


WILFRID LAURIER UNIVERSITY | Waterloo | Brantford | Kitchener | Toronto


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## Triple Bottom Line Achievements Through Energy Savings and Energy Performance Contracts

July 22<sup>nd</sup>, 2017



**EY**  
Building a better  
working world

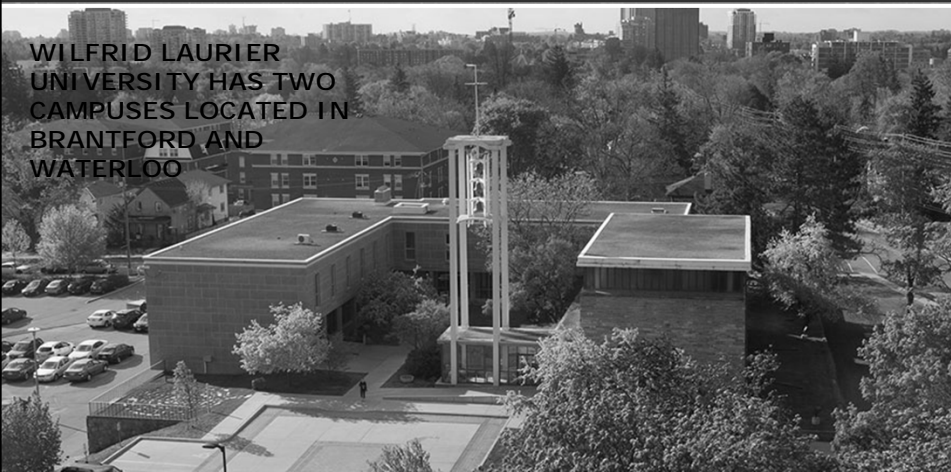


**Willms  
& Shier**  
Environment  
Aboriginal  
Energy Law

Gary Nower – Wilfrid Laurier University  
Edward Ng – EY  
Carl McKay - Willms & Shier

**LAURIER**  
*Inspiring Lives!*

### WILFRID LAURIER UNIVERSITY HAS TWO CAMPUSES LOCATED IN BRANTFORD AND WATERLOO



COMBINED THERE ARE OVER  
17,000 STUDENTS IN OVER  
3M FT<sup>2</sup>



We are here....



## Current Situation



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## Innovate or Die!



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## You Can't Fake Doing 50 Push up's!



The University required an integrated approach to manage these outstanding issues

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## Integrated Strategy



- Move from deferred to preventative maintenance
- Move to a Total Cost of Ownership (TCO) model using BIM
- Improve energy and sustainability performance
- Leverage technology

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## How?



ESCO



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## Why ESCO?



- Undertook a review of which business model to follow
- Deals with DM
- Allows for the implementation of new FM strategy (BIM & TCO)
- Addresses energy performance and Sustainability

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## Project Overview

### ESCO – Take 1



- P3 Procurement strategy - Guarantees
- RFQ
- RFP
- Revisit Strategy
- Reboot

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## Project Overview

### ESCO – Technical



- Re-tooled the RFP to include three (3) Representative Facilities, the balance of the portfolio and a micro grid study.

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## Project Overview

### ESCO – Implementation



Phase	ESCO Component	Status
Phase I	Three (3) Representative Facilities	Complete
Phase II	Portfolio Facilities	Beginning in May 2017
Phase III	Micro grid and CUP (Design)	July 2017

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## Project Overview

### Current Status



- Phase I complete – savings of approximately \$280K/yr. 40% reduction in energy
- Phase II Start May 2017 – Savings of approximately \$750K/yr.
- Phase III Start July 2017 - Savings of approximately \$1.4M/yr.
- Overall DM addressed in Phase I&II \$5M

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## Phase I & II Summary

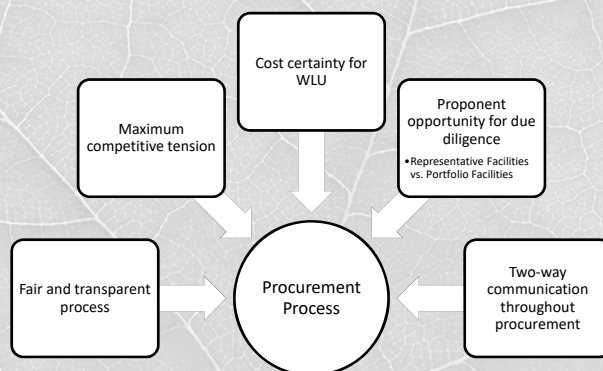


- Savings
  - 480MT CO<sub>2</sub>/yr.
  - 89,000m<sup>3</sup> natural gas/yr.
  - 68,000m<sup>3</sup> water
  - 5,885,134 kWh

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## Project Process and Transaction

### Procurement Principles



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# Project Process and Transaction

## Procurement Process



RFQ	RFP	Post Selection
<ul style="list-style-type: none"> <li>• Issuance of RFQ</li> <li>• Bidder clarification requests</li> <li>• RFQ response submissions</li> <li>• Evaluation of RFQ response submissions</li> <li>• Selection of three (3) shortlisted bidders</li> </ul>	<ul style="list-style-type: none"> <li>• Issuance of RFP</li> <li>• On-site visits (Representative Facilities)</li> <li>• Consultation meetings with bidders</li> <li>• Proposal submissions</li> <li>• Evaluation of Proposals</li> <li>• Selection of Preferred Proponent</li> <li>• Commercial and Financial Close</li> </ul>	<ul style="list-style-type: none"> <li>• Execution of Energy Performance Contract for Representative Facilities</li> <li>• Implementation of ECMs at Representative Facilities</li> <li>• Execution of Technical Audit Study (Representative Facilities)</li> <li>• Execution of Energy Performance Contract for Portfolio Facilities</li> <li>• Implementation of ECMs at Portfolio Facilities</li> </ul>
[3 to 4] months	9 months	[•] months

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# Project Process and Transaction

## Procurement Components



		Technical Proposal	Financial Proposal
Representative Facilities	75 points	A. Continuity of Key Project Personnel B. Facility Assessment C. Baseline Energy Consumption D. Proposed ECMs E. ECM Construction, Implementation and Maintenance F. ECM Measurement and Verification	A. Implementation Cost, Guaranteed Savings and Post Acceptance Performance Period Costs B. Payment Terms C. Financial Viability D. Proposal Summary
Portfolio Facilities	25 points	A. Potential ECMs	A. Energy Audit Fee B. Cost and Pricing

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## Project Process and Transaction

### Outcomes

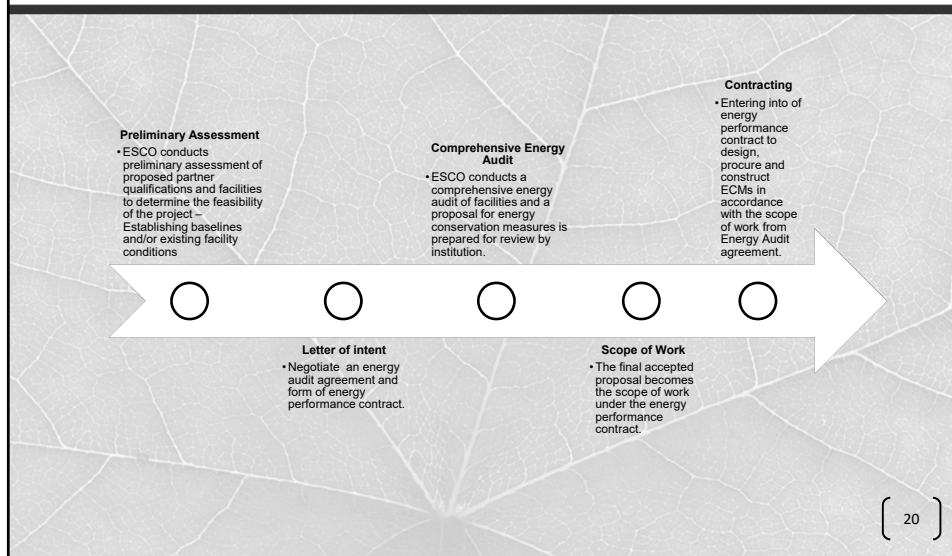


- WLU will fund the Project through a 20-year payback agreement that uses the energy savings to pay for the upgrades through an ESCO agreement with Johnson Controls Inc. (JCI)
- Proposed sustainable energy management initiatives include solar wall installations, system upgrades and an energy audit at WLU's facilities in Waterloo and Brantford
- JCI's proposed 18 ECMs for all three (3) Representative Facilities
- Total annual savings estimated at \$284,425, with electricity savings representing the most material value at \$262,000 per year.

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## Energy Performance Contracting

### Typical ESCO Contracting Process



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# Energy Performance Contracting

## Energy Audit Agreement



- Agreement between ESCO and Institution for ESCO to **conduct a technical energy audit** of the agreed to facilities and **provide a report** to the Institution that will form the basis of the scope of work under an energy performance contract.
- The report (or proposal) once approved by Institution becomes the **scope of work under the energy performance contract**.
- The cost of the energy audit is generally provided as **a fee per square foot**.
- Typically the **payment of the audit fee is contingent** on ESCO being able to show that the suite of energy saving measures proposed can be paid for with the resulting energy cost savings and within a maximum time period (payback period).
- Where the Institution accepts the proposal the **fees for the energy audit are rolled into the project costs** under the energy performance contract.

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# Energy Performance Contracting

## Energy Performance Contract



- Agreement between ESCO and Institution for ESCO to implement the accepted energy conservation measures arising from the energy audit.



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## Energy Performance Contracting

### Performance Guarantee



- ESCO guarantees that the project energy cost savings will pay for the projects capital costs and post implementation measurement and verification costs over a specific payback period.
- The pay back period is the period of time in which the aggregate energy cost savings must equal or exceed the capital costs of and post implementation measurement and verification costs.
- The payback period can be blended with various energy conservation measures with varying payback periods to allow for more comprehensive energy conservation measures. For example in the case of a 10 year pay back period an ECM with a 15 year pay back can be offset by ECMs with a 5 year pay back.
- In the event that the energy cost saving are not sufficient to pay for the project costs ESCO must compensate Institution for the under performance.

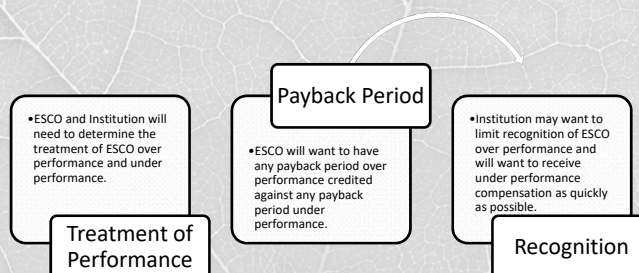
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## Energy Performance Contracting

### Reconciliation of Under Performance and Over Performance



- During the payback period there may be periods of over performance and under performance of energy savings.



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## Energy Performance Contracting

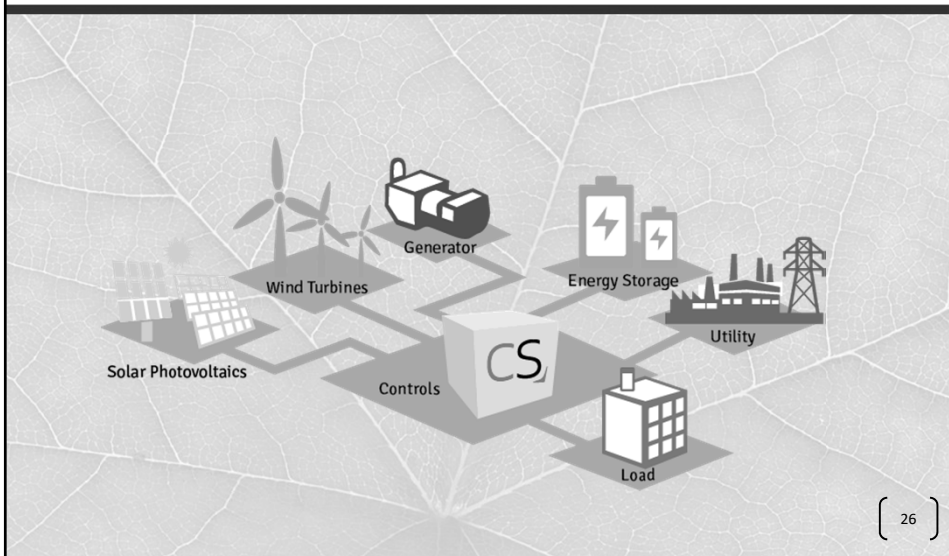
### Security for Performance



- ESCO's provision of security for its performance is a significant concern for institution.
- Significant part of Institution's comfort with ESCO's ability to complete its contractual obligations should come from RFQ process which will include financial background of ESCO.
- Energy Performance Contract will contain risk mitigation measures for construction and guarantee payment obligations including any of the following:
  - Performance and payment bond;
  - Letter of credit; and/or
  - Parent company guarantee.

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## Micro Grid Model



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## Micro Grid



Proposed Solution	
Measure	Summary
Solar PV (Waterloo and Brantford)	<ul style="list-style-type: none"> <li>Total installed capacity: 1135 kW</li> <li>Total annual production: 1370 MWh</li> <li>Total emissions reductions: 51.6 Tonnes/Yr</li> </ul>
Power Storage (Waterloo)	<ul style="list-style-type: none"> <li>2 MW(e) inverter complete with 2,000 kWh of power storage</li> </ul>
Microgrid (Waterloo)	<p>The major components proposed to be included at the Waterloo campus will include:</p> <ul style="list-style-type: none"> <li>Solar PV Systems, Power Storage, Combined Heat and Power</li> <li>Integration of larger existing emergency power systems as appropriate</li> <li>Automation of existing power switchgear at campus facility building substations</li> <li>Power control system</li> <li>Distributor Lines (Feeder Upgrades)</li> </ul>
Central Utilities Plant (Waterloo)	<ul style="list-style-type: none"> <li>Design and build a central utilities plant which will service the majority of the campus operations' heating, cooling and power needs.</li> <li>The proposed plant will incorporate an expandable new hot water boiler and chiller plants, a modular 1980 kW<sub>e</sub> cogeneration facility as well as hot and chilled water distribution systems.</li> </ul>
Financial Analysis	
Targeted Savings	<ul style="list-style-type: none"> <li>\$1,446,820 / year</li> <li>14.39 year payback (with incentives)</li> </ul>
Incentives	<ul style="list-style-type: none"> <li>\$9.9M including SIF as well as PSUI</li> </ul>
Project Cost	<ul style="list-style-type: none"> <li>\$20,821,311 (+/- 15%), after incentives</li> </ul>

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## Micro Grid Operating Modes



- Grid Connected Operation
  - CHP Operation
  - Power Storage Operation
  - Solar PV Operation
  - WLN Power Feeder Operation
  
- Temporary Outage Operation
  - CHP Operation
  - Emergency Generators

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## Micro Grid Operating Modes



- Island Mode Operation (Extended Outages)
  - CHP Operation
  - Power Storage Operation
  - Solar PV Operation
  - Emergency Generators

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## Questions?





Thank you



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