EcoPilot Canada | USA

HARNESSING BUILDING THERMODYNAMICS AND AI FOR SUSTAINABLE HVAC MANAGEMENT

CHES SCISS

Canadian Healthcare Engineering Society
MARITIME CHAPTER

Société canadienne d'ingénierie des services de santé
CHAPITRE MARITIME

SMART BUILDINGS START HERE

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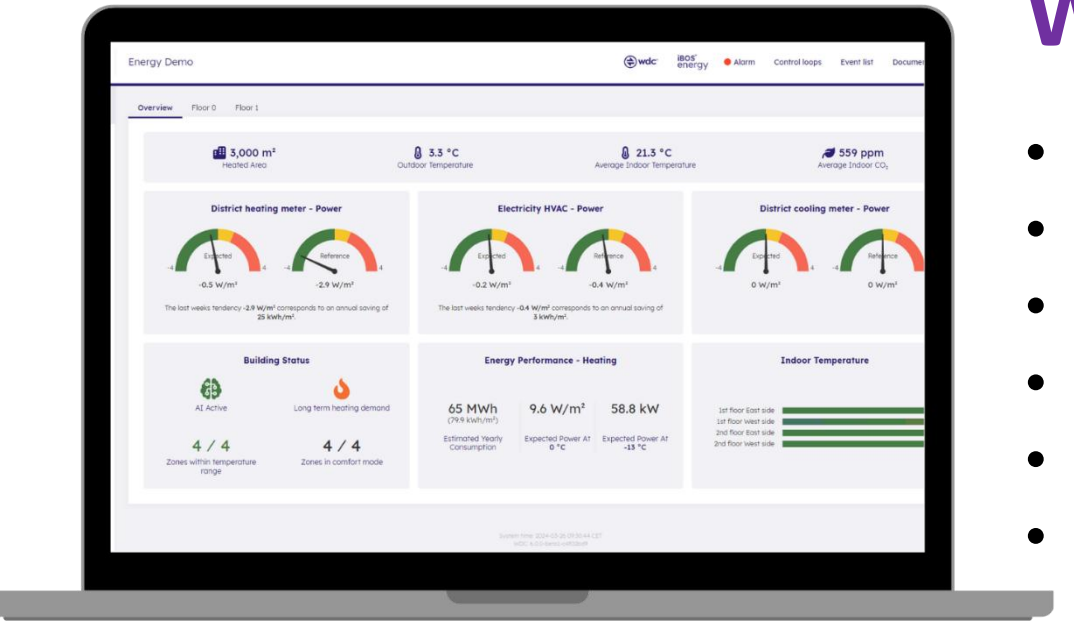

WELCOME.

- Introduction
- What we do
- Building Thermodynamics
- Traditional BAS vs AI
- Case Studies
- Q & A

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SMART BUILDINGS START HERE.

- Tobias Janes, Director of Technical Solutions
- Our company
- Our expertise

OUR MISSION. EcoPilot Canada | USA provides major carbon reduction and cost savings to building owners using innovative, user-friendly, AI powered technology that works seamlessly on top of all building management systems.

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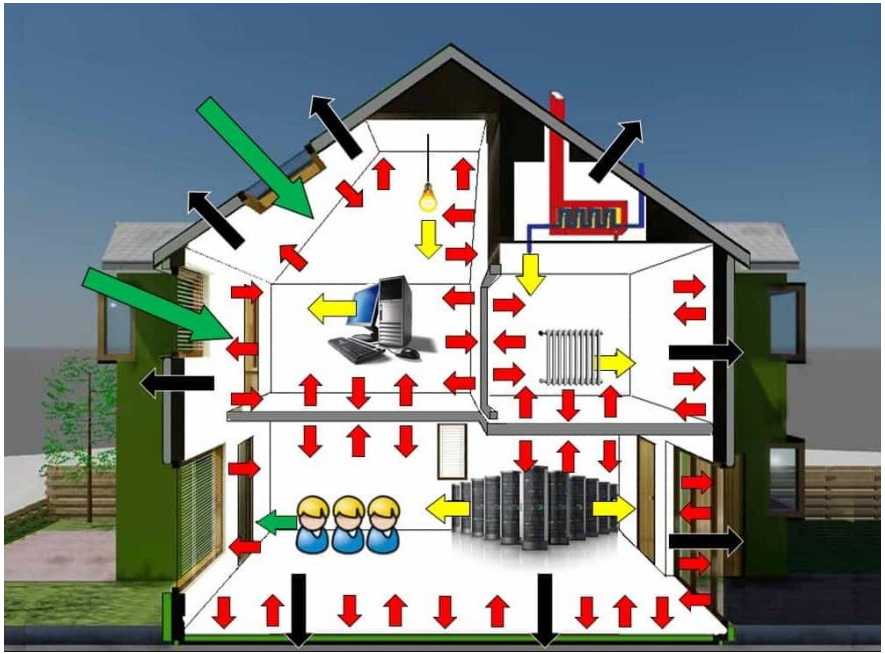
IN THE BEGINNING

ACADEMIC RESEARCH

- 1970’s KTH Royal Institute of Technology in Sweden
- Buildings are quite thermally inert by nature.
- Holistic control strategy to take advantage of a building's thermodynamic properties.
- The goal, to modernize the approach to controlling a building using free energy, weather and temperature data.
- The challenge, comfort and technology or lack thereof, and cost.

ENERGY BALANCE IN A BUILDING



$$E_{in} = E_{out}$$

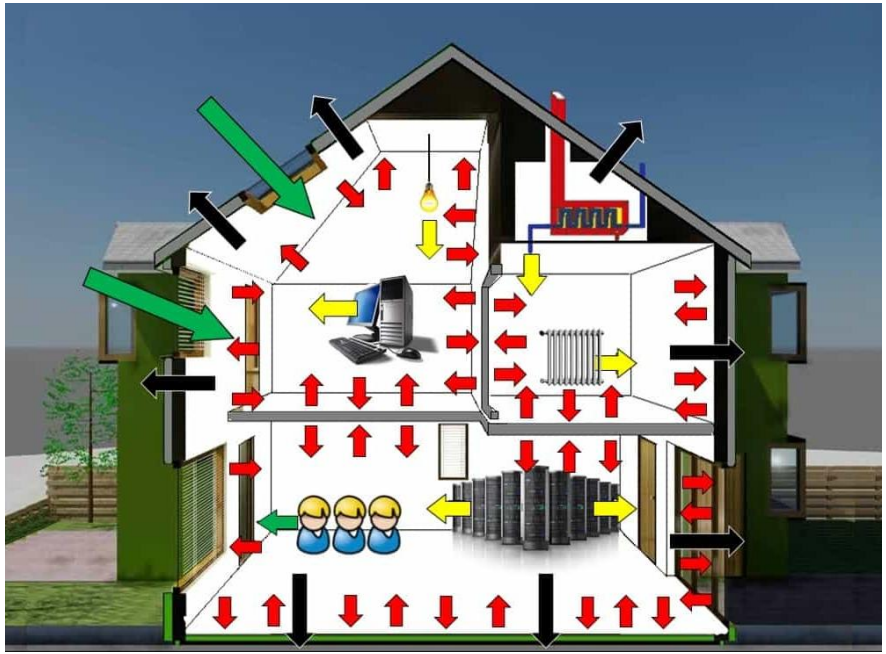
Heat gain:

- Solar heating
- Body heat
- Electrical systems
- Heating systems

Heat losses:

- Cooling systems
- Cold water
- Ventilation losses
- Transmission losses
- Cold water losses
- Air leakage
- Sewage losses
- Flue gas losses
- Radiant losses

OLDER CONTROL "STRATEGY" CONSTANT TEMPERATURE



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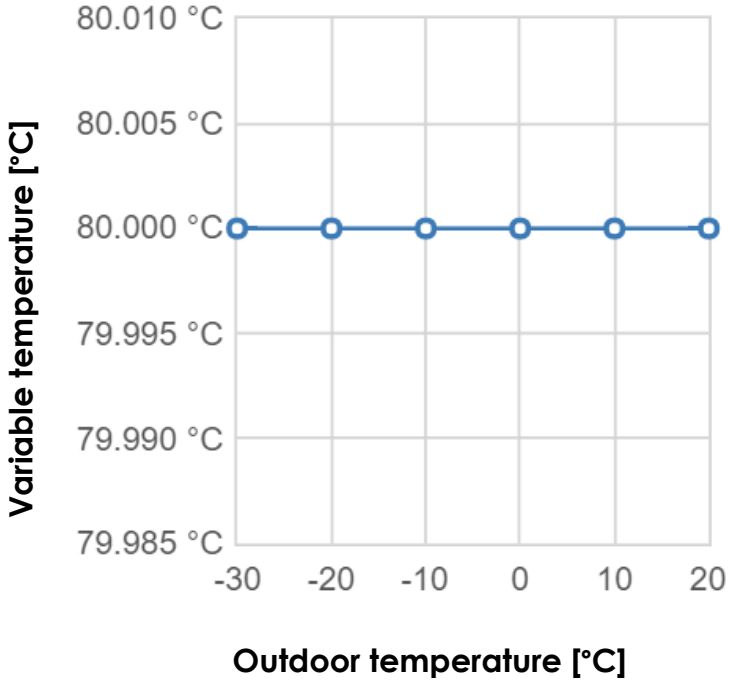
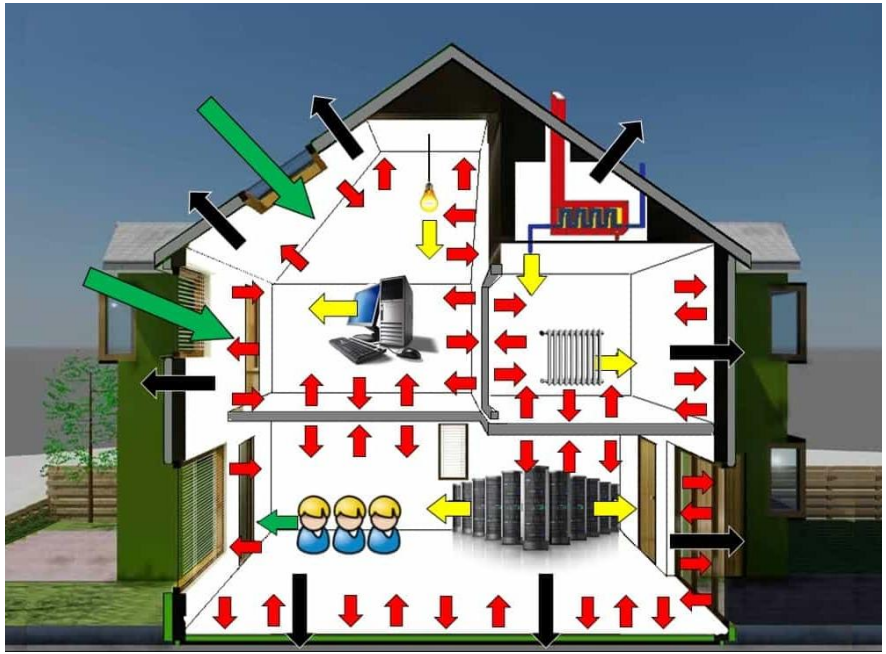
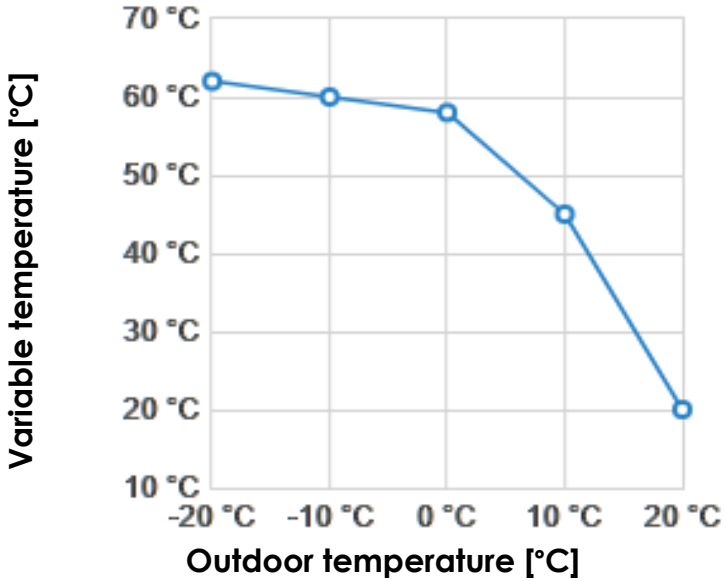


MODERN CONTROL STRATEGY
OUTDOOR COMPENSATED HEAT CURVE





$$E_{in} = E_{out}$$

WHAT WE KNOW NOW

- Building Thermodynamics
  - They don’t react to outside temperatures quickly(quite thermally inert), nor statically.
  - Can be used as batteries to store energy.
- Traditional building automation systems
  - Deliver efficiencies via control and scheduling
  - Control a building based on outside air reset / cutoff (static)
  - Don’t factor other static and fluid variables
  - Are typically reactive.

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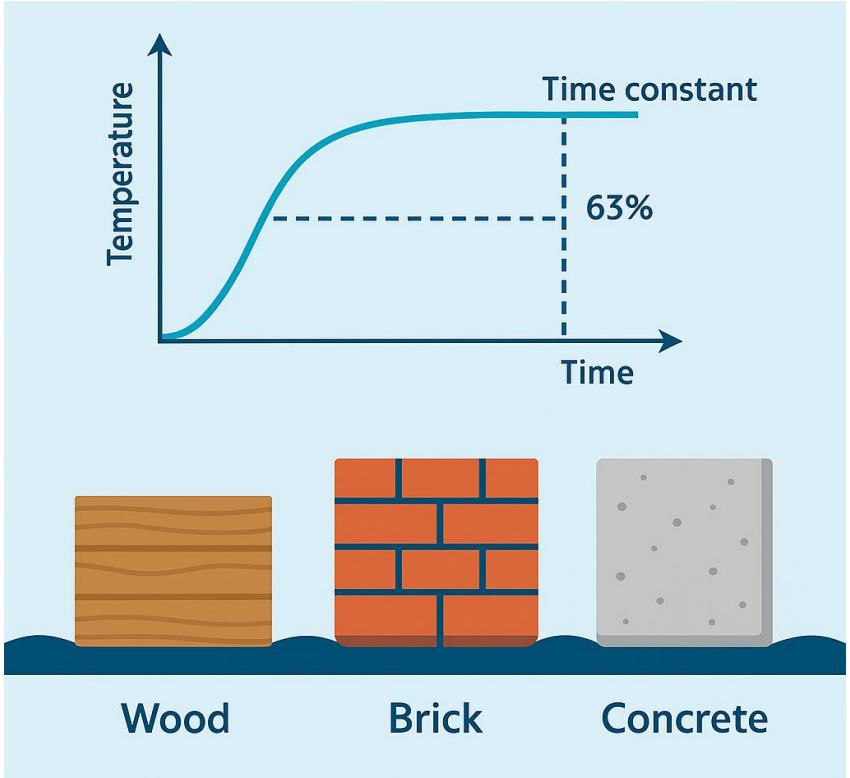
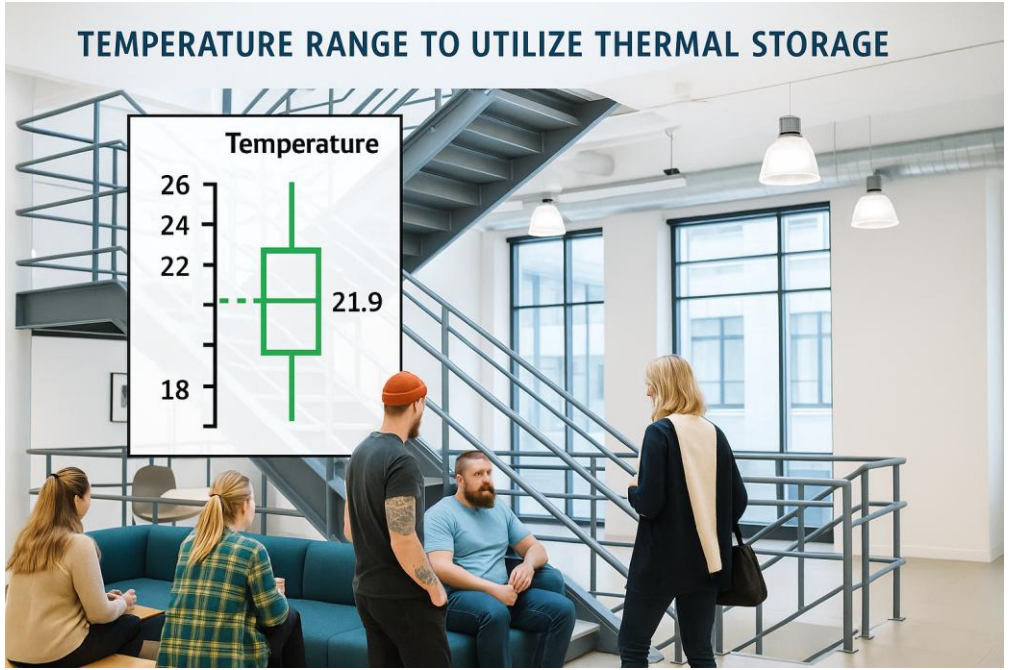
TIME CONSTANT OF MATERIALS



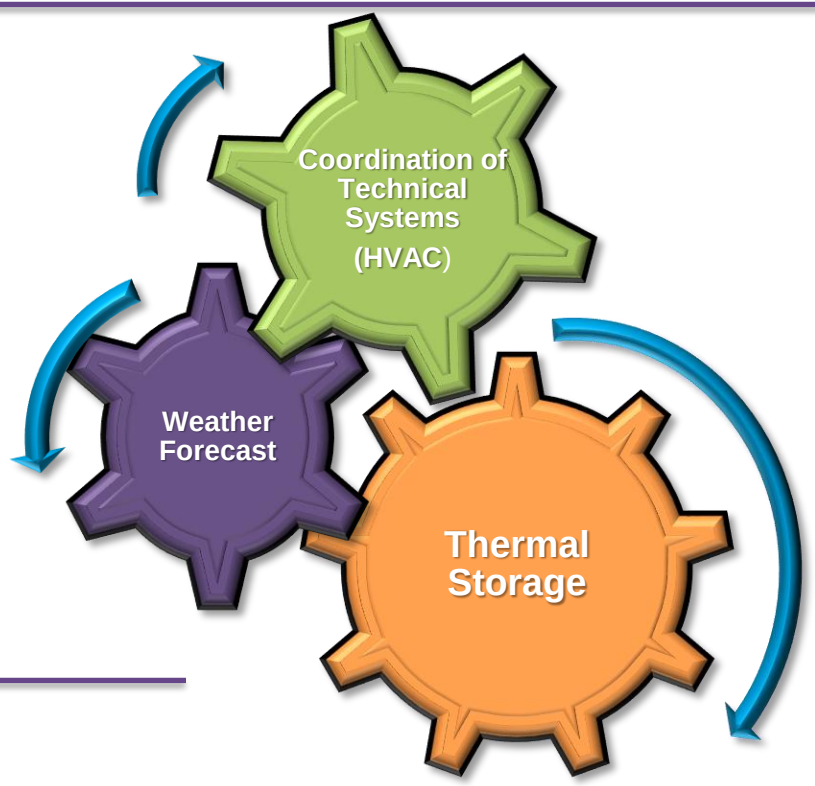
TEMPERATURE RANGE TO UTILIZE THERMAL STORAGE



DYNAMIC CONTROL

using thermal storage

- Time constant of materials
- Energy flow in a building
- Temperature range
- Balance temperature
- Intelligent decision making



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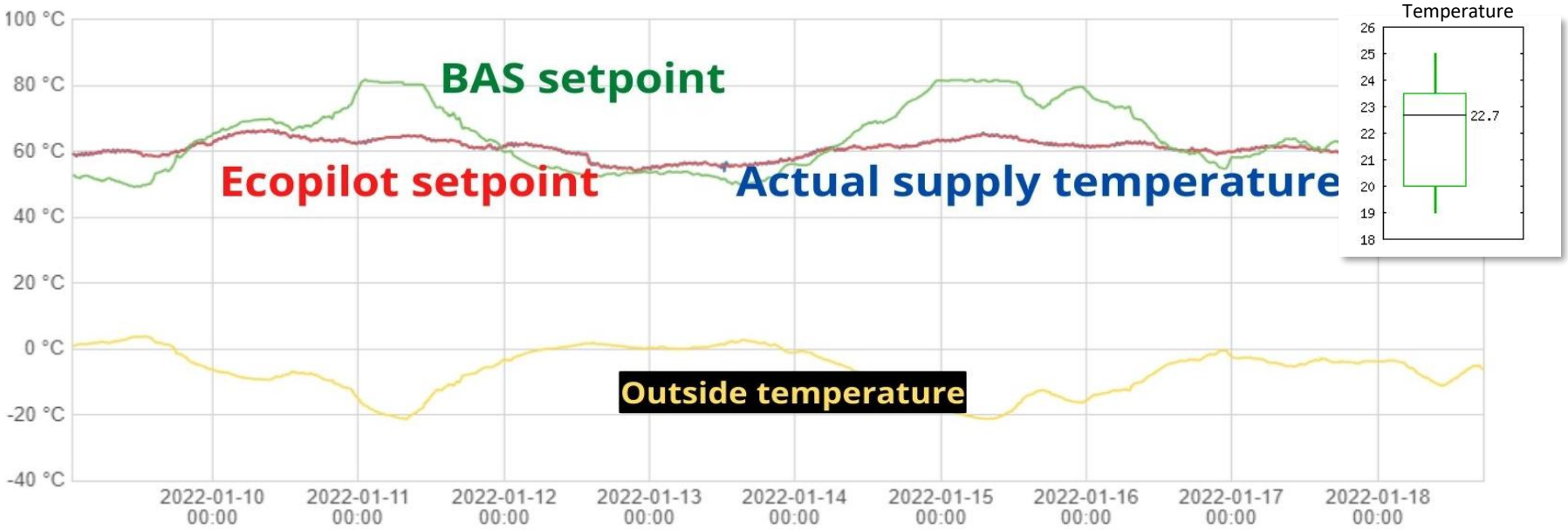
WHAT DO WE DO?

WE ADD THE NEXT LAYER OF INTELLIGENCE TO TRADITIONAL BUILDING MANAGEMENT SYSTEMS.

CONTINUOUS RECOMMISSIONING FOR AS LONG AS WE'RE IN OPERATION.

ecopilot®

AI USING THERMODYNAMICS IN ACTION



44% NATURAL GAS CONSUMPTION SAVINGS WHILE MAINTAINING AVERAGE COMFORT TEMPERATURE OF 22.7°C.

- Heating Supply Water Temp. HS01
- EcoPilot Sup. Water Calculated setpoint HS01
- Exist BAS Supply Water Setpoint HS01
- Outside Air Temperature MUA8

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CONSIDERATIONS FOR AI IN HEALTH CARE

- Considerations for health care facilities:
  - iBOS is a system and zone scalable solution - isn't all or nothing
  - Only controlling the temperature set points already being controlled by an existing control system, however, iBOS will slightly adjust the temperature every two minutes while staying within the already programed set point range. This improved control saves energy, money and reduces the peaks to better support overall comfort.
  - All BAS programming including staging, lead/lag sequencing, and safeties, etc. remain in place
  - iBOS control can be overridden or removed at the touch of a button, if need be, and all existing BAS programming remains in place

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VALUE PROPOSITION

- Prioritizes and improves tenant comfort
- Works autonomously – every 2 minutes.
- Averages **25% annually** in HVAC consumption
- Significantly reduces greenhouse gas emitions
- Quick payback with a **guaranteed energy savings** offer, **no upfront fee install**
- Unique tool for fault detection, maintenance plans, recommendations for additional energy savings
- 1,000's of installations worldwide, mature, proven.

IT PAYS TO SAVE.

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ECOPILOT CANADA | USA PROCESS

- **Qualify your building**
  - Centralized systems
  - Existing BAS
- **Complimentary building assessment**
  - Complete building checklist and/or read-only BAS access
  - Historical energy consumption and cost
- **Ecopilot team will:**
  - Provide detailed proposal, scope of work, timeline, savings estimate
  - Extend energy savings guaranteed, no fee install.
  - Monitor, report
  - Provide detailed M&V
  - Provide ongoing recommendations for further savings

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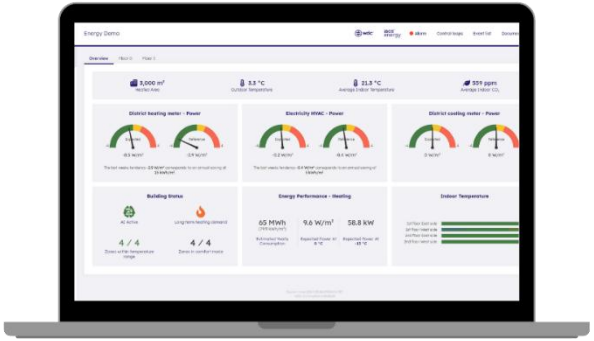
INSTALLATION IS SEAMLESS.

- Integration to BAS
- Non-evasive. No impact to daily operation.
- Works the second it’s turned on.
- Full training and support
  - **Ongoing reporting, include M&V, issues and recommendations**
- Dashboard provides:
  - Real time energy savings
  - BAS vs. Ecopilot setpoints
  - Energy alerts
  - Comfort in heat map



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MEET OUR SMART CUSTOMERS

boardwalk

PARAMOUNT MANAGEMENT

MARTEK

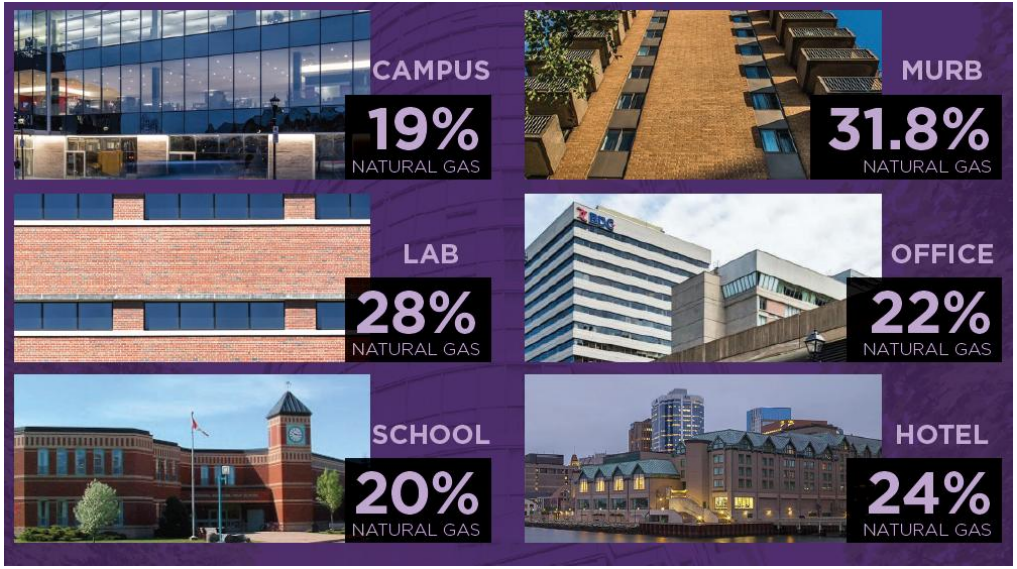
Crombie REIT

OXFORD

Kanas CORPORATION

Marriott

CONCERT PROPERTIES LTD



Énergie NB Power

SLATE

Aspen PROPERTIES

minto

vida LIVING

Halifax Regional School Board

Killam APARTMENT REIT

Shannex

TRIOVEST

WELL GROUNDED REAL ESTATE

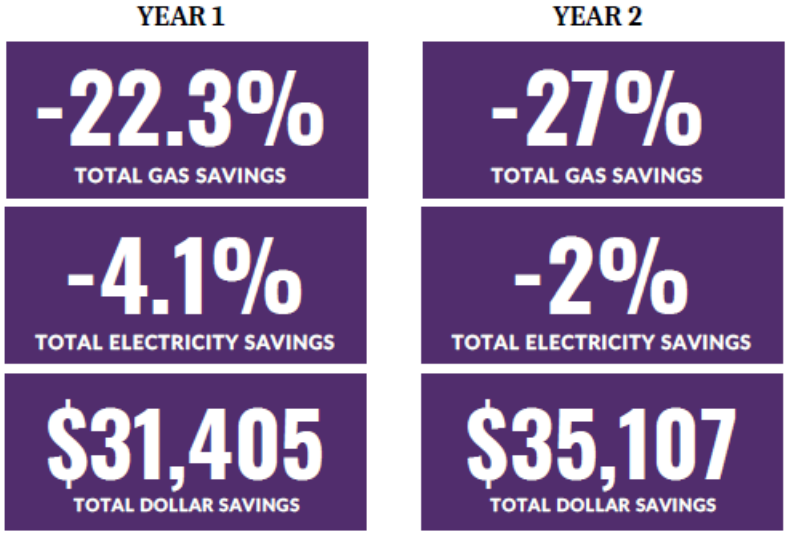
South Shore Regional Centre for Education

Southwest
Live. Shop. Work. Play.

HEALTH LAB FACILITY

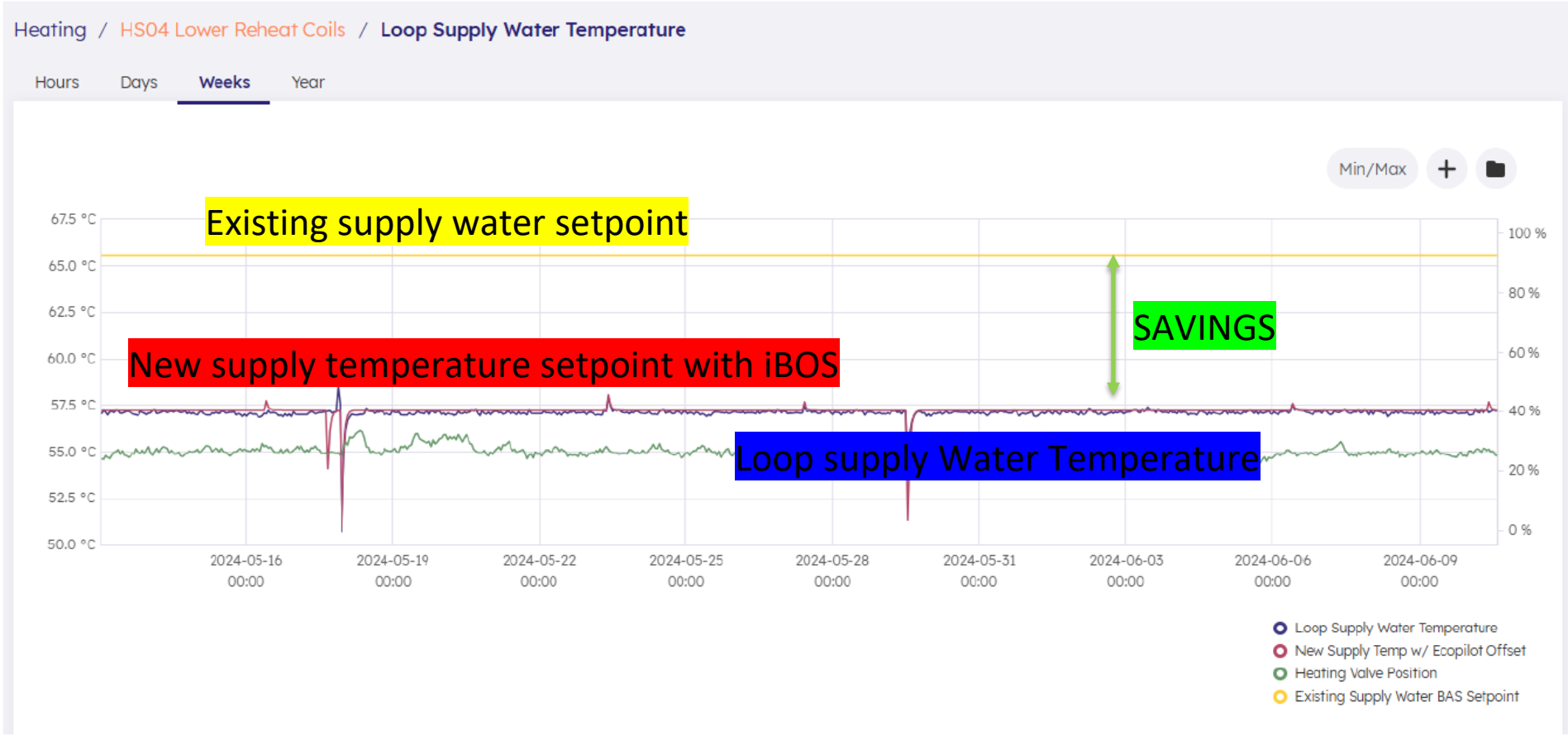
Since commissioning in 2021:

- iBOS has used optimized start/stop and control setpoint offsets to reduce the energy impact of the controlled HVAC systems (Boiler Plant, Chilled Water Plant, AHUs 1-4)
- Beyond real-time efficiency, also identified identifying malfunctioning or overridden equipment, controls/programming issues, and locating areas with the most heating and cooling losses.



ecopilot®

NEW YORK HOSPITAL



Shannex™

"ECOPILOT® SYSTEM IS AN 'ABSOLUTE DREAM' – WE'RE SAVING ENERGY AND RESIDENTS ARE COMFORTABLE."

Jodi Bartlett, General Manager

-18% NATURAL GAS CONSUMPTION	**-1335** GIGAJOULES	**$27,283** DOLLAR SAVINGS
-4% ELECTRICITY	**-71.13** MWH	**$10,713** DOLLAR SAVINGS

FEBRUARY 1ST, 2022 AND NOVEMBER 30TH, 2022


SHANNEX HARBOURSTONE


PARKLAND ON EGLINTON WEST


PARKLAND RIVERVIEW


DEBERT COURT


PARKLAND FREDERICTON


SHANNEX ANTIGONISH

"WE'RE ON A JOURNEY OF LEADING THE WAY TO GREENER LIVING."

KIM MACDONALD, SHANNEX VP PROPERTIES AND SUPPORT SERVICES.

34 BUILDINGS TOTAL!

MORE THAN SAVINGS…

Shannex – Maplestone, Halifax, NS

Example: What to expect in our ongoing reporting:

Item	Description	Responsibility	Reference
1	Investigate cause of points in some heating systems not reading properly	Shannex, BAS Contractor	Heating
2	Confirm Outdoor air cutoff points for heating and cooling mode in AHU-1	Shannex, BAS Contractor	Ventilation
3	If safe to do so, reduce minimum supply water temperature limit to 65°C from 70°C.	Ecopilot, with Shannex approval.	Heating
4	For all concerns around comfort or equipment operation, please contact support@ecopilotai.com	Shannex, Ecopilot	

QUESTIONS?

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