Strategic Energy Management Workshop

Systematic approach to optimising results from sustainability investments

October 21st, 2021

Lethbridge
Brighter Together

Introductions

Jay U. Manoharan, P. Eng.
Managing Principal, Energy Associates Intl.

Colette Kenney, M.A., P. Eng.
Director, Energy & Sustainability
colettek@eaiglobal.com

Charles Champagne, M.B.A., LEED G.A.
Director, Energy Management

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Agenda

- Alberta Electricity & Gas Market Update
- Opportunities, Barriers & Challenges
- A Framework for Better Decision Making

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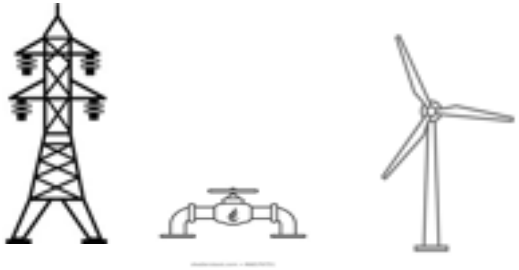
Integrated Energy Management Approach



Supply-Side

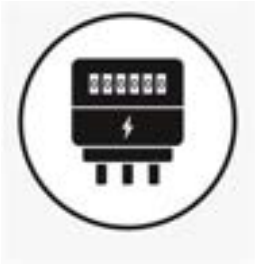
Electricity I Natural Gas I Renewables

Commodity Energy Supply Management – Wholesale OTC Trading & Origination Markets
+ VPPAs
+ Price & Volumetric Risk Management
+ Ancillary Market – Operating Reserves

Utility Supply Management - Tariff & MDAs

Regulatory Advocacy – Transmission & Distribution

Return On Investment



Demand-Side

Efficiency I Sustainability I Financing

Energy Efficiency & Asset Renewal – Project Development & Procurement
+ Energy Economics & GHG Impact Simulation
+ Engineering Assessment & Specification Development
+ Performance Risk Management
+ Measurement & Verification

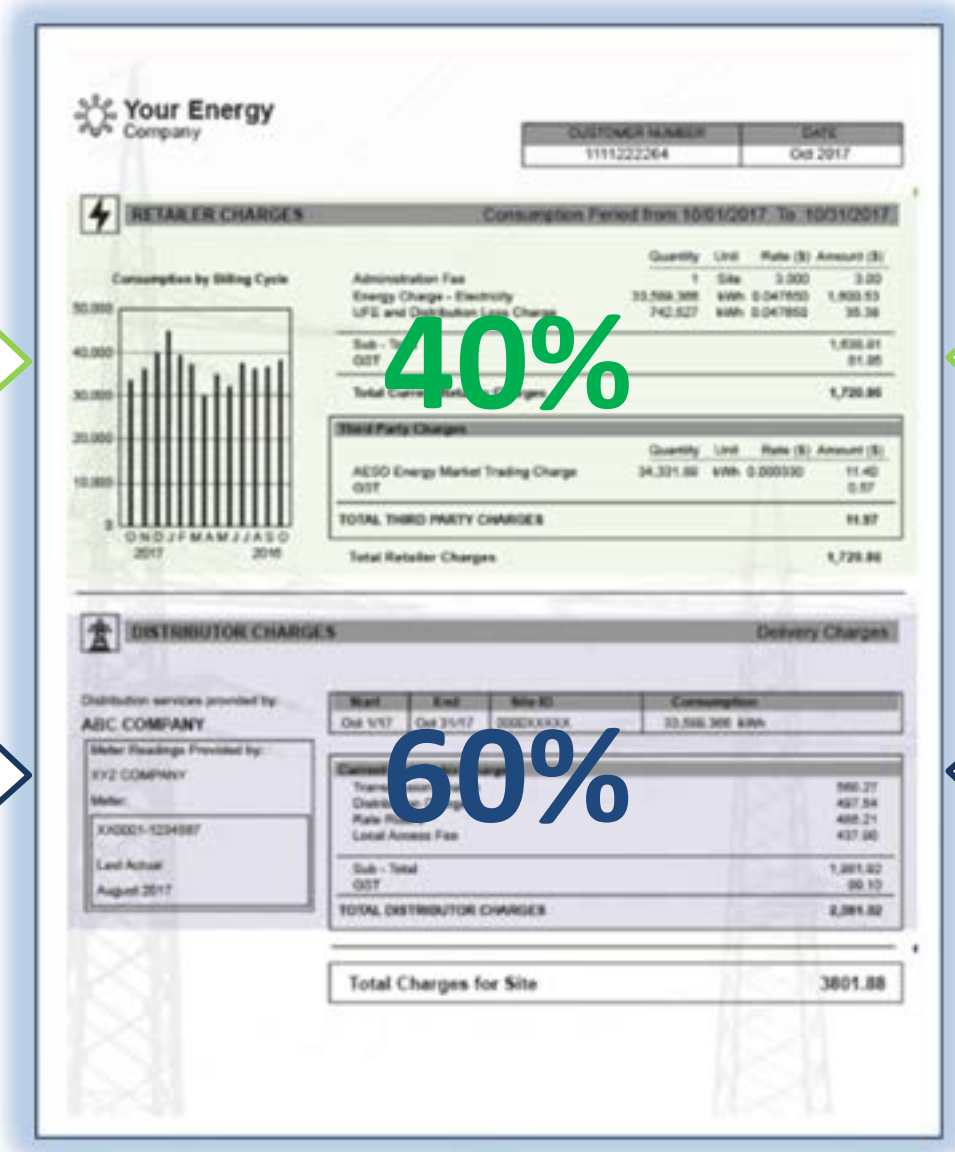
Project Financing – Custom 3rd Party Options, Grant Applications, carbon credits

Sustainability Development & Procurement – on-site solar & microgeneration

Facility Maintenance & Asset Planning

Typical Electricity Bill

ENERGY CHARGES:
<u>DEREGULATED</u>
AESO & NGX
Plug & Play market strategy
Product design



RISKS:
Tightening reserve margins
Higher priced imports: Mid-C
Coal-to-Gas conversions
Natural Gas volatility
Emissions penalties

DELIVERY CHARGES:
<u>REGULATED</u>
Transmission
Distribution
Rider adjustments

RISKS:
Hidden MDAs
Industrials exit stranded assets
23% costs increase by 2030

Electricity Market Update

Alberta Historic Pricing: Carbonized Grid (Coal)
Since 2005, AESO Index base load annual prices have averaged @ $59.15/MWh; average load-shaped AESO Index since 2005 @ 64.50/MWh.

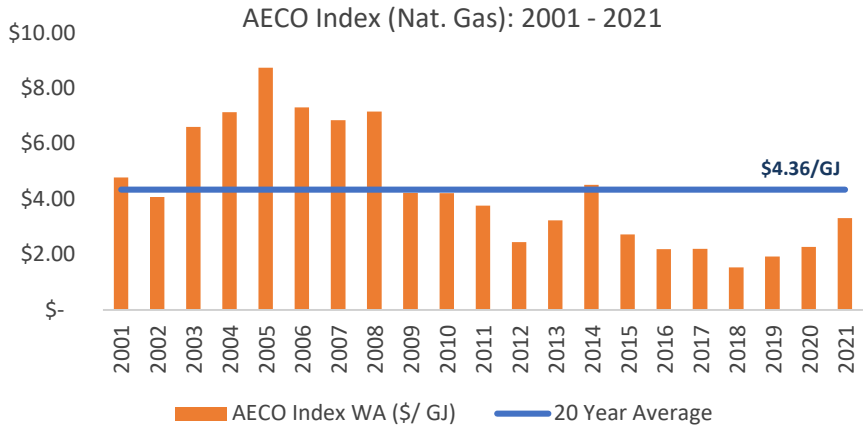
- AESO projected transmission charges to increase by 15% in 2025; by 23% by 2030 for average commercial customers (2021 @ $55.71/MWh)
- AUC bulk transmission proceedings starting late 2021 thru 2022; risk of higher costs with more large industrials looking BTF generation and intermittent use (not to coincide with system peak)

Term	Flat Mid-Market ($/MWh) **Oct. 21**	Flat Mid-Market ($/MWh) **Sept. 29***	Flat Mid-Market ($/MWh) **Sept. 22**	YTD Low ($/MWh)
2022	$92.00	$87.75	$83.00	$59.75
2023	$72.25	$69.50	$67.25	$52.50
2024	$61.75	$60.75	$58.00	$50.50
2025	$58.25	$57.75	$56.00	$50.75
2026	$58.00	$57.75	$52.00	$50.50
LCOE* 2024-2026	**$62.59**			

*TA announcement – Sundance 1 & 4, Keephills 5; 8.5% loss of capacity

**LCOE based on 479 MW CCGT to recover all capital & operating costs over 30-years; natural gas sensitivity impact up to $72/MWh

Natural Gas Market & Carbon Update



- In the last 20 years, natural gas prices based on continental market; today it's becoming an intercontinental market with Europe.

Term	Flat Mid-Market ($/GJ) **Oct. 21**	YTD Low ($/GJ)	Carbon Tax ($/GJ)
2022	$3.83	$2.20	$2.63
2023	$3.28	$2.04	$3.29
2024	$3.06	$2.09	$4.05
2025	$3.03	$2.23	$4.81
2026	$3.07	$2.34	$5.57

Source Type	2022 Carbon Intensity (ton/MWh)	2022 Emissions Value ($/MWh)	2023 Emissions Value ($/MWh)	2024 Emissions Value ($/MWh)	2025 Emissions Value ($/MWh)	2026 Emissions Value ($/MWh)
Emission Performance Credits	0.37	$18.50	$24.05	$29.60	$35.15	$40.70
Renewable Generation Offsets	0.53	$26.50	$24.05	$29.60	$35.15	$40.70

*coal-to-gas conversions complete

OPPORTUNITIES, BARRIERS & CHALLENGES

A systematic approach to optimizing results from sustainability investments

The Opportunity

Relative cost of distributed generation continues to fall

Energy efficiency still a low risk / high return investment

Efficiency is the low-hanging fruit for carbon emissions reductions

Abundance of energy / sustainability specific grants and incentives

“Finovation” eliminating the need for capital investment or debt

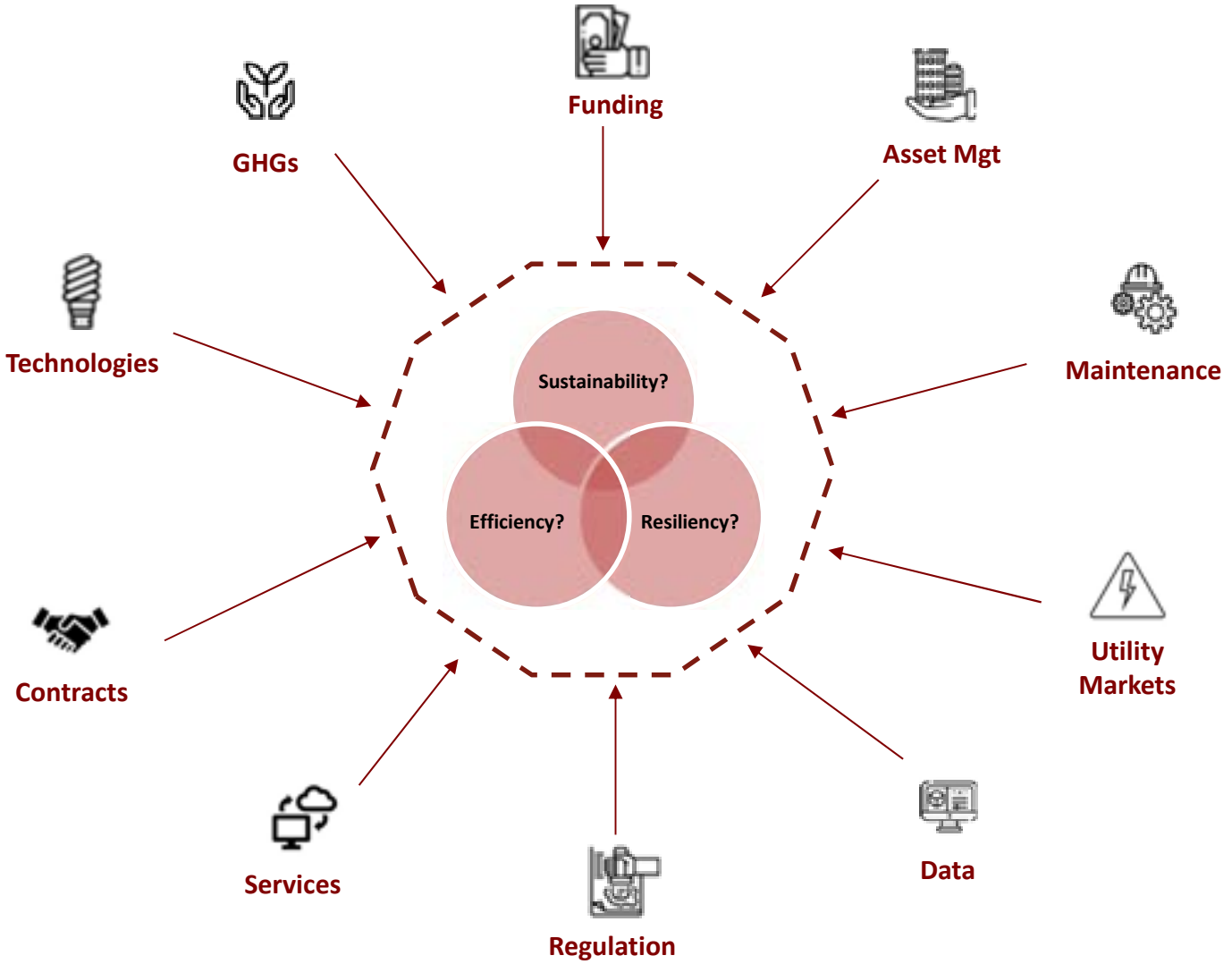
Common Barriers

Primary barriers to developing projects:

1. Access to capital or competition for limited capital
2. Limited internal expertise or resources to identify, evaluate, implement projects
3. Lack of transparency over utility costs, savings calculations, risks

Common negative outcomes experienced:

1. Over reliance on vendors to results in poor due diligence of risks
2. Savings or benefits not realized or transparent to owners due to a variety of factors
3. Stakeholders not engaged and/or not supportive.



Information overload can lead to poor decisions

FRAMEWORK FOR BETTER DECISION MAKING

A systematic approach to optimizing results from sustainability investments

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A Framework

1. Assess The Situation
2. Set Goals
3. Evaluate Strategic Options
4. Develop A Compelling Business Case
5. Manage Risk

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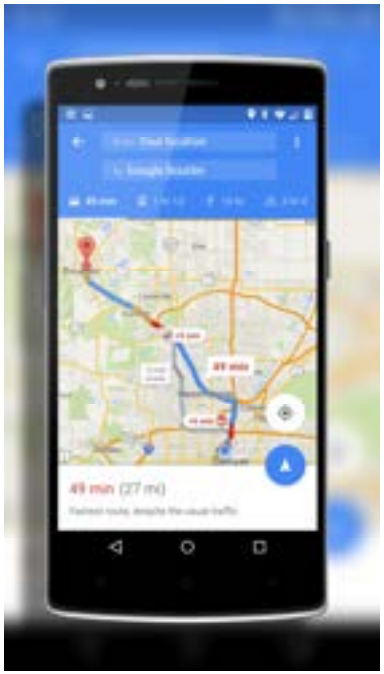
1 Assess the Situation

1. Energy Performance Benchmarking
2. Facility Energy Audits
3. Utility Contract Reviews



ASHRAE

ENERGY STAR® PortfolioManager®

APEGA

A Framework

1. Assess The Situation
2. **Set Goals**
3. Evaluate Strategic Options
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2 Set Goals

1. **Engage Key Stakeholders**

2. **Map Organisational Strategic Plans**

3. **Establish Priorities and Metrics**

A Framework

1. Assess The Situation
2. Set Goals
3. **Evaluate Strategic Options**
4. Develop Compelling Business Case
5. Manage Risk

3 Evaluate Strategic Options

1. **Supply-side Strategies:**
   Active Portfolio Management? On-site generation?

2. **Demand-side Strategies:**
   Energy efficiency, demand response, behavioural programs?

3. **Innovative market solutions:**
   ESA, Energy-as-a-Service, Energy Performance Contracts, PACE
   PPA / VPPA / RECs

4. **Investigate grant and financing programs:**
   Carefully review requirements and timetables.
   Understand trade-offs, environmental attributes.

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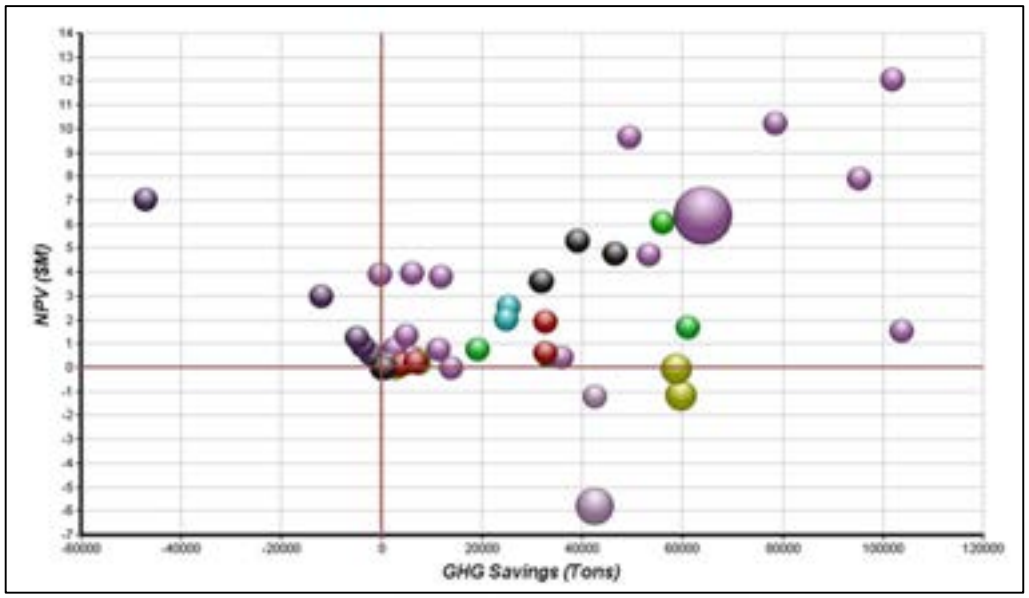
3 Evaluate Strategic Options – Decision Tools

1. **Multicriteria Decision Making /AHP**

2. **Decision Trees**

3. **Software tools**

Weighted Decision Criteria (AHP)	ROI	Sustainability	Comfort	Reliability	Risk
ROI	1	1/5	3	1/3	5
Sustainability	5	1	1/3	1/3	1/3
Comfort	1/3	3	1	1	1/7
Reliability	3	3	1	1	1/3
Risk	1/5	3	7	3	1



Rankings	Source EUI	Energy Cost Intensity	Gross Energy Spend	GHG Emissions	Weighted Average	Final Ranking
Sites / Weighting	25%	25%	25%	25%		
88	19	20	8	8	13.75	8
89	53	45	11	12	30.25	33
91	26	36	6	5	18.25	14
92	38	35	12	11	24	24
93	21	21	39	41	30.5	34
97	43	38	40	44	41.25	45
605	6	11	34	30	20.25	19
606	50	43	33	33	39.75	44
608	34	24	10	10	19.5	18
610	24	19	19	21	20.75	21
611	9	17	20	18	16	10
612	19	22	44	42	31.75	36
615	45	39	24	28	34	40

3 Evaluate Strategic Options – Grants and Financing

1. Grants & Incentive Programs

> 2 dozen available from Municipal to Federal

Some can be “stacked” to achieve 100% funding

Environmental attributes & carbon credits

2. Project Financing

Merchant specific offers for solar and retrofits

Canada Infrastructure Bank

3. Carbon Credits – Alberta Emission Offset System

Voluntary system can generate 8+ years of offsets

19 protocols in AB including building energy efficiency and distributed generation

4. Contracts

Energy performance contracts, Energy-as-a-Service

Power Purchase Agreements

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4 Develop a Compelling Business Case

1. Select appropriate financial metrics

2. Measure total cost of ownership (LCCA)

3. Integrate with Asset Management Plans

4. Accounting (Taxes and Depreciation)

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4 Develop A Compelling Business Case – Financial Metrics

Use Appropriate Financial Metrics:

Different metrics can paint very different pictures

Metric	Description	Pros/Cons/Applications
Simple Payback	Capital Cost / First Year Savings	Pros: Easy to calculate Cons: Does not present complete picture Applications: Sufficient for independent ECMs
Savings to Investment Ratio	**Total savings / Capital cost**	**Pros: Better than SP, Easy to calculate** **Cons: Does not reflect TVM** **Applications: Suitable for independent ECMs**
Net Present Value	**Total lifecycle cost and savings expressed in current dollars**	**Pros: Most complete picture** **Cons: More difficult to calculate** **Applications: Suitable for complex projects**
Internal Rate of Return	Rate of return on the investment expressed as %	Pros: Easy to compare to hurdle rate Cons: More difficult to calculate Applications: Suitable for complex projects
Modified Internal rate of Return	Similar to NPV but expressed as %	Pros: More complete picture Cons: More difficult to calculate Applications: Suitable for complex projects
Discounted Payback Period	Similar to NPV but expresses years to break-even on investment	Pros: Better than SP Cons: More difficult to calculate Applications: Suitable for independent ECMs

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4 Develop A Compelling Business Case - LCCA

Lifecycle Costing & Discounted Cash Flows

Don't be misled by quick paybacks and leave savings "on the table"

Example 1:

Your project costs $1,000,000 and saves $150,000 per year. The project has a simple payback of ~6.5 years. Is this project attractive?

What is the lifecycle of the equipment?

What are the operational costs?

What about financing costs?

What is the alternative?

Example 2:

Escalation 3%

Discount rate 5%

	Capital Cost	Utility Savings
Option 1	$ 1,000,000.00	$ 150,000.00
Option 2	$ 1,200,000.00	$ 125,000.00

Savings sufficient to generate > $460,000 in free cash flow for additional investment

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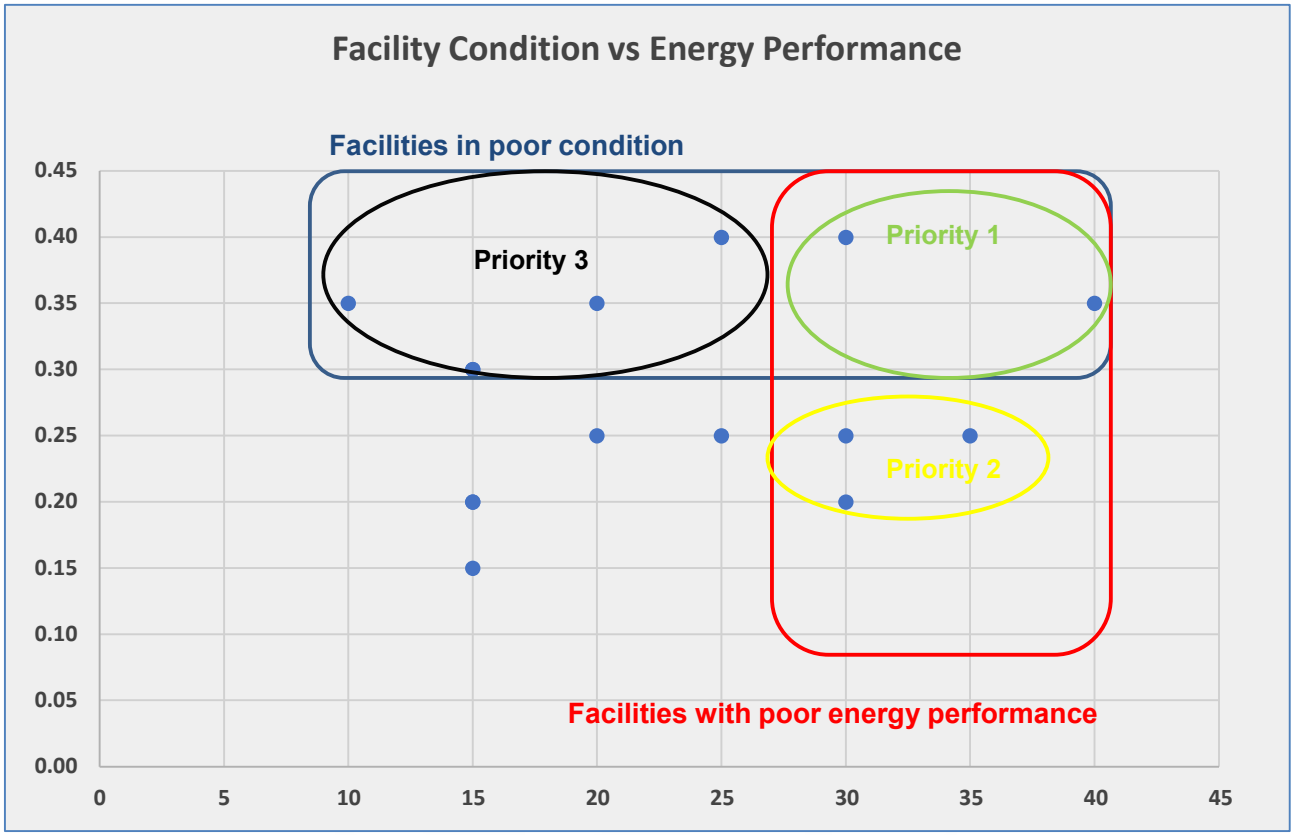
4 Develop A Compelling Business Case – Multivariate Analysis

Align sustainability investments with asset renewal needs



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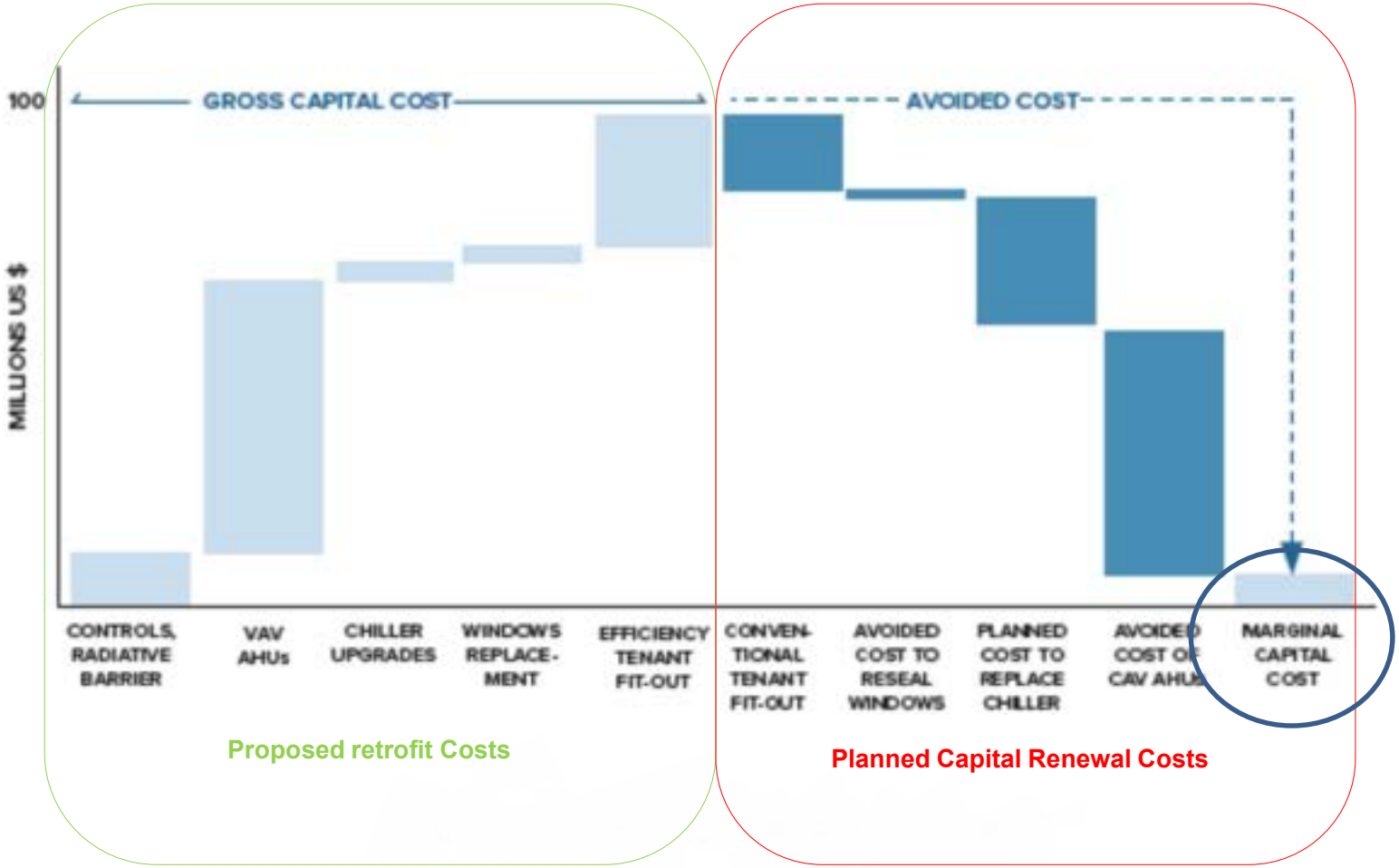
4 Develop A Compelling Business Case – Capital Cost Avoidance

Integrate with Asset Management Plans to Identify Capital Cost Avoidance

Marginal cost subject to IRR, not entire retrofit.



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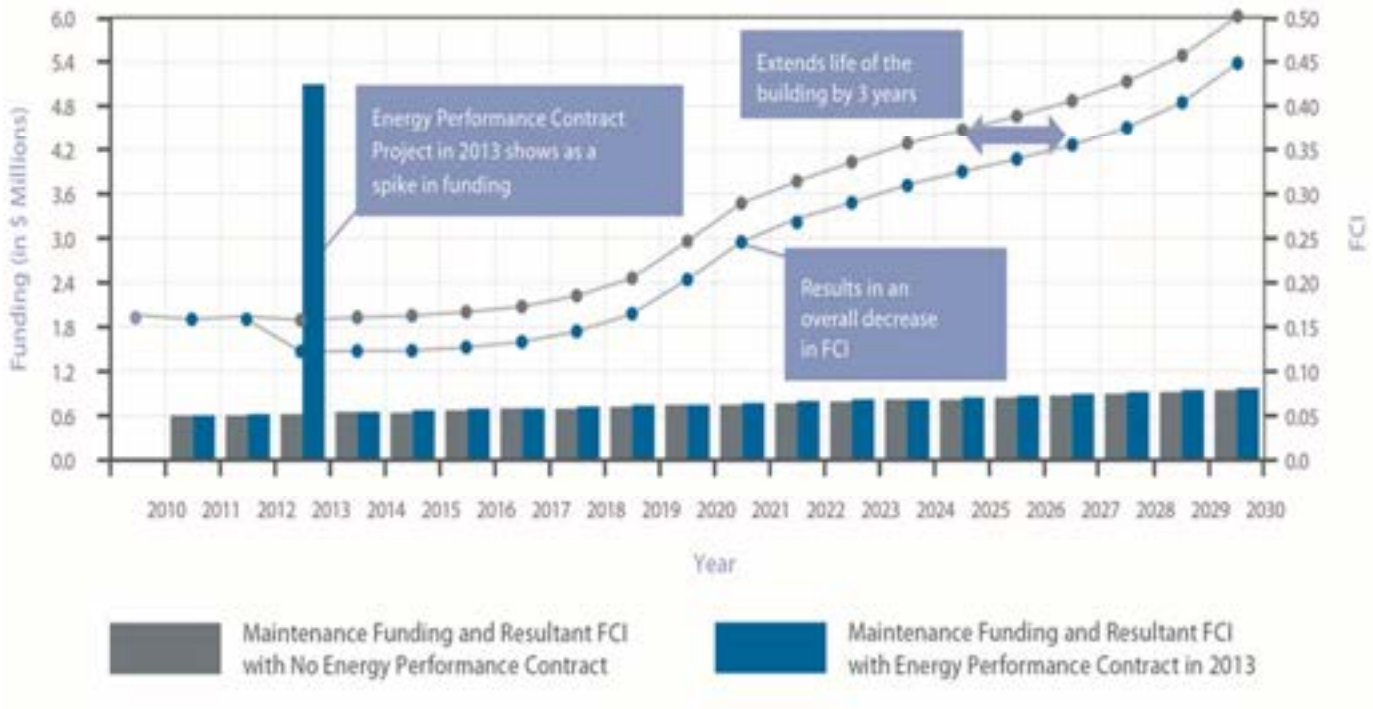
4 Develop A Compelling Business Case – Asset Management

Energy efficiency can impact strategic asset management decisions

Self-funding investments can greatly impact asset value, lifecycle, CAP rate, etc.



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5 Manage risk

1. **Scenario & Sensitivity Analysis**
2. **Standards, Certifications and Best Practices**
3. **Insurance and Financing**

INVESTOR CONFIDENCE PROJECT

BOMA BEST

Natural Resources Canada

ASHRAE

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5 Manage risk – Scenario & Sensitivity Analysis

All investment involves Risk AND Assumptions of the future

Always assess the probability of different outcomes and consider your risk appetite

Scenario Analysis and Sensitivity Analysis

Sensitivity analysis examines changing one variable at a time.

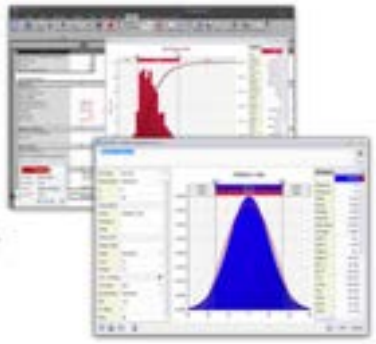
Scenario analysis examines effect of changing multiple input variables

For example:

Base-case scenario – ordinary/typical scenario.

Worst-case scenario – the most extreme negative situation

Best-case scenario – the most favorable projected outcome.



Monte Carlo Simulation

Monte Carlo Simulation is a statistical method applied where the probability of different outcomes is analyzed by running 1000's of scenarios at once.

Scenario		1					
Secenario NPV		$ 1,822,221.36	Power Escalation				
		$ 1,822,221.36	2%	3%	4%	5%	6%
Gas Escalation	4%		$815,204.42	$1,822,221.36	$2,975,826.04	$4,300,095.27	$5,823,207.65
	5%		$288,863.72	$1,295,880.66	$2,449,485.34	$3,773,754.57	$5,296,866.95
	6%		-$316,508.67	$690,508.27	$1,844,112.94	$3,168,382.18	$4,691,494.56
	7%		-$1,014,019.99	-$7,003.05	$1,146,601.63	$2,470,870.86	$3,993,983.25
	8%		-$1,819,008.08	-$811,991.14	$341,613.53	$1,665,882.77	$3,188,995.15
	9%		-$2,749,418.06	-$1,742,401.11	-$588,796.44	$735,472.80	$2,258,585.18
	10%		-$3,826,240.71	-$2,819,223.77	-$1,665,619.10	-$341,349.86	$1,181,762.52
	11%		-$5,074,022.73	-$4,067,005.79	-$2,913,401.11	-$1,589,131.88	-$66,019.50

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5 Manage risk – Risks of BTF Renewable/Distributed Energy

1. Performance

Assess actual performance of similar systems in your area instead of relying on vendor estimates and adjust your forecast accordingly

e.g: Solar PV insolation potential vs actual, CHP unscheduled shut-downs.

2. Commodity and Delivery Charges

Understand the impact to overall load profile product (on/off peak ratios) as it impacts physical energy pricing; demand ratchet cost exposure if unit under-performs or unavailable (maintenance or repair)

3. PPA Accounting

Not all PPAs are created equal. The devil is in the details. Some PPA structures can result in the 'off-taker" recognizing the contract as a liability on the balance sheet.

Conclusions

Key Takeaways:

- A holistic approach to developing your strategy will ensure optimal ROI to your organization.
- Using a structured process for making important decisions will ensure transparent alignment to organization goals.
- “Investment-grade” financial analysis for large/complex projects can unlock hidden potential.
- Know the risks, develop a mitigation strategy and invest accordingly.
- The time is now to take action. We’re not going back!