

GREENWAVE INNOVATIONS

Partners in Energy Conservation

GREENWAVE INNOVATIONS - OUR SOLUTIONS -





- Energy Consumption Data: Educate, Analyze & Conserve
- Solutions covering all Energy: Electricity, Gas & Water
- Predictive Maintenance & Monitoring: Long Term Solution
- Peak Demand Shaving and Quantifying Carbon Reductions
- Water Leak & Burst Detection
- Partner with our Clients to support their Sustainability Initiatives

Headquarters: Regina, SK

GREENWAVE INNOVATIONS - MINISTRIES, CROWNS & COMMUNITIES -

- Sov't of SK and the Ministry of Environment: Supporting the SK Prairie Resiliency Plan
- Ministry of Central Services: Cooper Place: Finance Ministry building
- Ministry of Education: Awarded contract for 16 schools across 8 divisions
- **SGI:** Premium discount for risk reduction: Greenwave exclusive. Discussing internal facilities
- SaskPower: Joint lab, CEOP program, future virtual net metering and grid management solutions
- SaskTel: Sales agreement & working partnership, SaskTel Collaboration Centre, discussing facilities
- SaskEnergy: Sharing AMI metering data with Greenwave & discussing internal facilities
- First Nations Communities: Partnering with FNPA, ISC (INAC), Tribal Councils, etc.
- **Gov't of Canada:** Low carbon economy fund & quantifying sustainable carbon reductions
- Partnership with SUMA: Supporting municipality's energy management initiatives

GREENWAVE INNOVATIONS - REAL-TIME ENERGY MONITORING -

Cloud based solution with simple hardware architecture

- Zero maintenance and non-intrusive sub-monitoring
- Data on real-time dashboards is delivered in 1 minute increments and never more than 1 minute old
 - Critical for educational, analytical and predictive maintenance benefits
- Software converts energy usage into dollars and carbon emissions
- Manage and display real-time consumption and production metrics offering a complete energy management platform
- Long Term Solution: Continual monitoring with predictive maintenance



AN ACCURATE ASSESSMENT - OFFICE TOWER EXAMPLE -





AN ACCURATE ASSESSMENT - HIGH SCHOOL EXAMPLE -

× Top 20 Circuits and Equipment, Last 24 Hours Top 20 Circuits and Equipment, Last 24 Hours Click and drag to zoom 400,000w Circuit 2019-08-20 2:26 AM (Click label to hide or show) MCC #1: 130.970 W 375,000w MCC #1 MCC #3: 58,246 W MCC #3 350,000w Chiller: 52.953 W Chiller 12,548 W 325,000w PP1: Busduct XFMR 13,980 W MCC-B: 9.658 W PP1 300,000w Panel CS3: 4,301 W MCC-B 4,510 W 275,000w Panel CS3 Commercial Kitchen 142: 2.896 W Panel M 250.000w Panel L1H: 1.689 W Commercial Kitchen 142 1,117 W 225,000w Panel LB1: 1,270 W Panel L1H Panel SD1A: 1,482 W Panel L1F 200.000w Panel L: 1.304 W Panel LB1 Panel L1A: 167 W 175,000w Panel SD1A Panel K: 1,050 W Panel L 150.000w Panel L1M: 1,325 W Panel A: 854 W Panel L1A 125,000w Panel O: 918 W Panel K Panel D: 970 W 100.000w Panel L1M Panel A 75,000w Panel O 50.000w Panel D 25,000w 3:00pm 6:00pm mq00:0 Aug 20 3:00am 6:00am 9:00am 12:00pm 3:00pm Select All



INNOVATIONS

AN ACCURATE ASSESSMENT - MONETARY REPORTS -

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			Past 30 Day	ys	Past 90 Days	Same 30 D	ays Last Year
	Electricity:	Daily Usage Cost	\$94	49	\$844		N/A
		Operating Hours	\$40	01	\$342		N/A
		Off Hours	\$54	48	\$503		N/A
		Monthly Demand Cost	\$13,70	01	\$12,567		N/A
		Average Daily Usage	12,146 kV	/h	10,809 kWh		N/A
		Estimated Cost By	Circuit. Past	t 30 Da	VS (i) Select Date Ra	nge	
	Total Measu	red Cost: \$42,159 (\$512	,937/yr)	Total	Operating Hours	s Off Hours	Demand Charge
FCC: MCC-MN							
AG: Chiller							\$1479
AG: GreenSpot	-					\$1222	
	-				4005	+	
AG: Distribution DP-603	-				\$965		
Heating Pump P-1				\$855			
FCC: CIBC Service				\$830			
FCC: Secondary Boiler Heat			\$732				
Pump P-2	-		\$714				
ECC: Elevator C	-		4705				
FCC: Elevator C			\$706				
FCC: Elevator C FCC: Chiller	-						
FCC: Elevator C FCC: Chiller FCC: Elevator D			\$704				

AN ACCURATE ASSESSMENT - MONETARY REPORTS -

	~		Past SU Days	Fast 90 Days	Same SU Days L	ast redi	
	Electricity:	Daily Usage Cost	\$949	\$844		N/A	
		Operating Hours	\$401	\$342		N/A	
		Off Hours	\$548	\$503		N/A	
		Monthly Demand Cost	\$13,701	\$12,567		N/A	
		Average Daily Usage	12,146 kWh	10,809 kWh		N/A	
		Estimated Demand Cha	arge By Circuit, P	ast 30 Days і Select	: Date Range		
	Demand Cha	arge: \$13,701 (\$166,6 !	97/yr) , 32 % of	total 29%	39%	32%	1
				Total Operating Ho	ours Off Hours	Demand Charge	ļ
AG: Chiller	-						
AG: Distribution DP-603			\$456				
FCC: MCC-MN			\$429				
AG: GreenSpot	-		\$415				
		e e	248				
FCC: Chiller			5-0				
FCC: Chiller		¢225					
FCC: Chiller FCC: Elevator C		\$325					
FCC: Chiller FCC: Elevator C FCC: Elevator B		\$325					
FCC: Chiller FCC: Elevator C FCC: Elevator B FCC: P-6 Condenser Water Pump		\$325 \$319 \$297					
FCC: Chiller FCC: Elevator C FCC: Elevator B FCC: P-6 Condenser Water Pump FCC: Elevator D		\$325 \$319 \$297 \$290					

AN ACCURATE ASSESSMENT - COMMERCIAL CLIENT: BEFORE -

FCC: MCC-MN



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AN ACCURATE ASSESSMENT - COMMERCIAL CLIENT: AFTER -

FCC: MCC-MN



10

COOPER PLACE- GOVERNMENT OF SASKATCHEWAN PROJECT -



- 6 month energy monitoring project resulted in the following results:
- > 30% Electrical Reduction: \$6000 / Mo
- > 20% Reduction of peak demand usage
- Removed 500 Metric Tonnes CO2e / Year
- 2 3 year payback on Greenwave services
- NOTE: This building had already achieved BOMA BEST designation



- IMPLEMENTING RENEWABLES -

- Identify & implement energy efficiency opportunities first
- Properly size and manage renewables w/ storage
- Monitor & Display both usage & generation



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PEAK SHAVING - REDUCING PEAK DEMAND: CLIENT, UTILITY & CARBON -



ELECTRICAL CARBON CONSUMPTION INTENSITY - SOURCE: NATIONAL INVENTORY REPORT – APR 15, 2019 -



- SK CARBON OFFSET SYSTEM

- Gov't of SK is developing a provincial carbon offset system
- Program will "Create value for reduced GHG emissions"
- Detailed "Before" vs "After" measurement and verification will be key to quantifying permanent GHG emission reductions
- Implementation of the program to begin in 2020; purchases in 2021
- Projects stretching back to 2017 expected to be eligible to participate
- Significant opportunity to produce offsets through energy efficiency



WATER MONITORING - CONSERVATION, LEAKS & BURSTS -





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- MANAGING MULTIPLE LOCATIONS -



MAINTENANCE STRATEGIES - PREDICTIVE MAINTENANCE -

- Alerts of potential equipment failures: changes in electrical patterns, breakers nearing capacity, energy consumption increases, short cycling, power factor decreases, etc.
- Alerts of equipment failures: zero power (i.e. RTU) or too much power (i.e. sump pump)
- Alerts that provide run-time (odometer) reminders for all mechanical maintenance
- Alter preventative maintenance schedules based on performance
 - > All regularly scheduled maintenance work is justified and validated
- Real-time water monitoring for leak detection with automatic shut-off mechanism
- Monitor and schedule maintenance from one centralized location
- Safety! Ensure emergency & exit lights, security & fire alarm panels, etc. are indeed working
- Insurance Premium Discounts!

GREENWAVE

ASSET MANAGEMENT - EQUIPMENT PERFORMANCE TRACKING -

Equipment Details: RTU 1 Kitchen

Overall Score:	64	(as of 2015-03-21)		
Average Energy Usage Per Day in kWh	28	View SiteSage Equipment Page		
Туре:	Rooftop (Package) Unit with Heating - Gas			
Make	Trace			
mano.	1 rang	<u>1153</u>		
Model:	YCD151C3H0AA			
Serial #.	R06100917D			
Age:	15			
Tons	5			
SEER:				
Heat:	Gas			
Stages (Cooling):	2			
Economizer?:	No			
Overall Condition:	Fair			
Cabinet Condition:	Good			
Condenser Coil Condition:	Fair			
Standing Water?	No			
Proper Drainage?	Yes			
Refrigerant Type:	R22			
Refrigerant Line Issues?	No			
Electrical Issues?	No			
Curb Adapter.	No			
Notes:				
Installer/Captured By:	Dell Mercer			

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19

- REAL-TIME DISPLAY: SOCIAL MEDIA -





This is why I feel saving energy is so important.

#greenwave
#energyeffeciency
#ValleyManorElementary



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