DECEMBER 8, 2023

Energy Management and Efficient Electrification Series for Ontario Municipalities

Developing a Retrofit Strategy for Your Buildings – Your Roadmap to Big Savings

Presented by
Stephen Dixon, Meghan Murray, Christian Tham

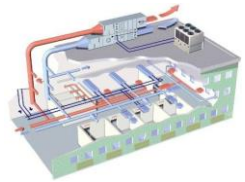
ieso Connecting Today. Powering Tomorrow.

SAVE ON ENERGY POWER WHAT'S NEXT

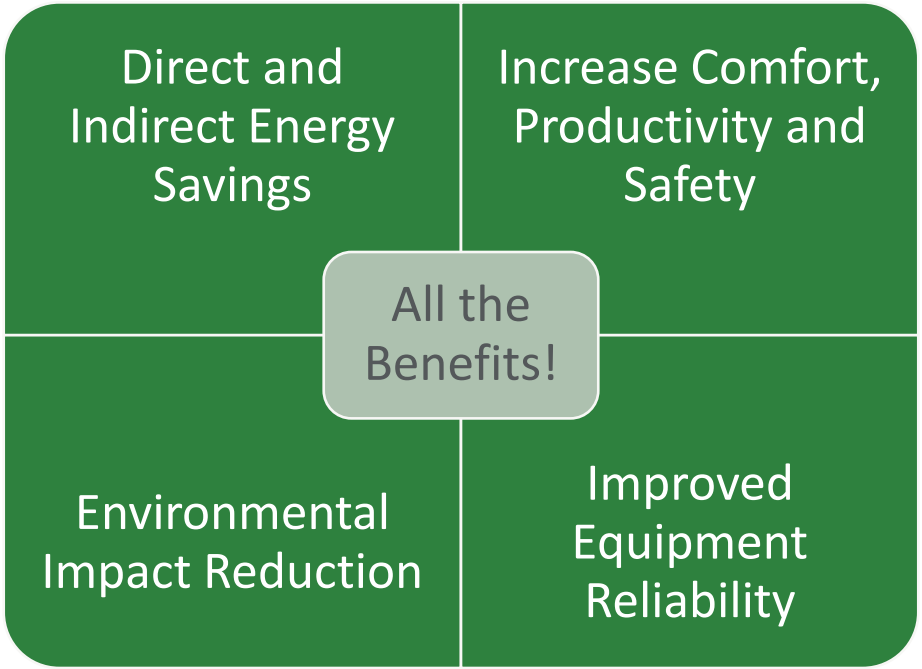
Our objectives

This workshop is designed to provide:

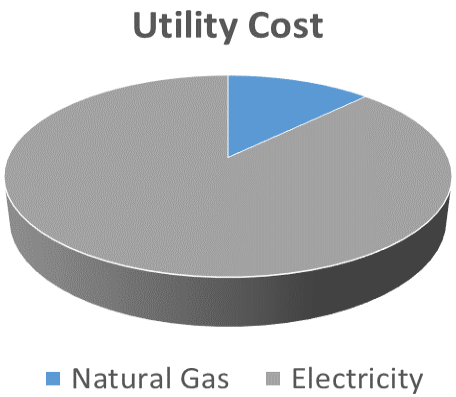
- A road map to finding and implementing savings with retrofits
- Techniques for making and pitching the business case
- An overview of how Save on Energy (SoE) support retrofits
- Insight into how Local Authority Services (LAS), as a not-for-profit, support municipal retrofits.

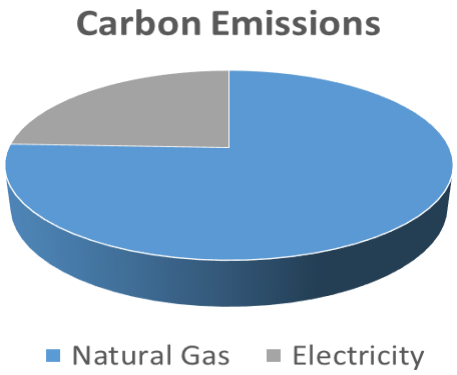


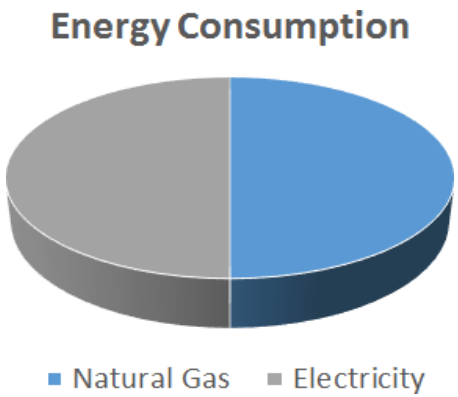
Retrofit Projects Can Deliver Many Benefits



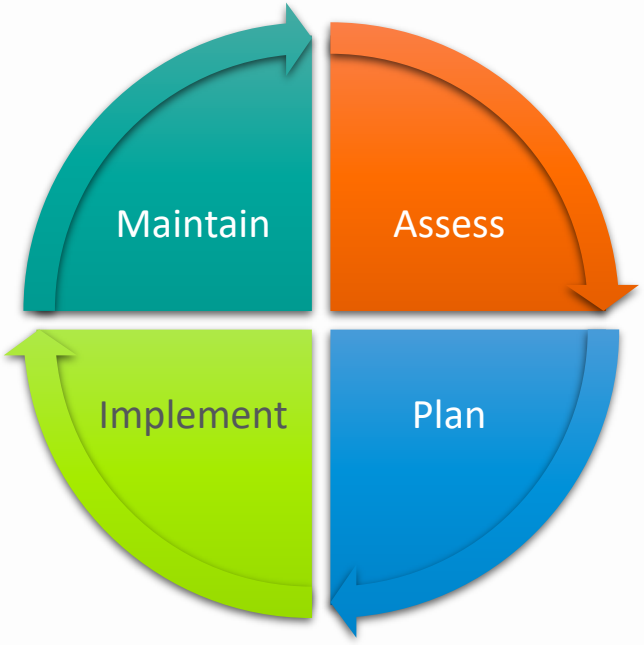
Energy, Cost and Carbon (for a typical Ontario Building)







The Approach



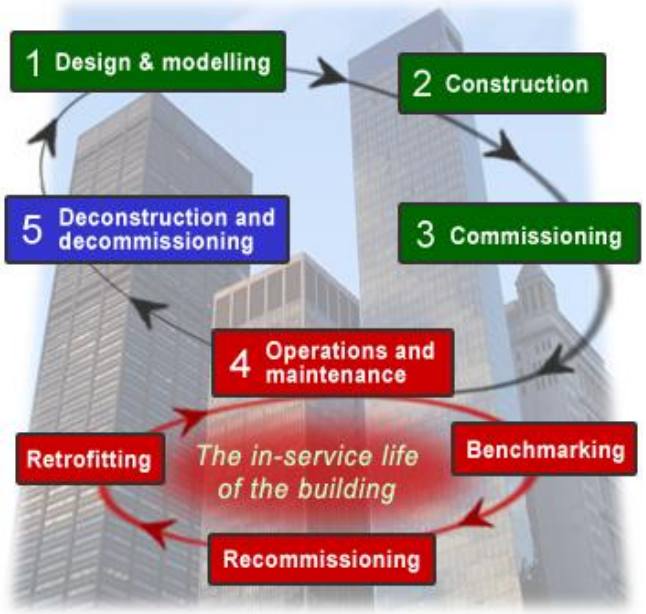
Defining the Categories of Retrofits

- **Minor retrofits** – one-off measures
  - Adding insulation
  - Upgrading lighting systems
- **Major retrofits** – holistic approach
  - Replacing window glazing and doors
  - Updating inefficient heating and cooling systems
    - Can become part of a deep retrofit

- **Deep retrofits** – extensive
  - Aim at large overall reductions across the board
  - Multiple systems replacement
    - Accounts for synergies between systems
  - Renewable energy systems
  - Air- or ground-source heat pumps

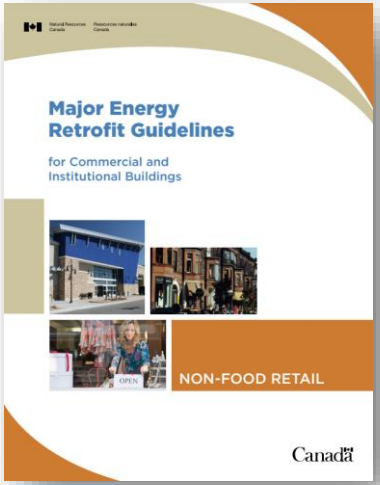
Poll:
How many participants are planning a retrofit?

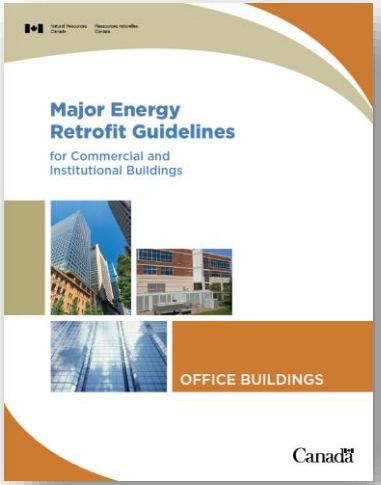
Retrofitting Within the Building Life Cycle

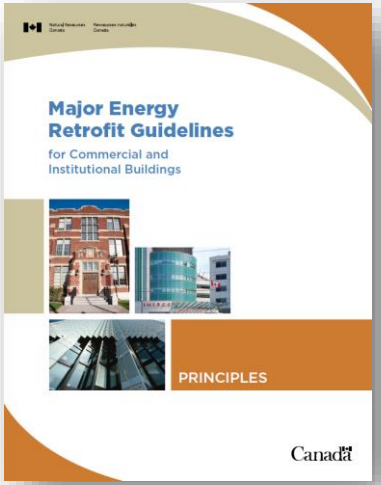


Source: The Building Life Cycle, http://www.nrcan.gc.ca/energy/efficiency/buildings/eeb/key/cycle/3973

We'll Be Using This Road Map







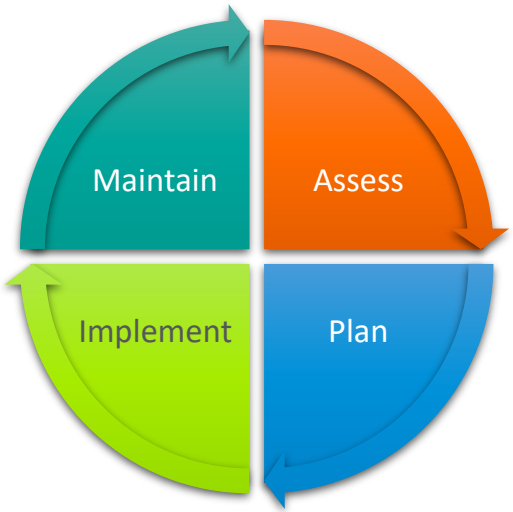
Additional guides available:

- K-12 Schools
- Hospitals
- Hotels and Motels
- Supermarkets
- Food Stores

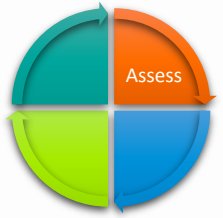
https://www.nrcan.gc.ca/energy-efficiency/buildings/existing-buildings/retrofitting/20707

Retrofit Strategy

1. Assess	• Establish commitment • Benchmarking with Portfolio Manager • Identifying opportunities
2. Plan	• Staging project measures • Determining timing • Creating the business case
3. Implement	• Managing your project • Selecting a contractor • Commissioning and project hand-off
4. Maintain	• Training staff • Ongoing building optimization • Monitoring and tracking



https://www.nrcan.gc.ca/energy-efficiency/buildings/existing-buildings/retrofitting/20707

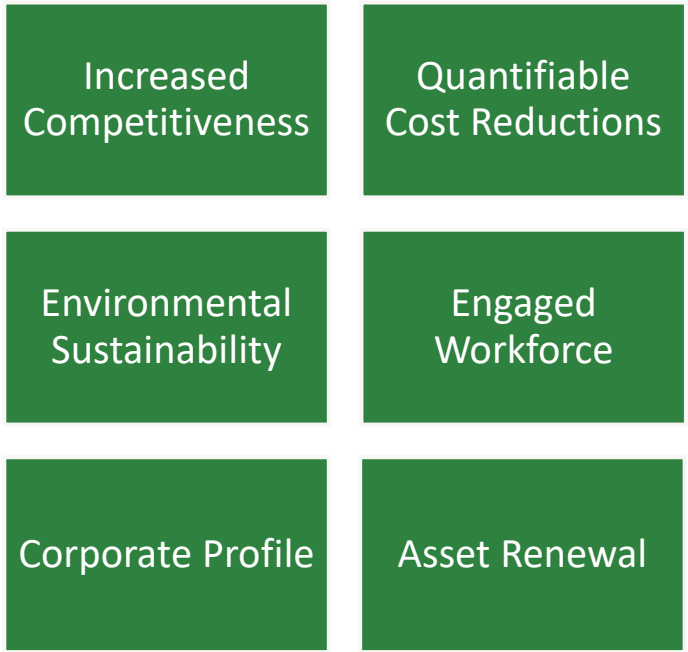


1. Assess

Establishing Commitment, Benchmarking and Finding the Opportunities

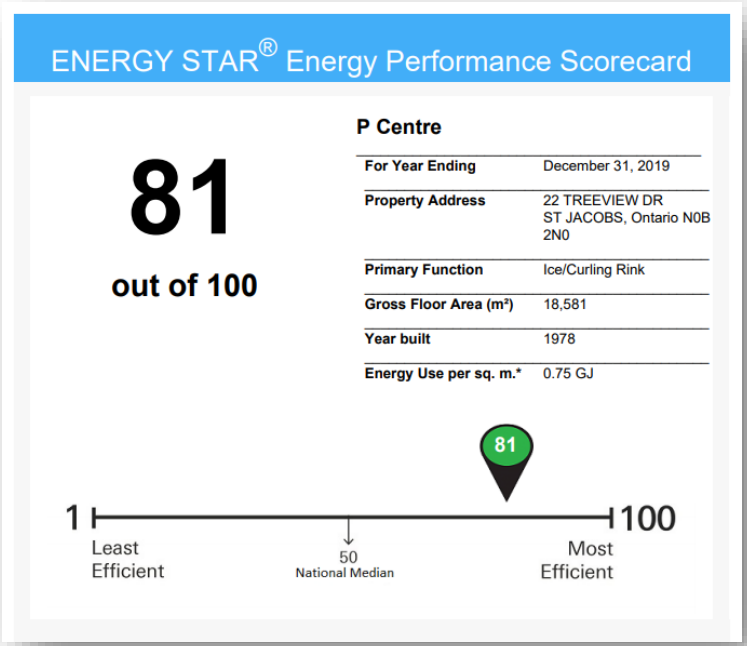
Establishing Commitment

- What is it?
  - Full and visible support of senior management
  - May be in the form of a vision statement or energy policy
- Why do you need it?
  - Authority
  - Profile
  - Project funding
- When do you need it?
  - Get commitment to initiate project
  - Update annually to maintain momentum



ESG – Environmental, Social & Governance

Benchmarking is Foundational



By July 2023, all buildings over 50,000 sq. ft. will need to report under Ontario Energy Water Reporting and Benchmarking (EWRB) Regulations.

https://www.ontario.ca/page/report-energy-water-use-large-buildings

Energy Assessment Process – Seven Steps

Selecting and Prioritizing Measures – Three Key Steps

1. From the point of purchase

2. To the point of end use

Understand Present Usage

1. Understand Costs
2. Compare Yourself
3. Understand When
4. Understand Where

Find the Savings Opportunities

5. Eliminate Waste
6. Maximize Efficiency
7. Optimize Supply

3. And, back to the point of purchase (or supply)

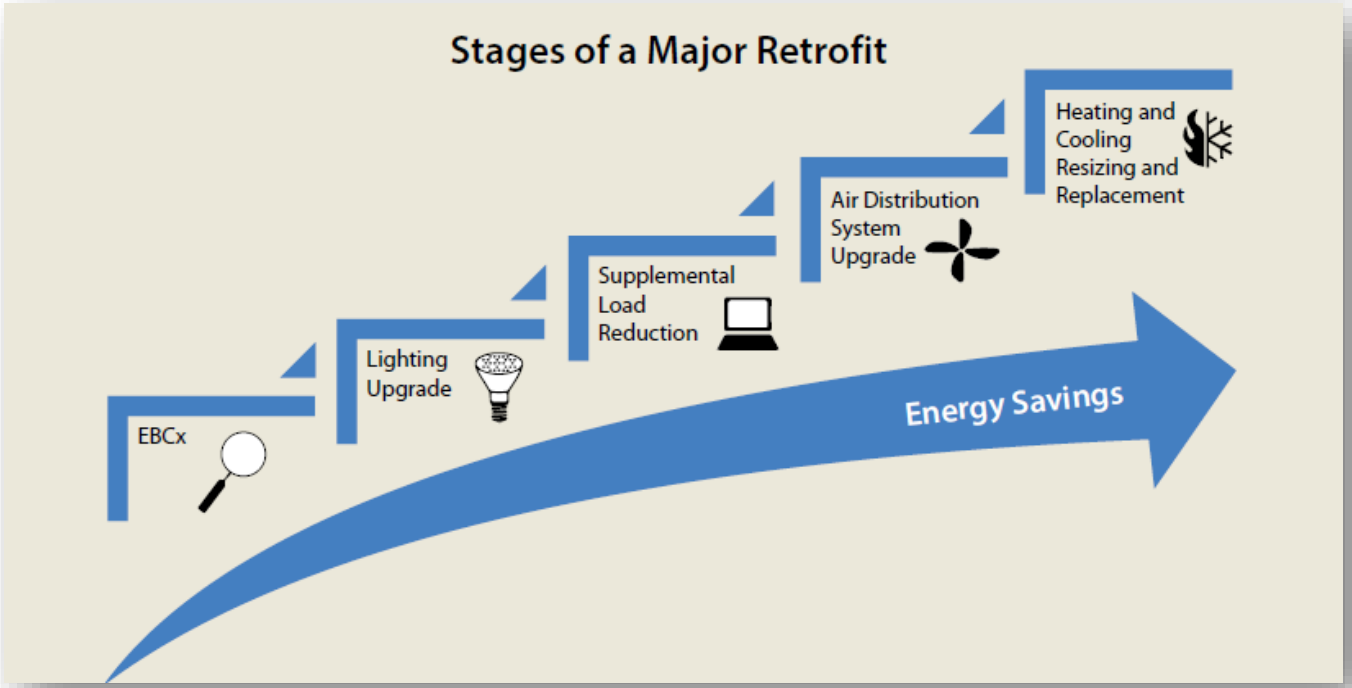
Identifying Opportunities with An Energy Audit …What Makes a Good Audit?

1. Objectivity of auditor
2. Lots of input from customer and operators
3. Correct hours and correct price in savings estimates
4. Analysis of historical data
5. Installed costs – not just equipment cost
6. Accounting for interaction between measures.
7. Good financials – SIR, NPV & IRR – not just simple payback

2. Plan

Staging, Timing, Building the Business Case and Financing

Staging Retrofits Will Maximize Benefits



https://www.nrcan.gc.ca/energy-efficiency/buildings/existing-buildings/retrofitting/20707

Existing Building Commissioning (EBCx)

- EBCx is not actually a measure, it is a process!
  - Optimize what is already in-place
  - Establish the current facility requirements
  - Eliminate waste, increase occupant comfort, equipment reliability

- Within a major retrofit strategy
  - EBCx should not be done on systems that are planned to be changed within the next 3-5 years
  - It may be done to establish proper baseline operating conditions and on systems not targeted for major retrofit
  - Can be done alongside of major retrofit, often the EBCx provider becomes a Cx provider for the new systems.

Lighting Upgrades

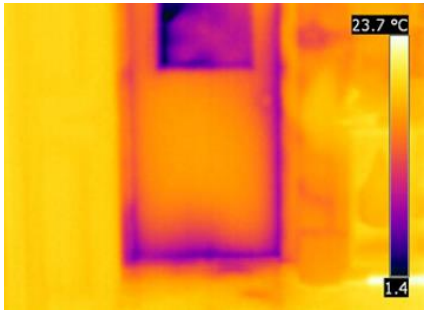
- Changing from T8 to LED, lamp for lamp, is not always optimal and is often not a major retrofit.
- Redesign of the lighting system to optimize light level and take full advantage of LED fixture efficiency, not just lamp efficiency, falls into the major retrofit category.
- Requires more planning – what is the future use of my building?
- Benefit can be as much as 50% greater than a simple drop-in lamp retrofit.
- Reduces cooling loads, can positively impact other major retrofit to HVAC systems

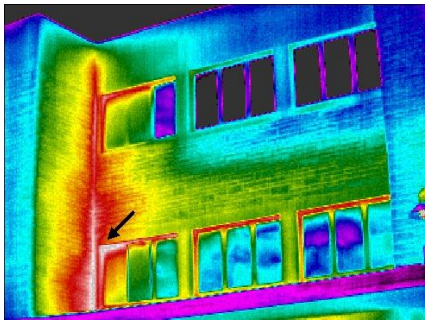
Plug/IT Load Reduction

- Often the single largest end use in an office building, twice as much as lighting in many cases.
- Difficult to address as it involves mostly tenants in many buildings
  - Must involve tenants from the onset, including IT
- Can negatively, and significantly, impact HVAC if not properly planned
- Main HVAC should never serve to cool IT spaces

Building Envelope

- Lower Cost
  - Repair/maintain weather stripping to reduce infiltration of outside air
  - Caulking/sealing windows and air gaps to reduce infiltration of outside air
- Higher Cost
  - Replace windows with 2-, 3- or 4-pane systems with low-e and argon filled
  - Insulation upgrades to reduce heat transfer through the walls, roof and foundation

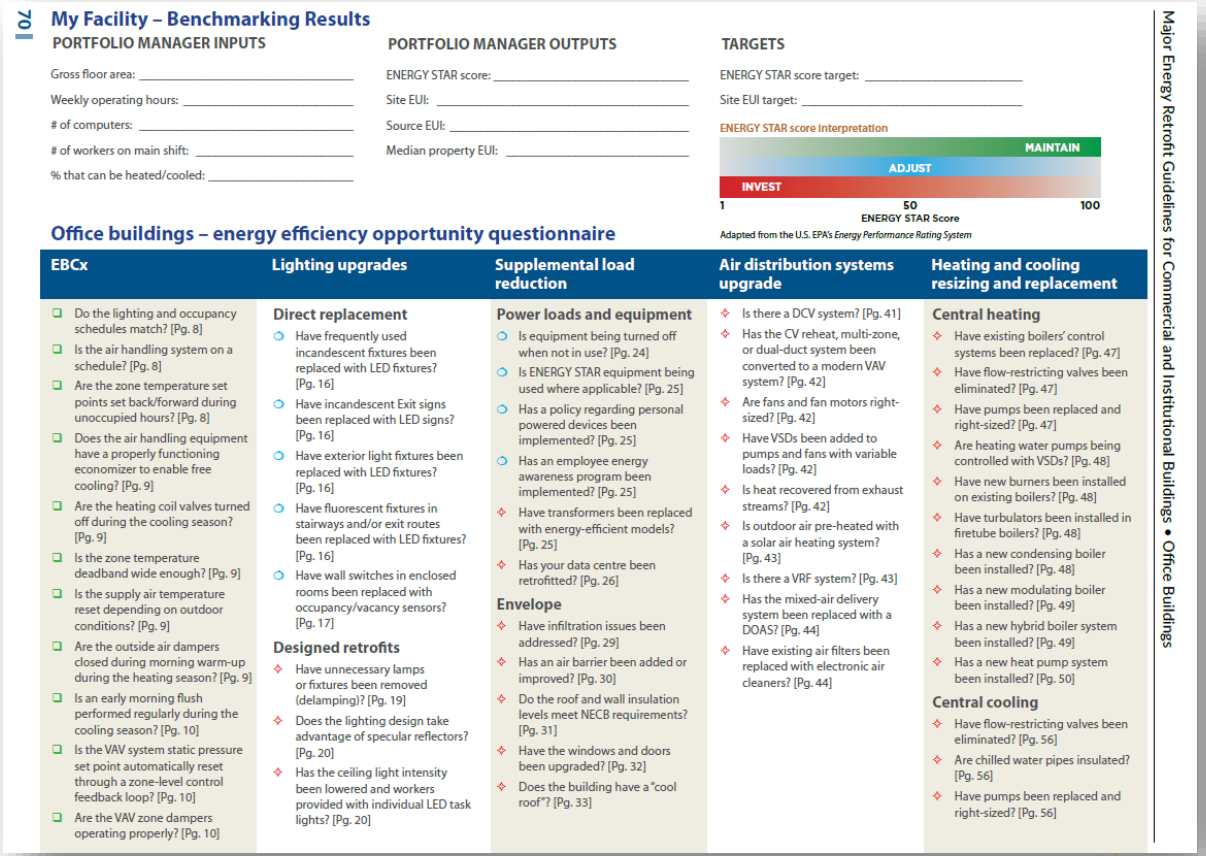




HVAC Replacement and Upgrade

- Rooftop units (RTUs) are often "Install and Forget" HVAC Systems
  - Can lead to significant inefficiencies
- Major retrofit of HVAC including RTUs should focus on efficiency, reliability, serviceability. Look for:
  - Built quality – dampers, casings, components
  - Efficiency – EER, motor, VFDs, heating efficiency
  - Controls – open protocol/interoperability
- Consider various forms of heat pumps for heating where applicable
  - Efficient electrification resources coming from Save on Energy

A Checklist: Benchmarking to Opportunity



10

My Facility – Benchmarking Results

PORTFOLIO MANAGER INPUTS

Gross floor area: _____

Weekly operating hours: _____

# of computers: _____

# of workers on main shift: _____

% that can be heated/cooled: _____

PORTFOLIO MANAGER OUTPUTS

ENERGY STAR score: _____

Site EUI: _____

Source EUI: _____

Median property EUI: _____

TARGETS

ENERGY STAR score target: _____

Site EUI target: _____

ENERGY STAR score Interpretation

MAINTAIN

ADJUST

INVEST

1 50 100

ENERGY STAR Score

Adapted from the U.S. EPA's *Energy Performance Rating System*

Office buildings – energy efficiency opportunity questionnaire

EBCx

- ❑ Do the lighting and occupancy schedules match? [Pg. 8]
- ❑ Is the air handling system on a schedule? [Pg. 8]
- ❑ Are the zone temperature set points set back/forward during unoccupied hours? [Pg. 8]
- ❑ Does the air handling equipment have a properly functioning economizer to enable free cooling? [Pg. 9]
- ❑ Are the heating coil valves turned off during the cooling season? [Pg. 9]
- ❑ Is the zone temperature deadband wide enough? [Pg. 9]
- ❑ Is the supply air temperature reset depending on outdoor conditions? [Pg. 9]
- ❑ Are the outside air dampers closed during morning warm-up during the heating season? [Pg. 9]
- ❑ Is an early morning flush performed regularly during the cooling season? [Pg. 10]
- ❑ Is the VAV system static pressure set point automatically reset through a zone-level control feedback loop? [Pg. 10]
- ❑ Are the VAV zone dampers operating properly? [Pg. 10]

Lighting upgrades

Direct replacement

- ○ Have frequently used incandescent fixtures been replaced with LED fixtures? [Pg. 16]
- ○ Have incandescent Exit signs been replaced with LED signs? [Pg. 16]
- ○ Have exterior light fixtures been replaced with LED fixtures? [Pg. 16]
- ○ Have fluorescent fixtures in stairways and/or exit routes been replaced with LED fixtures? [Pg. 16]
- ○ Have wall switches in enclosed rooms been replaced with occupancy/vacancy sensors? [Pg. 17]

Designed retrofits

- ✧ Have unnecessary lamps or fixtures been removed (delamping)? [Pg. 19]
- ✧ Does the lighting design take advantage of specular reflectors? [Pg. 20]
- ✧ Has the ceiling light intensity been lowered and workers provided with individual LED task lights? [Pg. 20]

Supplemental load reduction

Power loads and equipment

- ○ Is equipment being turned off when not in use? [Pg. 24]
- ○ Is ENERGY STAR equipment being used where applicable? [Pg. 25]
- ○ Has a policy regarding personal powered devices been implemented? [Pg. 25]
- ○ Has an employee energy awareness program been implemented? [Pg. 25]
- ✧ Have transformers been replaced with energy-efficient models? [Pg. 25]
- ✧ Has your data centre been retrofitted? [Pg. 26]

Envelope

- ✧ Have infiltration issues been addressed? [Pg. 29]
- ✧ Has an air barrier been added or improved? [Pg. 30]
- ✧ Do the roof and wall insulation levels meet NECB requirements? [Pg. 31]
- ✧ Have the windows and doors been upgraded? [Pg. 32]
- ✧ Does the building have a "cool roof"? [Pg. 33]

Air distribution systems upgrade

- ✧ Is there a DCV system? [Pg. 41]
- ✧ Has the CV reheat, multi-zone, or dual-duct system been converted to a modern VAV system? [Pg. 42]
- ✧ Are fans and fan motors right-sized? [Pg. 42]
- ✧ Have VSDs been added to pumps and fans with variable loads? [Pg. 42]
- ✧ Is heat recovered from exhaust streams? [Pg. 42]
- ✧ Is outdoor air pre-heated with a solar air heating system? [Pg. 43]
- ✧ Is there a VRF system? [Pg. 43]
- ✧ Has the mixed-air delivery system been replaced with a DOAS? [Pg. 44]
- ✧ Have existing air filters been replaced with electronic air cleaners? [Pg. 44]

Heating and cooling resizing and replacement

Central heating

- ✧ Have existing boilers' control systems been replaced? [Pg. 47]
- ✧ Have flow-restricting valves been eliminated? [Pg. 47]
- ✧ Have pumps been replaced and right-sized? [Pg. 47]
- ✧ Are heating water pumps being controlled with VSDs? [Pg. 48]
- ✧ Have new burners been installed on existing boilers? [Pg. 48]
- ✧ Have turbulators been installed in firetube boilers? [Pg. 48]
- ✧ Has a new condensing boiler been installed? [Pg. 48]
- ✧ Has a new modulating boiler been installed? [Pg. 49]
- ✧ Has a new hybrid boiler system been installed? [Pg. 49]
- ✧ Has a new heat pump system been installed? [Pg. 50]

Central cooling

- ✧ Have flow-restricting valves been eliminated? [Pg. 56]
- ✧ Are chilled water pipes insulated? [Pg. 56]
- ✧ Have pumps been replaced and right-sized? [Pg. 56]

Major Energy Retrofit Guidelines for Commercial and Institutional Buildings • Office Buildings

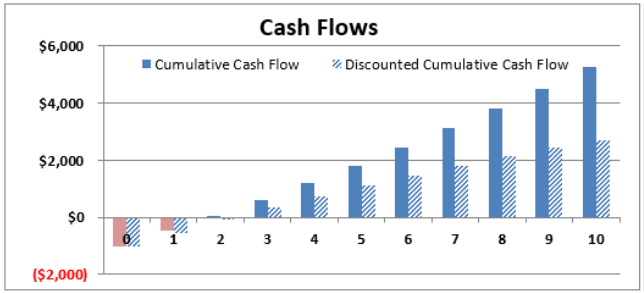
https://www.nrcan.gc.ca/energy-efficiency/buildings/existing-buildings/retrofitting/20707

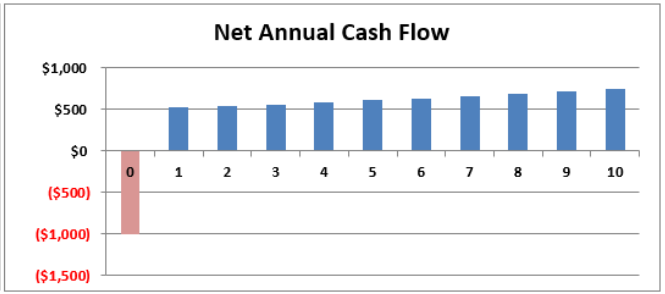
Developing the Financial Case

Treat Energy Efficiency as an Investment!

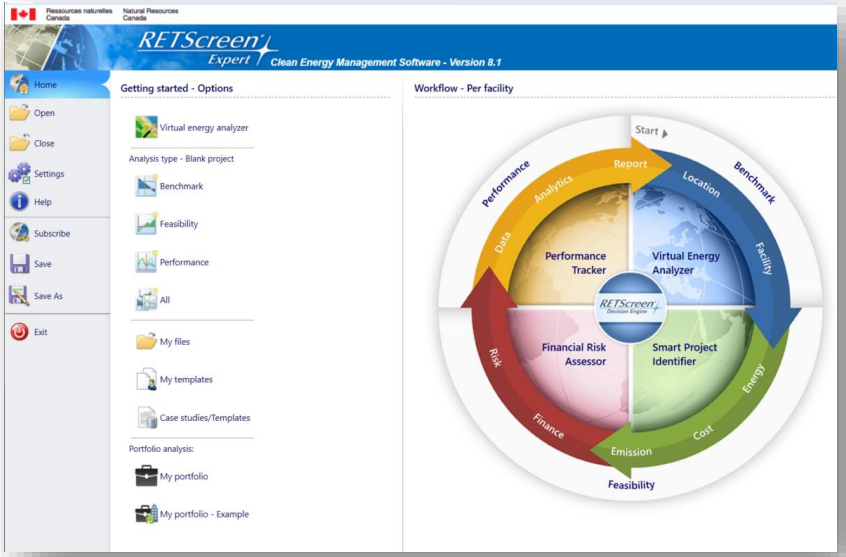
- As an investment, consider using value indicators such as:
  - Savings to Investment Ratio (SIR)
  - Net Present Value (NPV)
  - Internal Rate of Return (IRR)

Financial Metrics		Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
Simple Payback	2.0 yrs	1	2	3	4	5	6	7	8	9	10
Internal Rate of Return	IRR	-48.0%	4.0%	28.3%	40.3%	46.7%	50.3%	52.4%	53.7%	54.5%	55.0%
Modified Internal Rate of Return	MIRR	-48.0%	5.5%	21.3%	26.4%	27.8%	27.9%	27.5%	26.9%	26.2%	25.4%
Net Present Value	NPV	($527)	($80)	$342	$742	$1,119	$1,477	$1,814	$2,133	$2,435	$2,721
Savings to Investment Ratio	SIR	0.5	0.9	1.3	1.7	2.1	2.5	2.8	3.1	3.4	3.7

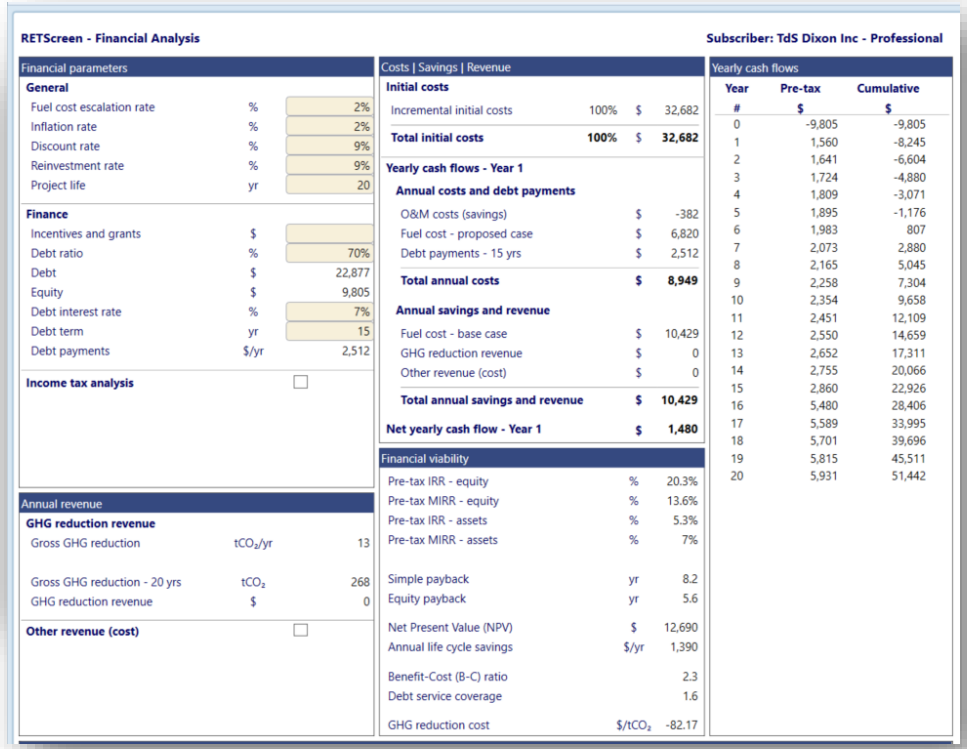




RETScreen Expert – A Technical & Financial Analysis Tool!



You can explore a whole building retrofit using the Virtual Energy Analyzer



RETScreen - Financial Analysis — **Subscriber: TdS Dixon Inc - Professional**

Financial parameters

General		
Fuel cost escalation rate	%	2%
Inflation rate	%	2%
Discount rate	%	9%
Reinvestment rate	%	9%
Project life	yr	20
Finance		
Incentives and grants	$	
Debt ratio	%	70%
Debt	$	22,877
Equity	$	9,805
Debt interest rate	%	7%
Debt term	yr	15
Debt payments	$/yr	2,512
Income tax analysis	☐	

Annual revenue

GHG reduction revenue		
Gross GHG reduction	tCO_2/yr	13
Gross GHG reduction - 20 yrs	tCO_2	268
GHG reduction revenue	$	0
Other revenue (cost)	☐	

Costs | Savings | Revenue

Initial costs			
Incremental initial costs	100%	$	32,682
Total initial costs	**100%**	**$**	**32,682**
Yearly cash flows - Year 1			
Annual costs and debt payments			
O&M costs (savings)		$	-382
Fuel cost - proposed case		$	6,820
Debt payments - 15 yrs		$	2,512
Total annual costs		**$**	**8,949**
Annual savings and revenue			
Fuel cost - base case		$	10,429
GHG reduction revenue		$	0
Other revenue (cost)		$	0
Total annual savings and revenue		**$**	**10,429**
Net yearly cash flow - Year 1		**$**	**1,480**

Financial viability

Pre-tax IRR - equity	%	20.3%
Pre-tax MIRR - equity	%	13.6%
Pre-tax IRR - assets	%	5.3%
Pre-tax MIRR - assets	%	7%
Simple payback	yr	8.2
Equity payback	yr	5.6
Net Present Value (NPV)	$	12,690
Annual life cycle savings	$/yr	1,390
Benefit-Cost (B-C) ratio		2.3
Debt service coverage		1.6
GHG reduction cost	$/tCO₂	-82.17

Yearly cash flows

Year	Pre-tax	Cumulative
#	$	$
0	-9,805	-9,805
1	1,560	-8,245
2	1,641	-6,604
3	1,724	-4,880
4	1,809	-3,071
5	1,895	-1,176
6	1,983	807
7	2,073	2,880
8	2,165	5,045
9	2,258	7,304
10	2,354	9,658
11	2,451	12,109
12	2,550	14,659
13	2,652	17,311
14	2,755	20,066
15	2,860	22,926
16	5,480	28,406
17	5,589	33,995
18	5,701	39,696
19	5,815	45,511
20	5,931	51,442

Incentives from Save on Energy

About the Retrofit Program

The Save on Energy Retrofit program offers commercial electricity customers incentives to upgrade equipment, reduce energy bills, lower carbon footprints and enhance staff comfort.

Which of my facilities are eligible?

Offices | Libraries | Recreation Centers | Multi-family | Emergency Services | Water Treatment

About the Retrofit Program

Which project types are eligible?

Lighting

HVAC

Controls & Automation

Refrigeration

Motors & Drives

Compressed Air

Prescriptive and Custom Tracks

Prescriptive

- Set incentive rates for common retrofits.
- No calculations required.
- No post-project M&V.

Custom

- Calculated incentive based on energy (kWh) or demand (kW) savings for more complex projects.
- Estimated savings calculations required.
- Post project M&V may be required to verify savings.

Retrofit Program Process (1/2)

Visit the Resources and Support page for Application Checklists, Tips and Best Practices

Register for the Retrofit Portal

Sign up for a Save on Energy account at saveonenergy.ca/Retrofit.

A user guide and instructional videos are available online on the Retrofit Program's Resources & Support page.

Submit Application Documents

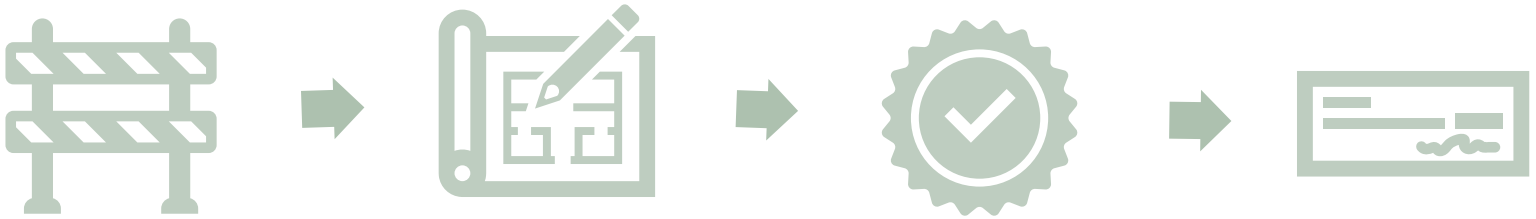
Enter project details. Attach quotes, specification sheets, calculations, pre-project photos, M&V Plan (if required).

Project Pre-Approval

Respond to any requests for information. Receive your notice of pre-approval

Retrofit Program Process (2/2)

Visit the Resources and Support page for Application Checklists, Tips and Best Practices



Project Installation
Complete your project installation once you have received your notice of pre-approval

Post-Project Application
Enter project details.
Attach invoices, proof of payment, QA/QC photos and M&V documents if required.

Post Project Approval
You will receive a notice of approval following review and approval of all required documents

Incentive Payment
Following approval, submit an invoice for the approved incentive amount.

Retrofit Program spring 2023 changes

- **Custom track** introduced in May 2023
- Updated incentive structure
    - New and increased incentives
    - Same incentive rate for lighting and non-lighting projects (**$1,200/kW or $0.13/kWh**, whichever is higher)
    - $1 million incentive cap for Retrofit projects has been removed
    - Incentives continue to be capped at 50% of project costs
- Changes to **networked lighting** control incentives
    - Incentives now calculated on **$/kWh** (moving away from $/sq. ft.)
    - An incentive offering for networked lighting controls — from $0.15/sq. ft. to **$0.35/kWh**

Retrofit Program fall 2023 changes

- Prescriptive incentives for most **non-lighting** measures have increased as of October 30, 2023
- Most non-lighting incentives have **doubled,** and some have increased three- or fourfold, including air source heat pumps
- The **last day to apply for lighting** projects (prescriptive or custom) in the Retrofit program is **December 17, 2023**
- The **Instant Discounts Program** for lighting launches **December 18, 2023**
- In this program, incentives will be paid directly to distributors, enabling them to offer instant point-of-sale discounts on energy-efficiency lighting to customers
- Visit the Retrofit program website for the updated measures and incentives.

New Measure Incentives Rates

Measure	New Incentive
Unitary Air Source Heat Pump 20.0 to <63.3 Tons	$18,000/unit
Refrigeration Compressors High Efficiency Scroll Compressors	$240/HP
Circulator Pumps with ECMs >=750<1490 W (>=1<2HP)	$2,200/unit
Compressed Air VD Variable Displacement Compressor >= 20 HP	$3,120/unit
Demand Control Ventilation – Enclosed Parking Garage >50 to <= 75 HP	$29,850/unit
Unitary Air Conditioning Unit 20 to < 63 tons	$4,880/unit
Variable Frequency Drive 5 HP	$1,050/unit
Variable Frequency Drive 150HP	$29,400/unit

The complete list of incentives can be found on the Retrofit program webpage.

Retrofit regional adders

In certain areas of Ontario where electricity constraints exist, Save on Energy introduced Retrofit regional adders that **double the incentive for non-lighting prescriptive measures** to further encourage uptake in the Retrofit program. The target areas are:

- Niagara region
- Kingston area
- Southern Huron Perth
- Pembroke area
- Kenora
- Waubaushene
- Barrie/Muskoka
- Elmira
- Peterborough/Belleville

Postal codes for each eligible target area are available on the Save on Energy website

Training Courses

Save on Energy offers incentives of up to 50% for ~20 training courses, plus certification exam fees, including:

- Achieving Net-Zero Buildings
- Energy Management and the ISO 50001 Standard
- HVAC Optimization for High Performance Sustainable Buildings
- Certified Energy Manager (CEM)
- Certified Measurement & Verification Professional® (CMVP)

To register, visit: https://saveonenergy.ca/Training-and-Support/Training-Courses

Training Courses for Enbridge Customers

Enbridge customers are eligible for incentives of up to 75% for three courses:

- Dollars to $ense Workshops - up to $500 a day
- Certified Sustainable Building Operator® (CSBO) - up to $2,250 of course fees
- Certified Energy Manager® (CEM) - up to $2,500 of course fees

Save on Energy's Capability Building Program

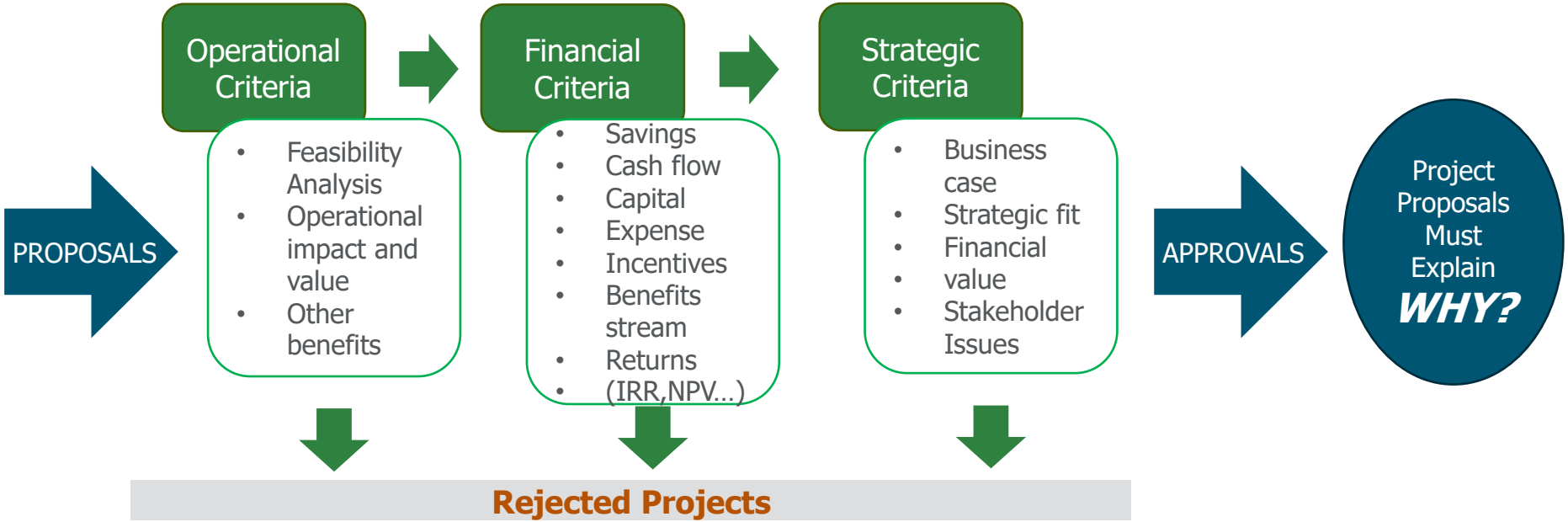
- Save on Energy's Capability Building program is designed to increase awareness of energy-efficiency opportunities, and to enhance knowledge and develop skills in organizations and communities across Ontario so they can undertake energy-efficiency actions and participate in Save on Energy programs
- The program includes tools such as workshops, webinars, training courses, coaching, peer learning and information resources including guides and videos

Making and Pitching The Business Case

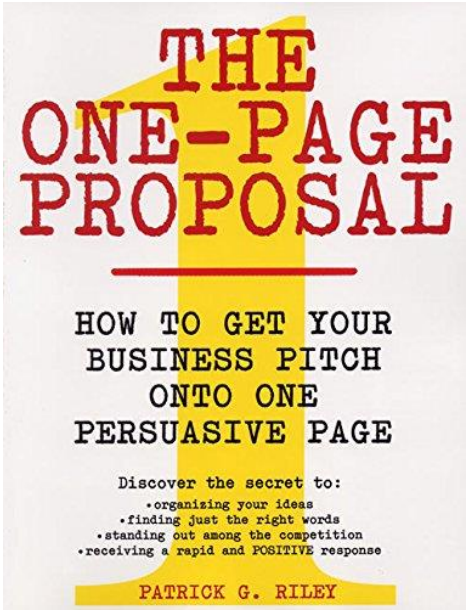
Featuring the One-Page Proposal

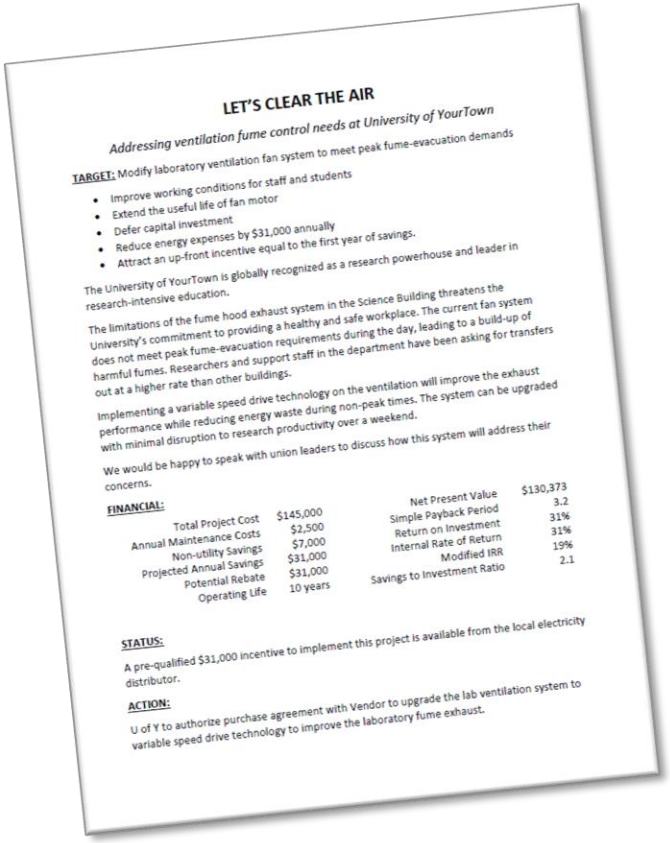
Getting to Yes!

Mapping the Decision Process



The One-Page Proposal





LET'S CLEAR THE AIR

Addressing ventilation fume control needs at University of YourTown

TARGET: Modify laboratory ventilation fan system to meet peak fume-evacuation demands

- Improve working conditions for staff and students
- Extend the useful life of fan motor
- Defer capital investment
- Reduce energy expenses by $31,000 annually
- Attract an up-front incentive equal to the first year of savings.

The University of YourTown is globally recognized as a research powerhouse and leader in research-intensive education.

The limitations of the fume hood exhaust system in the Science Building threatens the University's commitment to providing a healthy and safe workplace. The current fan system does not meet peak fume-evacuation requirements during the day, leading to a build-up of harmful fumes. Researchers and support staff in the department have been asking for transfers out at a higher rate than other buildings.

Implementing a variable speed drive technology on the ventilation will improve the exhaust performance while reducing energy waste during non-peak times. The system can be upgraded with minimal disruption to research productivity over a weekend.

We would be happy to speak with union leaders to discuss how this system will address their concerns.

FINANCIAL:

Total Project Cost	$145,000	Net Present Value	$130,373
Annual Maintenance Costs	$2,500	Simple Payback Period	3.2
Non-utility Savings	$7,000	Return on Investment	31%
Projected Annual Savings	$31,000	Internal Rate of Return	31%
Potential Rebate	$31,000	Modified IRR	19%
Operating Life	10 years	Savings to Investment Ratio	2.1

STATUS:

A pre-qualified $31,000 incentive to implement this project is available from the local electricity distributor.

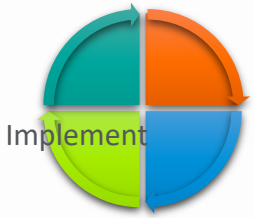
ACTION:

U of Y to authorize purchase agreement with Vendor to upgrade the lab ventilation system to variable speed drive technology to improve the laboratory fume exhaust.

The Strategic Steps of a One-Page Proposal

Follows a logical thought process:

- Title and subtitle - what's to come
- Target and secondary targets - goals
- Rationale - background, WHY, the pitch
- Financial - $$$
- Status - what's happening
- Action - what do you want?



3. Implement

Project Management, Financing and Contracting

Project Management and Contracting

- A good project can get derailed by poor project management
- All retrofit projects should have a formal management, typical following the five-step process
  - **Initiating** involves defining your project and obtaining authorization to proceed.
  - **Planning** involves establishing the scope of work, project objectives and the course of action.
  - **Executing** involves selecting contractors and completing the project work.
  - **Monitoring and controlling** happens in parallel with the execution step and involves ensuring that the project work is undertaken as planned, as well as managing any necessary change orders.
  - **Closing** involves finalizing project activities and formally closing contracts.
- The root of the project management success is good communication

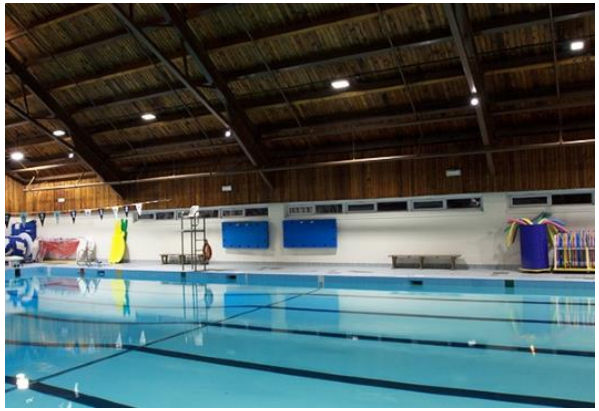
An End-to-End Retrofit and Implementation Process

The LAS Facility Lighting Service

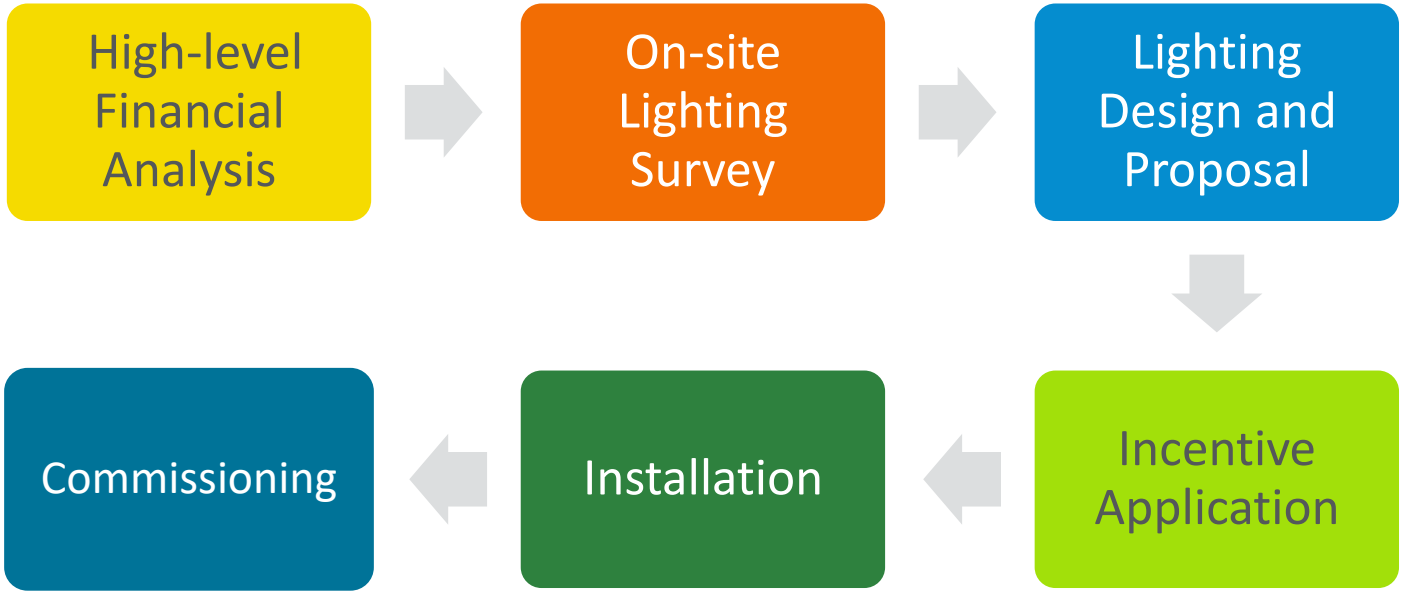
Energy Savings Made Easy!

Key Facilities

- Long-Term Care Homes
- Municipal Offices
- Library and Town Halls
- Public Works and Transit Garages
- Pools and Gymnasium
- Community Centres
- Arenas and Curling Rinks
- Baseball Diamonds



LAS Facility Lighting Service



Haldimand County Grandview Lodge LTC

128-Bed Long-Term Care Facility

- Energy cost ..... $62,801 (60% reduction)
- Maintenance ..... $7,950 (80% reduction)
- Incentives $23,000
- Financial value ..... IRR of 28.5% (simple payback of 3.7 years)
- Energy consumption ..... 393,778 kWh

Peterborough Memorial Centre

Before and After

Energy Cost and Maintenance Savings

- Energy cost ..... $12,742 (45% reduction)
- Maintenance ..... $3,334 (80% reduction)
- Incentives $6,840
- Financial value ..... IRR of 22.1% (simple payback of 4.6 years)
- Energy consumption ..... 70,787 kWh

Kenora Aquatic Centre (Pool Lighting)

Base Case:

- Lamp Type: T5 (54W)
- Operating Hours: 5,828 hrs
- Wattage: 17 kW
- Annual Consumption: 96,512kWh

Proposed Case

- Lamp Type: LED – Acuity DSX PGT
- Wattage: 6 kW
- Annual Consumption: 35,924 kWh
- Energy and Maintenance Savings: $11,694.06
- Financials: IRR of 27.1% (simple payback of 3.9 years)

Program stats

- Over 120 projects completed and counting
- Community centres, municipal offices, town halls, arenas pools, gymnasium, public works garages and long-term care facilities
- Cumulative savings to municipalities: over $1 million
- Energy consumption savings: 6.3 million kWh
- Incentives: $520,000
- 40 municipalities participated
- Save on Energy incentives availability: 2021-2024

Let’s continue the conversation

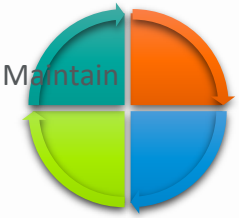
LAS | AMO Business Services

T 416.971.9856 TF 877.426.6527

Christian Tham

Municipal Program Specialist
ctham@amo.on.ca

647-932-3774 ext. 452

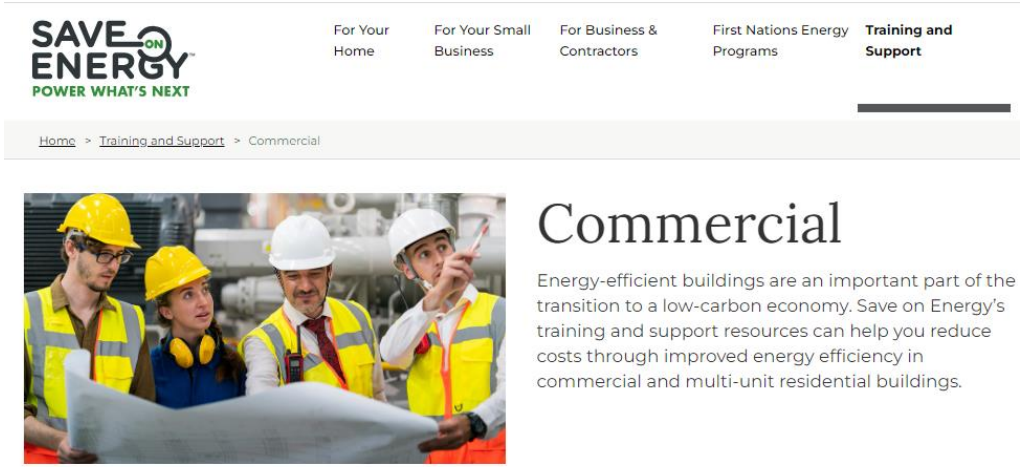


4. Maintain

Commissioning, Handoff, Training, Ongoing Optimization and Monitoring

Training – Before, During and After Retrofits

- Up to 75% support available for training
- Customizable to your needs and facility
- Hands-on and practical
- Certifications



https://saveonenergy.ca/Training-and-Support/Commercial

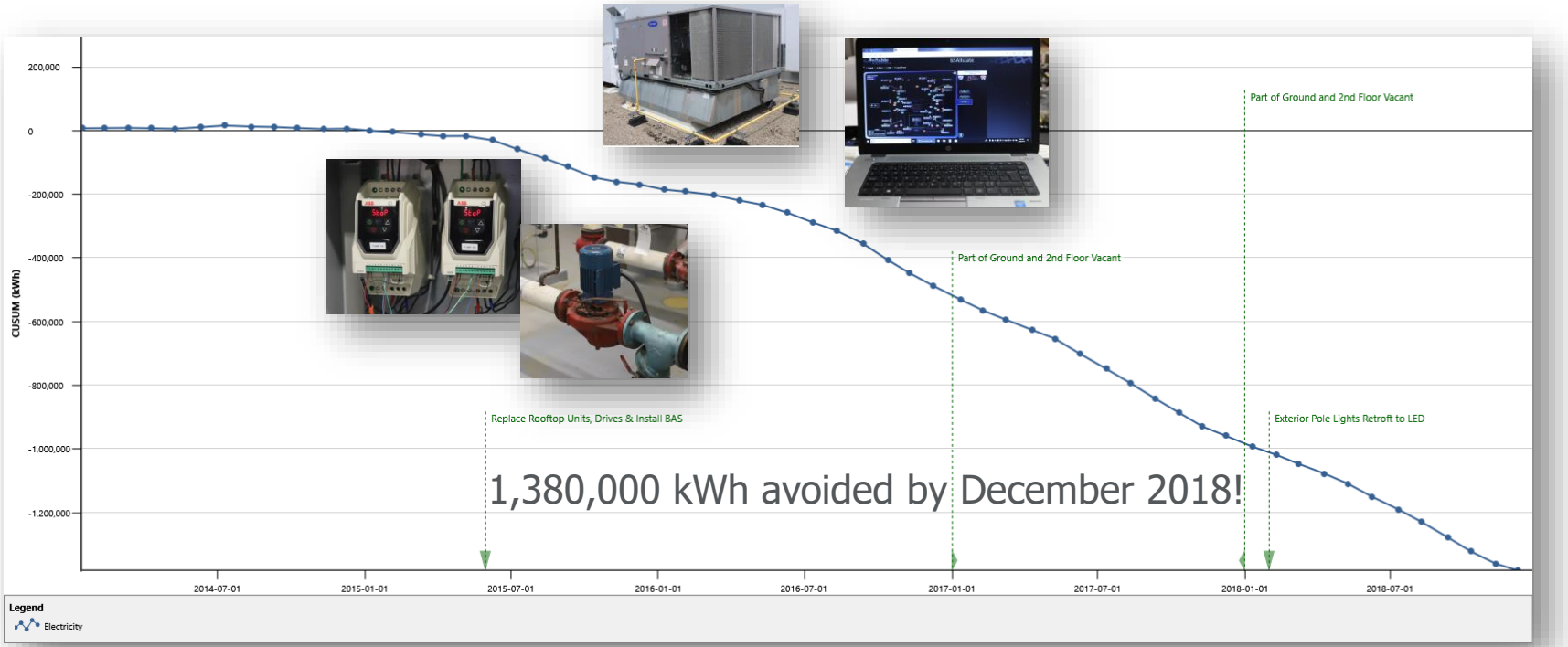
Monitoring to Show/Ensure the Results

- 3 floors, 48,000 sq.ft.
- Energy reduced by 37% from 2014 to 2018

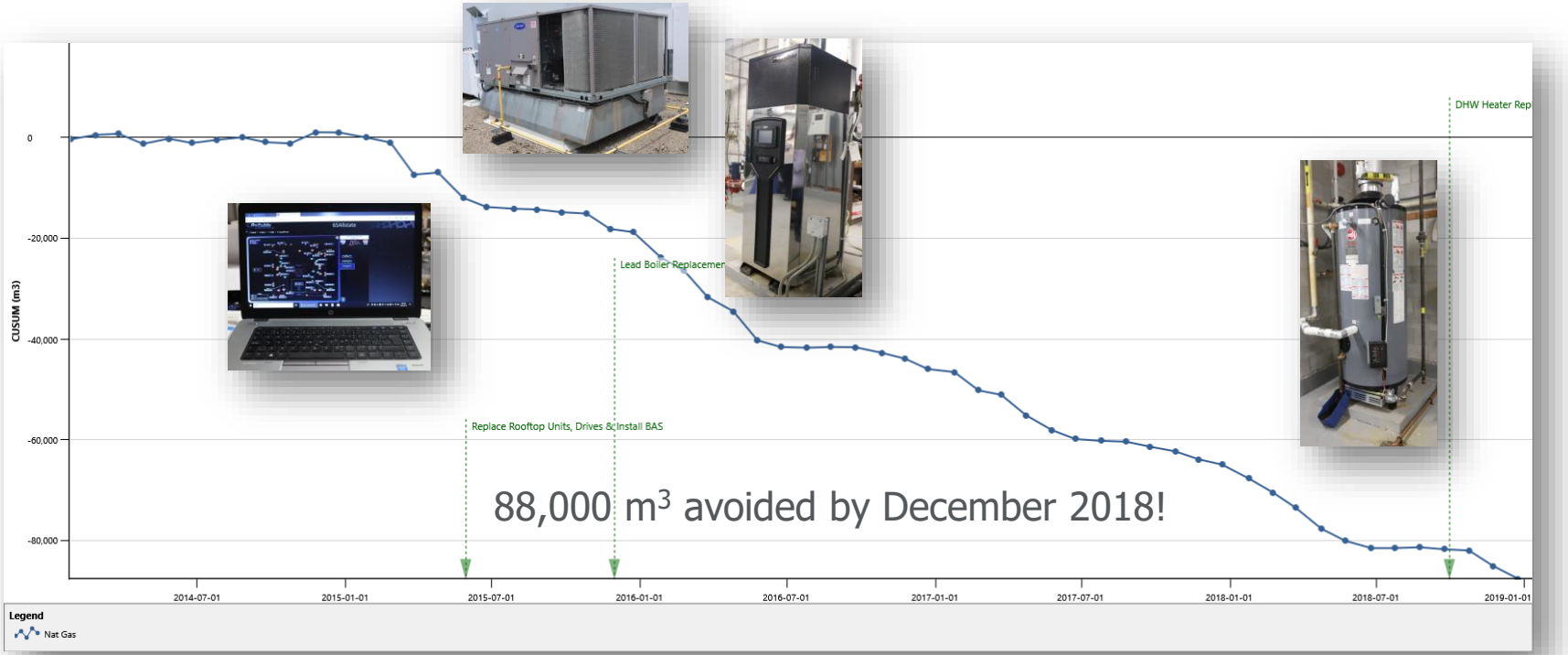
  2014: 47.3 kWh/ft2

  2018 29.8 kWh/ft2
- Actions linked to asset renewal
- Measures include:
  - Four new rooftop HVAC units
  - VFDs on circulator pumps
  - Building automation system
  - One of two boilers, DHW heater
  - Exterior lighting
  - Commissioning

Electricity Improvement



Natural Gas Improvement



A Retrofit Strategy – A Roadmap to Savings and a Roadmap to the Future!

1. Assess	• Establish commitment • Benchmarking with Portfolio Manager • Identifying opportunities
2. Plan	• Staging project measures • Determining timing • Creating the business case
3. Implement	• Managing your project • Selecting a contractor • Commissioning and project hand-off
4. Maintain	• Training staff • Ongoing building optimization • Monitoring and tracking

Questions and Answers

Thank you

SaveOnEnergy.ca

trainingandsupport@ieso.ca

@SaveOnEnergyOnt

facebook.com/SaveOnEnergyOntario

linkedin.com/showcase/
SaveOnEnergy-Ontario

ieso
Connecting Today.
Powering Tomorrow.

SAVE ON ENERGY
POWER WHAT'S NEXT