Healthcare Webinar Series #3
Implementation, Funding and Futureproofing

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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?
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Introducing your Hosts



Ed Rubinstein has been leading and developing energy management programs and teams for over 25 years including the University Health Network's award-winning Energy & Environment team and as a vice-president at a renewable energy company. Ed and his teams have been honoured with numerous awards, including recognition as a member of the 2018 Clean16.



Stephen Dixon, Principal at TdS Dixon Inc., has over 45 years of experience delivering energy management services to industrial, commercial, institutional, and utility organizations. Widely recognized as a leader in energy management training, Stephen's mission is simple: empower organizations to use energy more effectively through skill development, best practices, and practical tools. His experience includes 950+ energy assessments, 3,000+ workshops, and inspiring over 45,000 individuals across 2,100 organizations.

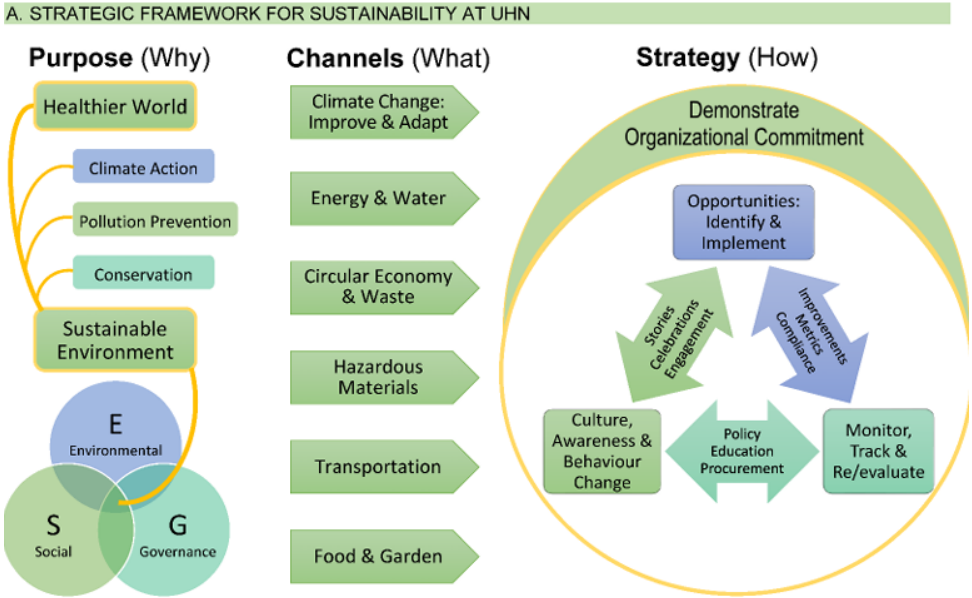
Agenda

- Strategic framework
- Effective & High Value Projects
- Financial Analysis
- Financial Options
- One Page Proposal
- Effective Commisioning
- Effective Measurement & Verification

Strategic Framework

Energy Plan Example: University Health Network

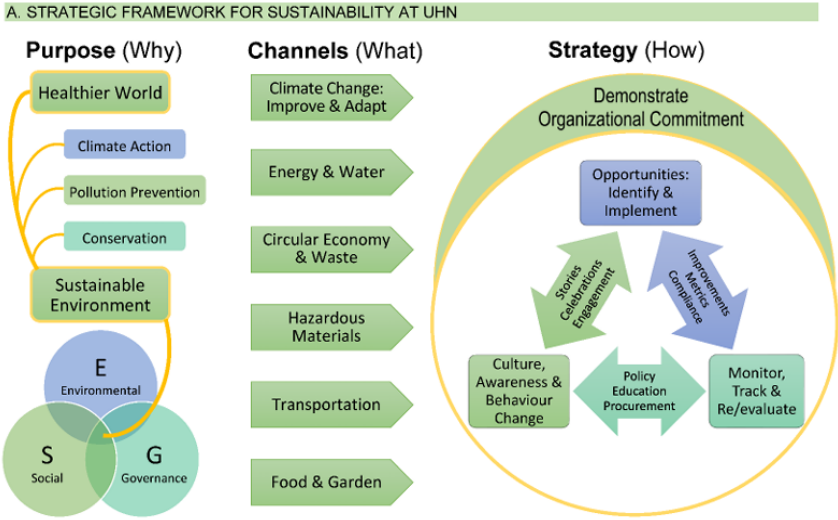




www.uhn.ca/corporate/AboutUHN/Greening_UHN/Pages/uhn_energy_plan.aspx

Energy Plan Example: University Health Network

- Shows the connection between purpose, strategy and measurable actions (detailed in the plan).
- Recognizes that energy management is more effective when integrated with other initiatives, not siloed.
- Emphasizes that people, data and technology all have important and equal roles to play in energy management, as well as how they inform each other.



Effective & High Value Projects

Addition of Variable Speed Drives to Domestic Water Booster Pumps

- New control package allows duty cycling of pumps while ensuring operations were maintained in-case of a power outage.
- Installation of more conveniently located shut-off valves.
- Installation of pump isolation valves to facilitate maintenance.
- Planned shutdown of hospital's water system.
- Extensive collaboration within the hospital and with contractors.



LED Lighting Retrofit in Hallways and Public Spaces

- Improved light quality:
  - higher colour rendering and consistent colour temperature make public spaces feel brighter and cleaner, with no flicker or warm-up delay
- Improved light quantity and spread:
  - even coverage with fewer dark spots and less glare, improving wayfinding, visibility and security camera performance
- Used as an organization-wide engagement opportunity:
  - a visible first project staff and patients notice right away, building support for the retrofits that follow





Connection of Hospital to District Cooling System

- Addressed legacy chilled water system balancing issues.
- Added key cooling system components to emergency power.
- Refreshed Building Operators' control room.
- Designed system (and contract) to encourage further efficiencies with cooling system.



District Cooling Retrofit at Toronto General Hospital – Saving Money While Improving Infrastructure

Appropriate Financial Analysis to Drive Value

Key Parameters

- Capital Cost
- One time or phased (re-fit)
- Savings
  - energy & other
- Time Horizon
  - The period over which the project will deliver value
- Discount rate
  - Minimum rate of return required by investor
  - Weighted average cost of capital
  - Higher risk tends to increase discount rate.
- Inflation Rate
  - Energy & other



Essential Formulas

Conventionally future amounts are compared (apples to apples) with Present Value

$$Present\ Value = \frac{Future\ Amount}{(1 + Discount\ Rate)^{years}}$$

Future savings are typically determined by inflating present savings

$$Future\ Amount = Present\ Savings\,(1 + Inflation\ Rate)^{years}$$

Results Formulas

Savings to investment ratio

$$\frac{Sum\ of\ the\ PV\ of\ Cash\ Inflows\ (Savings)}{PV\ of\ Cash\ Outflows\ (Investment)}$$

Net Present Value

$$Sum\ of\ the\ PV\ of\ Cash\ Inflows\ (Savings) - PV\ of\ Cash\ Outflows\ (Investment)$$

Complex Formulas (Spreadsheet Functions)

- **Internal Rate of Return (IRR)**
  - The discount rate that makes the NPV zero.
  - Assumes cash re-invested at project rate of return – likely high

- **Modified Internal Rate of Return (MIRR)**
  - Considers both the cost of the investment and the interest received on reinvestment of cash.
  - Assumes a more modest interest on reinvestment
  - A more conservative result.

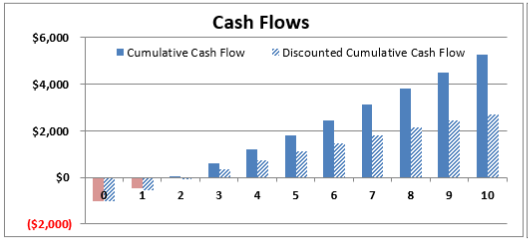
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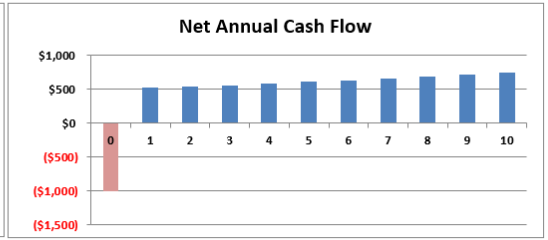
The Whole Picture

Energy Project Life Cycle Cash Flow Analysis

Year of Project		0	1	2	3	4	5	6	7	8	9	10
Project Costs		$1,000										
Inflation Rate	4.0%											
Annual Project Savings		$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500
Savings with Inflation			$520	$541	$562	$585	$608	$633	$658	$684	$712	$740
Net Cash Flow		($1,000)	$520	$541	$562	$585	$608	$633	$658	$684	$712	$740
Cumulative Cash Flow		($1,000)	($480)	$61	$623	$1,208	$1,816	$2,449	$3,107	$3,791	$4,503	$5,243
Discount Rate	10.0%											
Present Value (PV) of Net Cash Flow		($1,000)	$473	$447	$423	$400	$378	$357	$338	$319	$302	$285
Cumulative PV of Net Cash Flow		($1,000)	($527)	($80)	$342	$742	$1,119	$1,477	$1,814	$2,133	$2,435	$2,721

Financial Metrics		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Simple Payback	2.0 yrs										
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





Financing Rate (for MIRR)	10.0%
Re-Investment Rate (for MIRR)	10.0%

More available:

[Making the Business Case for Energy Efficiency | Save on Energy]

Funding Options

Incentives

In our previous webinar we detailed the SaveONenergy Instant Discounts and Retrofit programs.

Retrofit

- **Prescriptive stream -** Streamlined, pre-defined incentives for common equipment upgrades (see Save on Energy worksheets). Minimum $500 project incentive
- **Custom stream -** Flexible incentives for larger or more complex projects. Projects must save at least 1 kW or 2,000 kWh. $1,800/kW and $0.20/kWh rates. Minimum $1,500 project incentive
- To participate in the Retrofit Program, projects must be pre-approved with minimum incentives of **$500 for prescriptive projects** and **$1,500 for custom projects**.

Instant Discounts

- Upfront, point-of-sale discounts for energy-efficient lighting products to help businesses lower energy costs and improve their space. No paperwork required.

Retrofit Spring 2026 Updates

Updates Effective June 30, 2026		Description
	Adjust incentive for networked lighting controls (including horticulture lighting) by 10%.	Networked lighting controls adjusted from $0.35/kWh to **$0.30/kWh**
	Adjust incentive for small-to-medium generation solar DER by 10%.	Solar DER (>10kW) adjusted from $860/kW to **$770/kW-AC** nameplate capacity. Remove wall-mount eligibility.

Learn More: SaveONenergy.ca/News-and-Updates
The next Retrofit program enhancements are expected for Fall 2026.

*Incentives are capped up to 50% of project costs

Retrofit Program – Incentives for Networked Lighting Controls

Applicants must provide documentation to confirm **total controlled wattage** for the fixtures and the total controlled area (ft^2) where they will be installed.

The advanced lighting controls system must be capable of meeting all the following system capabilities to be eligible:

Networked Advanced Lighting Controls	
Continuous dimming	**$0.30 per kWh**
Control zoning	
PAR or broad spectrum light sensors	
Capable of incorporating weather information	
Luminaries and device addressability	
Optional: Capable of reporting	

Solar Photovoltaic Distributed Energy Resource

Micro Generation

- Installed kW-DC capacity up to 10 kW
  - **Incentive Rate:** $1,000/kW-DC [*no change*]

Small to Medium Generation

- Installed kW-AC capacity between >10kW and <= 1MW
  - **Incentive Rate:** $770/kW-AC
  - *Remove eligibility for wall-mount*

Note: Projects that are > 1 MW-AC remain eligible, however incentives are capped at 1 MW-AC

Additional Changes

- **Prescriptive - Packaged Terminal Heat Pump** (PTHP) – no incentive change - split into two
  - Assuming PTHP that meets the Ontario O.Reg. 509/18 for upgrades without an existing base case
  - Replaces an existing PTAC with electric resistance.

New measure:

- **Prescriptive - Clean Water Pump (CWP)** measure**.**
  - **$15/HP**
  - Can stack incentives with existing prescriptive VFDs to achieve a system-wide savings.

For all eligible program measures, visit https://saveonenergy.ca/sbp-measures

Peak Performance Program Overview

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Peak Performance Overview

What is Peak Performance?

Demand Response (DR) program that provides financial incentives to C&I buildings for reducing HVAC load on peak demand days.

Key Benefits:

- Reduce cooling costs
- Get paid based on how much energy you save during demand response events
- Qualified participants receive an additional enabling incentive for new equipment



Learn more at saveonenergy.ca/peakperformance

Peak Performance Program Structure

Program Administrator

- IESO administers program
- CLEAResult is Delivery Agent
- Registers Participants
- Call Events
- Issue settlements

"Participants"

- Aggregators / mid-size customers
- Enroll Contributors
- Manage event participation
- Submit meter data
- Receives incentives

Participant 1

Participant 2

Participant 3

"Contributors"

- Customers
- Curtail energy during events

Contributor

Contributor

Contributor

Contributor

Contributor

Example Load Reduction by Customer Type

Type of Facility	Example DR Measures	Example HVAC Load Curtailment	Estimated Performance Incentive	Estimated Enabling Incentive
Large office building	Use energy management system (EMS) to setback A/C temp	250 kW	$13,750	$5,000
Warehouse	Adjusting HVAC settings	50 kW	$2,750	$1,000
Grocery store	Adjusting HVAC settings	30 kW	$1,650	$600
University	Shut off rooftop package units, heat pumps, and wall mount classroom units	500 kW (campus-wide)	$27,500	$10,000
Retail store	Adjusting HVAC settings	20 kW	$1,100	$400
Shopping mall	Shut off one-half of the roof top units through the EMS	500 kW	$27,500	$10,000





Note: Incentive amounts shown here are *estimates* based on similar buildings. Actual incentives paid are dependent upon performance in the program. Enabling incentive is a one-time incentive only for expenses incurred to participate in the program.

Creative Financing

What is a (Green) Revolving Fund (GRF)?

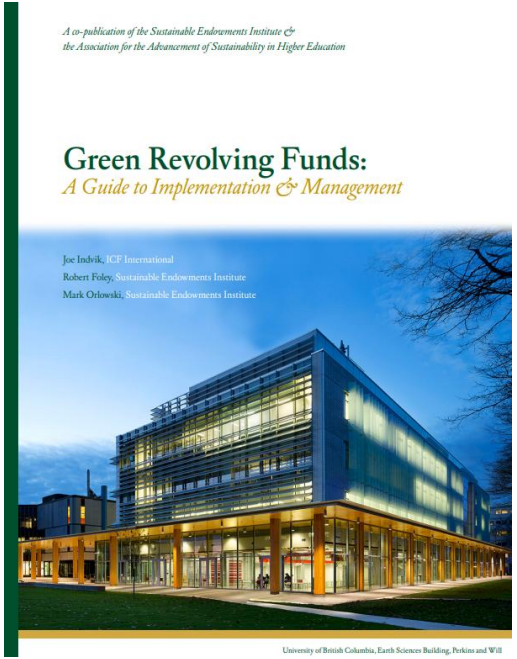
- A GRF is an internal fund that provides financing to parties within an organization to implement energy efficiency, renewable energy, and other sustainability projects that generate cost savings.
- There are many models including dedicated funds/cost centres, notional ledgers, and hybrid approaches



- Green revolving funds provide benefits beyond one-time investments, including promoting hands-on learning, enhancing reputation and building the business case for sustainability.

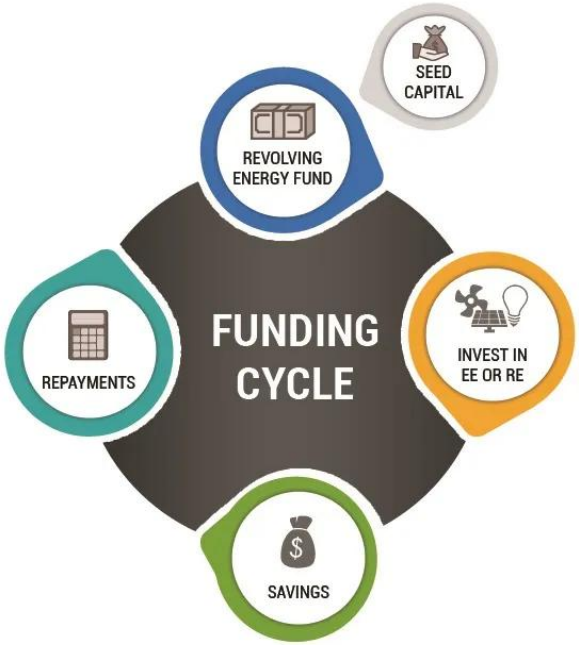
Implementation Steps for a Green Revolving Fund

1. Do your homework
2. Select your model
3. Assess your opportunity and run the numbers
4. Build buy-in
5. Secure seed capital
6. Establish financial flows
7. Launch the fund
8. Implement projects
9. Track, analyze, and assess performance
10. Optimize and improve



Are Health Care Organizations Using GRFs?

- **Smaller BC Health Authority**
  - British Columbia, Canada
  - Formalizing governance and financial flows
- **Fraser Health**
  - British Columbia, Canada
  - Savings linked to future investment
  - $432,000 invested from GRF in electricity-savings projects
- **Vancouver Coastal Health**
  - British Columbia, Canada
  - A GRF within a Broader Funding Portfolio with other funding
  - $1.2 million invested from GRF in energy-efficiency initiatives



Graphic: https://www.pdx.edu/sustainability/green-revolving-fund

What is an Energy Performance Contract (EPC)?

- An EPC is a performance-based financing mechanism: an Energy Service Company (ESCO) designs, builds and arranges financing for energy retrofits, and guarantees the resulting energy and cost savings.
- The ESCO carries some or all of the up-front capital cost plus the technical and performance risk; the client repays out of utility savings over the contract term.
  - Typical measures: HVAC and control upgrades, lighting, window glazing and doors, low-flow fixtures, sub-metering and fuel switching.
- Once the contract closes, all further energy, GHG and utility savings stay with the organization — a low-risk, turnkey route to capital upgrades.

Natural Resources Canada, Energy Performance Contracts / Federal Buildings Initiative

EPCs in Health Care Facilities

- Hospitals are among the most energy-intensive public buildings — 24/7 operation, complex mechanical systems and strict air-quality and resilience standards make them strong EPC candidates.
- Through the 2000s, guaranteed ESPCs became the typical route to upgrade publicly owned buildings in the MUSH sector — municipal, universities/colleges, schools and hospitals.
  - Healthcare EPCs have been delivered across Canada, with clusters in Ontario.
- NRCan's Qualified Bidders List vets ESCOs for technical and financial capacity: Tier 1 firms (Ameresco, Ecosystem, Honeywell, Johnson Controls, Siemens, Trane and others) bid to full contract limits; Tier 2 up to $5 million.

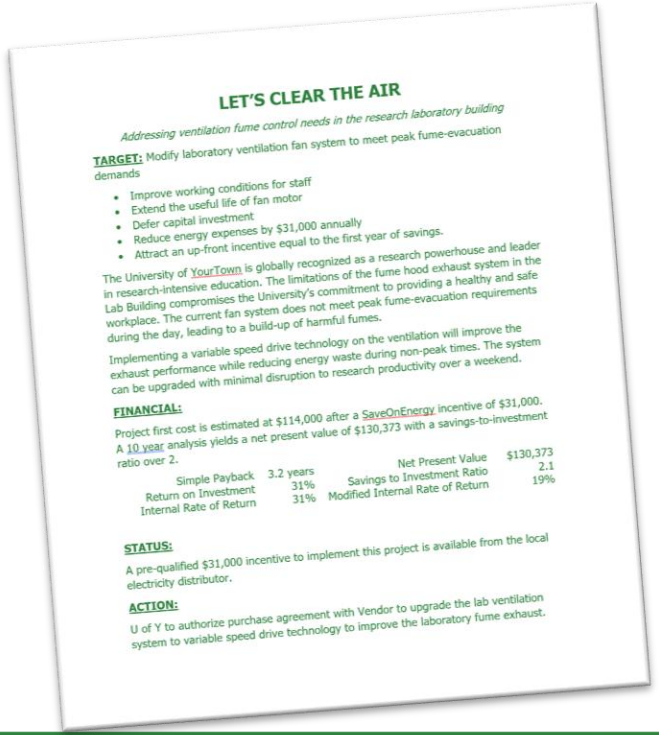
NRCan Qualified Bidders List; Senate ENEV brief on Energy Service Performance Contracts (ESAC)

What is Energy as a Service (EaaS)

- EaaS is a service based financing mechanism that can embed the assurances of an EPC.
  - Demands the same rigor of investigation and analysis as an EPC project.
  - Typically longer term-lengths in-line with those used for EPC.
- A service-provider designs, builds, finances and operates systems that deliver energy services such as heating and cooling.
  - System performance is guaranteed ("locked-in") through rate structures.
  - Instead of comparing actual consumption to a calculated baseline, the client is billed only for the energy they actually consume.

One Page Proposal

The One-Page Proposal



LET'S CLEAR THE AIR

Addressing ventilation fume control needs in the research laboratory building

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

- Improve working conditions for staff
- 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 Lab Building compromises 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.

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.

FINANCIAL:

Project first cost is estimated at $114,000 after a SaveOnEnergy incentive of $31,000. A 10 year analysis yields a net present value of $130,373 with a savings-to-investment ratio over 2.

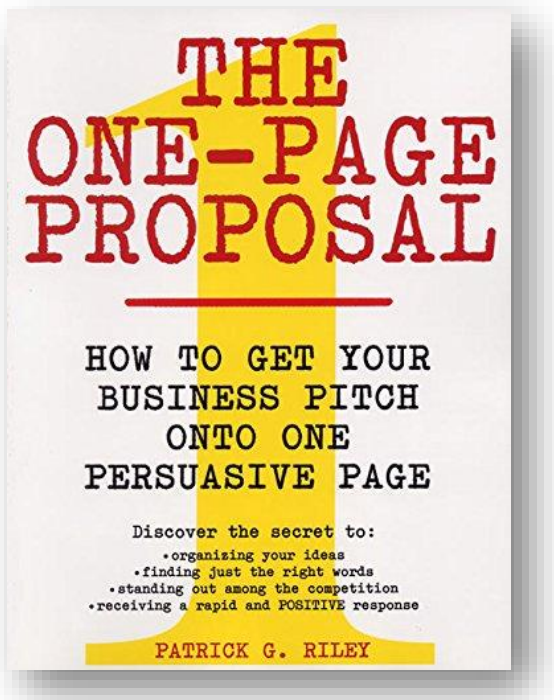
Simple Payback	3.2 years	Net Present Value	$130,373
Return on Investment	31%	Savings to Investment Ratio	2.1
Internal Rate of Return	31%	Modified Internal Rate of Return	19%

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 your One-page Proposal

Follows a logical process of thought:

- 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?

Adapted from http://www.slideshare.net/uvic/the-one-page-proposal-presentation

TITLE and subtitle

LET'S CLEAR THE AIR

Addressing ventilation fume control needs in the research laboratory building

- TITLE (ALL IN UPPER CASE) labels and defines the entire proposal
  - TITLE condenses the details into a single, captivating phrase – if nothing else gets read, this will
- Subtitle (in upper and lower case below the main title) gives more detail, builds interest, adds "punch"
  - Subtitle provides a second chance to "hook" your reader

Adapted from http://www.slideshare.net/uvic/the-one-page-proposal-presentation

TARGET: (title in italicized upper case and underlined)

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

- This is the main goal of your proposal
- Could also be called the “intention”
- Answers your reader’s question...
- “what exactly will happen if I accept this proposal and it goes forward?”

Adapted from http://www.slideshare.net/uvic/the-one-page-proposal-presentation

SECONDARY TARGETS (not titled)

- Almost all proposals have more than one target/objective
- Alone, each may not be able to justify the proposal,
  - Together they add weight and purpose to the main objective
- Secondary targets highlight additional perceived benefits and increase the odds for approval
- In your reader's mind your idea goes from "this is an interesting idea" to "this a great idea"

- Improve working conditions for staff
- 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.

Adapted from http://www.slideshare.net/uvic/the-one-page-proposal-presentation

RATIONALE (not titled)

- this, the longest section, is the all-important step where you "sell" your idea
- better still, if this section is well crafted, your proposal will sell itself
- in two or three concise paragraphs, it convincingly presents all the reasons **WHY** your proposal should be accepted (think benefits!)
- back up your objectives by showing you've done your homework – discuss needs and present key features, advantages, and benefits
- here's your chance to show you are prepared, and to infect the reader with your passion!

Adapted from http://www.slideshare.net/uvic/the-one-page-proposal-presentation

RATIONALE

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 Lab Building compromises 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.

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.

FINANCIAL (title in italicized upper case and underlined)

This is where you clarify the financial commitments required and benefits that will result

Even though the 1st reader may not be a financial investor, it is still important to explain the money issue, another reader may be financial!

FINANCIAL:

Project first cost is estimated at $114,000 after a SaveOnEnergy incentive of $31,000. A 10-year analysis yields a net present value of $130,373 with a savings-to-investment ratio over 2.

Simple Payback	3.2 years	Net Present Value	$130,373
Return on Investment	31%	Savings to Investment Ratio	2.1
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Adapted from http://www.slideshare.net/uvic/the-one-page-proposal-presentation

STATUS (title in italicized upper case and underlined)

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

- Here's where you answer some key questions:
  - what is the current situation?
  - what has been accomplished already and/or what preparations are underway?
  - who have you talked to and are there any agreements/related deals already in place?
- This is a great chance to build credibility and momentum

Adapted from http://www.slideshare.net/uvic/the-one-page-proposal-presentation

ACTION (title in italicized upper case and underlined)

- Your action statement is in response to your reader's implied question
  - "what exactly do you want me to do?
- Remember – if you don't ask for something, it's not a proposal

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.

Adapted from http://www.slideshare.net/uvic/the-one-page-proposal-presentation

Effective Commissioning

Stages of Effective Commissioning

Pre-Design

Establish the [OPR] and Basis of Design (BOD), form the commissioning team, and set initial project budgets and scopes.

Design

Conduct design reviews, finalize testing criteria, update requirements, and integrate commissioning language into contractor tender documents.

Construction

Perform static pre-functional checklists, point-to-point verifications, test and balance procedures, and functional performance tests.

Occupancy & Operations

Complete final training sessions, execute post-occupancy performance monitoring, and conduct warranty reviews (such as a 10-month check).

Effective Commissioning – Keys to Success

- **Early Engagement:** Integrate commissioning activities into the master project schedule from day one rather than treating it as an end-of-project afterthought.
- **Independent Authority:** Appoint an objective Commissioning Provider who reports directly to the owner.
- **Collaborative Problem Solving:** Maintain open communication and dedicated logs to track and resolve deficiencies cooperatively.

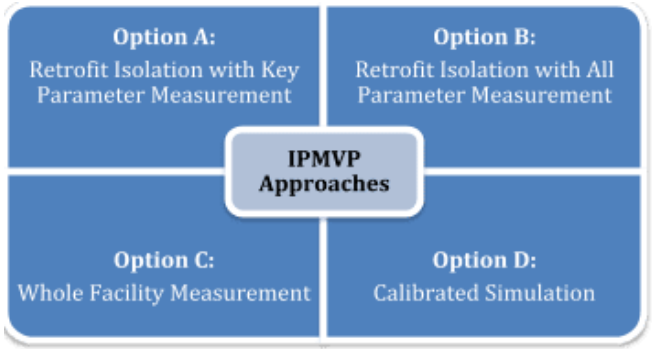


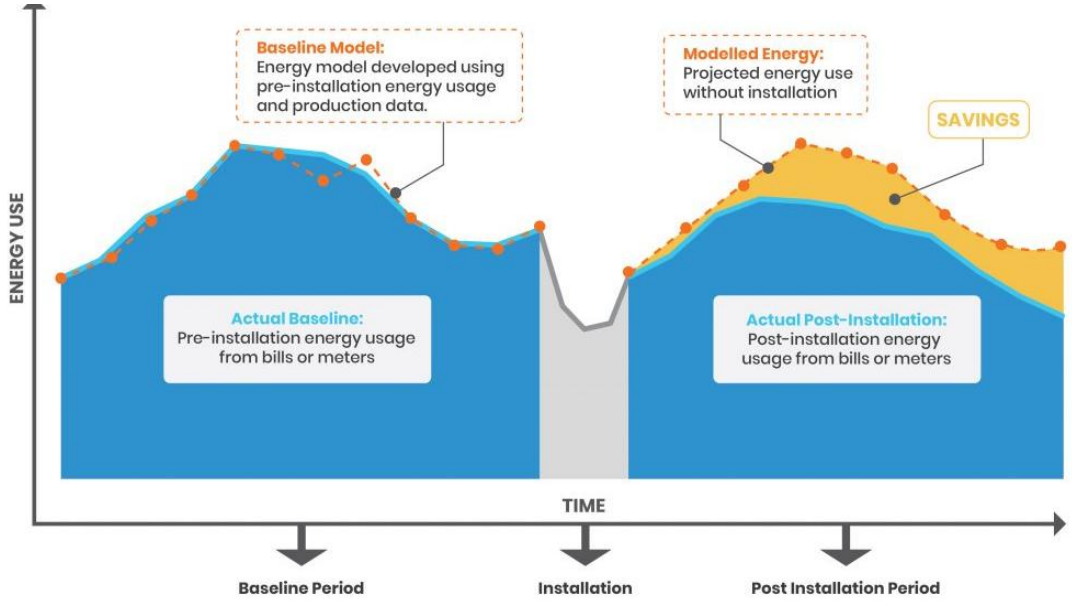
Effective M&V

Effective Measurement & Verification (M&V)

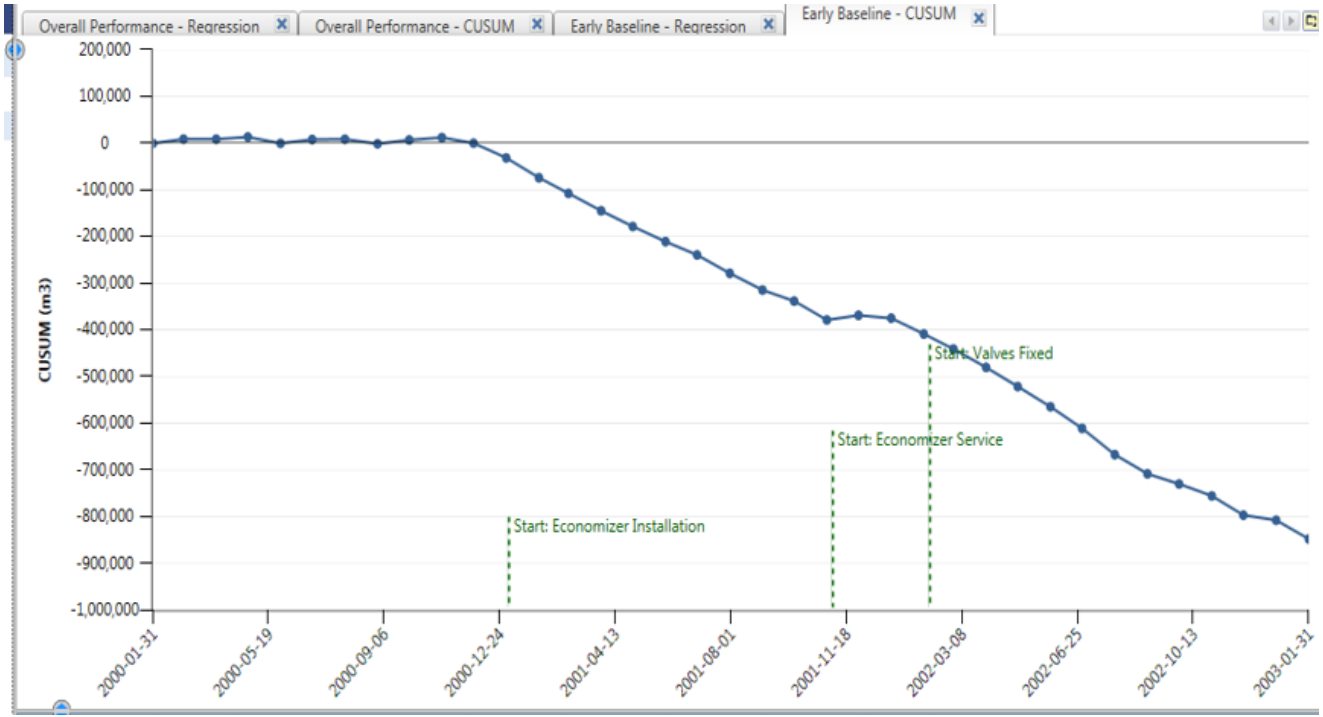
- **Planning:** Create a documented M&V plan upfront detailing measurement boundaries, the chosen protocol (such as the IPMVP), baseline duration, and reporting methods.
- **Collecting:** Gather historical utility bills, meter records, and operational parameters to establish a clean, accurate energy baseline.
- **Measuring:** Install calibration-checked meters, sensors, or data loggers to track post-retrofit performance and consumption parameters.
- **Analyzing:** Normalize data against variable operating conditions and compute true avoided energy use using standardized formulas.
- **Reporting:** Present transparent, credible findings to stakeholders, financial entities, or program administrators

M&V – How?


Option A:
Retrofit Isolation with Key Parameter Measurement
Option B:
Retrofit Isolation with All Parameter Measurement
IPMVP Approaches
Option C:
Whole Facility Measurement
Option D:
Calibrated Simulation


Baseline Model:
Energy model developed using pre-installation energy usage and production data.
Modelled Energy:
Projected energy use without installation
SAVINGS
ENERGY USE
Actual Baseline:
Pre-installation energy usage from bills or meters
Actual Post-Installation:
Post-installation energy usage from bills or meters
TIME
Baseline Period
Installation
Post Installation Period

M&V Can Catch Lost Savings – Boiler Retrofit in Health Care



IPMVP Option C Used to Track Reduced Consumption with a CUSUM Chart

Futureproofing Health Care Facilities

Building Resiliency

Energy Efficiency and Energy Management projects futureproof health care facilities and helps deliver better patient care

- Resilient buildings: lower loads extend back-up power in outages
- Renewed infrastructure: replaces end-of-life plant and controls
- Continuity of care: a facility that can stay open during an outage or storm
- Predictable cost: budget certainty over every kWh and kW
- Savings: Energy savings reinvestment opportunities



SaveonEnergy Case Study - Kingston General Hospital

Better Patient Care

Energy work shows up at the bedside

PATIENTS

- Stable temperature and humidity in rooms, ORs and imaging
- Ventilation and filtration support infection prevention
- Quieter, better-lit space aids rest and recovery

STAFF

- Comfortable, modern workplace supports recruitment and retention
- Fume and exposure control in labs, pharmacy and sterile processing
- Fewer hot and cold calls frees staff for preventive work

FACILITY

- Fewer equipment failures and less unplanned downtime
- End-of-life plant and controls renewed, deferred capital cleared
- Savings redirected to equipment, programs and staff

Thank you

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