



University and Colleges PME & PowerLogic Users Group

Schneider Electric

October 21, 2021

Webinar

Life Is On

Schneider
Electric

Agenda

- 1 **Introductions**
- 2 **Objectives**
- 3 **Case Study: Queens University**
- 4 **Case Study: U of Guelph**
- 5 **PME reporting and hosting options**
- 6 **Discussion**

Schneider Electric Team

Multi-discipline Team

- Schneider Electric Canada:
 - Yoann Briant, National Director
 - Mauricio Gonzalez, Sales Manager
 - Roger LaPierre, Business Development
 - Lakmini Perera, End User Sales
 - Matthew Puscus, Digital Energy Solutions
 - Jesus Vargas, Digital Energy Solutions
 - Tirtho Dutta Gupta, P.Eng.
- Schneider Local Rep:
 - Adam Campbell
 - Eric Langford



Institutions Represented

Universities and colleges are active energy managers.

- Following post-secondary campuses have PME software and/or Schneider Meters. This is a partial list of installations in Ontario.



Institutions Represented

Alphabetical Order

Brock University:	Elenore Breslow
Carleton University:	Penny Jastremski, Gavin Symonds
Conestoga College:	Tony Sasso
Durham College / UOIT:	Stephen Cassar, Brent Skillen
Georgian College:	Duncan Mills
University of Guelph:	Doug Doel
McMaster University:	Joe Emberson, Alvin Baldovino, Elliott Jeyaseelan
Queens University:	Janet Pollard, Nathan Splinter, David Gerrish
Seneca College:	Jon Dilworth
University of Toronto:	Keith Foster, Ahmed Azhari
University of Waterloo:	Chris Ford
University of Western Ont:	Evan Green, Mike Greene
Wilfrid Laurier University:	Adam Clarkson
York University:	Steve Prince, Bogdan Strafalogea



Objective

What and Why a Users Group?

- University and College campuses are viewed as leaders in their communities.
- We want to ensure that the PowerLogic and ION meters and the Power Monitoring Expert (PME) software is being used to meet the needs of the various users.
- We believe that bringing together users with common requirements, it will be possible to maximize these the significant investments in metering and energy monitoring.
- If common concerns or requirements are identified, then Schneider should be able to adapt a solution to meet a common need among users. University and College campuses are an important customer base for Schneider Electric.



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Case Study – Queens University

- Dave Gerrish

Agenda – 10 Minutes on PME at Queen's University



1. Our metering needs
2. The PME system at Queen's
3. How we use PME



Our metering needs



Queen's is the size of a small municipality, in energy and water use

- Around 100 buildings
- 100 GWh of electricity consumption per year
- Central Heating Plant
 - 15 MW of electrical capacity
 - 150 MW of steam heat capacity



Our metering needs



What are our key metering needs?

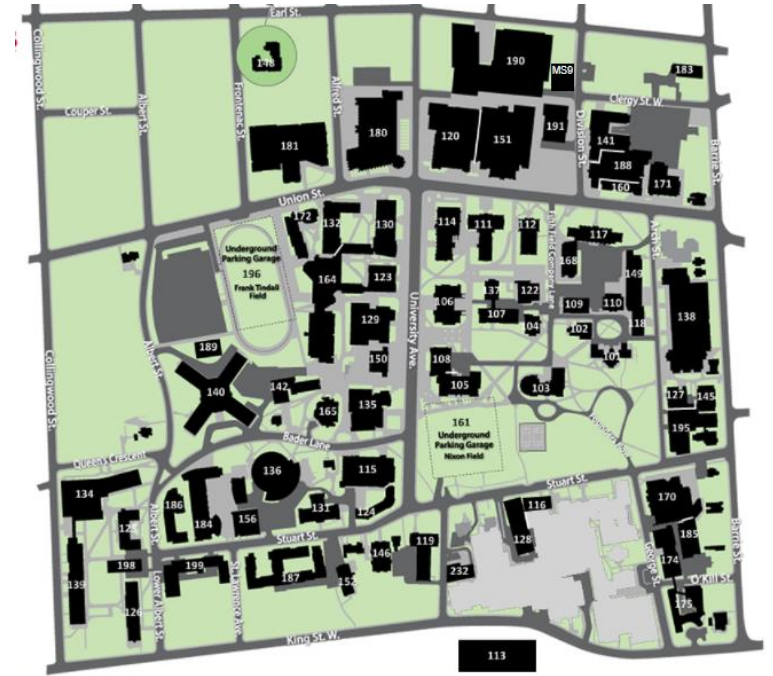
- Billing
 - Queen's shares a substation with Kingston General Hospital
 - Internally we bill the residences group for their energy use
- Monitoring electricity, water, steam and gas use for conservation projects
 - Identifying buildings that are heavy utility users
 - Estimating savings from projects
 - Confirming savings once projects are complete (M&V)
 - Peak shaving

The PME system at Queen's



Electrical

- Queen's has several utility feeders that are consolidated into a single bill
- The utility owned meters on these feeds are either read directly into PME through a read-only connection to the meter or from pulse outputs
- Every building has a Queen's owned Eaton power meter picked up by PME

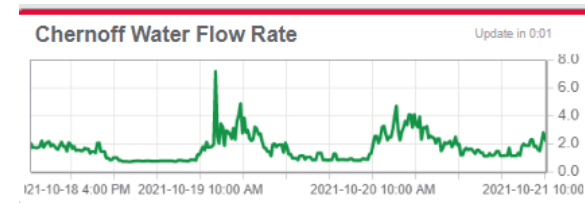
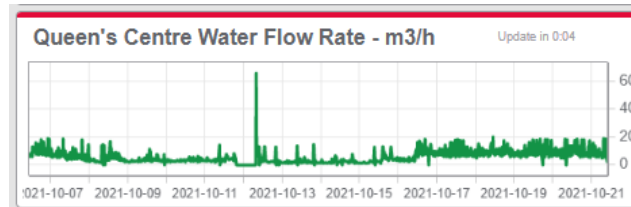
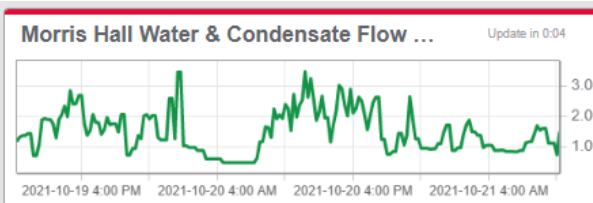


The PME system at Queen's



Mechanical (new!)

- Previously we had no interval data for gas, water, and condensate, monthly reads were done by the utility (water, gas) or by our own trades (condensate)
- We now meter some gas, water, and condensate through PME
- Plans to expand to all buildings once funding approved (~\$3,000 / building)
- Finding a PLC that could read both the pulse outputs from the utility (water, gas) meters and our condensate totalizer heads was a ***SIGNIFICANT*** challenge



What we use PME for - Billing



KGH Substation Energy Usage Report

Usage Summary

Source	Real Energy Net ()
	September, 2021
07 Connel B	280,825.86
08 Burr Wing	62,862,869.58
09 Waldron Tower	595,705.86
10 CPP	67,979,485.26
11 Botterell	137,961.47
12 Etherington	553,844.74
13 Kidd A	1,296,936,017.92
14 Kidd B	326,868.99
15 Emergency B	69,455.87
16 Connell A	443,891.71
17 McLaughlin	430,043.14
18 School of Med	363,782.14
21 Connell 0 Fdr A	306,147.33
22 Connell 0 Fdr B	391,323.65
Total	1,431,678,223.50

The PME Reporting module is used to provide automatic reports for billing purposes

- Convenient way to have periodic data provided via email
- We do sometimes have issues with bugs, a “sanity check” of reports is needed before sending them out

What we use PME for - Conservation



Every project is different, some involve seasonal equipment like chillers, others intermittent equipment like compressors, others are baseload equipment.

In all cases having interval data is extremely helpful to each step.

- Identifying buildings & equipment that are heavy utility users
- Estimating savings from projects
- Confirming savings once projects are complete (M&V)

What we use PME for – Peak shaving operations



From a utility budget management perspective, peak shaving is the top priority.

The Queen's cogen plant is able to sometimes offset more than the total consumption of the campus. As part of our agreement with Utilities Kingston we are not allowed to (virtually) export power.

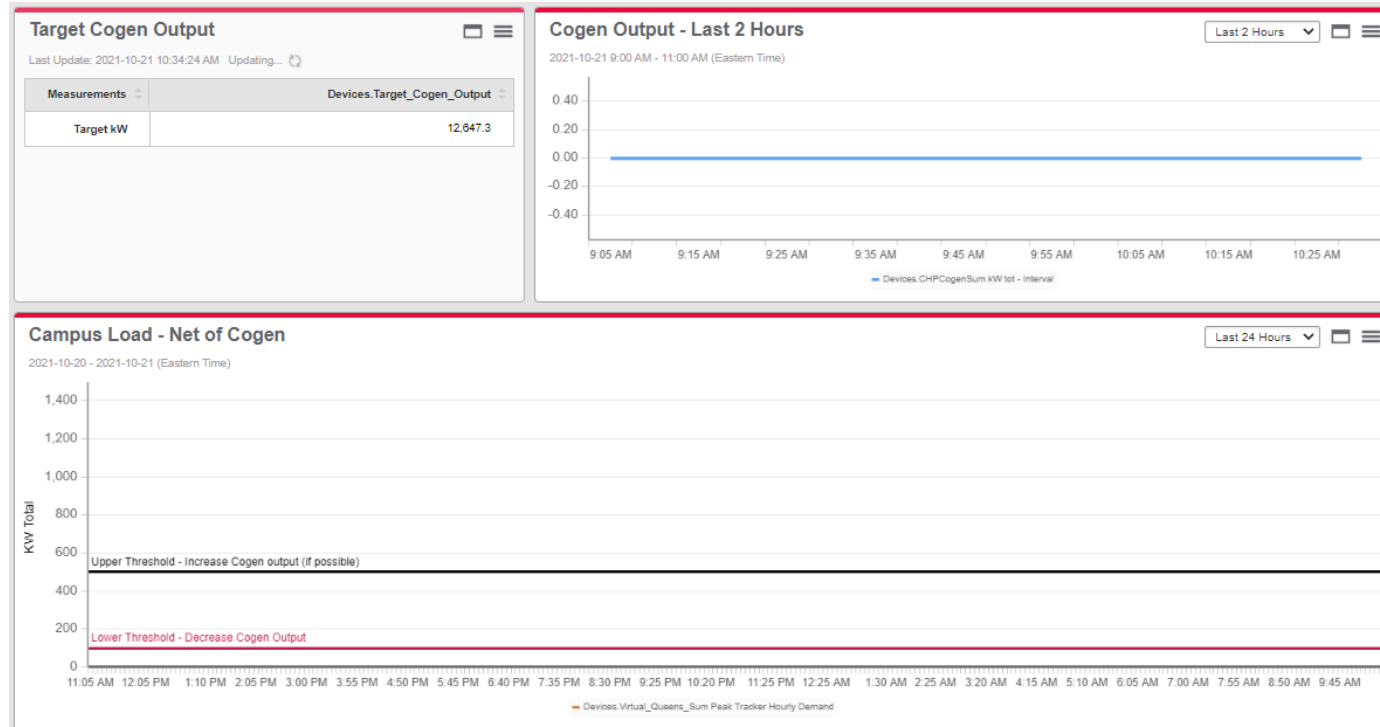
High resolution interval data from this virtual sum account that combines the several feeders coming into the campus with the cogen output allows operators to monitor and manually adjust cogen output using a PME dashboard (next slide).

What we use PME for – Peak shaving operations



For security reasons the cogen control is air gapped from the internet, output adjustments must be made manually.

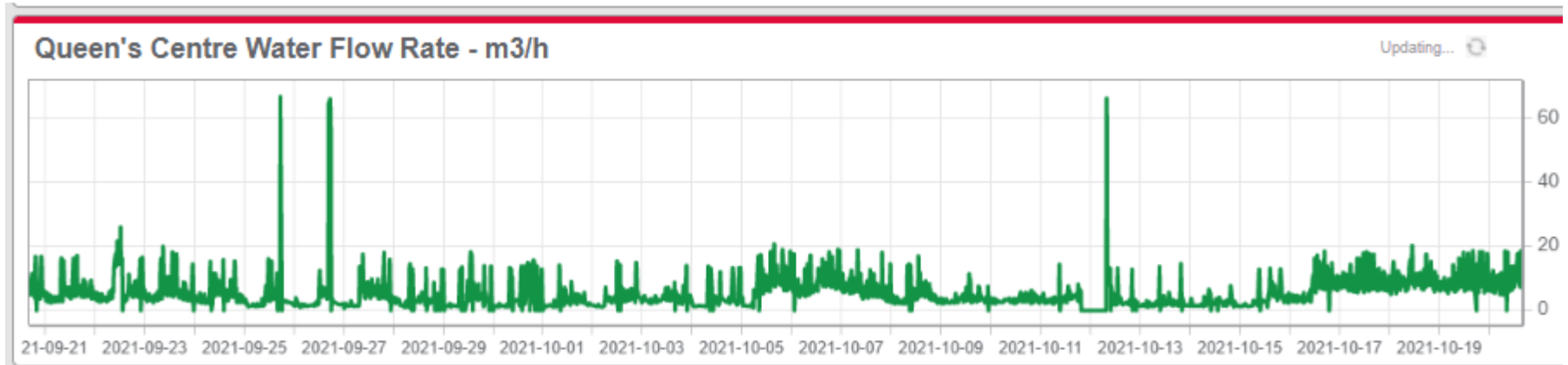
This dashboard is available on a second terminal in the control room.



Other things we use PME for...





Looking for anomalous use that could indicate a problem



Including email alarms for high use, which are easy to set up in Designer

ALARM ! Queen's Centre Water

 pwr_alert@queensu.ca
To David Gerrish; milley.jake@queensu.ca; Pierre Bartkowiak

 You forwarded this message on 10/12/2021 9:36 AM.

Queen's Centre Water has exceeded 50m³/h.

If everyone does a little...

...we'll achieve only a little.

We must do a lot.

Questions?

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University of Guelph PME System Overview and WAGES

October 21st, 2021

Webinar

Agenda

- 1 UofG PME system overview
- 2 Devices in the system
- 3 How the users get access to the system
- 4 WAGES solution
- 5 Summary

UofG - PME system overview

Over 25 years running...

- History about the system. Migration process and historical information over the time.
- Large variety of devices connected in the university network.
- 50 Buildings monitored at different levels.
- Multiple screens, dashboards, trends and reports deployed.

Evolution



SMS system

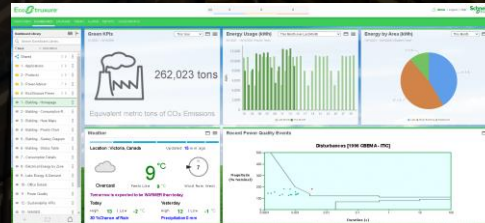


ION Enterprise



ION EEM

Power Monitoring Expert (PME)



UofG - PME system devices

From the old technology to new one...

- Different type of gateways to bring serial devices to the network:
- EGXs 100, 300 and 400,
- ECC21, PM8ECC.
- Link 150
- Meters used as gateway passthrough.

Total of 377 devices connected

- CM2000, CM3000 and CM4000 Series
- PM500, PM600, PM700 and PM800 Series
- ION 7650, Micrologic unit trip. PM5000
- ION9000 and PM8000
- Third party meters and breakers.
- WAGES Devices

Evolution



EGX 400



Link 150

Circuit Monitoring Series



Power Monitor



PM500 Series

ION Power Quality



Schneider Breakers



ION9000 The most accurate meter in the world



PQ 8000 Series

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UofG - PME system User Access

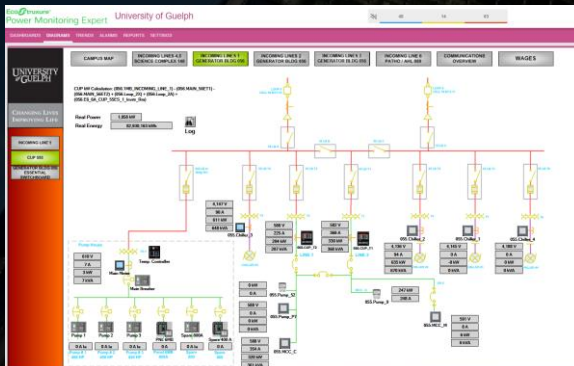
Who is using the system? And what are they getting out of this?

Users:

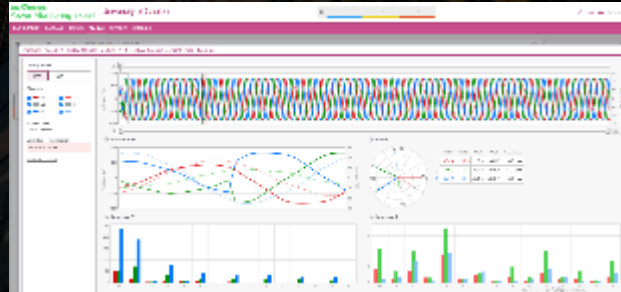
- Operators in the Central Utility Plant.
- Engineering Staff
- Electrical contractors
- Electrical Shop
- Consultants

- Note: The access requires VPN connection to the university network, the users can get on their computers and smartphones the PME Web tools.

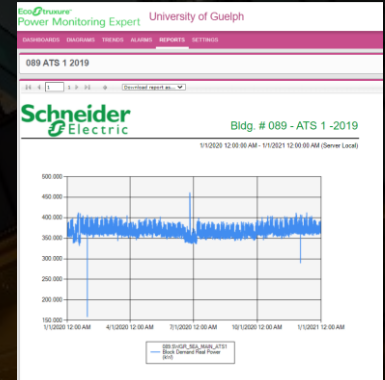
SLD Diagrams up to date



Dip Power Quality Analysis



Energy Reports Reports

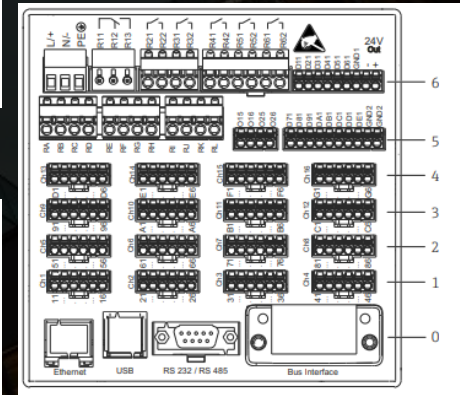


UofG - WAGES

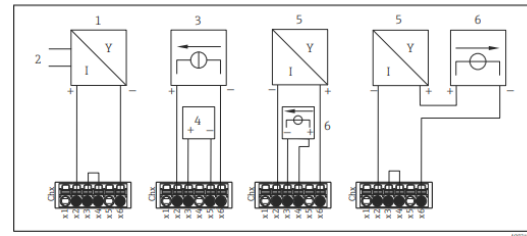
Simple solution to capture the nonelectrical sources...

- Advanced Data Manager Memograph M, RSG45.
- The Advanced Data Manager is a flexible and powerful system for organizing process value.
- Allow to do calculations.
- Expose all the information in Modbus TCP and other protocols.
- Easy access through the meter web page.
- HART input cards for sensor directly connected

Memograph M RSG45



6.3.5 Connection example: HART® input in a point-to-point connection

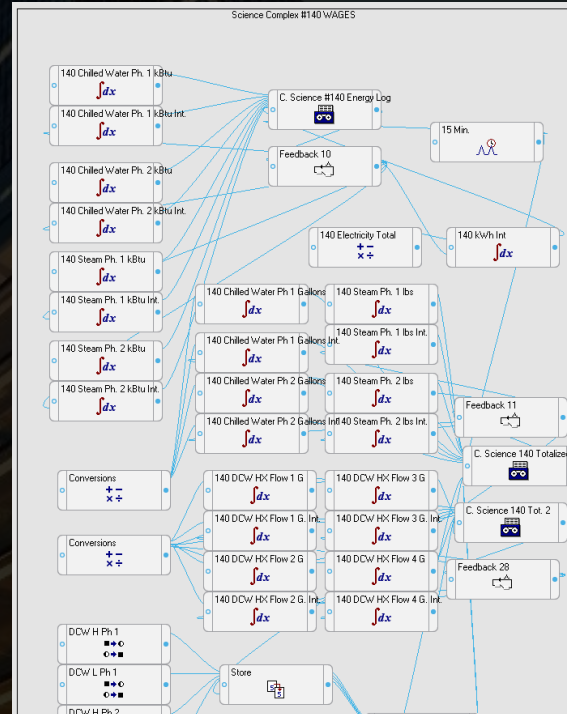


UofG - WAGES

Bring the information from the data manager to PME...

- Create the Modbus Driver associated to the register available in the RSG 45.
- Additional calculation in VIP (If this is required).

Name	Modbus address	Format	Units	Handle	Scale
CHWS_T_Ph1	90032	IEEEFloat	139217729		
CHWS_T_Ph2	90035	IEEEFloat	139217730		
CHWS_T_Ph3	90038	IEEEFloat	139217731		
CHWS_T_Ph4	90041	IEEEFloat	139217732		
CHWS_T_Ph5	90044	IEEEFloat	139217733		
CHWS_T_Ph6	90047	IEEEFloat	139217734		
CHWS_T_Ph7	90050	IEEEFloat	139217735		
CHWS_T_Ph8	90053	IEEEFloat	139217736		
CHWS_T_Ph9	90056	IEEEFloat	139217737		
CHWS_T_Ph10	90059	IEEEFloat	139217738		
CHWS_T_Ph11	90062	IEEEFloat	139217739		
CHWS_T_Ph12	90065	IEEEFloat	139217740		
CHWS_T_Ph13	90068	IEEEFloat	139217741		
CHWS_T_Ph14	90071	IEEEFloat	139217742		
CHWS_T_Ph15	90074	IEEEFloat	139217743		
CHWS_T_Ph16	90077	IEEEFloat	139217744		
CHWS_T_Ph17	90080	IEEEFloat	139217745		
CHWS_T_Ph18	90083	IEEEFloat	139217746		
CHWS_T_Ph19	90086	IEEEFloat	139217747		
CHWS_T_Ph20	90089	IEEEFloat	139217748		
CHWS_T_Ph21	90092	IEEEFloat	139217749		
CHWS_T_Ph22	90095	IEEEFloat	139217750		
CHWS_T_Ph23	90098	IEEEFloat	139217751		
CHWS_T_Ph24	90101	IEEEFloat	139217752		
CHWS_T_Ph25	90104	IEEEFloat	139217753		
CHWS_T_Ph26	90107	IEEEFloat	139217754		
CHWS_T_Ph27	90110	IEEEFloat	139217755		
CHWS_T_Ph28	90113	IEEEFloat	139217756		
CHWS_T_Ph29	90116	IEEEFloat	139217757		
CHWS_T_Ph30	90119	IEEEFloat	139217758		
CHWS_T_Ph31	90122	IEEEFloat	139217759		
CHWS_T_Ph32	90125	IEEEFloat	139217760		
CHWS_T_Ph33	90128	IEEEFloat	139217761		
CHWS_T_Ph34	90131	IEEEFloat	139217762		
CHWS_T_Ph35	90134	IEEEFloat	139217763		
CHWS_T_Ph36	90137	IEEEFloat	139217764		
CHWS_T_Ph37	90140	IEEEFloat	139217765		
CHWS_T_Ph38	90143	IEEEFloat	139217766		
CHWS_T_Ph39	90146	IEEEFloat	139217767		
CHWS_T_Ph40	90149	IEEEFloat	139217768		
CHWS_T_Ph41	90152	IEEEFloat	139217769		
CHWS_T_Ph42	90155	IEEEFloat	139217770		
CHWS_T_Ph43	90158	IEEEFloat	139217771		
CHWS_T_Ph44	90161	IEEEFloat	139217772		
CHWS_T_Ph45	90164	IEEEFloat	139217773		
CHWS_T_Ph46	90167	IEEEFloat	139217774		
CHWS_T_Ph47	90170	IEEEFloat	139217775		
CHWS_T_Ph48	90173	IEEEFloat	139217776		
CHWS_T_Ph49	90176	IEEEFloat	139217777		
CHWS_T_Ph50	90179	IEEEFloat	139217778		
CHWS_T_Ph51	90182	IEEEFloat	139217779		
CHWS_T_Ph52	90185	IEEEFloat	139217780		
CHWS_T_Ph53	90188	IEEEFloat	139217781		
CHWS_T_Ph54	90191	IEEEFloat	139217782		
CHWS_T_Ph55	90194	IEEEFloat	139217783		
CHWS_T_Ph56	90197	IEEEFloat	139217784		
CHWS_T_Ph57	90200	IEEEFloat	139217785		
CHWS_T_Ph58	90203	IEEEFloat	139217786		
CHWS_T_Ph59	90206	IEEEFloat	139217787		
CHWS_T_Ph60	90209	IEEEFloat	139217788		
CHWS_T_Ph61	90212	IEEEFloat	139217789		
CHWS_T_Ph62	90215	IEEEFloat	139217790		
CHWS_T_Ph63	90218	IEEEFloat	139217791		
CHWS_T_Ph64	90221	IEEEFloat	139217792		
CHWS_T_Ph65	90224	IEEEFloat	139217793		
CHWS_T_Ph66	90227	IEEEFloat	139217794		
CHWS_T_Ph67	90230	IEEEFloat	139217795		
CHWS_T_Ph68	90233	IEEEFloat	139217796		
CHWS_T_Ph69	90236	IEEEFloat	139217797		
CHWS_T_Ph70	90239	IEEEFloat	139217798		
CHWS_T_Ph71	90242	IEEEFloat	139217799		
CHWS_T_Ph72	90245	IEEEFloat	139217800		
CHWS_T_Ph73	90248	IEEEFloat	139217801		
CHWS_T_Ph74	90251	IEEEFloat	139217802		
CHWS_T_Ph75	90254	IEEEFloat	139217803		
CHWS_T_Ph76	90257	IEEEFloat	139217804		
CHWS_T_Ph77	90260	IEEEFloat	139217805		
CHWS_T_Ph78	90263	IEEEFloat	139217806		
CHWS_T_Ph79	90266	IEEEFloat	139217807		
CHWS_T_Ph80	90269	IEEEFloat	139217808		
CHWS_T_Ph81	90272	IEEEFloat	139217809		
CHWS_T_Ph82	90275	IEEEFloat	139217810		
CHWS_T_Ph83	90278	IEEEFloat	139217811		
CHWS_T_Ph84	90281	IEEEFloat	139217812		
CHWS_T_Ph85	90284	IEEEFloat	139217813		
CHWS_T_Ph86	90287	IEEEFloat	139217814		
CHWS_T_Ph87	90290	IEEEFloat	139217815		
CHWS_T_Ph88	90293	IEEEFloat	139217816		
CHWS_T_Ph89	90296	IEEEFloat	139217817		
CHWS_T_Ph90	90299	IEEEFloat	139217818		
CHWS_T_Ph91	90302	IEEEFloat	139217819		
CHWS_T_Ph92	90305	IEEEFloat	139217820		
CHWS_T_Ph93	90308	IEEEFloat	139217821		
CHWS_T_Ph94	90311	IEEEFloat	139217822		
CHWS_T_Ph95	90314	IEEEFloat	139217823		
CHWS_T_Ph96	90317	IEEEFloat	139217824		
CHWS_T_Ph97	90320	IEEEFloat	139217825		
CHWS_T_Ph98	90323	IEEEFloat	139217826		
CHWS_T_Ph99	90326	IEEEFloat	139217827		
CHWS_T_Ph100	90329	IEEEFloat	139217828		



UofG - WAGES

Bring the information from the data manager to PME...

- Creation of the Device template.
- Configuration of screens to allocate the WAGES in campus map per building.

Science Complex # 140 WAGES

[Back to Main Campus Map](#)

Instantaneous Values		Inst. Values Data log	
Chilled Water Supply Temp. Ph. 1	48.9 (°F)		
Chilled Water Return Temp. Ph. 1	54.1 (°F)		
Chilled Water Supply Temp. Ph. 2	0.0 (°F)		
Chilled Water Return Temp. Ph. 2	70.5 (°F)		
Chilled Water Flow Ph. 1	441.6 (GPM)	0.0 Gall 15 Min Int.	
Chilled Water Flow Ph. 2	172.5 (GPM)	0.0 Gall 15 Min Int.	
Steam Flow Ph. 1	3,907.8 (lb/hr)	240.8 Lb. 15 Min Int.	
Steam Flow Ph. 2	2,327.5 (lb/hr)	142.2 Lb 15 Min Int.	
Domestic Cold Water High Ph. 1	0.0 (gallons)	0.0 (Gall) 15 Min Int.	
Domestic Cold Water Low Ph. 1	0.0 (gallons)	0.0 (Gall) 15 Min Int.	
Domestic Cold Water High Ph. 2	192,831.4 (gallons)	0.0 Gall 15 Min Int.	
Domestic Cold Water Low Ph. 2	419,420.9 (gallons)	0.0 (Gall) 15 Min Int.	

Instantaneous Values		Totalized Values Data log	
DCW HX Flow 1	-0.3 (gpm)	0.3 (Gall) 15 Min Int.	
DCW HX Flow 2	-0.0 (gpm)	0.0 (Gall) 15 Min Int.	
DCW HX Flow 3	-0.0 (gpm)	0.0 (Gall) 15 Min Int.	
DCW HX Flow 4	-0.0 (gpm)	0.0 (Gall) 15 Min Int.	

Energy			Energy Values Data log	
Chilled Water Energy Ph. 1	1,145.2 (kBtu/Hr)	89.3 (kBtu) Int. 15 Min.	6,396,897.8 (kBtu)	
Chilled Water Energy Ph. 2	1,860.3 (kBtu/Hr)	119.9 (kBtu) Int. 15 Min.	10,480,655.9 (kBtu)	

CAMPUS MAP | INCOMING LINES 4 & 5 SCIENCE COMPLEX 140 | INCOMING LINE 5 1 GENERATOR BLDG 056 | INCOMING LINES 2 GENERATOR BLDG 056 | INCOMING LINE 5 3 GENERATOR BLDG 056 | INCOMING LINE 6 PATHO / AHL 089 | COMMUNICATIONS OVERVIEW | WAGES

Goekh Weather Current Conditions
Temperature: 22.3 C
Relative Humidity (Hour Inptial): 75%

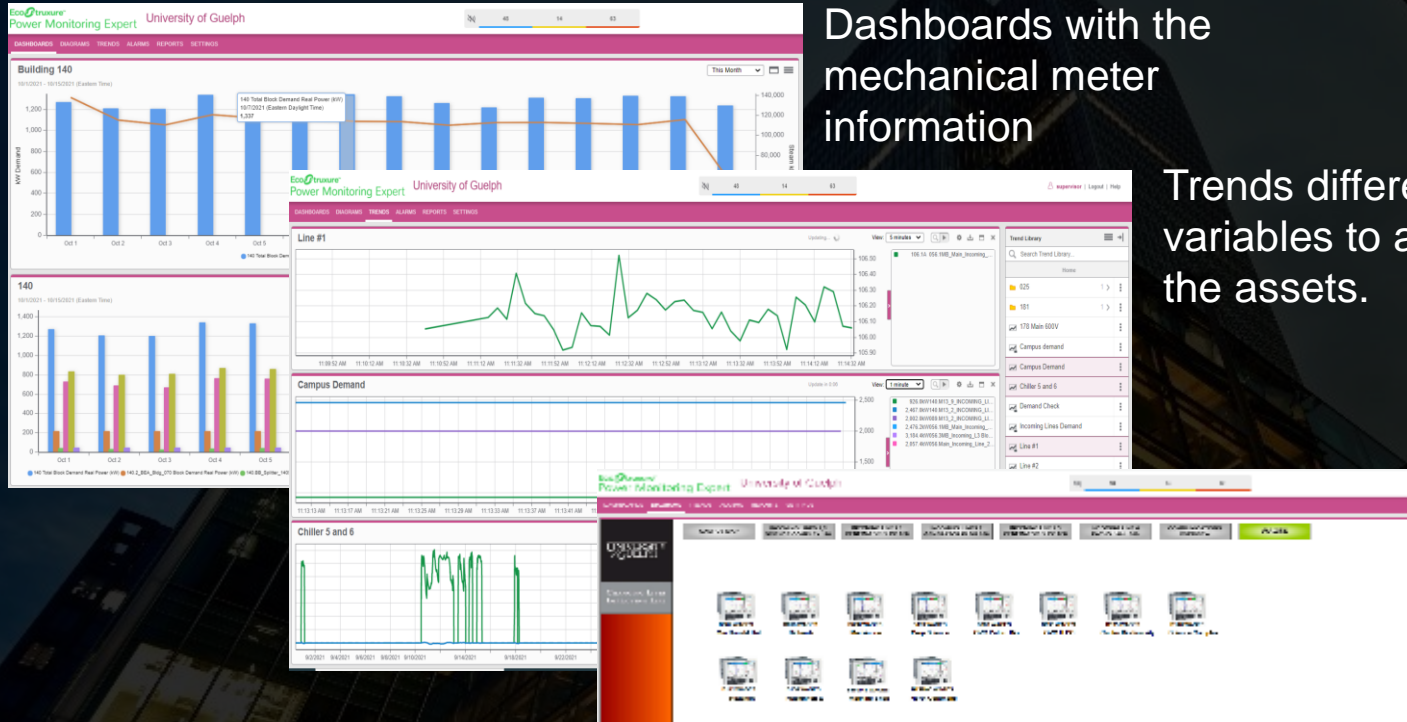
UNIVERSITY OF GUELPH
CHANGING LIVES
EMPOWERING LIVES

Incoming Line 1	Incoming Line 2	Incoming Line 3	Incoming Line 4	Incoming Line 5	Incoming Line 6	Campus Total
178 kW	2,091 kW	3,179 kW	2,419 kW	879 kW	3,389 kW	11,480 kW
1,040 kVA	2,074 kVA	3,410 kVA	2,741 kVA	1,068 kVA	2,188 kVA	12,440 kVA
14,100 V	14,134 V	14,210 V	13,883 V	14,193 V	14,099 V	14,080 V

Approximate total
Incoming Lines Campus and CUP
and Return
Total kW

UofG - WAGES

Tracking the information captured in the system.



UofG - WAGES

Summary

- Standardization of the WAGES in a single connection point per building.
- Easy to verify, calibrate and troubleshoot the sensor attached to the data manager.
- Consolidate all the nonelectrical sources on one device to streamline the integration process.
- The solution can be replicate on Multiple buildings using the same methodology

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PME Reporting and Hosting options

- Jesus Enrique Vargas
- Out of time...next session

Follow up

Next meeting six to eight months

- Next scheduled for April 21, 2022
- Suggestions for future topics?
- Based on feedback from today; we will follow up individually or to the group as required.
- Presentation is posted at:

<http://know-your-power.com/archive/ucug>

