grid tied, this means that the power we produce is used in the building first, if we generate more than what is required for that building the extra is sold back to the grid. Currently we have 3 sites with alternative energy all 3 sell back to the grid – the largest is from the Oilfields Regional Arena – we have sold 27 megawatts of electricity to the grid. This is tracked from the Electrical meter, there is currently 16.65 kilowatts of solar installed on the Oilfields Regional Arena.

Projects - Alternative Energy

The Scott Seaman Sports Rink has sold 6.1 megawatts of electricity to the grid with a 5.2 kilowatt solar system. The Town office has sold 688 kilowatt hours of electricity to the grid with a 4.83 kilowatt solar system. The power we sell back to the grid shows up as a credit. We are paid at spot market prices for electricity sold to the grid.

Our payback for the solar is still longer because we changed how we purchase electricity. We now purchase our electricity from the wholesale market rather than the retail market. We are also purchasing for 5 years into the future at a set rate.

Projects – Energy

Some of the projects for energy conservation were insulation. There was a problem with the exterior walls leaking – so while fixing that problem we also re-insulated. A Low emissivity ceiling was also installed – this was to help insulate, improve lighting and audio. Weather stripping around doors was also replaced, with better insulation we were able to raise the temperature of the ice from 16 to 18 degrees Fahrenheit to 22 to 24 degrees Fahrenheit. This made a huge difference on the refrigeration run time. These projects were not all at the same time so the changes happened over a number of years.

Projects – Energy

Low-E-Ceiling

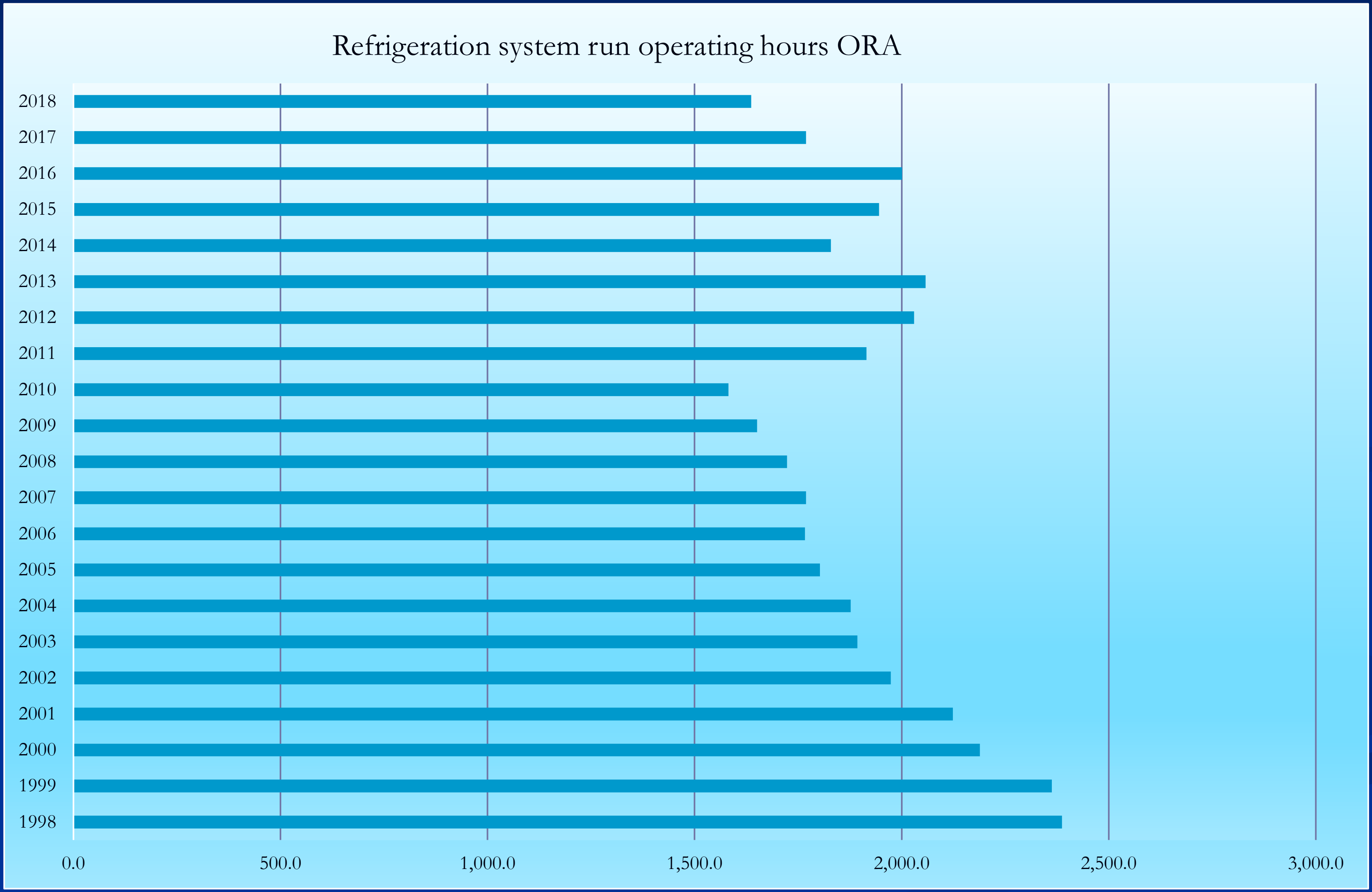
Projects – Energy

Motion Sensor Showers

Projects – Energy

Scott Seaman Sports Rink Roof

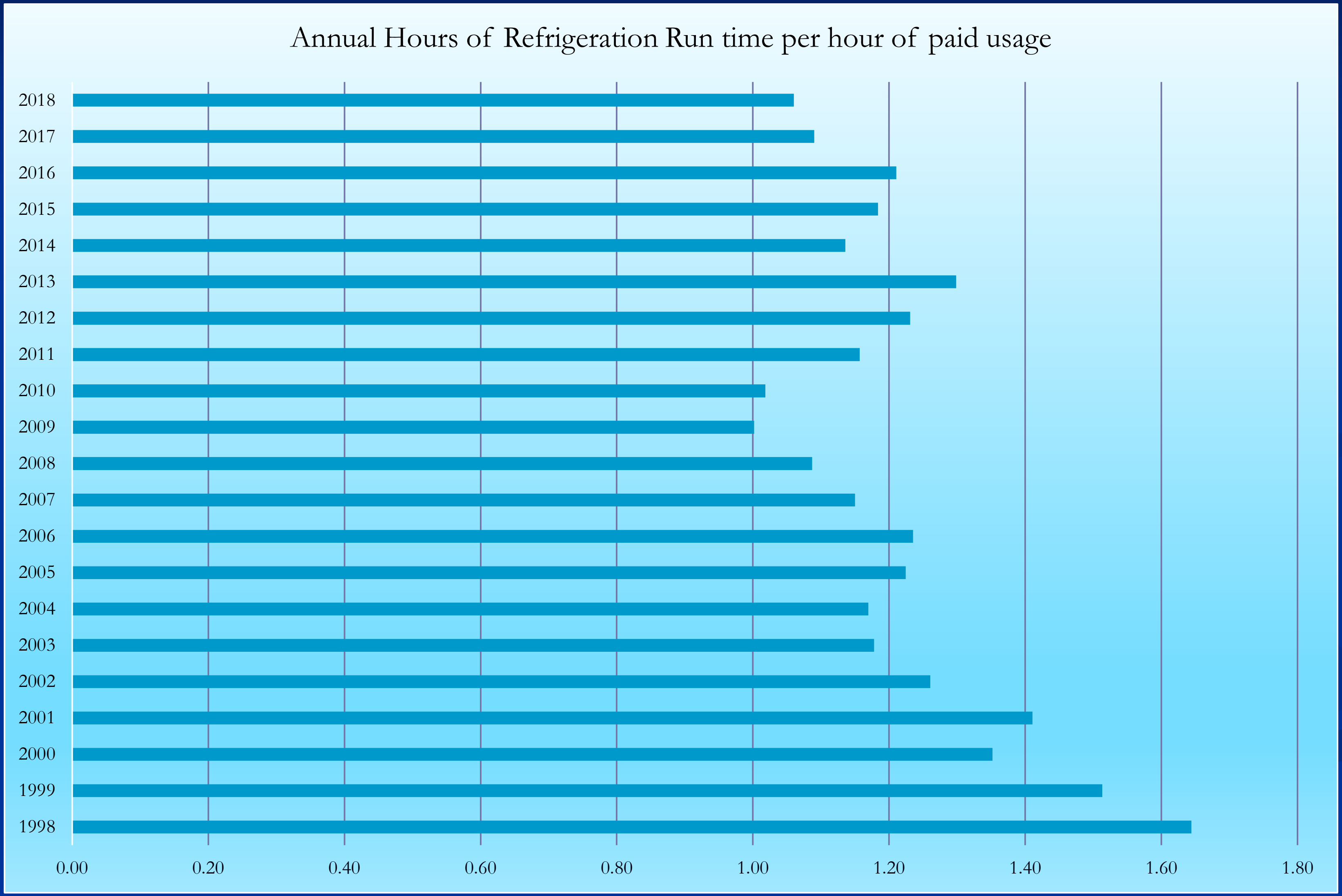
Projects – Energy



Projects – Energy

From the previous chart does not give you the entire prospective of our system. Our refrigeration system has a rating of 40 tons of cooling capacity, to keep summer ice you should be running 100 tons. In 2011 we extended the time we keep the ice in by one month – from 7 months to 8 months. In 1998 we had 1,452 hours of paid usage, in 2018 we have 1,537.5 hours of paid usage. Our refrigeration system operated for 2,386.9 hours in 1998 – in 2018 the refrigeration system operated for 1,637 hours - 749.9 hours less.

Projects – Energy



Projects – Energy

The previous data is comparing refrigeration operating hours to hours of paid usage. This gives us how many hours the refrigeration system operates for each hour of paid usage. In 1998 the refrigeration system operated for 1.64 hours for every hour of paid usage. In 2018 the refrigeration system operated for 1.06 hours for every hour of paid usage – in 2009 we had reduced it to 1 to 1, the paid ice usage does vary each year but this gives us a better measurement of efficiency.

Projects – Energy

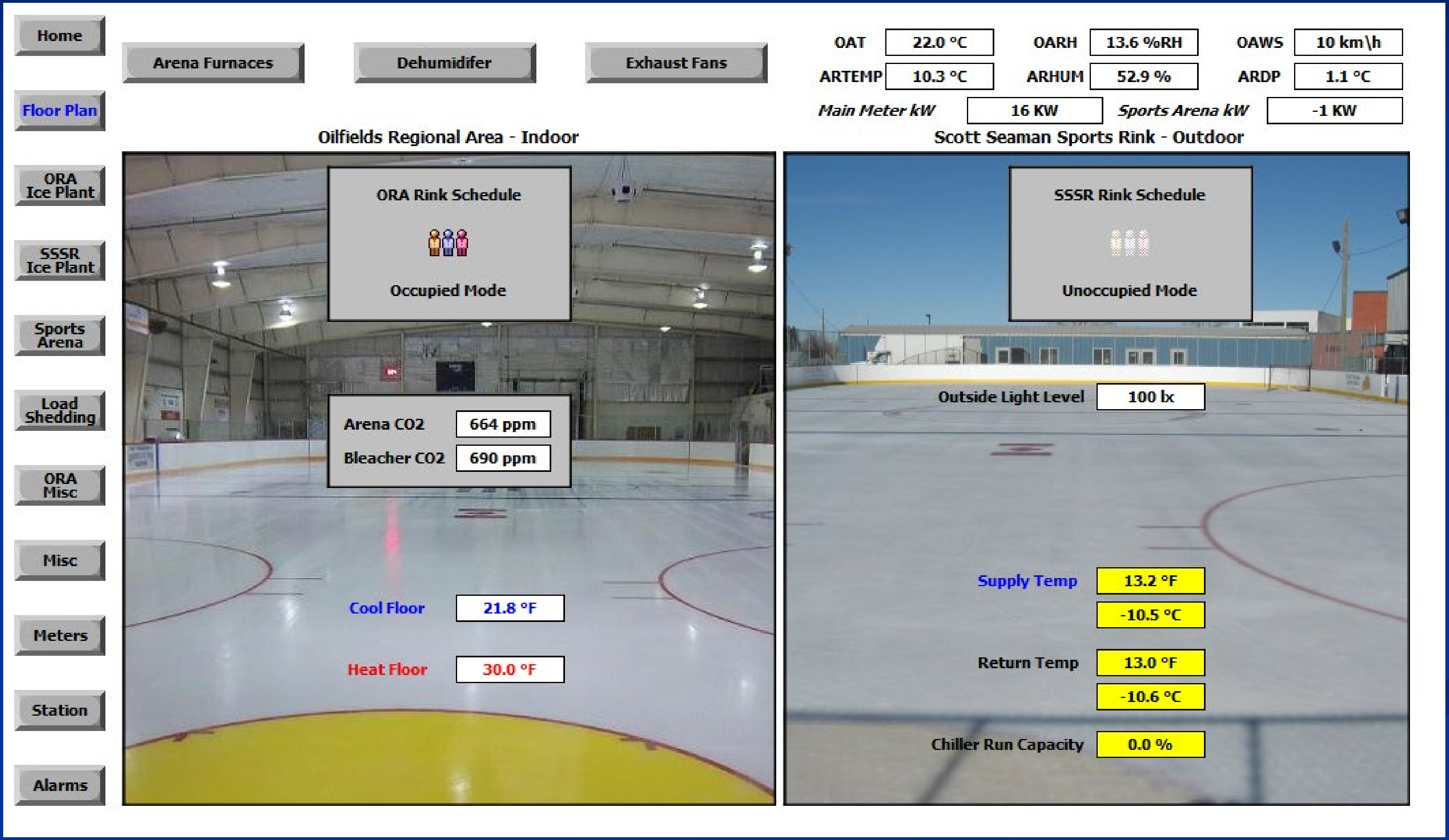
One of the other undertakings to reduce energy was an energy management system. This controls the refrigeration system, dehumidifier, exterior lighting, lighting over the outdoor arena (Scott Seaman Sports Rink) furnaces, exhaust fans, bleacher heating, domestic water circulating pump and load shedding for the 2 arena's. It controls the items using a schedule of usage and a weather station. Part of the controls are not for energy conservation they are for facility safety – exhaust fans for the ice area and the SSSR change room exhaust fans are controlled by CO_2 sensors.

Projects – Energy

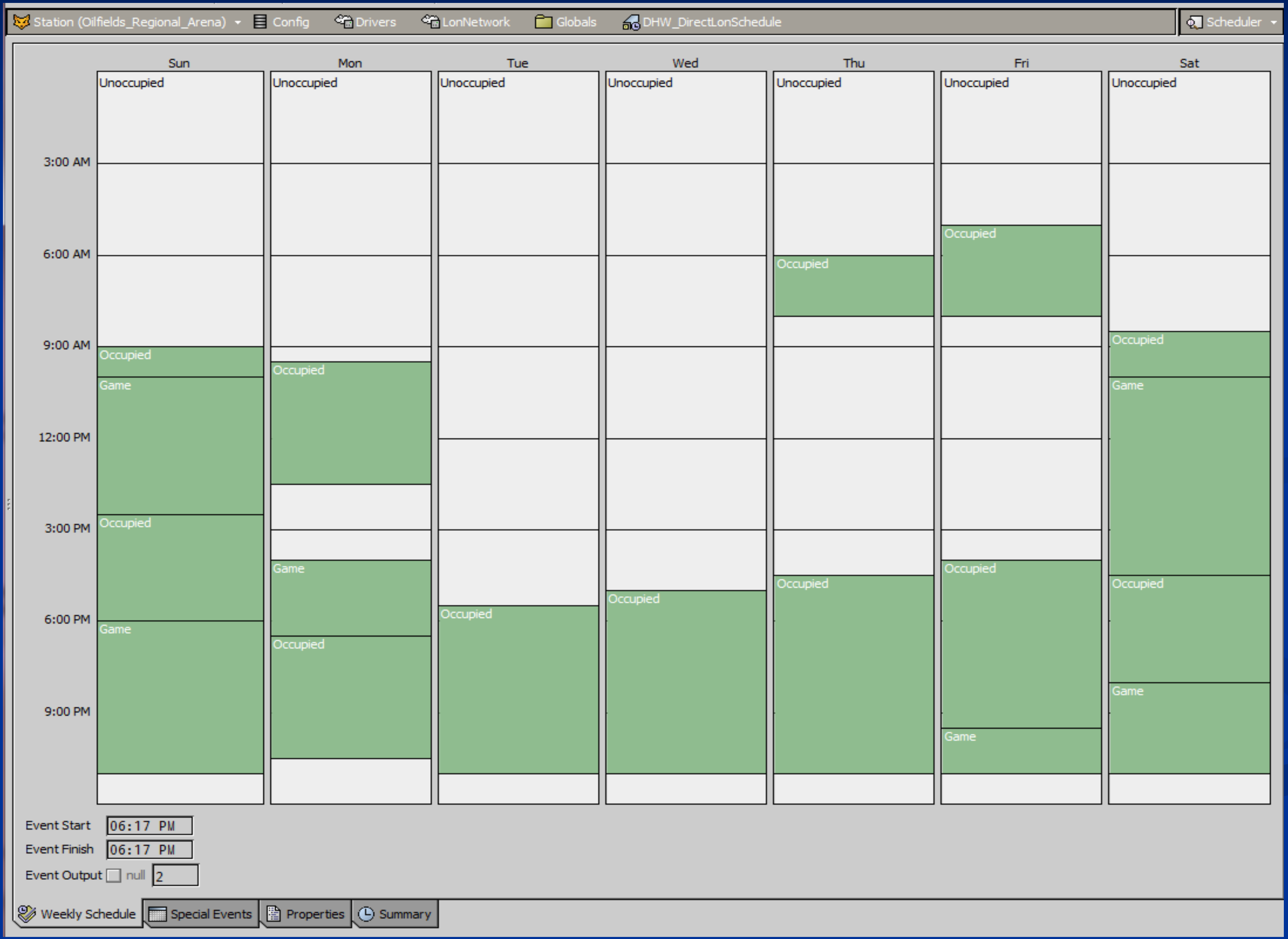
On the ORA refrigeration controls with our system being under sized it also tracks the amperage of the compressor motor. This allows us to unload 2 cylinders during warmer weather so it does not overload the motor and burn it out. Furnaces have the temperature lowered by 7 degrees when the facility is not in use, and exterior lights are only on when the building is occupied, they turn on with light level and shut off 1.5 hours after the last usage.

The energy management system was a larger project, it was installed over 5 years – this was done to keep the cost down for each budget year.

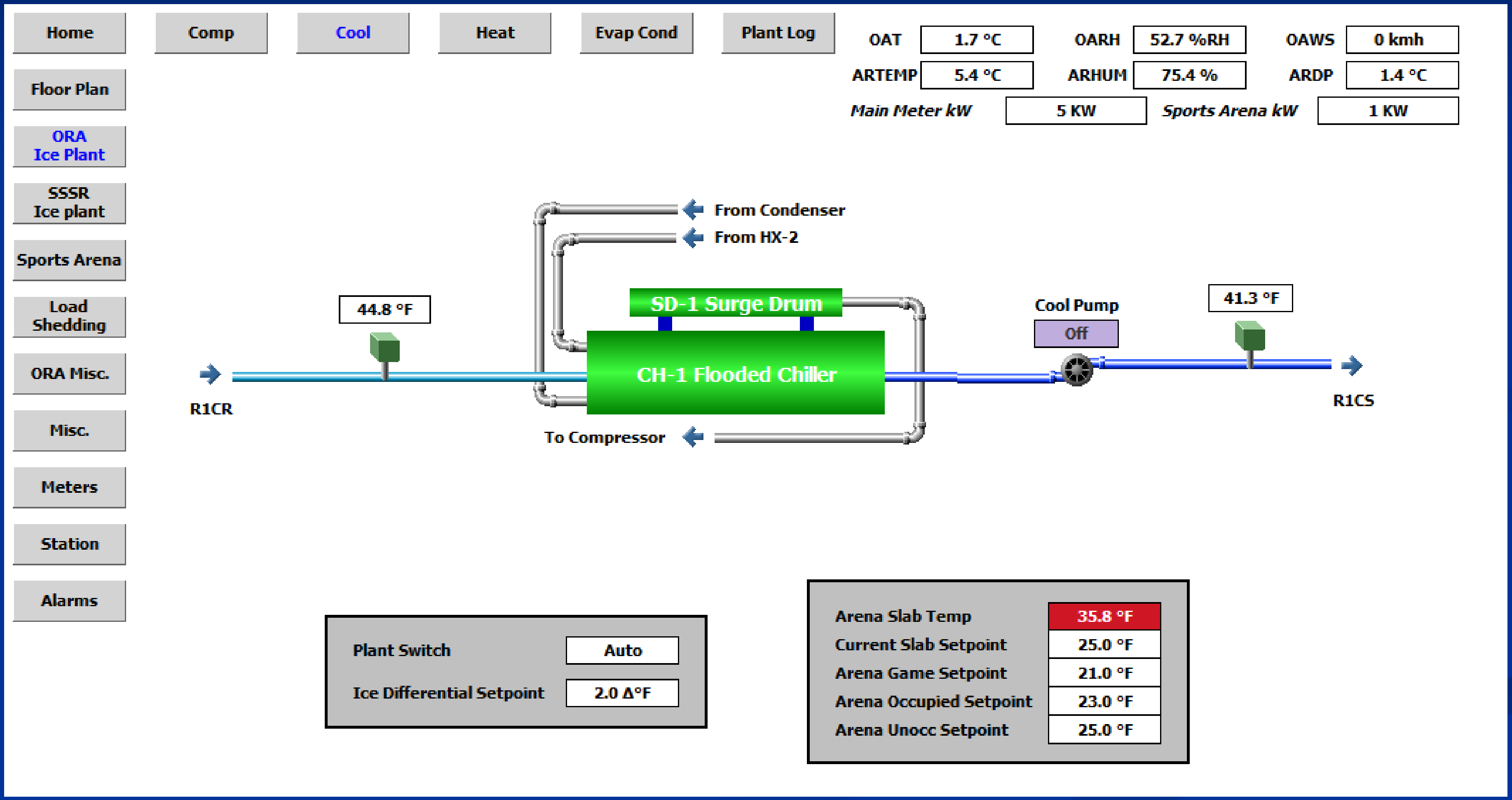
Projects – Energy



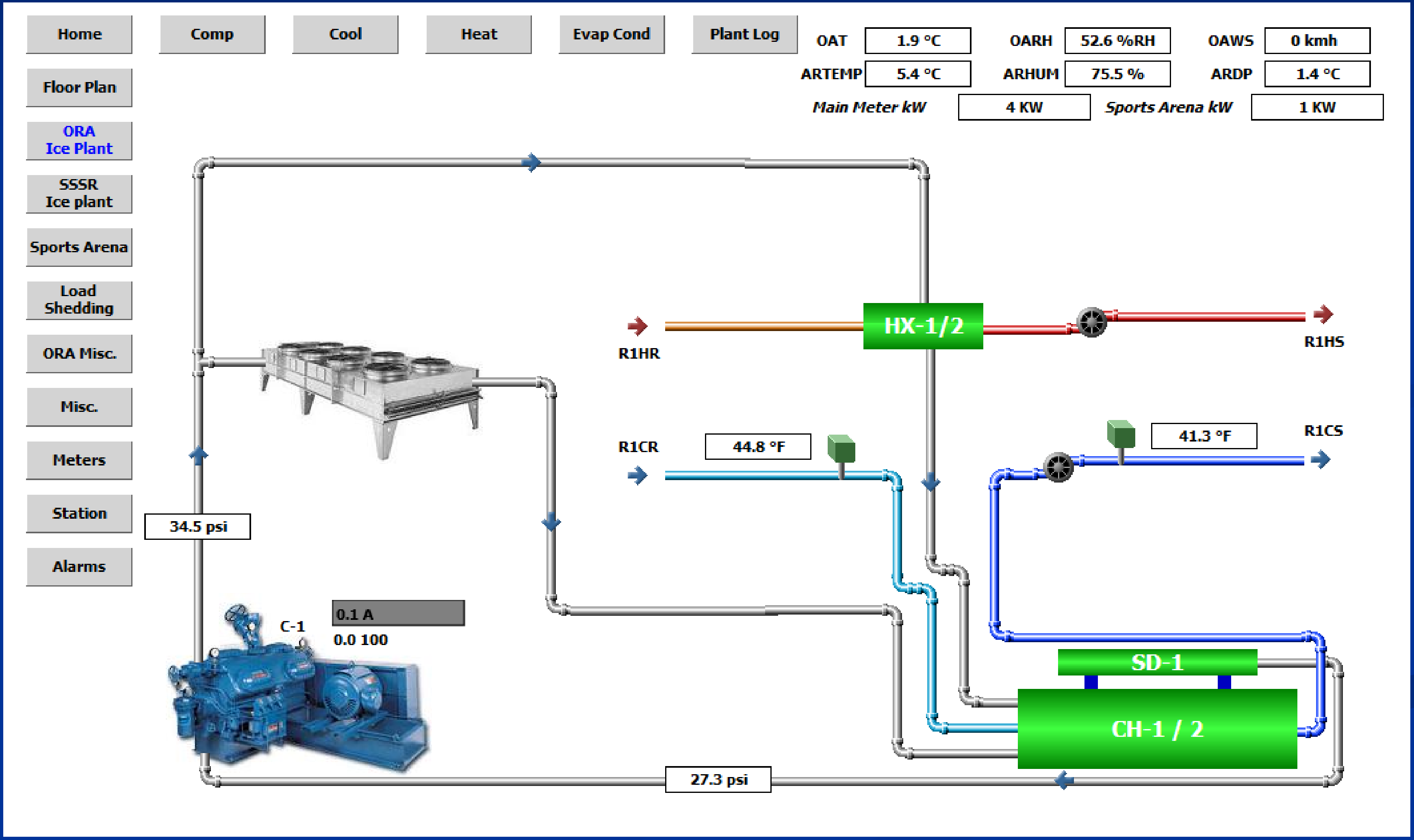
Projects – Energy



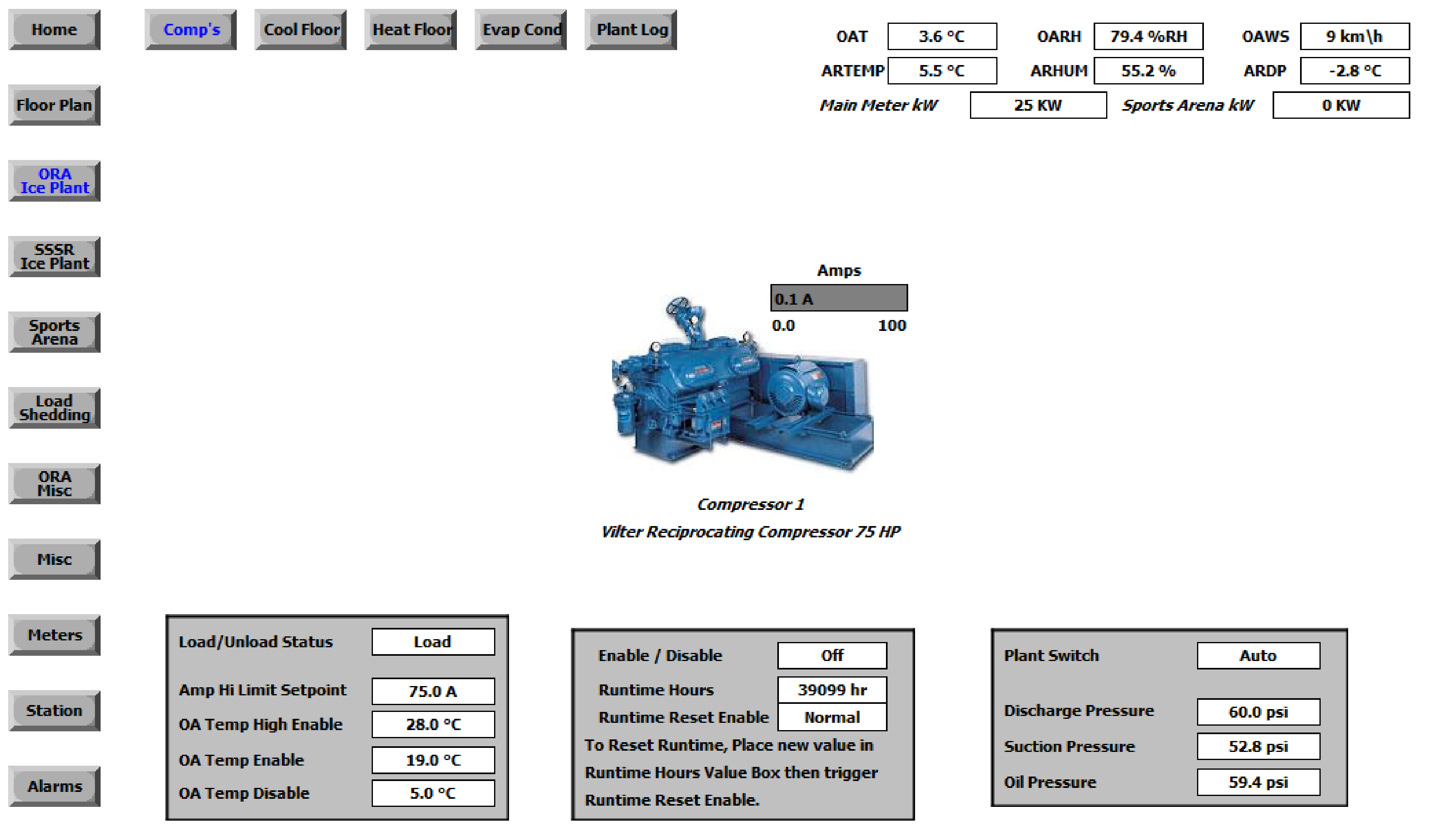
Projects – Energy



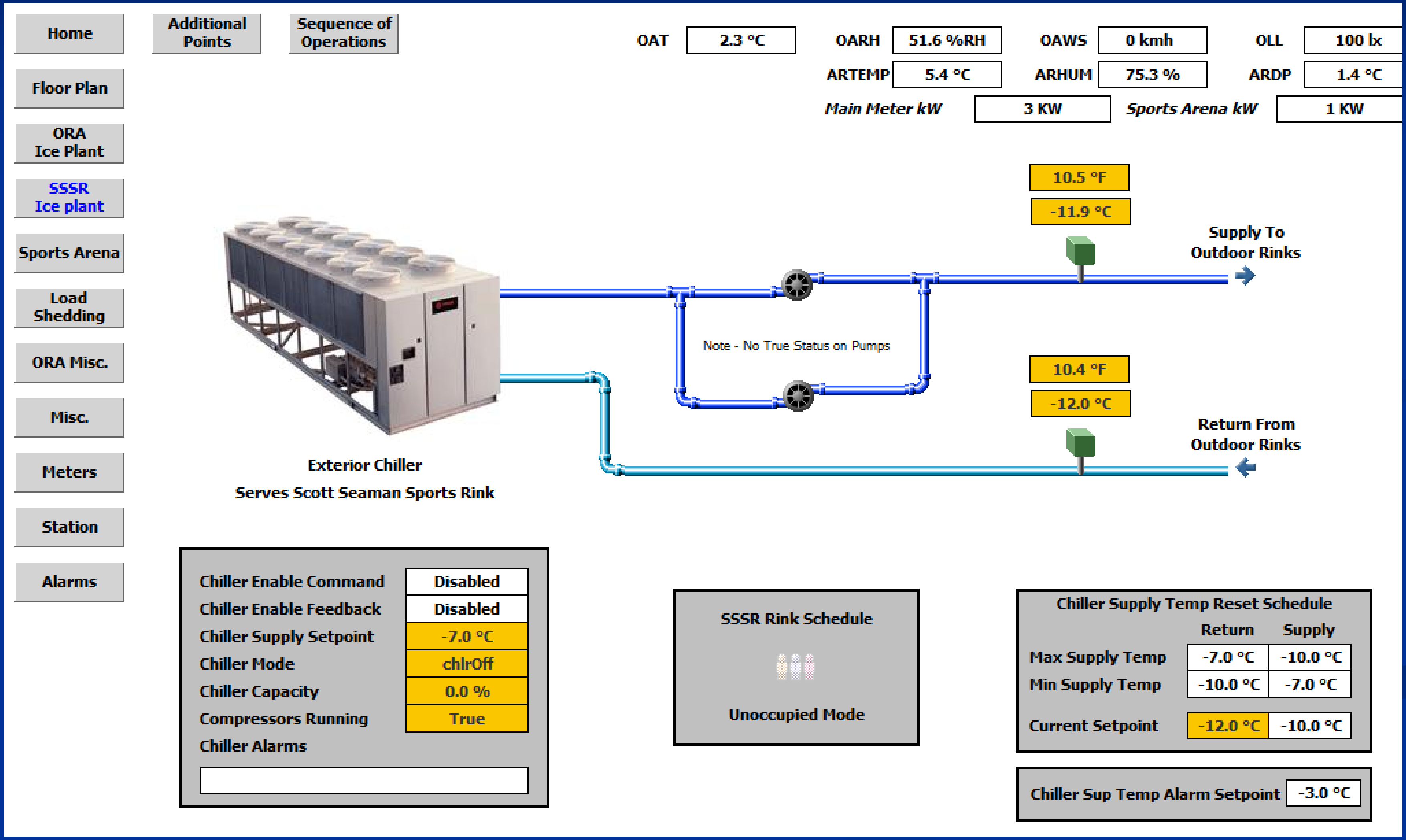
Projects – Energy



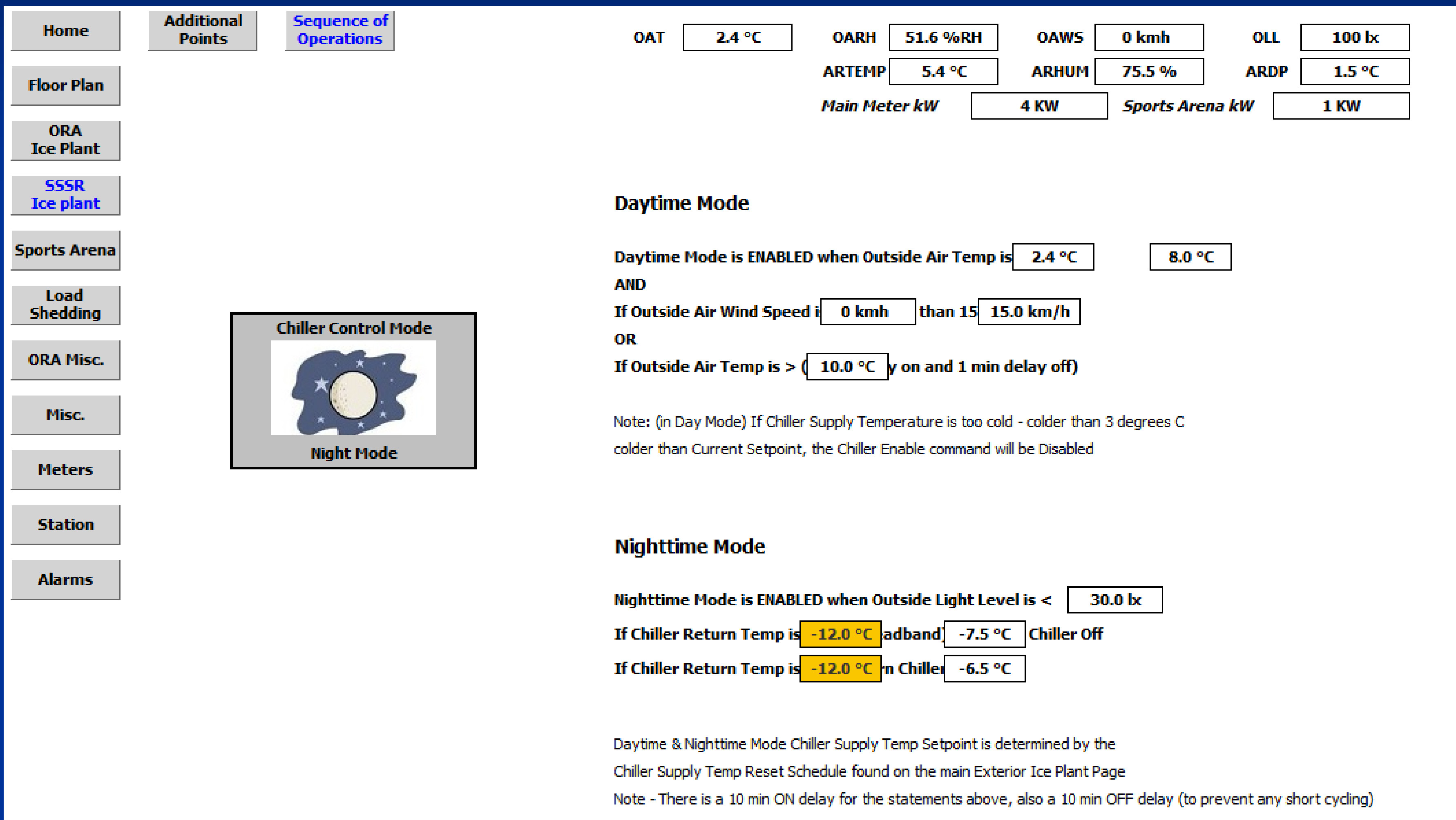
Projects – Energy



Projects – Energy



Projects – Energy



Projects – Energy

Home | Floor Plan | ORA Ice Plant | SSSR Ice plant | Sports Arena | Load Shedding | ORA Misc. | Misc. | Meters | Station | Alarms

Additional Points | Sequence of Operations

OAT	2.4 °C	OARH	51.5 %RH	OAWS	0 kmh	OLL	100 lx
		ARTEMP	5.4 °C	ARHUM	75.3 %	ARDP	1.4 °C

Main Meter kW: 3 KW | *Sports Arena kW*: 1 KW

Exterior Chiller

Serves Scott Seaman Sports Rink

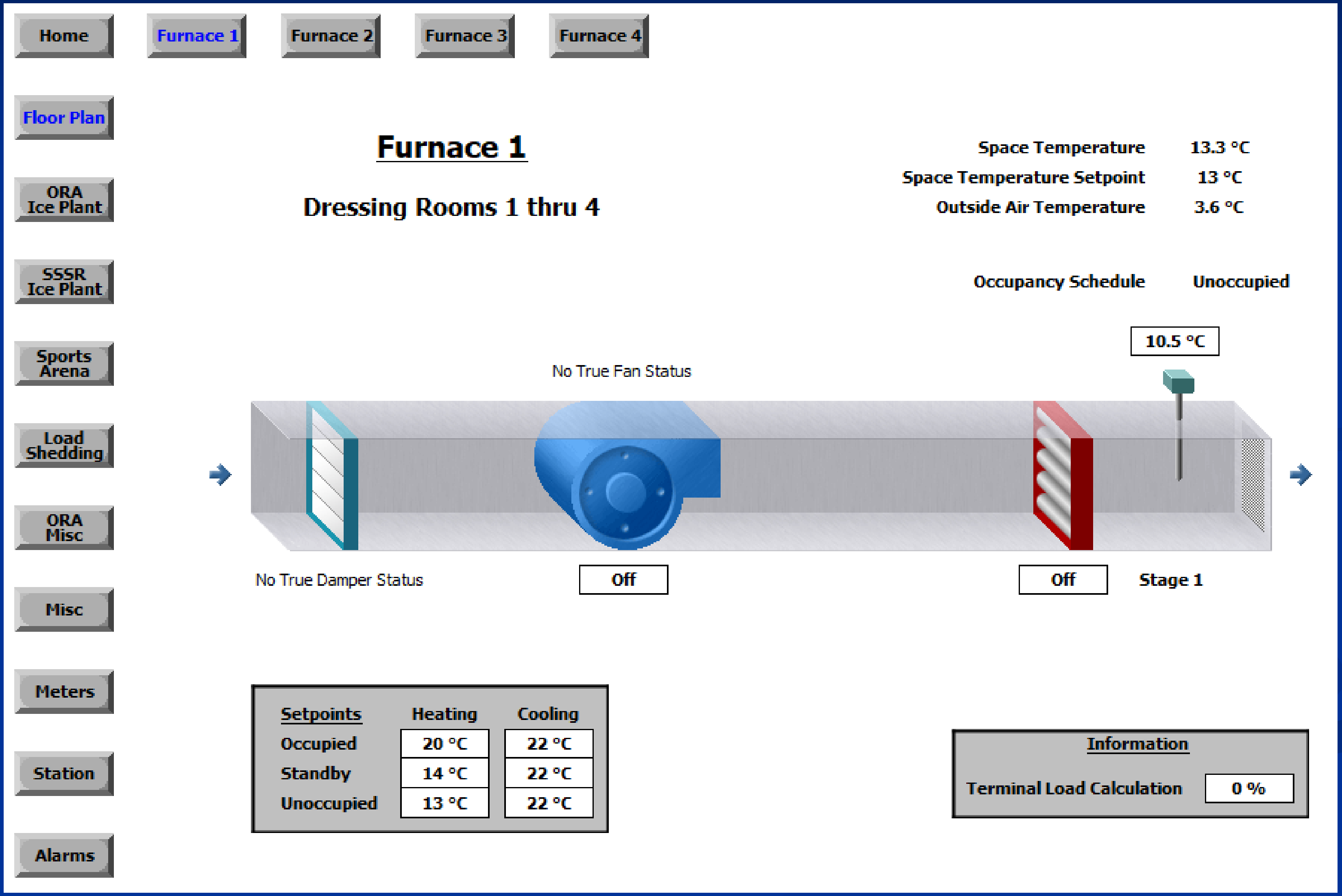
Lonworks Communication Information from Chiller LCI Board

Chiller Enable Command	Disabled
Chiller Enable Feedback	Disabled
Chiller Supply Setpoint	-7.0 °C
Chiller Mode	chlrOff
Chiller Capacity	0.0 %
Compressors Running	True
Chiller Alarms	
Chiller Actual Capacity	0.0 %
Chiller Actual Cap Limit	0.0 %
Chiller Supply Temp	-11.9 °C
Chiller Return Temp	-12.0 °C
Chiller Running Status	0.0 %
Chiller Outside Air Temp	0.0 °C
Chiller Evap Water Pump	Off
Chiller Evap Water Flow	Off

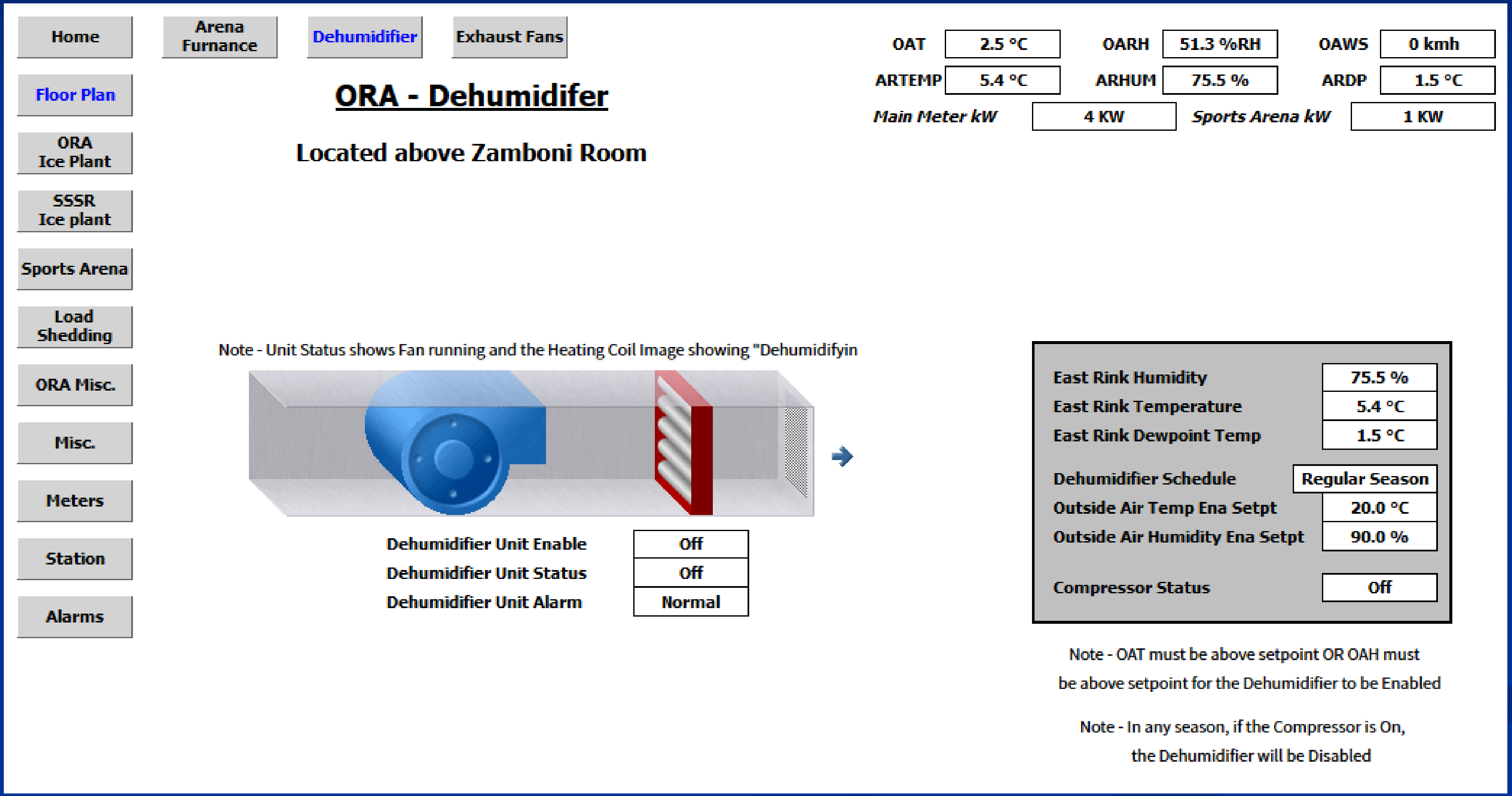
Chiller Local Mode	false
Condenser Water Flow	false
Chilled Water Flow	false
Chiller Limited	false
Chiller Operating Mode	hvacAuto
Chlr Base Loading Active	false
Chlr Head Relift Request	false
Chlr Hot Gas Bypass Active	false
Chiller In Defrost	false
Chiller Max Capacity	false
Chlr Noise Reduction On	false

Chiller C1 Evap Rfgt Press	0.0 psi
Chiller C2 Evap Rfgt Press	0.0 psi
Chiller C1 Evap Rfgt Temp	0.0 °C
Chiller C2 Evap Rfgt Temp	0.0 °C
Chiller C1 Cond Rfgt Press	0.0 psi
Chiller C2 Cond Rfgt Press	0.0 psi
Chiller C1 Cond Rfgt Temp	0.0 °C
Chiller C2 Cond Rfgt Temp	0.0 °C
Chiller C1 Air Flow %	0.0 %
Chiller C2 Air Flow %	0.0 %
Chiller HiSide Oil Press A	0.0 psi
Chiller HiSide Oil Press C	0.0 psi
Chiller Oil Temp A	0.0 °C
Chiller Oil Temp C	0.0 °C
Chiller Voltage	0 V
Chiller Amperage A	0 A
Chiller Amperage C	0 A
Chiller Starts A	0.0
Chiller Runtime A	0.0 hr
Chiller Starts C	0.0
Chiller Runtime C	0.0 hr

Projects – Energy



Projects – Energy



Projects – Energy

Home
Floor Plan
ORA Ice Plant
SSSR Ice Plant
Sports Arena
Load Shedding
ORA Misc
Misc
Meters
Station
Alarms

OAT	3.4 °C	OARH	80.5 %RH	OAWS	13 km\h
ARTEMP	5.5 °C	ARHUM	55.0 %	ARDP	-2.8 °C

Main Meter kW	23 KW	*Sports Arena kW*	0 KW

PLANT ROOM

Plant in Manual Selector Switch	Auto
Plant in Automation Enable	Auto

NORTH WALL

Outside Air Temp - C	3.4 °C
Outside Air Temp - F	38.0 °F
Outside Air Humidity	80.5 %RH
Outside Light Level	100 lx
Outside Wind Speed	13 km/h

DHW PUMP

Schedule Follows Indoor Rink Sched	Unoccupied
Pump Command	On
Pump Status	On
Supply Temperature	13.5 °C
Pump ON Setpoint (lower than OAT)	18.0 °C
Pump Cycle Setpoint (lower than BHT)	5.0 °C

BLEACHER CONTROL

Hanging Bleacher Temp	4.1 °C
Hanging Bleacher Setpoint	12.0 °C
Bleacher Heater Command	On
Outside Air Enable	17.0 °C
Outside Air Temp	3.4 °C

ARENA GAS DETECTION

Note - EF1 & EF2 are enabled and monitored together
Arena CO2 and Bleacher CO2 are averaged to Enable EF

Arena CO2 Level	540 ppm
Bleacher CO2 Level	579 ppm
Arena Exhaust Fan Enable	Disable
Arena Exhaust Fan Status	Off
Arena Exhaust Fan Dampers	Close
Arena Effective CO2 Setpoint	800 ppm
Arena Occupied CO2 Setpoint	700 ppm
Arena Unoccupied CO2 Setpoint	800 ppm
Exhaust Fan On Delay (Seconds)	300.0 s
Exhaust Fan Off Delay (Seconds)	600.0 s

Projects – Energy

Home | Floor Plan | ORA Ice Plant | SSSR Ice plant | Sports Arena | Load Shedding | ORA Misc. | Misc. | Meters | Station | Alarms

Main Meter | Sports Rink Meter

OAT	2.6 °C	OARH	51.4 %RH	OAWS	0 kmh
ARTEMP	5.5 °C	ARHUM	75.5 %	ARDP	1.5 °C

AVERAGE MAIN METER POINTS

VOLTS	282 VOLTS	*KILLOWATTS*	3 KW	*POWER FACTOR*	0.647
AMPS	9 AMPS	*KILOWATT HOURS*	54614 kWh	*LINE FREQUENCY*	60.0 Hz

VOLTAGE

RMS Voltage, Phase A	283 VOLTS
RMS Voltage, Phase B	284 VOLTS
RMS Voltage, Phase C	281 VOLTS

CURRENT

RMS Current, Phase A	11 AMPS
RMS Current, Phase B	5 AMPS
RMS Current, Phase C	13 AMPS

POWER

Real Power - REAL TIME KW	3 KW
Real Power, Phase A	1 KW
Real Power, Phase B	0 KW
Real Power, Phase C	1 KW
Peak Negative Power	-11709 W
Date & Time of Peak	12:15 PM 01 Apr 2019

Reset Enable

DEMAND

Average Demand Power	4 KW
Peak demand power	8 KW
Date & Time of Highest Peak Demand	07:00 AM 01 Apr 2019

ENERGY

Total positive energy	54614 kWh
Net Energy, Phase A	17670 kWh
Net Energy, Phase B	17343 kWh
Net Energy, Phase C	18825 kWh
Total net reactive energy	29266 kVARh

REACTIVE POWER

Reactive Power, All Phases	3 kVAR
Reactive Power, Phase A	1 kVAR
Reactive Power, Phase B	1 kVAR
Reactive Power, Phase C	2 kVAR

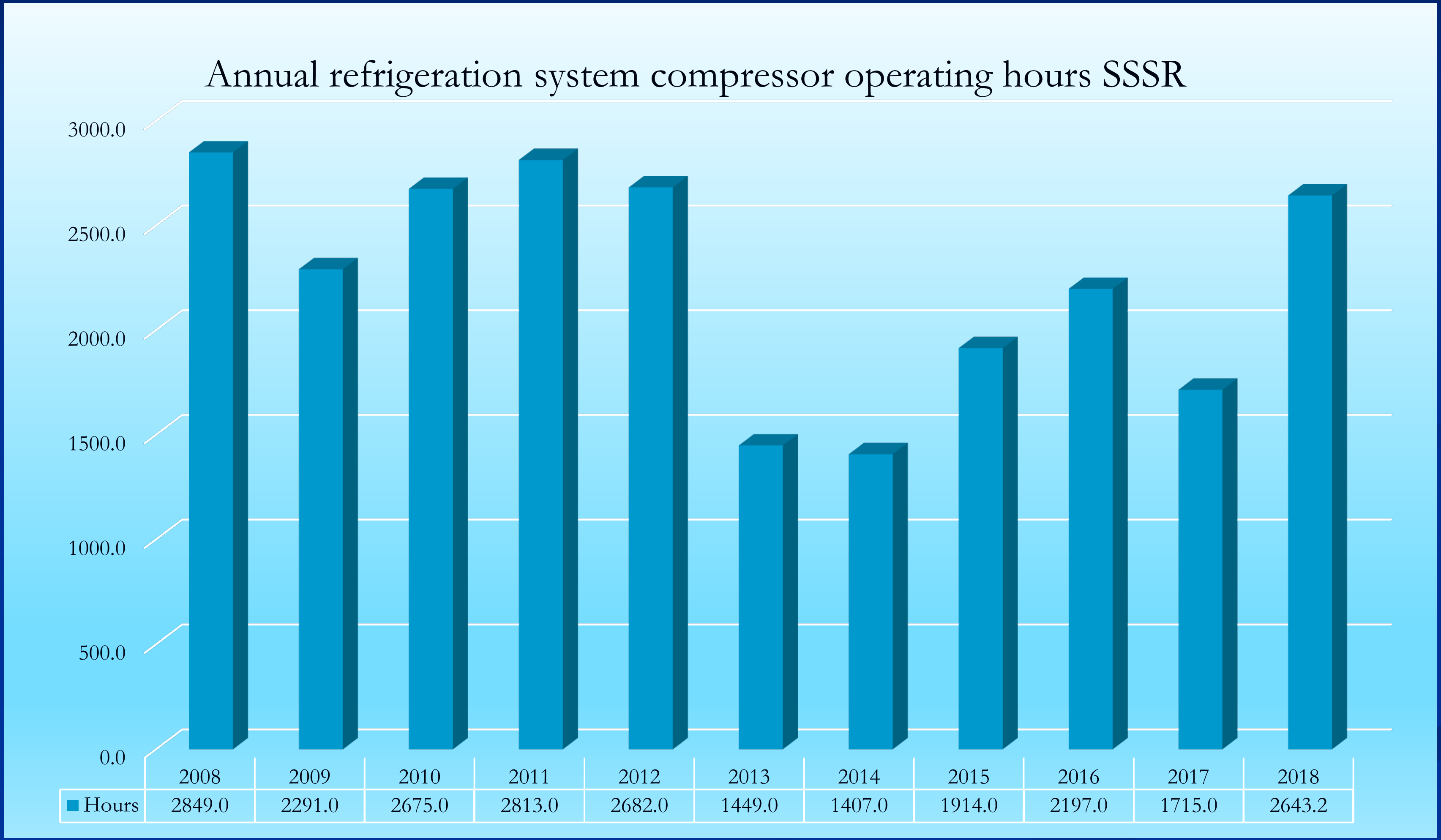
POWER FACTOR

Power Factor Average	0.647
Power Factor, Phase A	0.901
Power Factor, Phase B	0.515
Power Factor, Phase C	0.476

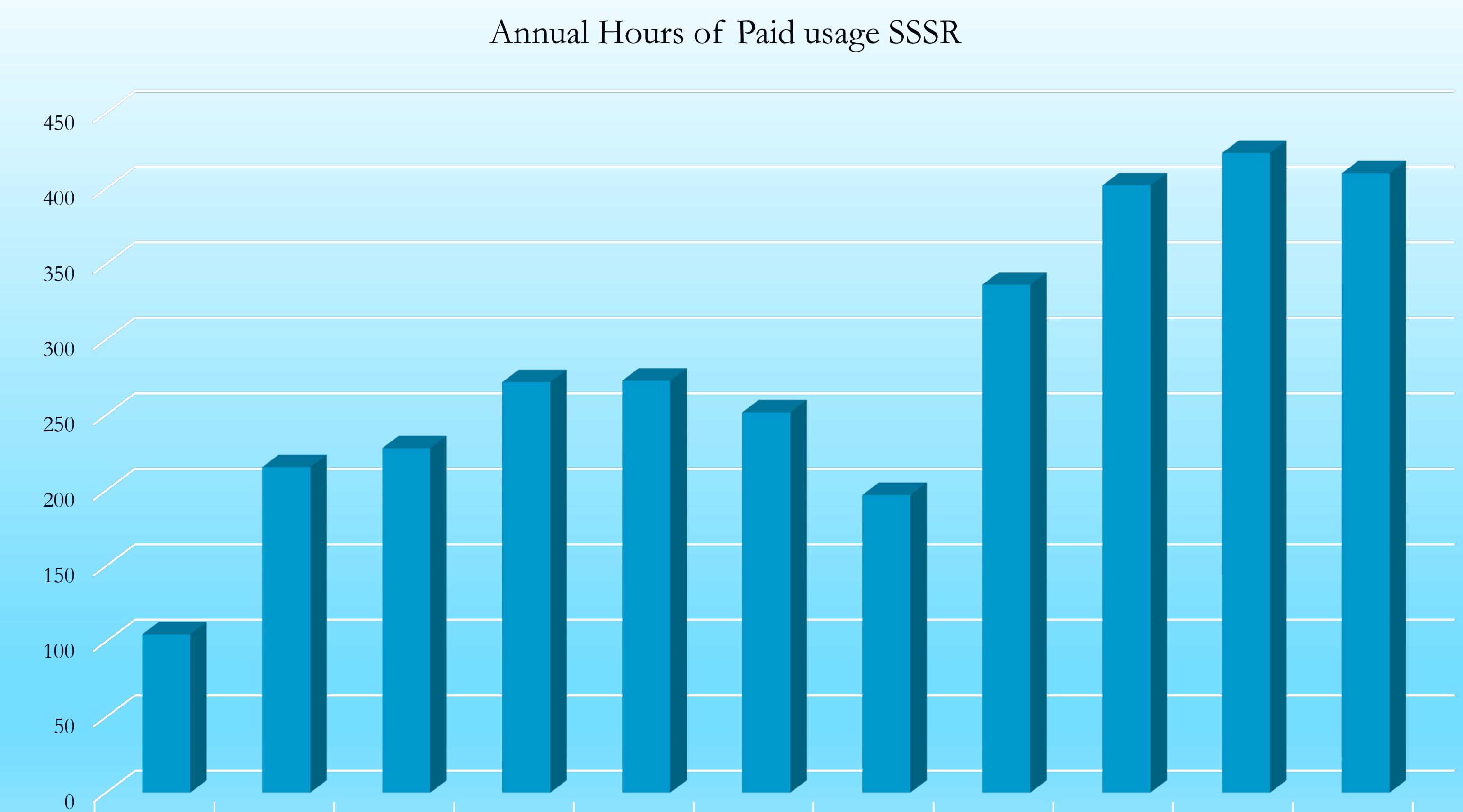
Power Meter monitors the Main Building service : 480 Volts, 800 Amps

Note : The Demand Power value reflects the last 15 minutes of usage

Projects – Energy

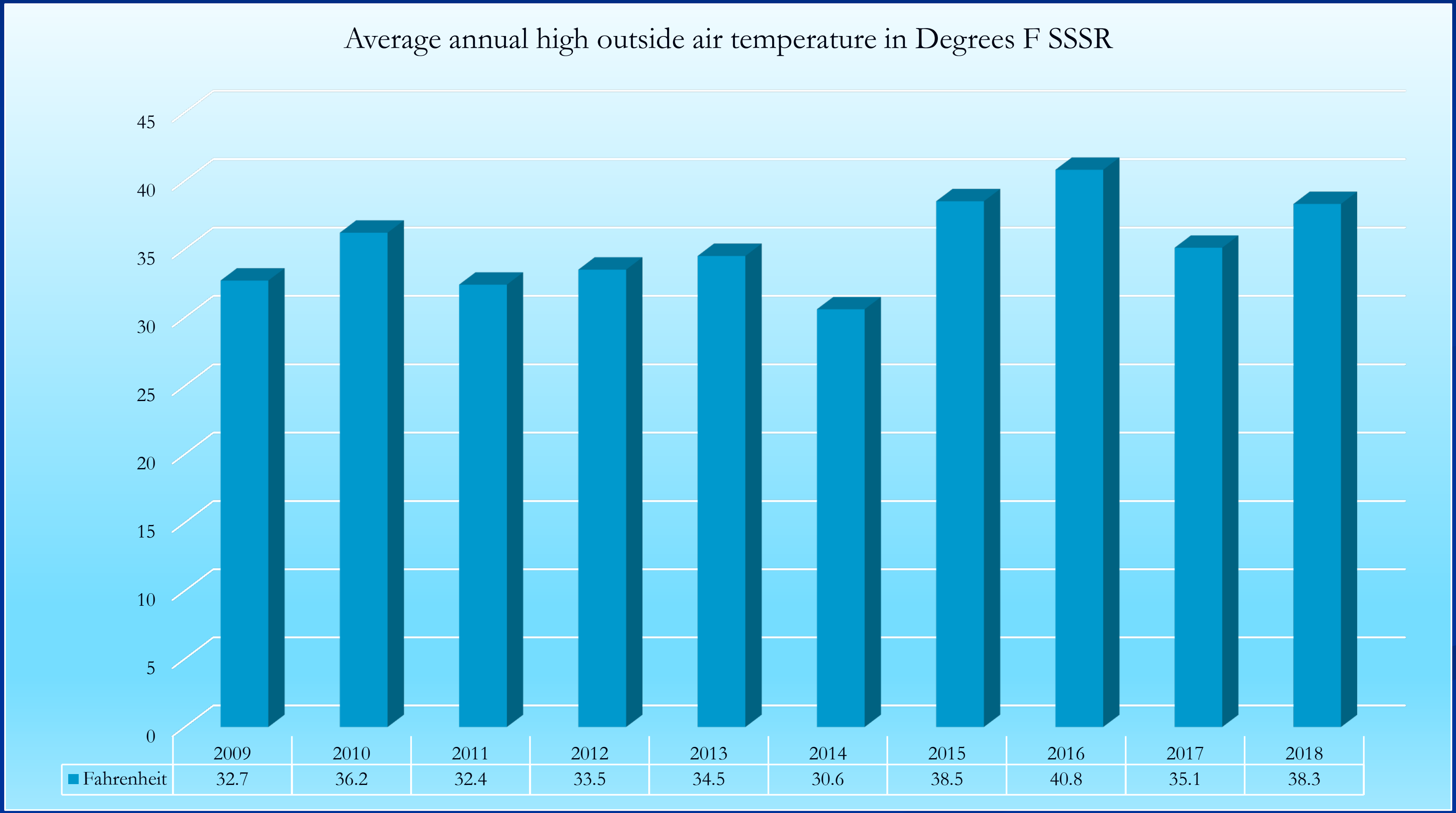


Projects – Energy



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Hours	104.75	215.5	228	271.75	272.75	251.75	197	336.25	402	423.5	410

Projects – Energy



Projects – Natural Gas

We have changed out four furnaces and two water heaters. These were changed out at the end of their life cycle to high efficiency units. Two furnaces and one water heater we were able to get grants which covered 50% of the cost. This is when one of the energy audits was undertaken. It was part of the grant requirements from the Municipal Climate Change Action Center (MCCAC) The first items were just night setback thermostats, we have also insulated our hot water lines – this was done when they were replaced.

Projects – Natural Gas

The bleacher heating controls were change and a timer to turn them off and on. The spectators have to turn them on and they operate for 60 minutes. When the building is not in use they are not on. They are also controlled by the energy management system so when the temperature gets above 13 degrees Celsius inside or 20 degrees Celsius outside the bleacher heaters will turn off.

Projects – Water

- One of the first water projects was fix all the leaks, faucets, toilets, taps, change to low flow heads in showers and on taps - this had the largest effect on the consumption and was the cheapest undertaking.
- One of the other projects that made a difference was with low flow fixtures. The first one was changing the controls on the showers, they are low flow but they are also controlled by motion sensors. When they were changed we were also able to get a grant to cover 50% of the cost.

Savings

- What are the savings? Some of the savings are not easily calculated, power factor correction can help reduce your T & D charges, power cleaning improves the operation of electrical equipment by removing power spikes which can extend its life. Extending the equipment's life also saves us money.

Savings

- By making your equipment operate more effectively, you can also reduce its maintenance costs. Only operating the equipment when needed reduces your utilities and extends the equipment's life. Alternative energy – if produced during the highest usage periods can have an effect on your electrical demand, if you lower this part of your bill (included as part of the distribution fees) it will effect you annually.

Savings

Water usage						
Oilfields Regional Arena						
	Annual					
	Consumption	Gallons	Cost		Reduced	
Year	Imperial Gallons	Reduced	per 1,000 gallons	Savings	Metric Tons CO2	
2003	678,000		$ 2.70			
2004	362,000	316,000	$ 2.70	$ 853.20	10.0	
2005	321,000	357,000	$ 2.80	$ 999.60	11.3	
2006	303,000	375,000	$ 2.95	$ 1,106.25	11.9	
2007	340,000	338,000	$ 3.55	$ 1,199.90	10.7	
2008	406,000	272,000	$ 3.55	$ 965.60	8.6	
2009	461,000	217,000	$ 4.97	$ 1,078.49	6.9	
2010	446,476	231,524	$ 4.97	$ 1,150.67	7.3	
2011	360,463	317,537	$ 4.97	$ 1,578.16	10.0	
2012	404,193	273,807	$ 4.97	$ 1,360.82	8.7	
2013	352,325	325,675	$ 9.09	$ 2,960.39	10.3	
2014	344,977	333,023	$ 9.32	$ 3,103.77	10.5	
2015	347,552	330,448	$ 9.55	$ 3,155.78	10.5	
2016	313,858	364,142	$ 9.78	$ 3,561.31	11.5	
2017	299,510	378,490	$ 9.78	$ 3,701.63	12.0	
2018	327,974	350,026	$ 10.70	$ 3,745.28	11.1	
	Cumulative saving	4,779,672		$ 30,520.85	151.3	

Savings

Electrical consumption purchased from grid (does not include alternative enery)					
Oilfields Regional Arena					
	Electricity				
	Consumption	Difference	Reduced	Cost	
Year	KWhrs	KW Hours	Metric tons of CO2	per KW Hour	Savings
1999	265,000				
2004	255,229	9,771	7.3	$ 0.06	$ 586.26
2005	238,096	26,904	20.1	$ 0.06	$ 1,614.24
2006	226,088	38,912	29.0	$ 0.06	$ 2,334.72
2007	233,050	31,950	23.8	$ 0.06	$ 1,917.00
2008	235,718	29,282	21.8	$ 0.06	$ 1,756.92
2009	219,554	45,446	33.9	$ 0.09	$ 4,090.14
2010	202,585	62,415	46.5	$ 0.09	$ 5,617.35
2011	224,504	40,496	30.2	$ 0.09	$ 3,644.64
2012	243,404	21,596	16.1	$ 0.09	$ 1,943.64
2013	241,106	23,894	17.8	$ 0.09	$ 2,150.46
2014	210,412	54,588	40.7	$ 0.06	$ 3,275.28
2015	261,130	3,870	2.9	$ 0.06	$ 232.20
2016	223,789	41,211	30.7	$ 0.06	$ 2,472.66
2017	203,417	61,583	45.9	$ 0.06	$ 3,694.98
2018	191,989	73,011	54.4	$ 0.06	$ 4,380.66
	Cumulative saving:	**564,929**	**421**		**$ 39,711.15**

Savings

Natural Gas					
Oilfields Regional Arena				Average	
	Annual		Reduced	Cost for	
Year	Consumption GJ	Difference	Metric Tons CO2	Gas	Savings
2008	2284.77				
2009	2265.1	19.67	1	3.74	$ 73.57
2010	1928.6	356.17	16.9	4.02	$ 1,431.80
2011	1935.55	349.22	16.6	7.2	$ 2,514.38
2012	1786.82	497.95	24	3.98	$ 1,981.84
2013	1764.32	520.45	25.2	4.72	$ 2,456.52
2014	1754.68	530.09	25.7	6.39	$ 3,387.28
2015	1429.1	855.67	42	5.28	$ 4,517.94
2016	1345.58	939.19	46	5.26	$ 4,940.14
2017	1508.29	776.48	39	6.01	$ 4,666.64
2018	1462.32	822.45	41.5	5.93	$ 4,877.13
	Cumulative savings	5,667.34	277.90		$ 30,847.24

Savings

Electrical consumption purchased from grid (does not include alternative enery)					
SSSR Electricity					
Annual Consumption		**Difference**	**Reduced**	**Cost**	
Year	**KW Hours**	**KW Hours**	**Metric tons of**	**per KW Hour**	**Savings**
2008	167,114		CO2 Equivalent		
2009	151,665	15,449	11.5	$ 0.09	$ 1,390.41
2010	170,376	-3,262	-2.4	$ 0.09	-$ 293.58
2011	170,000	-2,886	-2.2	$ 0.09	-$ 259.74
2012	177,973	-10,859	-8.1	$ 0.09	-$ 977.31
2013	141,143	25,971	19.4	$ 0.09	$ 2,337.39
2014	123,946	43,168	32.2	$ 0.06	$ 2,590.08
2015	146,976	20,138	15.0	$ 0.06	$ 1,208.28
2016	167,596	-482	-0.4	$ 0.06	-$ 28.92
2017	142,192	24,922	18.6	$ 0.06	$ 1,495.32
2018	154,599	12,515	9.3	$ 0.06	$ 750.90
Cumulative savings		**124,674**	**93**		**$ 8,212.83**

Savings

Water					
Annual Consumption SSSR					
	Imperial	Gallons	Cost per		Reduced
Year	Gallons	Reduced	1,000 gallons	Savings	Metric tons of
2009	35,000				CO2 Equivalent
2010	77,088				
2011	24,505	52,583	$ 4.97	$ 261.34	1.7
2012	27,870	49,218	$ 4.97	$ 244.61	1.6
2013	17,971	59,117	$ 9.09	$ 537.37	1.9
2014	46,941	30,147	$ 9.32	$ 280.97	1.0
2015	23,652	53,436	$ 9.55	$ 510.31	1.7
2016	29,498	47,590	$ 9.78	$ 465.43	1.5
2017	27,034	50,054	$ 9.78	$ 489.53	1.6
2018	30,642	46,446	$ 10.70	$ 496.97	1.5
Cumulative savings		388,591		$ 3,286.54	12.3

Savings

Town Office	Electricity		Reduced		
	Consumption	Difference	Metric tons of	Cost per	
Year	KW hours	KW Hours	CO2 Equivelent	KW Hour	Savings
2010	66,002				
2011	54,360	11,642	8.7	$ 0.09	$ 1,047.78
2012	51,640	14,362	10.7	$ 0.09	$ 1,292.58
2013	47,135	18,867	14	$ 0.09	$ 1,698.03
2014	49,123	16,879	12.6	$ 0.06	$ 1,012.74
2015	43,519	22,483	16.7	$ 0.06	$ 1,348.98
2016	42,700	23,302	17.3	$ 0.06	$ 1,398.12
2017	46,162	19,840	14.8	$ 0.06	$ 1,190.40
2018	41,124	24,878	17.6	$ 0.06	$ 1,492.68
Cumulative savings		152,253	112		$ 10,481.31

Savings

Town office	Natural Gas		Reduced		
Gj	Consumption	Difference	Metric tons of	Cost per	
Year	GJ's	GJ's	CO2 Equivelent	GJ's	Savings
2011	484.27				
2012	428.22	56.05	2.8	$ 3.98	$ 223.08
2013	414.67	69.6	3.5	$ 4.72	$ 328.51
2014	411.94	72.33	3.6	$ 6.39	$ 462.19
2015	332.8	151.47	7.6	$ 5.28	$ 799.76
2016	398.53	85.74	4.3	$ 5.26	$ 450.99
2017	638	-153.73	-7.7	$ 6.01	-$ 923.92
2018	443.47	40.8	2.1	$ 6.41	$ 261.53
Cumulative savings		**322**	**16**		**$ 1,602.14**

Savings

Street Lights Converted to LED					
	Electricity		Reduced		
	Consumption	Difference	Metric tons of	Cost per	
Year	KW hours	KW Hours	CO2 Equivelent	KW Hour	Savings
2016	215,353				
2017	163,392	51,961	38.7	$ 0.06	$ 3,117.66
2018	94,488	120,865	90.1	$ 0.06	$ 7,251.90
Cumulative savings		**172,826**	**129**		**$ 10,369.56**

Oilfields Regional Arena

611 3rd Street S.W., Black Diamond, AB T0L 0H0 | Map It

Portfolio Manager Property ID: 6047561

Year Built: 1988

Edit

Finish your application for ENERGY STAR Certification

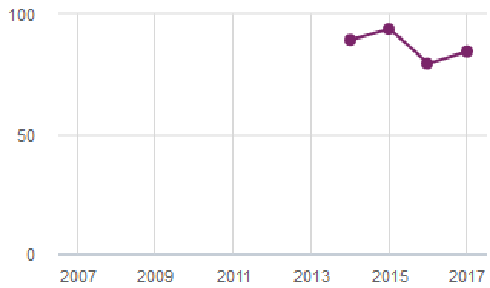
ENERGY STAR Score (1-100)

Current Score: 96

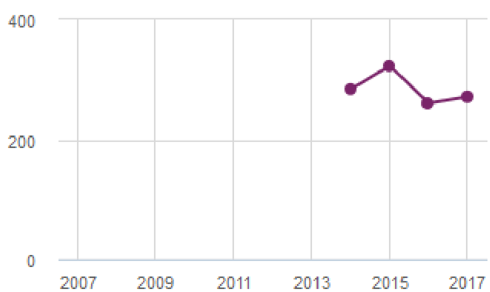
Baseline Score: 94

Summary | Details | Energy | Water | Waste & Materials | Goals | Design

Source EUI Trend (kBtu/ft²)



Total GHG Emissions Trend (Metric Tons CO2e)



Change Metrics

Change Time Periods

Metrics Summary

Metric	Dec 2014 (Energy Baseline)	Aug 2018 (Energy Current)	Change
ENERGY STAR Score (1-100)	94	96	2.00 (2.10%)
Source EUI (kBtu/ft²)	89.2	82.0	-7.20 (-8.10%)
Site EUI (kBtu/ft²)	68.4	62.6	-5.80 (-8.50%)
Energy Cost ($)	40,380.27	39,638.38	-741.89 (-1.80%)
Total GHG Emissions Intensity (kgCO2e/ft²)	8.4	7.8	-0.60 (-7.10%)
Water Use (All Water Sources) (kgal)	416.1	Not Available	N/A
Total Waste (Disposed and Diverted) (Tons)	7.14	7.45	0.31 (4.30%)

Check for Possible Data Errors

Run a check for any 12-month time period to see if there are any possible errors found with your data.

Check for Possible Errors

Summary

Start with the simple things, staff behavior modification, then look at what items you have that can be modified to reduce power, gas & water consumption. Insulation, thermostats, when equipment operates, how it operates, why it operates, automate so it is only used when required. Don't only look at the quick payback items, look at longer payback items, once you have reduced utility consumption look at alternative energy. Take advantage of opportunities when they come available. The entire time you need to record the results then compare annually.

Questions?

On behalf of the Town of Black Diamond, we'd like to thank all of you for your time and your attendance. We can only be stronger and more effective by sharing information and working together. What we work on today will benefit future generations.

For additional Information please feel free to contact Les Quinton 403-933-5272 or lesq@town.blackdiamond.ab.ca