

2016 ONPHA Conference and Trade Show

Concepts & Cases: Energy Efficiency for Non-Profit Housing Providers

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ONPhA



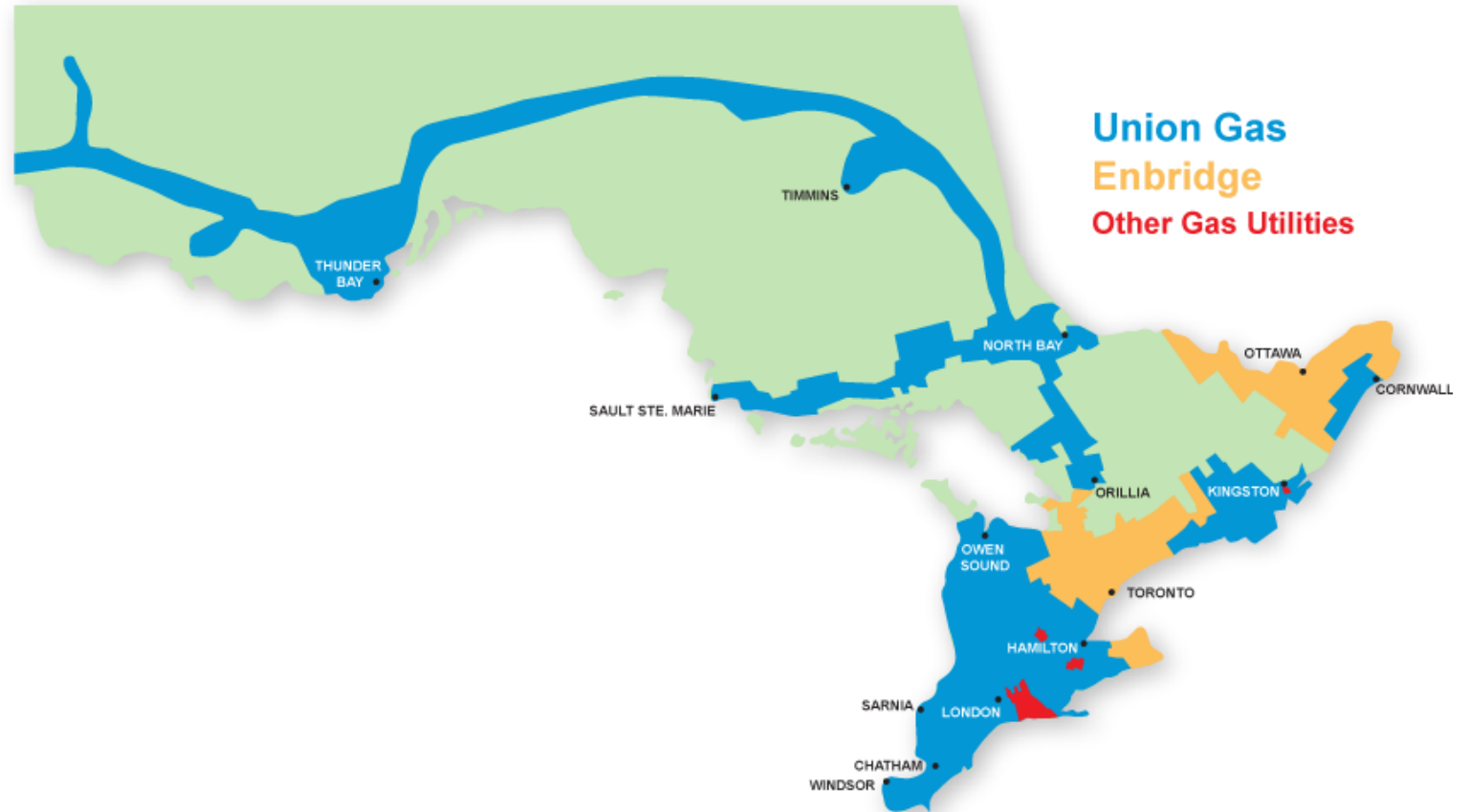
Today's Topics

- Union Gas & Natural Gas Overview
- Reducing Natural Gas Consumption
 - Natural Gas Programs and Incentives
- Reducing Electricity Consumption
 - Electricity Programs and Incentives
- Connecting with Union Gas
- Q&A Session



Union Gas: Your Energy Experts

- Natural gas storage, transmission and distribution company – over 100 years
- Distribution business serves 1.4 million customers, in over 400 communities
- One of Canada's Top 100 Employers 2011-to-2015



Benefits of Natural Gas

✓ **Cleanest of the fossil fuels**

- Only one carbon atom to burn

✓ **Safest of the fossil fuels**

- Lighter than air

✓ **Abundant supply ensures long term price stability**

- At least 100 years supply in North America

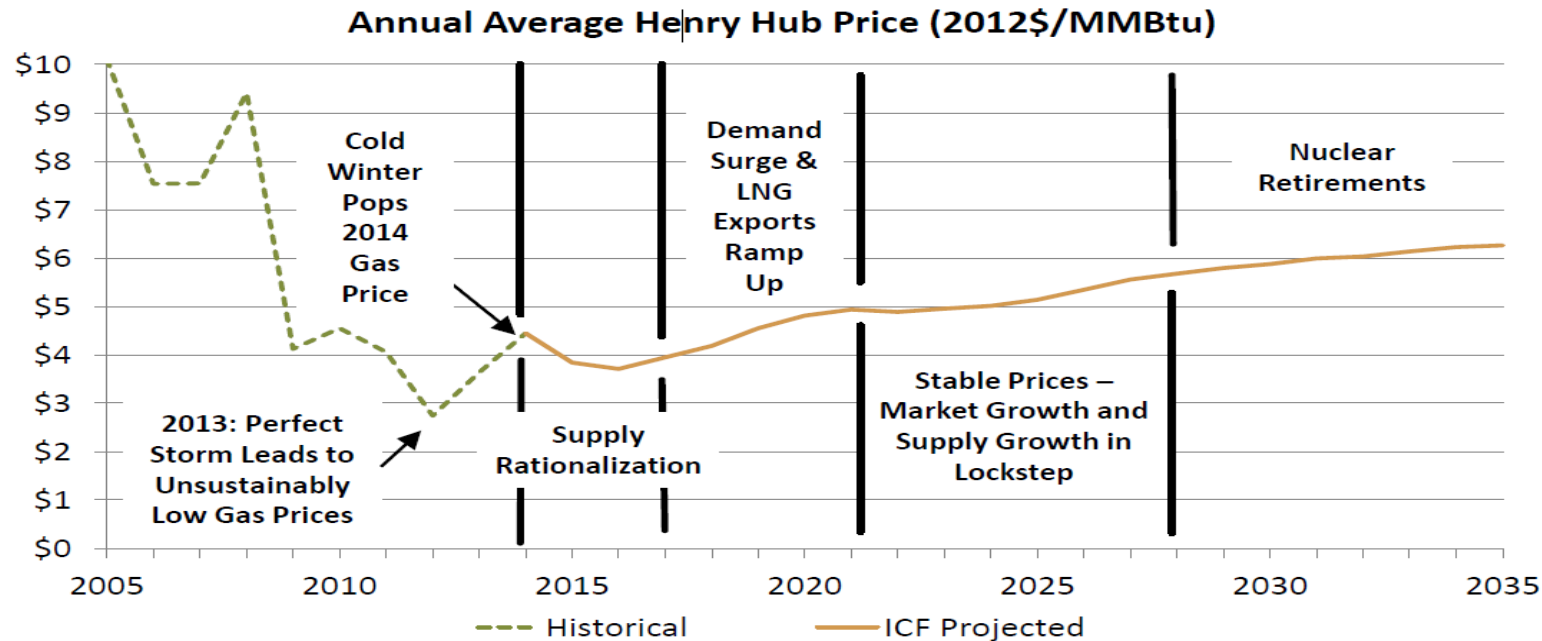
✓ **~1/8th the cost of using electricity (S. Ontario)**

- Does not include electric system losses

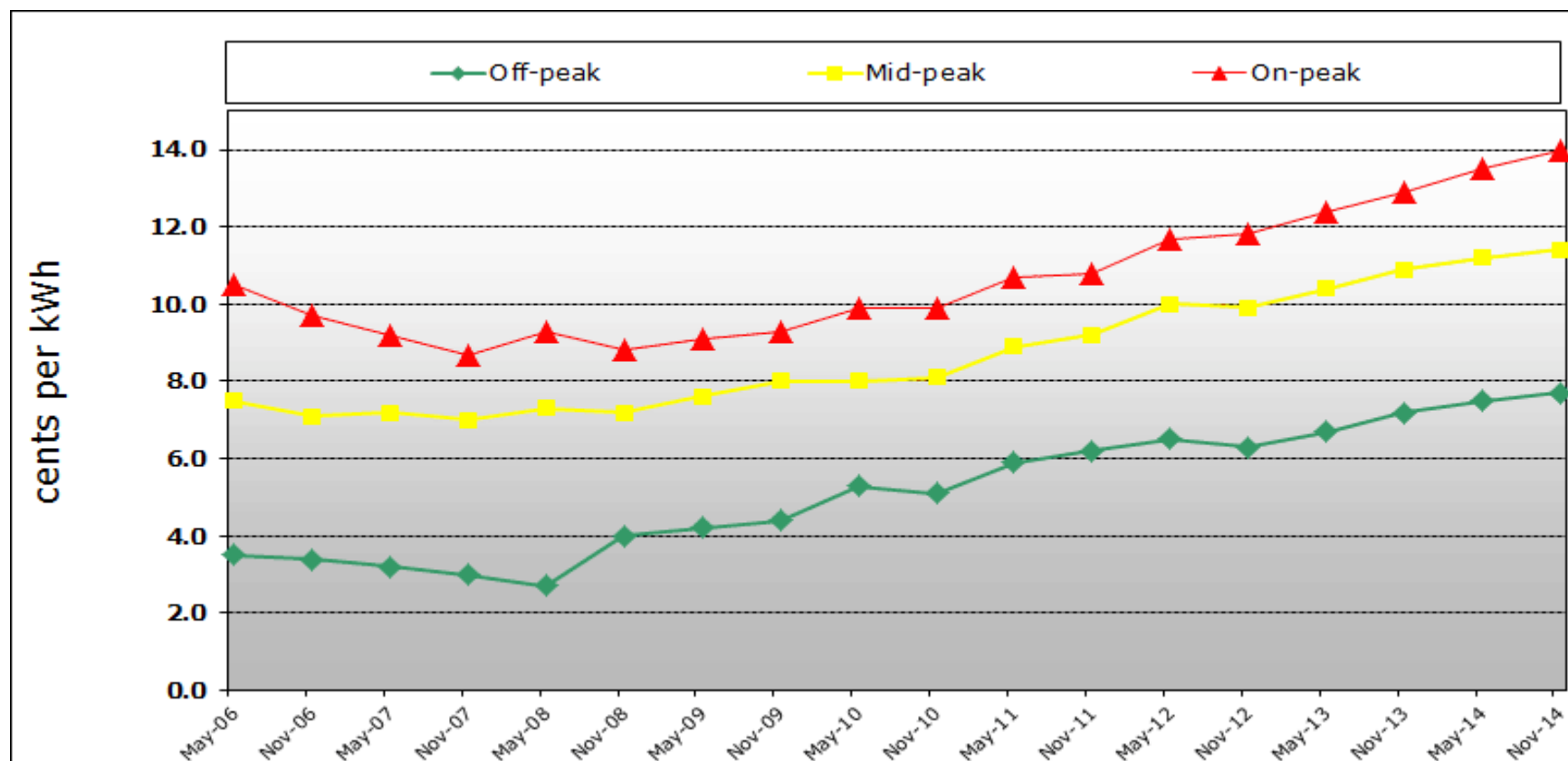


Natural Gas Pricing Outlook (ICF)

Gas Prices Remain Relatively Low in the Near Term, but Increase as the Market Grows



Electric price history (source – OEB)



Conserving Energy in Ontario

Energy conservation is a good thing!

- ✓ **Preserves the environment**

- Fewer greenhouse gas emissions

- ✓ **Protects from rising energy prices**

- Helps keep companies competitive and strong
- Helps individuals stay warm and comfortable

- ✓ **Reduces the need for new infrastructure**

- Keeps the price of energy low
- Maximizes use of existing pipelines and generating stations



Union Gas Energy Conservation

- ✓ Union Gas has offered Energy efficiency programs to residential, commercial and industrial customers since 1997
- ✓ Our Account Managers can help:
 - Identify energy efficiency and technical upgrade opportunities
 - Locate applicable incentive programs
 - Fill out applications and ensure customer submissions
- ✓ **Union Gas has generated over 6 billion m3 of savings, the equivalent of 2.1 million cars off the road for a year.**



Reducing Natural Gas Consumption



Natural Gas Reductions

- Heating Systems
- Domestic Hot Water
- Make Up Air and Heat Recovery
- Building Envelope Improvements
- Controls and BAS



Natural Gas Reductions - Heating

- Replace old boilers with condensing boilers
 - 15% to 20% savings
 - Can often use lower BTU rated boilers
- Tune up and clean existing boilers
 - Up to 5% savings
- Install a control or Building Automation System to better regulate heating requirements



Case: Condensing Boilers for Space Heating

Situation: 25 unit seniors apartment building

- Old boilers requiring multiple repairs – reaching end of life
- Higher than normal gas consumption
- Unreliable performance leads to tenant complaints

Solution: Install condensing boilers for space heating

- 2 x 399 mbh condensing boilers
- Project cost – **\$34,500**
- Annual gas savings – **8,300 m3 = \$2,000**
 - Lifetime savings over 197,000 m3 = \$40,000
- Incentive received from Union Gas - **\$17,250 (50% of costs)**



Natural Gas Reductions – Domestic Hot Water (DHW)

- Replace old stand alone tanks with condensing water heaters
 - 20% to 30% savings of DHW load
- Lower delivery temperature to apartments
- If using boilers for both heat and DHW, ensure proper controls to prevent wasted heat



Natural Gas Reductions – Make Up Air and Heat Recovery

- Replace old MUA with condensing MUA
 - 15% to 25% savings
- “Right-size” the new MUA based on airflow
- Add Heat Recovery where possible
- Control time of use through VFD and control system



Case: VFD on MUA 2014

Situation: 6 small apartment buildings – 15 to 30 apartments

- MUA running full speed 24 hours per day
- MUAs fairly new – no need to change them

Solution: Install VFD on MUA

- Time clock to reduce CFM rate at certain times of day
- Can run at 50% or less for several hours per day
- Cost of VFDs – **\$4,000 to \$7,000 – total \$29,000**
- Annual gas savings – **45,000 m3 = \$14,000**
- Incentive received from Union Gas - **\$14,500 (50% of costs)**
- **Also eligible for electric incentives!**



Natural Gas Reductions – Building Envelope Improvements

- Leaking and drafty windows and doors
 - High cost – Replace the windows and doors
 - Low cost – weather-strip and air-seal the perimeters
- Upgrade roof insulation if needed
 - Can often be done when roof is being replaced
 - Small savings unless there is no insulation there
- Building Cladding and Solar Wall
 - If need to replace one or more walls, consider a Solar Wall

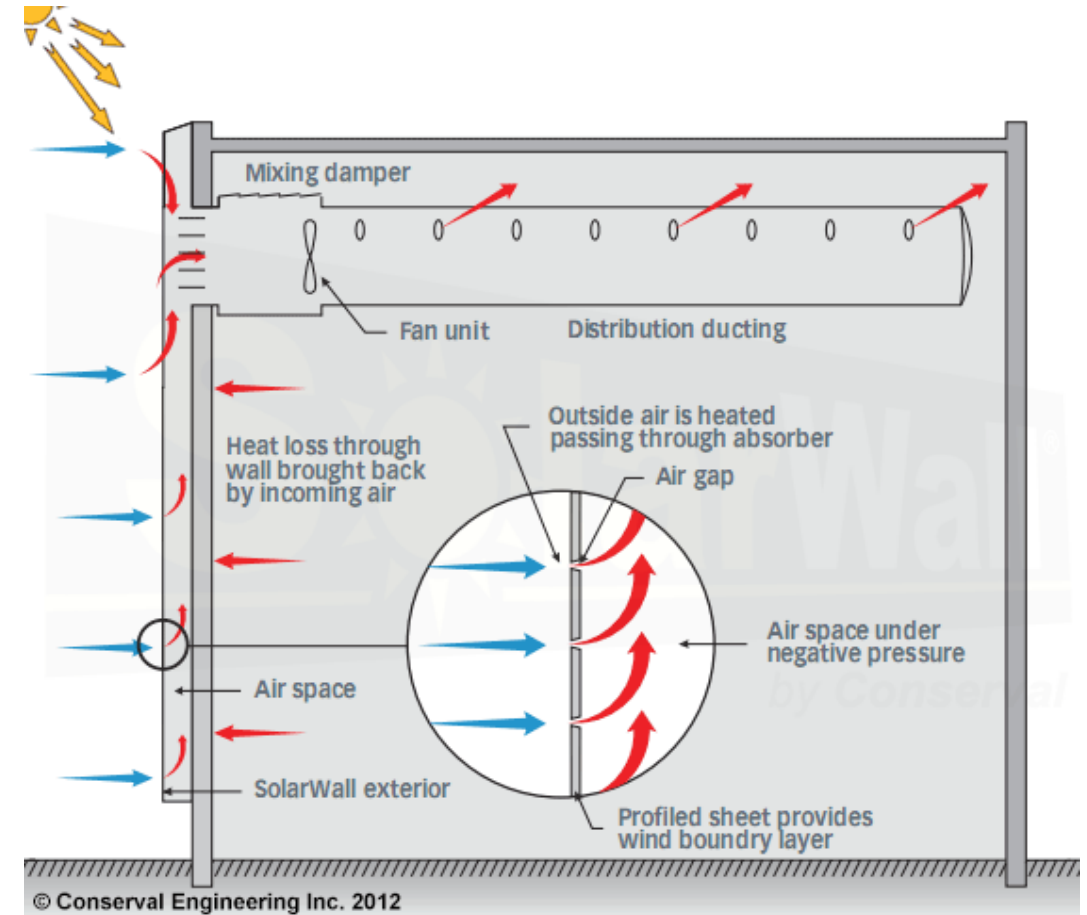


Natural Gas Reductions

– Building Envelope Improvements

Building Cladding and Solar Wall

- Double wall system - Insulated wall next to the building
- Collector panel mounted away from the building wall
- Air space heated by sun – 15C to 60C above ambient temp
- Heated air directed into the incoming air stream of the MUA
- Pre-heats the incoming air, reducing gas requirement



Case: Solar Wall cladding on building 2014

Situation: 386 unit apartment building

- Electric heat, gas MUA
- Exterior walls needed replacement
 - Brickwork deteriorating beyond repair

Solution: Add a Solar Wall to preheat the incoming make up air

- Project cost - \$229,000 additional
- Annual savings - 31,000 m3 = **\$9,000 per year**
 - Expected life is **40 years**
- Incentive received from Union Gas - **\$81,800**



Natural Gas Reductions - Controls

- Control systems now available for multifamily buildings with central gas heating
- Relatively new to the Ontario market – 2012 introduction
- These systems limit the amount of heat available to building zones
- Savings between 20% and 40% of the heating load
 - Requires individual building assessment by vendor
- Cost varies with system
 - Wired or wireless, number of units, number of zones, etc



Case: Building Controls 2013

Situation: 252 unit apartment building

- Gas heat, hot water and MUA
- Lots of wasted heat – windows open, hot and cold spots, etc
- Annual heating consumption about 180,000 m³

Solution: Install wireless controls with heating zones

- Controls amount of heat available to each apartment
 - Eliminates hot and cold spots in the building
- Project cost - \$70,000
- Annual savings 25% - 45,000 m³ = **\$14,400**
- Incentive received from Union Gas - **\$35,000**



Natural Gas Program Offerings (DSM)

Union Gas Programs & Incentives

✓ **Union Gas' current Ontario Energy Board approved plan for Affordable Housing customers:**

- 2016 – 2020: OEB approved significant incentives for Affordable Housing Providers
 - Funding a huge issue for non-profit customers
 - Green Investment Fund compliments rebate programs from utilities



Affordable Housing Single Family Program

✓ Single Family – Target Market

- Union Gas customer
- Home is part of an Affordable Housing complex (private or non-profit)
- Home is built prior to 1975 and requires more insulation
- Home has a natural gas furnace

✓ Single Family – Offering

- Free Home energy assessment
- Free Insulation & air-sealing upgrades
- Furnace incentive: \$275 per unit replaced
 - (90% AFUE or less >>>>>> 95% AFUE or higher)



Affordable Housing Multi-Family Program

✓ Multi-Family – Target Market

- Union Gas customer
- Building is multi-residential (part 3 under OBC)
- Building is a part of an Affordable Housing complex (private or non-profit)

✓ Multi-Family – Program Offering

- Building assessment – identify energy efficiency/technical upgrades
- Incentives for pre-determined and custom projects



AHCP Multi-Family Incentive Details

- **Pre-determined, equipment incentives***

- Various technologies with approved pre-set savings numbers
- Incentive is \$0.10 / **lifetime** m3 saved

- **Custom Incentives***

- Anything not covered in the Pre-determined program
- New and retrofit projects eligible
- Must prove natural gas savings specific to the building
- Incentive is \$0.10 / **lifetime** m3 saved

***Both Pre-determined and Custom limited to 50% of installed costs**



Predetermined Incentives

Type of Project	Incentive Example	Average % Project Cost Covered by UC Incentive
Condensing Boiler – Space heat (299,000 BTU)	\$7,200	35%
Condensing Boiler – Space heat (1,000,000 BTU)	\$25,000	35%
Condensing MUA + VFD (3,000 cfm)	\$12,500	35%
Heat Recovery (HRV)	\$18,750	45%
Energy Recovery (ERV)	\$24,400	45%
Condensing Gas Water Heater	\$1,900	30%



Custom Incentives

Any project that reduces natural gas consumption and is not part of our Pre-determined program (building specific).

Type of Project	Number of Projects in 2015	Average Incentive
VFD on Existing MUA	9	50% of the project cost
Insulation	3	\$4,361
Controls	3	\$39,200
Solar Wall	1	\$81,800
High Efficiency Hot Water Heating	3	\$13,900



Applying is Easy!

Program Incentives:

- Contact your UG Account Manager to identify possible incentives
- Simple 1 page application form – on our website or from your Union Gas Account Manager **(we can help with the application!)**
- Submit your application **after** the project installation, as soon as it's complete

UG Account Manager will assist with your application

For More information:

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Reducing Electricity Consumption



Electricity Reductions

- Replace electric equipment with gas where possible
 - Gas is up to 8 times less expensive than electricity
 - Sometimes also eligible for natural gas incentive
- Controls and BAS
- Variable Frequency Drives (VFDs)
- Combined Heat and Power (CHP)
- OPA programs
 - Lighting
 - Appliances
 - Custom projects
- No incentive for “fuel switching” from IESO or Union Gas



Reducing Electricity – Combined Heat and Power (CHP)

- Use natural gas (or other fuel) to generate electricity
- NOT an “emergency generator”
- Runs 24 hours per day, 365 days per year
 - ½ day maintenance per year
- Offsets a portion of the electric load
- Hot exhaust from the natural gas generator directed to pre-heat another gas application – DHW, MUA, boiler loop, etc.
- No feedback to the grid – no utility contract required
- Eligible for an OPA incentive based on electricity reduction



CHP Case: Lanark County Housing



Technology:
19 kW packaged micro CHP

Lanark County Housing : 19kW micro CHP



- Lanark Bell Ave. has 60 adult apartments
- Everything is electric except domestic hot water
- Supplies:
 - 30% electrical demand at 100% MCHP output
 - Utilizes 100% hot water radiators during winter
 - Utilizes 40% hot water for DHW



Lanark County Housing



- Hot water radiators added to ducting to heat hallways and lobby
- Heats DHW via two indirect tanks

Equipment	EC Power NA – 19kW micro CHP
Commissioning Date	May 2013
Uses	Space and DHW Heating
Cost	\$80,000
Annual Savings	\$12,500
Simple Payback	3.8 Yrs after OPA Grant



Case: CHP 2014

Situation: 60 unit apartment building

- Electric heat, gas hot water
- Cost of electricity rising dramatically
- Apartments becoming hard to rent

Solution: Install EC Power Micro CHP unit

- 19kw unit uses natural gas to generate electricity
- Waste heat used to pre-heat domestic hot water
- Project cost - **\$80,000**
- Annual cost savings - **\$12,500**
- Incentive received from OPA - **\$32,000**



Electricity Program Offerings (CDM)



Program for Electricity savings for Commercial customers

- Audit incentives
- Equipment incentives
- Lighting, motors, air conditioning, VFDs, etc
- Custom projects
- **Pre-approval required** – minimum project sizes needed in some programs
- Available through 81 electric utilities in Ontario
- 2011-2014 programs extended to 2015 to bridge transition to new CDM Framework in 2016

www.saveonenergy.ca



Ontario and Other Provinces

- Ontario: Enbridge Gas – GTA, Ottawa, Niagara – rebates similar to UG
 - www.enbridgegas.com
- Quebec: Gaz Metro gas incentives Hydro Quebec electric incentives
 - <http://gazmetro.com> <http://www.hydroquebec.com/business/>
- Manitoba Hydro – gas and electric programs
 - www.hydro.mb
- Fortis BC – gas and electric programs
 - www.fortisbc.com
- Sask Energy – natural gas incentive program
 - www.saskenergy.com
- Heritage N.S. – rebates on conversions in Energy Star
 - www.heritagegas.com



Thank you!



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