While waiting for the workshop to start…

Get ready to participate!

- Turn on your camera
- Find the unmute button and say "Hi" to check your audio

- Find the "raise hand" button

Answer our opening question!

What are you hoping to get from today's session?

Answer in chat or raise hand and unmute

OCTOBER 3RD, 2025

Finding Opportunities in our Energy Data

Adam Dixon
Knowenergy

ieso Connecting Today. Powering Tomorrow.

SAVE ON ENERGY POWER WHAT'S NEXT

Welcoming our guest speaker

Adam Dixon, *Knowenergy*

Knowing energy since 2013, he brings a new and fresh approach to energy management, specializing in energy performance analysis and residential sector services. He also works behind the scenes as an energy analyst in support of energy audits while also providing support to the development of TdS Dixon's well known energy training services.

A podcast by Save on Energy: The Energy Manager's Playbook

Presented by IESO's Save on Energy training and support team:

- ❑ Features real-world stories from Ontario's energy management community
- ❑ Covers industrial, institutional, commercial and municipal sectors
- ❑ Focuses on challenges, successes and practical insights
- ❑ Bite-sized episodes for quick and impactful learning
- ❑ A resource for energy professionals and decision-makers

Questions or feedback?
trainingandsupport@ieso.ca

Tune in on your preferred platform:
saveonenergy.ca/training-and-support/podcast

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SAVE ON ENERGY POWER WHAT'S NEXT

By the end of this workshop, you will be able to:

- Tell a story types of facility energy data.
- Identify signs of inefficiencies, errors, or unusual consumption.
- Describe how to use benchmarks and historical comparisons.
- Apply simple methods for visualizing data.
- Connect data findings to real operational opportunities.

What types of energy data should we use?

Depends on your Goals and state of Data (See previous webinars)

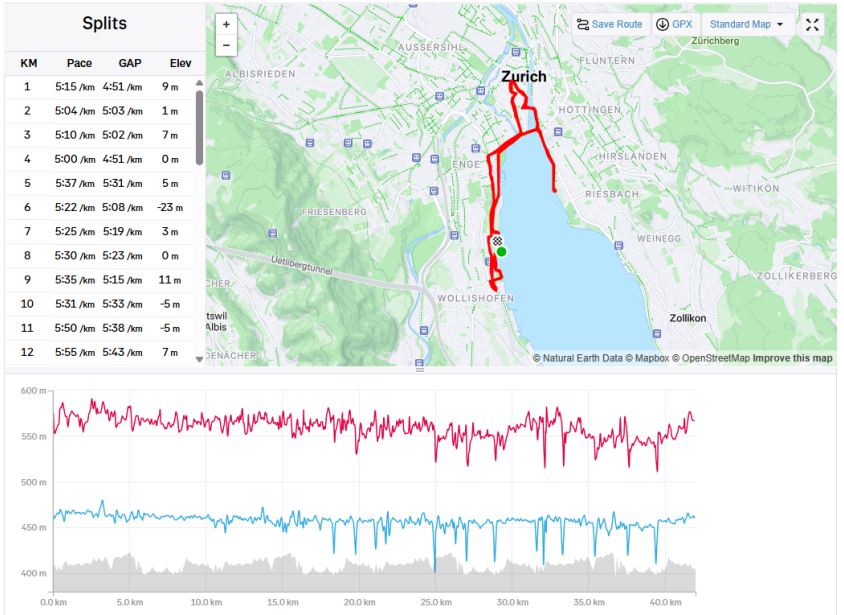
High Level → Very Granular

- Benchmark Data (Annual)
- Monthly Data
- Daily/SubDaily (Interval)

Data is the heartbeat of the building

When we look at HR data, we understand some of the underlying process and variables (ex. Did you run a marathon today?

We need to do the same in our Buildings, we don’t need to know everything, but any info helps tell the story and find opportunities.



1. Identifying opportunities with benchmarking

Benchmarking overall energy alone provides minimal clue as to the cause of the performance change

Benchmarking by energy source and demand provides more insight and should be done:

- Higher electricity intensity with similar demand intensity indicates longer operation/schedules
- Higher demand intensity with minimal change in electricity intensity is new Equipment/Process but with minimal consumption
- Higher gas intensity with minimal change to electric intensity suggests colder weather (if not corrected) or more heat load – typically outside (ventilation) air.

Finding savings with benchmarking

Demand Intensity in range – **OK**

Electricity intensity above range – **not OK!**
- Suggest reduction to 20 kWh/ft^2
- Possible reduction = 10.6 kWh/ft^2

- **Total Savings ~ 600,000 kWh/yr**
  ~ $ 65,000/yr

Solution was to provide a small HVAC system to serve 24/7 operations centre rather than run whole building HVAC outside of 8 AM to 5 PM.

Natural Gas Intensity in range – **OK!**

This facility is a four storey building with a basement and mechanical penthouse. The total floor area is assumed to be 57,000 sq feet. Two key intensity ratios can be calculated based upon the 1994 historical data.

1. Demand Intensity

Typical peak demand intensity (in 1994) for an office building is:	4 – 10 watts/ ft^2
This building demands 380 kW over 57,000 ft^2 for:	6.7 watts/ ft^2.

2. Electrical Energy Intensity

Typical energy intensity (in 1994) for an office building is:	14 to 26 kWh/ ft^2
This building used 1,743,120 kWh in 1994, for:	30.6 kWh/ ft^2

3. Fuel (Natural Gas) Energy Intensity

Typical fuel energy intensity (in 1994) for an office building is:	12 to 24 kWh/ ft^2
This building used 961,448 kWh in 1994, for: (92, 447 m^3 at 10.4 kWh/m^3)	16.9 kWh/ ft^2

4. Overall Energy Intensity 47.5 kWh/ ft^2

5. Other Benchmarks

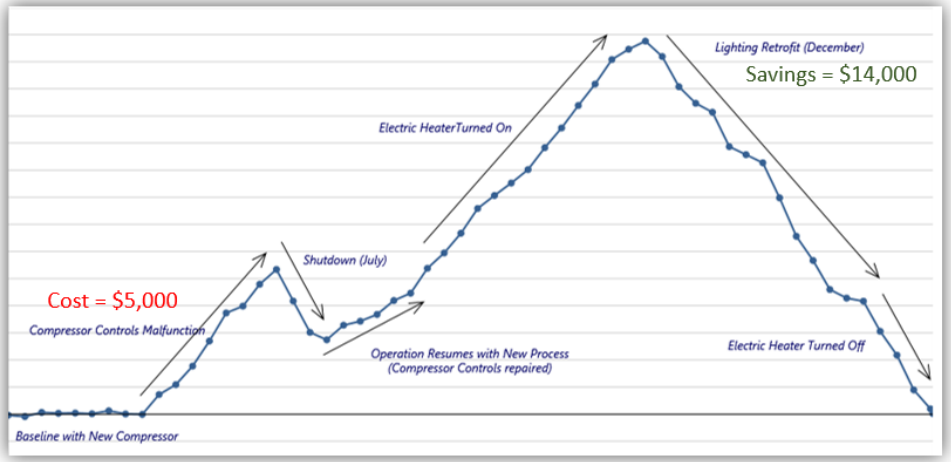
BOMA BEST™ 2014 Average:	27.4 kWh/ft^2
REALpac 2013 Average:	29.5 kWhft^2

2. Monthly data (CUSUM analysis)

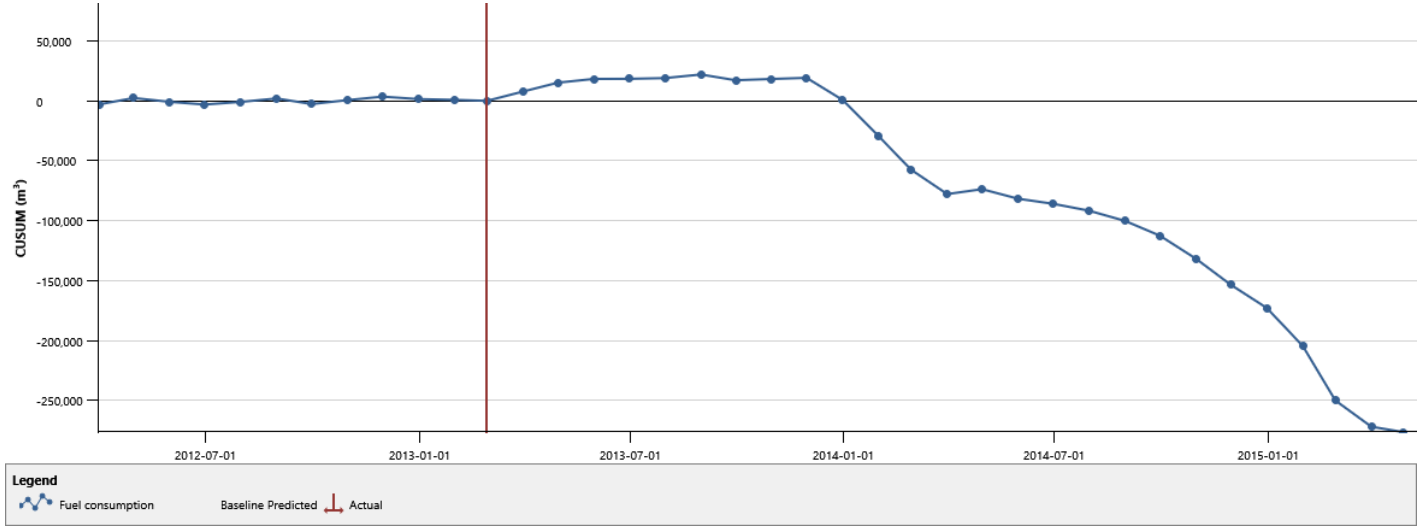
Cumulative Sum of The differences between actual consumption and a predicted Consumption based on driving variable (i.e. Weather, Occupancy, etc)

Summary:
Slope up = needs to be explained (higher us)
Slope Down = Good (savings)
Flat = baseline consumption

CUSUM Tells the Story!!

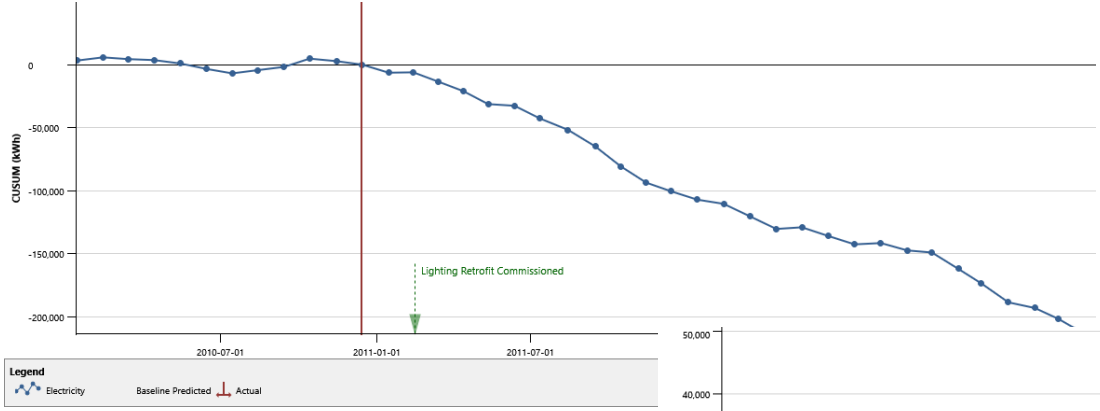


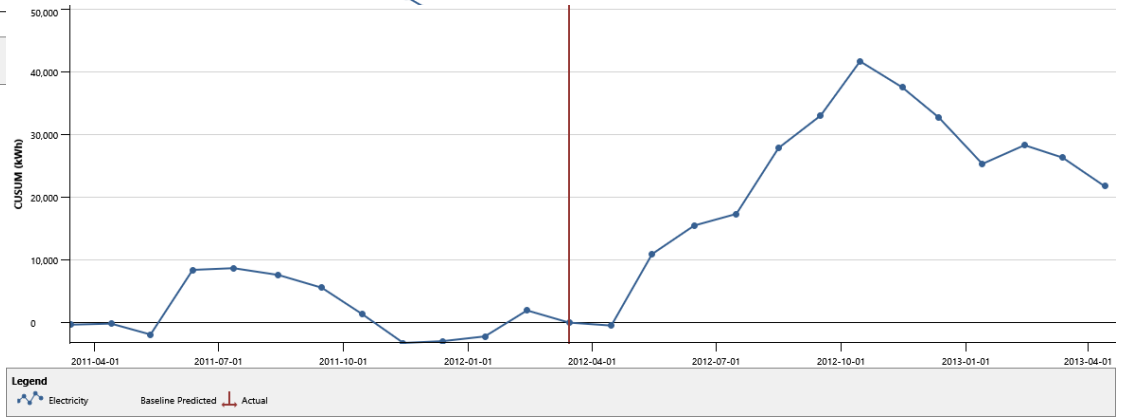
Real world examples



CUSUM tells the story and creates questions to ask and places to look

Real world examples





3. Identifying opportunities with sub-daily (interval data)

There are many tools and techniques using interval data, a few we will discuss are:

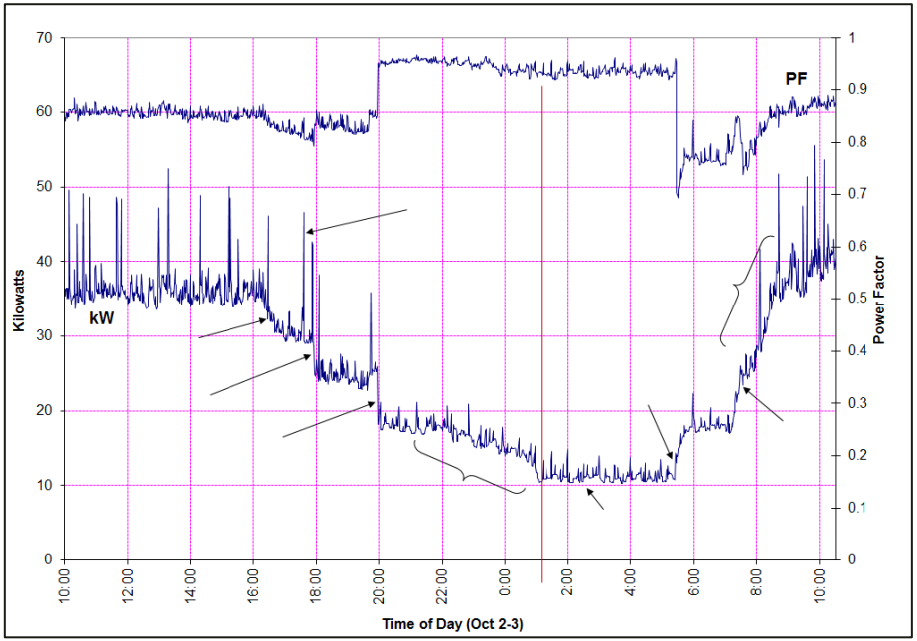
- Heat Maps
- Load Duration Curves
- Time Series Graphs

BUT always be extra careful with incoming data, check the data quality!

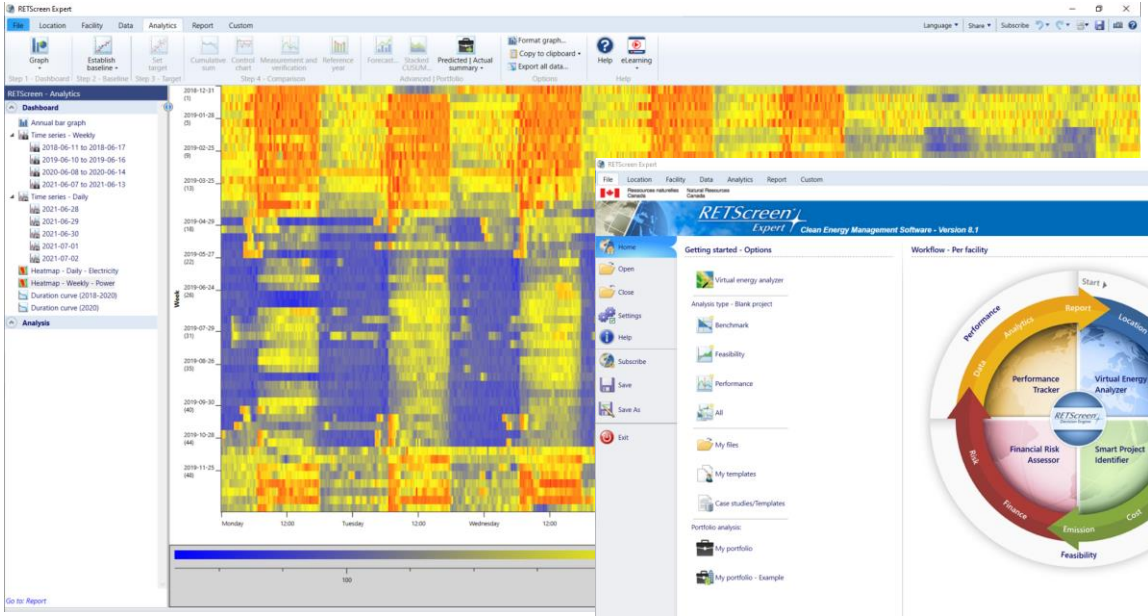
Detailed profile analysis using five-minute demand (kw) and power factor (PF) data

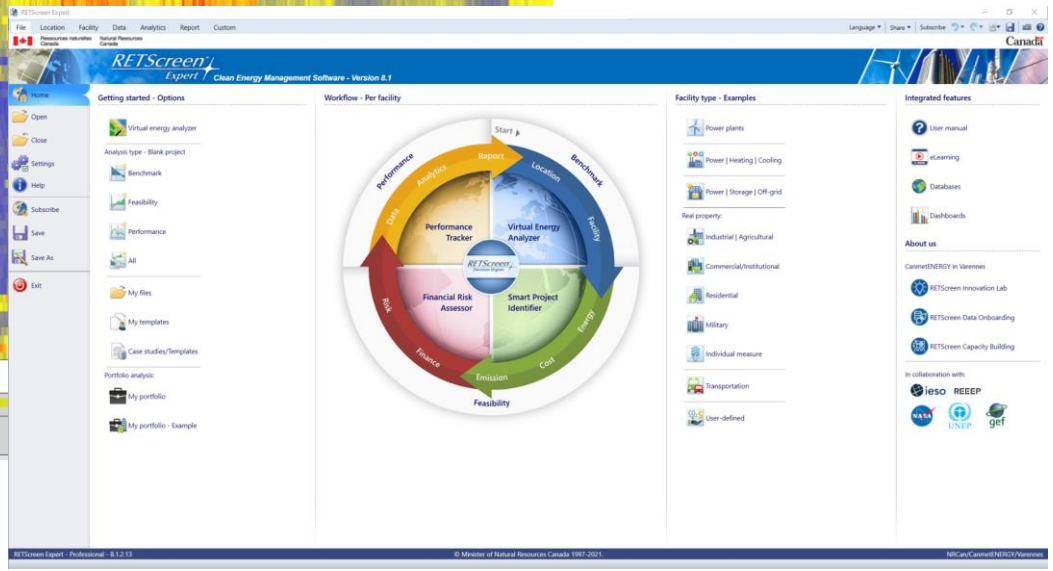
Using kW & PF Information

- + kW - PF
  - Motor load on
- + kW + PF
  - Lighting load on
- - kW - PF
  - Lighting load off
- - kW + PF
  - Motor load off

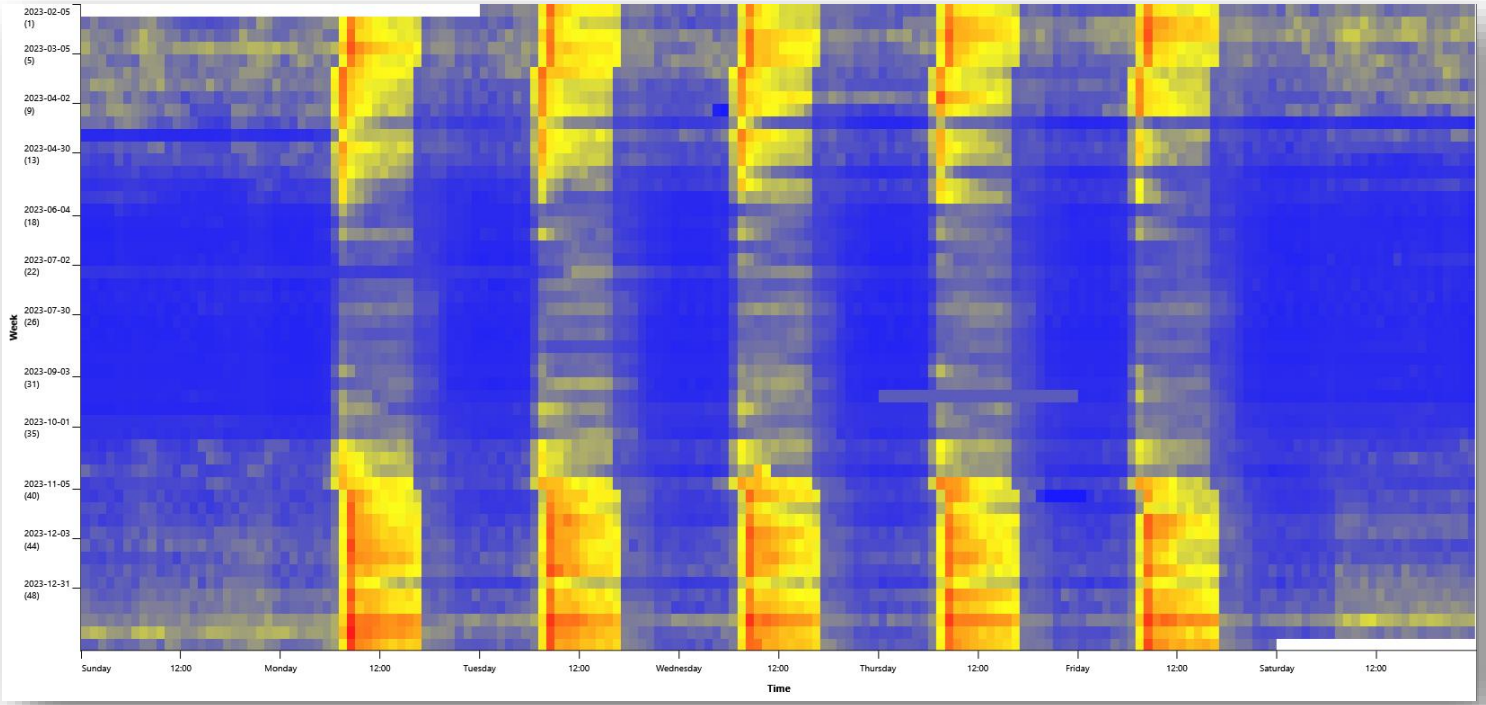


Interval data time series analysis in RETScreen expert

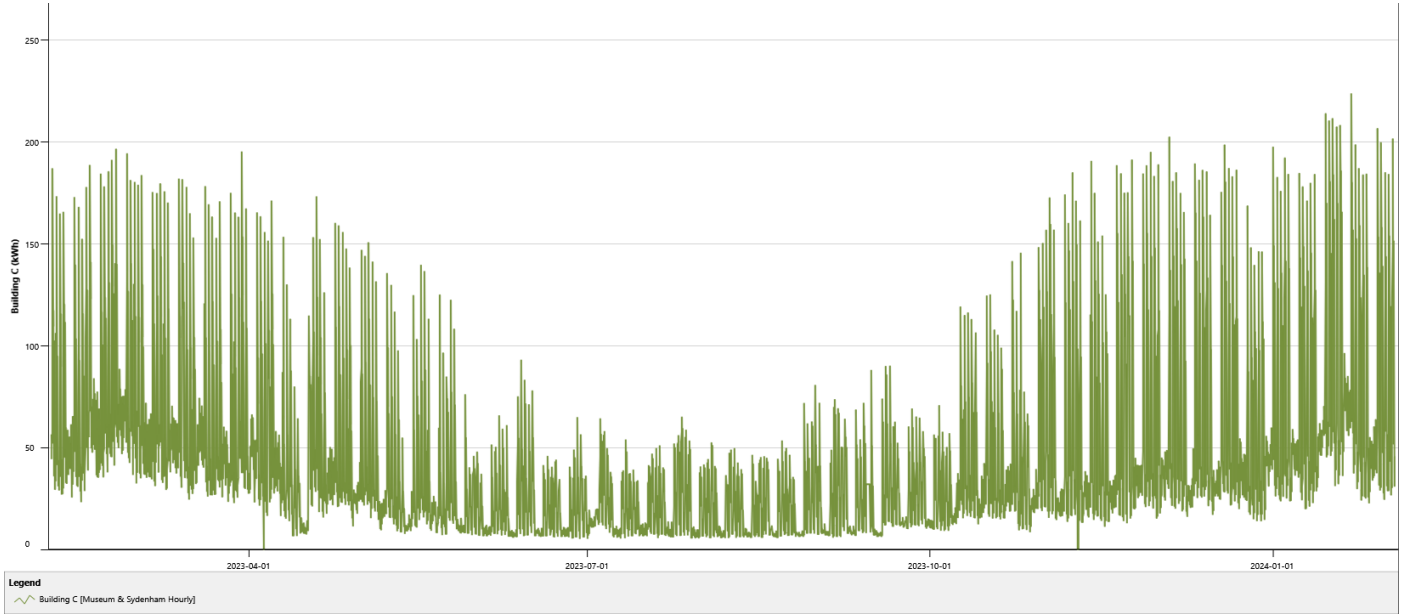




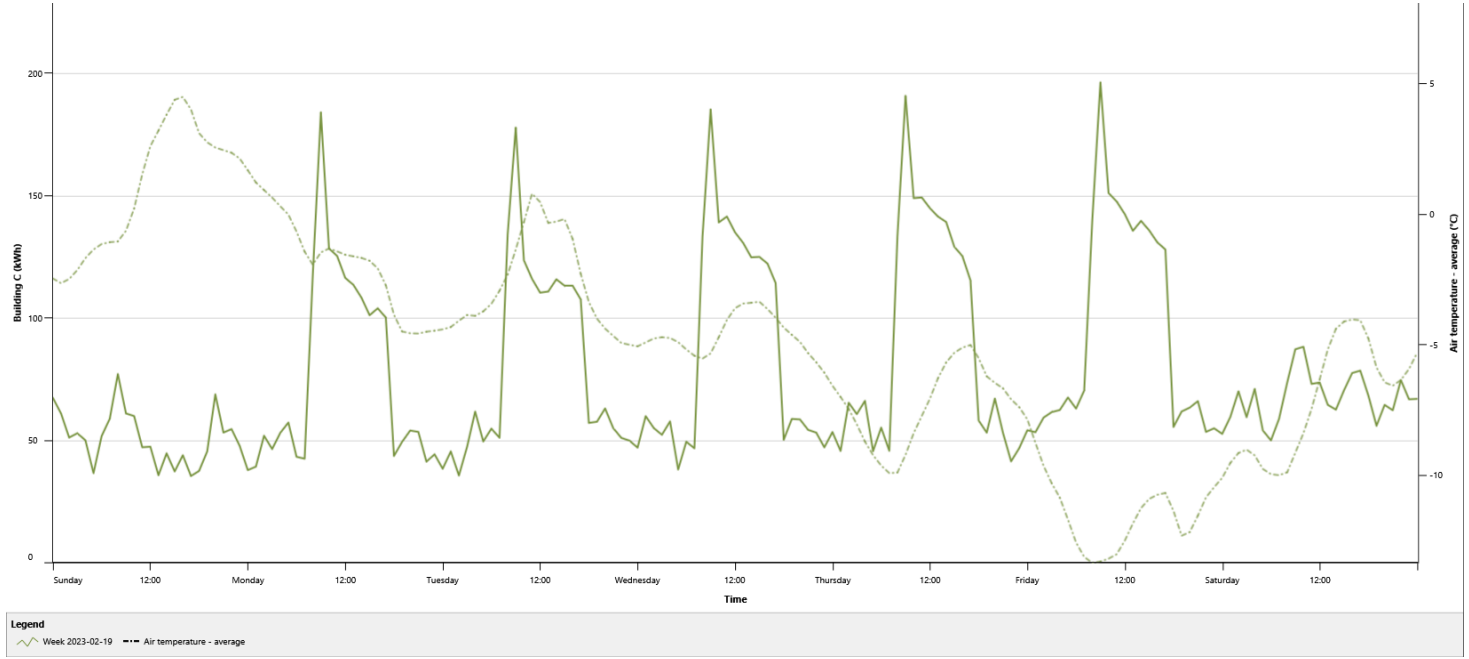
Heat map: Feb 2023 – Jan 2024 (re-purposed school)



Re-purposed school demand profile: Feb 2023 – Jan 2024

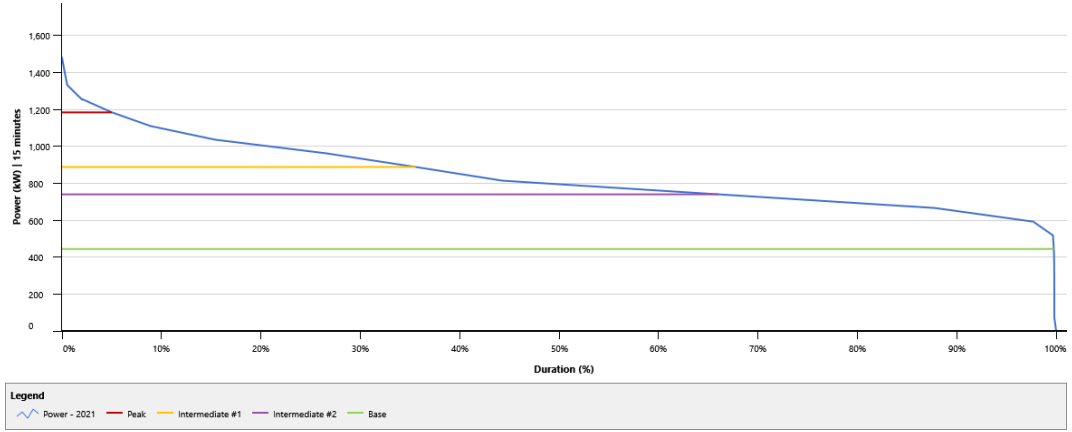


Re-purposed school demand profile : Week of Feb 19th, 2023 – Family Day



Load duration curves

AI Overview…A load duration curve is a graph in electric power systems that arranges power demand data from highest to lowest, showing the percentage of time demand exceeds a specific level, unlike a load curve which orders data chronologically. This curve helps utilities plan generation capacity, determine optimal plant sizes, and understand how long different load levels occur over a period, with the area under the curve representing total energy consumed.



Summary

- Use the Data appropriate for your Goals
- Learn about the building first
- Create a story using one are more methods of analysis
- Ask more questions and answers giving!

Stay connected with tools and resources

- Virtual one-on-one coaching: post-webinar support intake form for tailored support for organizations to manage energy resources effectively
- Monthly bulletin: sign up to receive monthly training updates on all Save on Energy training and support new tools and resources
- Live training calendar: visit this page to easily register for upcoming events and workshops
- Training and support webpage: visit this page to access all training and support materials

Post-Webinar Support

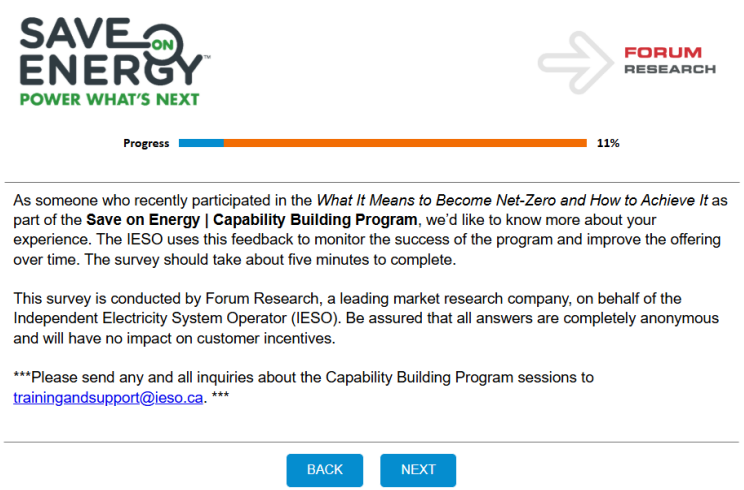
One-on-one coaching: tailored support for managing energy resources effectively

Post-webinar support intake form

Coaching sessions conducted virtually: phone, video calls, and email

Designed for organizations, new or old, seeking guidance.

Upcoming survey: We want your feedback!



- Check your email! A survey is coming your way soon.
- Why? Help us improve our training programs.
- Who? Conducted by Forum Research on behalf of the IESO.
- Time? Takes only 5 minutes to complete.
- Confidentiality: Your responses are anonymous and won't impact participation or incentives.

The survey will be sent from:
surveyinfo@forumresearch.com

Thank you!

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