Minimizing the Cost Impact of Cap and Trade through Energy Efficiency

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Enbridge Gas Distribution
Ontario’s Cap and Trade: A Natural Gas Perspective

- Government of Ontario’s program started on January 1, 2017
- “Caps” province-wide GHG emissions as measured in CO$_2$e
- Creates market for “trading” emission allowances
- Government has indicated funds it collects will be used for GHG reduction efforts

For detailed and latest information on Cap & Trade visit: www.ontario.ca/capandtrade
Information on Cap & Trade

- **Government:**
  - [www.ontario.ca/capandtrade](http://www.ontario.ca/capandtrade)

- **Enbridge Gas Distribution**
  - [www.enbridgegas.com/capandtrade](http://www.enbridgegas.com/capandtrade)
Energy efficiency can help reduce what you would otherwise pay

- Energy Use
- GHG Emissions

which results in

- Energy Costs
- Cap & Trade Costs
Enbridge Incentive Program: Industrial Customer Offerings
Enbridge DSM Programs

DSM – Demand Side Management:

- Mandated by the Ontario Energy Board (OEB);
- Comprised of programs designed to help our customers use their natural gas as efficient as possible;
- This year the new 5-year framework agreed between OEB, the intervening community and gas utilities;
- Stability through to 2020.
Enbridge DSM Programs

Our programs cover:

- Residential market
- Industrial market
- Commercial market
Large Industrial Programs

Our interests today will be focused on: Energy Efficiency
Large Industrial Programs

Program offerings based on:

- Over 20 years of experience;
- Gained Customer trust through direct involvement with customers and/or trusted business partners;
- Auditing process in place to ensure calculated savings are realistic → confidence in investment.
Large Industrial Programs

Helped our customers save:

- Approx. 175,000,000 m$^3$ of natural gas;
- For industrial customers, we have also identified:
  - More than 20,000,000 KWh of electricity;
  - And over 800,000 m$^3$ of water savings.

In a three year period ALONE.

Participating in our programs helps:

- Improve customer’s bottom line;
- Reduce CO$_2$ emissions.
Large Industrial Programs

Large Industrial Sector

Custom Program

Comprehensive Energy Management Program
CEM program:

Structured energy management not prevalent:
- Companies don’t have resources;
- Lack of clear payback justification.

When implemented:
- Often focused on energy cost (commodity contracts, peak demand, etc.);

Potential to be so much more!
Why Manage Energy?

- Heating Equipment
- Drying
- Aggregates
- Insulation
- Draft Reduction
Why Manage Energy?

DECISIONS based on knowledge

ACTIONS based on decisions

SAVINGS based on actions
Why Manage Energy?

- Non-energy Benefits:
  - Make better capital investment decisions - knowing where and how much energy is consumed in equipment;
  - Operational improvements;
  - Better preventative maintenance
    - Increased up time
    - Enhanced utilization rates.
Large Industrial Programs

Large Industrial Sector

Custom Program

CEM Program
Custom program:

- Customized solutions to use energy as efficiently as feasible;
- Based on personal interaction between our Energy Solutions Consultants and customer’s technical staff;
- Uncovering and supporting initiatives tailored to a specific facility.
Custom Program

Knowledge Development
Arming our customers with information.

Opportunity Identification
Testing and energy use analysis.

Measurement
Choosing the right metering methods to quantify key energy inputs.

Action and Implementation

Engineering Analysis
Analyzing and interpreting data to monetize savings opportunities.
Energy efficiency is about reducing waste

U.S. Department of Energy publication, in 2008:

Here are examples how, working with our customers, we have found ways to overcome these obstacles.
Capturing waste heat increases heating efficiency of your processes → lowering costs of production.
## Drum Dryer

### Estimated Value of Drum Dryer Flighting:

<table>
<thead>
<tr>
<th></th>
<th>New dryer flighting install</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Investment</strong></td>
<td></td>
<td>$35,000</td>
</tr>
<tr>
<td><strong>Savings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td></td>
<td>76,700 [ m³/yr ]</td>
</tr>
<tr>
<td>@ $0.25/m³</td>
<td></td>
<td>$19,175</td>
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<tr>
<td><strong>Carbon Reduction</strong></td>
<td></td>
<td>tCO₂e 144</td>
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<tr>
<td><strong>Savings</strong></td>
<td></td>
<td>$19,175</td>
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<tr>
<td><strong>Enbridge Incentive</strong></td>
<td></td>
<td>$11,335</td>
</tr>
<tr>
<td><strong>Simple Payback</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Before incentives)</td>
<td></td>
<td>1.8 [ years ]</td>
</tr>
<tr>
<td>(After incentives)</td>
<td></td>
<td>1.2 [ years ]</td>
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</tbody>
</table>
Baghouse

**Estimated Value of induced draft fan VFD:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost of Equipment and installation</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Investment</td>
<td></td>
<td>140,000</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost of Natural Gas [m³/yr]</th>
<th>$</th>
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</thead>
<tbody>
<tr>
<td>Savings</td>
<td>200,000</td>
<td>50,000</td>
</tr>
<tr>
<td>@ $0.25/m³</td>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost of Carbon Reduction [tCO₂e]</th>
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<tbody>
<tr>
<td>Carbon Reduction</td>
<td>375</td>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost of Enbridge Incentive</th>
<th>$</th>
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<tbody>
<tr>
<td>Enbridge Incentive</td>
<td>17,500</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>(Before incentives) [years]</th>
<th>(After incentives) [years]</th>
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</thead>
<tbody>
<tr>
<td>Simple Payback</td>
<td>2.8</td>
<td>2.5</td>
</tr>
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</table>
## Estimated Value of Insulating High Temperature Equipment:

<table>
<thead>
<tr>
<th></th>
<th>Cost of Insulation</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Total Investment</strong></td>
<td></td>
<td>$ 35,000</td>
</tr>
<tr>
<td><strong>Savings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td>m³/yr</td>
<td>146,850</td>
</tr>
<tr>
<td>@ $0.25/m³</td>
<td></td>
<td>$ 36,700</td>
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<tr>
<td><strong>Carbon Reduction</strong></td>
<td>tCO₂e</td>
<td>275</td>
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<tr>
<td><strong>Savings</strong></td>
<td></td>
<td>$ 36,700</td>
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<tr>
<td><strong>Enbridge Incentive</strong></td>
<td></td>
<td>$ 14,843</td>
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<tr>
<td><strong>Simple Payback</strong></td>
<td>(Before incentives)</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>(After incentives)</td>
<td>7</td>
</tr>
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</table>
## Air Compressor Heat Recovery

**Actual water cooled air compressor project:**

<table>
<thead>
<tr>
<th></th>
<th>New install of equipment &amp; labour</th>
<th></th>
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<tbody>
<tr>
<td><strong>Total Investment</strong></td>
<td>$6,913</td>
<td></td>
</tr>
<tr>
<td><strong>Savings</strong></td>
<td><strong>Natural Gas</strong> [ m³/yr ] 30,450</td>
<td></td>
</tr>
<tr>
<td></td>
<td>@ $0.25/m³ $7,613</td>
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</tr>
<tr>
<td><strong>Carbon Reduction</strong></td>
<td>tCO₂e 57</td>
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<tr>
<td><strong>Savings</strong></td>
<td>$7,613</td>
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<tr>
<td><strong>Enbridge Incentive</strong></td>
<td>$3,457</td>
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<tr>
<td><strong>Simple Payback</strong></td>
<td>(Before incentives) 11 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(After incentives) 6 months</td>
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</tbody>
</table>
Summary of Energy Project Savings

Averaged Project Savings:

- Average cost $54,230
- Average annual savings $28,372
- IRR = 44% over 5 years

And to help with first year cash flow:

- Average incentive $11,784
Plant efficiency – What else can be done?
Plant efficiency – Burner Tuning

- Keep burner tuned regularly.

- Only make changes to the air/fuel settings when gas analyzer is available.
Plant efficiency – Burner Tuning

- Mark initial linkage and control settings “Home Position”.

- Use qualified technicians to do burner tuning
Plant efficiency – Effects of Moisture on RAP and Sand

- 1% $\text{H}_2\text{O} = 10% \text{CH}_4$

- Grade and pave under stockpiles
Plant efficiency – Effects of Moisture on RAP and Sand

- Separate stockpiles
- Cover RAP, sand and aggregate loading bins
Summary

- Helping customers get from managing energy costs ...

... to managing energy.

Places Enbridge can help

- DRUM DRYER
- DRUM DRYER
- STOCKPILES & AGGREGATES
- THERMAL FLUID HEATER
- BURNER & CONTROLS
- PIPING INSULATION
- HEAT RECOVERY & ID FAN REDUCTION
Thank you!

Questions, Comments

Resource Information


Places Enbridge can help

Fuel Switching from Diesel to CNG

Natural Gas Vehicles

A natural gas vehicle (NGV) is an economical and environmentally-friendly alternative to diesel vehicles.

Natural gas can fuel many different vehicle types including: heavy-duty trucks, city buses, transport trucks, trains, and freight ships. Even ice resurfacing!

20% 40%

Converting fleets and heavy-duty vehicles from diesel to natural gas will reduce greenhouse gas emissions by approximately 20% and save up to 40% on fuel.

Ontario has access to an abundant supply of natural gas which means costs will stay low for the foreseeable future.

Converting to natural gas from diesel means cleaner air.

75—95% less Nitrogen Dioxide
99% less Sulfur Dioxide
70—90% less Carbon Monoxide
90% less Particulate Matter
89% less Volatile Organic Compounds
20% less Carbon Dioxide
Natural Gas Vehicle Experts (NGV) – Program Design and Delivery

29 Years Supporting Ontario’s NGV Programs

- Station Rental Program
  - 200 Plus Rental VRA’s
- Education and Facilitation
- Public Rate 9 Stations
- Collaborative partnerships
- Municipal and Private Clients
- Station Design
- Station Operation
- Station Maintenance
- Codes and Standards
CNG Solutions for the Asphalt Industry

Transitioning from Diesel and Gasoline to CNG...Ask the Experts

Call us to Evaluate your Fleet

Enbridge has the experience, tools, staff, and market partnerships to deliver immediate GHG reductions

- **Financial Assistance:** Fueling Infrastructure Rental Program
- **Partnerships:** Collaboration with proven market leaders
- **Enbridge Gas Distribution NGV Team:** Ready to work with your fleet and energy teams to improve your bottom line and help mitigate financial risk related to emissions.
CNG Solution for the Asphalt Industry

CNG Trucks for the asphalt and aggregate industries
Original Equipment Manufacturers (OEMs) Support

Mature - well supported market with plenty of options and choice.
Thank you!

Questions, Comments