

Item #7.2  
Public Works Committee  
May 22, 2014



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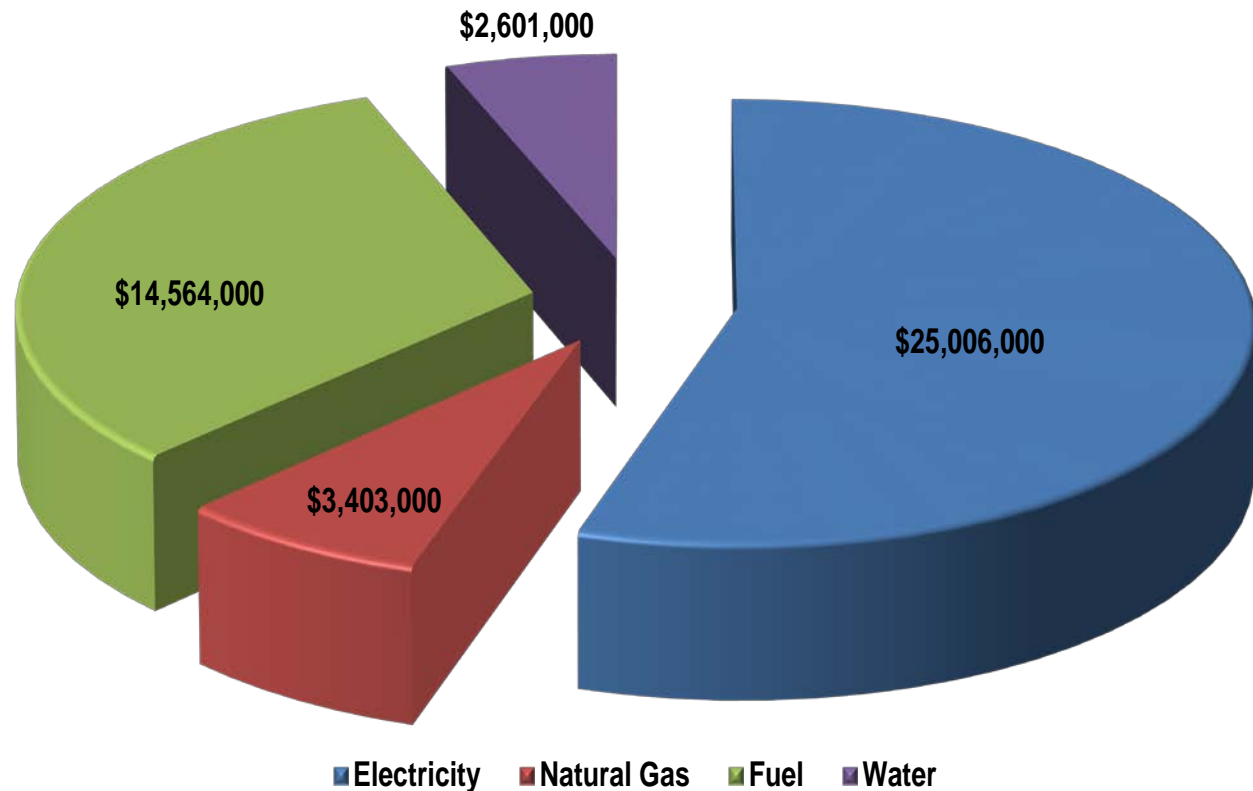
**Public Works  
Corporate Assets and Strategic Planning  
2013 Annual Energy Report**

*Providing services that bring our City to life !*

# 2013 Utility Costs

City of Hamilton Total \$45 million

2013 Utility Costs



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- Processes
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# Energy Targets

- Energy intensity is a measure of the amount of total energy a facility uses per square foot of useable space.
- Energy intensity is now 20% lower in Corporate facilities;
  - Seven years ahead of plan.
  - Original target was 20% by 2020.

Energy Intensity	2013
Target	9%
Actual	20%

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# 2013 vs 2005 Base Year

## Consumption:

	2005	2013	% Change
Electricity (kWh)	239,308,000	221,162,000	-7.6%
Natural Gas (m3)	14,279,000	11,983,000	-16.1%
Total Energy (ekWh *)	391,664,000	346,626,000	-11.5%

## Cost:

	2005	2013	% Change
Electricity Cost	\$20,941,000	\$25,006,000	19.4%
Natural Gas Cost	\$6,088,000	\$3,403,000	-44.1%
Total Energy Cost	\$27,029,000	\$28,409,000	5.1.%

\* kWh = kilowatt - hours

\* m3 = cubic meters

\* ekWh = equivalent kilowatt hours

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# Green House Gas Emissions

(Tonnes CO<sub>2</sub>e per Year)

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# Energy Savings and Avoided Costs

The following categories account for the 32.8 million in Energy Savings and Avoided Costs.

- **Utility Rates and Cost Avoidance:**
  - \$16.3 million through management of utility rates and cost avoidance;
- **Cost Recovery:**
  - \$3.4 million in recovered energy expenditures;
- **Energy Conservation & Incentives:**
  - \$13.2 million in reduced energy by installing more efficient systems and received incentives.

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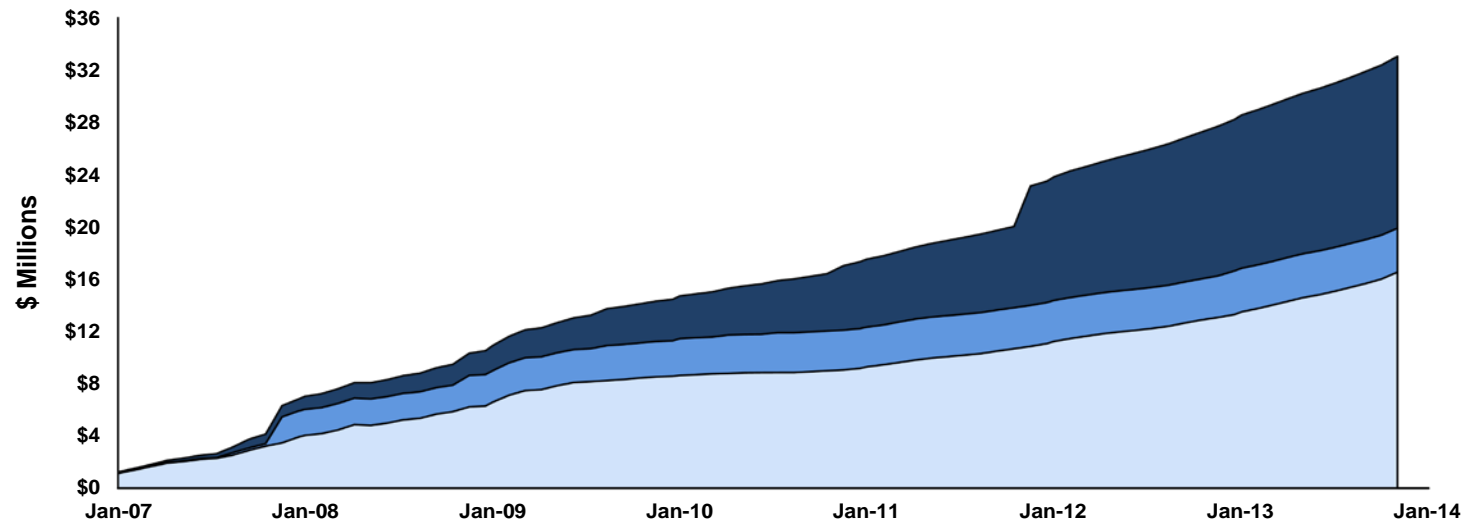
# Energy Savings and Avoided Costs

## City of Hamilton's Cumulative Energy Savings & Avoided Costs (2006 - 2013)

□ Utility Rates & Cost Avoidance    ■ Cost Recovery    ■ Energy Conservation & Incentives

\$16.3 Million    \$3.4 Million    \$13.2 Million

**Total \$32.8 Million**



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# Energy Savings and Avoided Costs

Avoided costs calculated on the basis of what additional energy costs would have been incurred if no corrective or remedial action was taken to eliminate energy waste or to procure energy cost effectively.

Direct cost savings are the result of measures taken to reduce energy consumption using more efficient equipment or processes such as LED lighting or variable frequency drives on motors.

Savings/Avoided Costs	Levy Benefits (Tax Base)	Rate Benefits (Water Rates)	Corporate Total (\$)
Avoided Costs	\$16,056,000	\$7,617,000	\$23,673,000
Direct Savings	\$8,030,000	\$1,175,000	\$9,205,000
Total Savings	\$24,086,000	\$8,792,000	\$32,878,000

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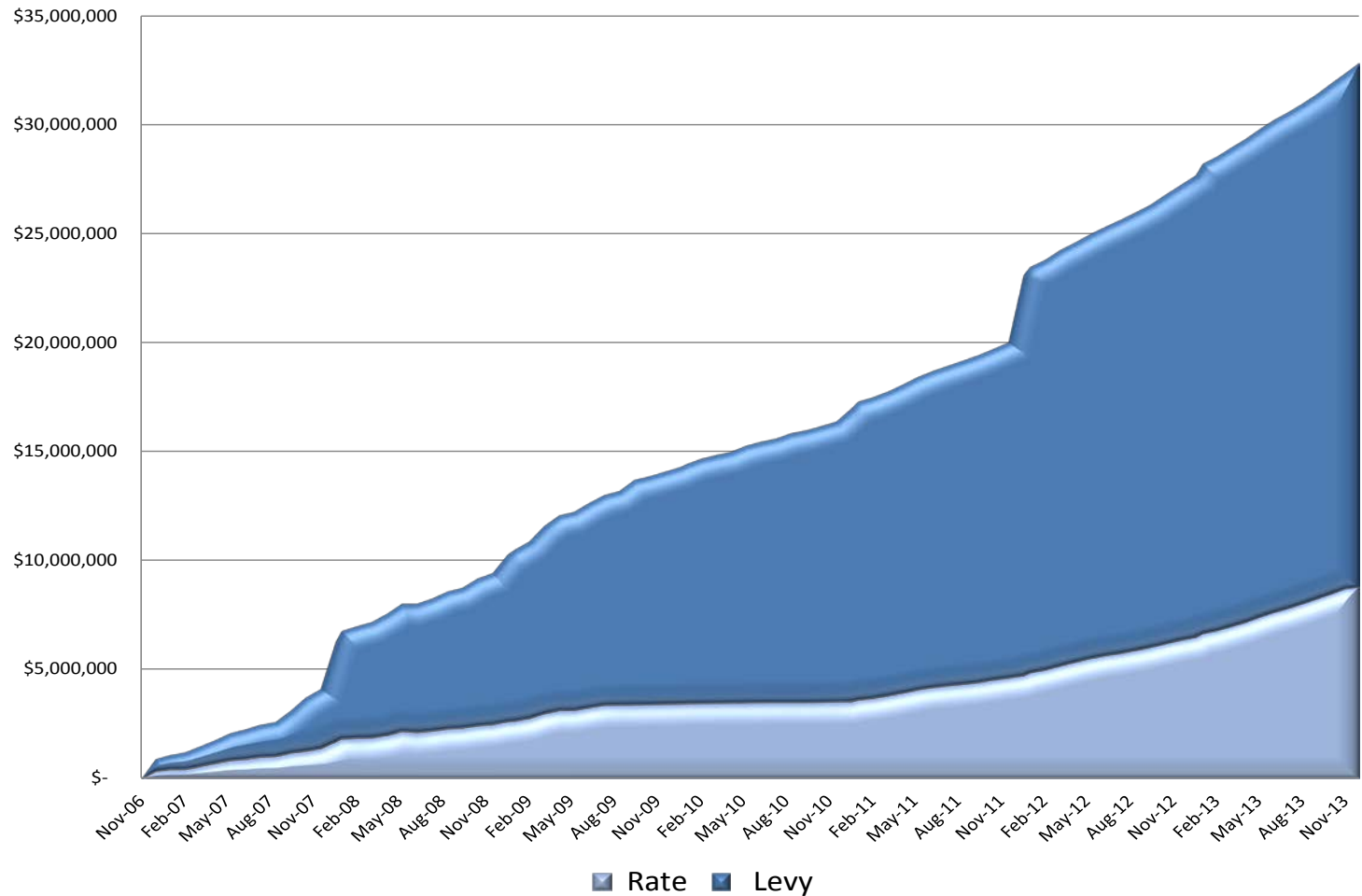


# Cumulative Energy Savings & Avoided Costs

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# Energy Savings and Avoided Costs

## Annual Savings and Avoided Costs Summary:

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	2006	2007	2008	2009	2010	2011	2012	2013	Cumulative
<b>Levy RPP/Interval Change</b>	\$ 176,153	\$ 769,379	\$ 1,165,727	\$ 775,391	\$ -	\$ -	\$ -	\$ -	\$ 2,886,651
<b>Rate RPP/Interval Change</b>	\$ 365,710	\$ 1,067,700	\$ 783,762	\$ 655,992	\$ -	\$ -	\$ -	\$ -	\$ 2,873,163
<b>Levy Global Adjustment</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 298,308	\$ 945,464	\$ 1,243,772
<b>Rate Global Adjustment</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,061,230	\$ 1,213,631	\$ 1,652,757	\$ 3,927,617
<b>Levy Gas</b>	\$ 351,941	\$ 684,336	\$ 657,476	\$ 719,823	\$ 429,954	\$ 610,946	\$ 587,416	\$ 563,312	\$ 4,605,204
<b>Rate Gas</b>	\$ -	\$ 42,280	\$ 146,185	\$ 152,394	\$ 99,457	\$ 130,036	\$ 119,524	\$ 126,581	\$ 816,457
<b>Energy Conservation Levy</b>	\$ -	\$ 458,703	\$ 751,330	\$ 1,215,974	\$ 1,403,687	\$ 1,248,486	\$ 1,798,887	\$ 1,152,996	\$ 8,030,063
<b>Energy Conservation Rate</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 426,200	\$ 513,415	\$ 939,615
<b>Incentives</b>	\$ 34,424	\$ 364,247	\$ 87,776	\$ 172,940	\$ 440,252	\$ 2,957,967	\$ 94,625	\$ 40,515	\$ 4,192,746
<b>Cash Recovery Levy</b>	\$ -	\$ 1,756,570	\$ 418,492	\$ 299,173	\$ 339,163	\$ 95,518	\$ 38,600	\$ 179,975	\$ 3,127,491
<b>Cash Recovery Rate</b>	\$ -	\$ 235,375	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 235,375
<b>Total(s):</b>	\$ 928,229	\$ 5,378,589	\$ 4,010,747	\$ 3,991,687	\$ 2,712,514	\$ 6,104,183	\$ 4,577,192	\$ 5,175,016	\$32,878,156

# Energy Procurement

## Electricity

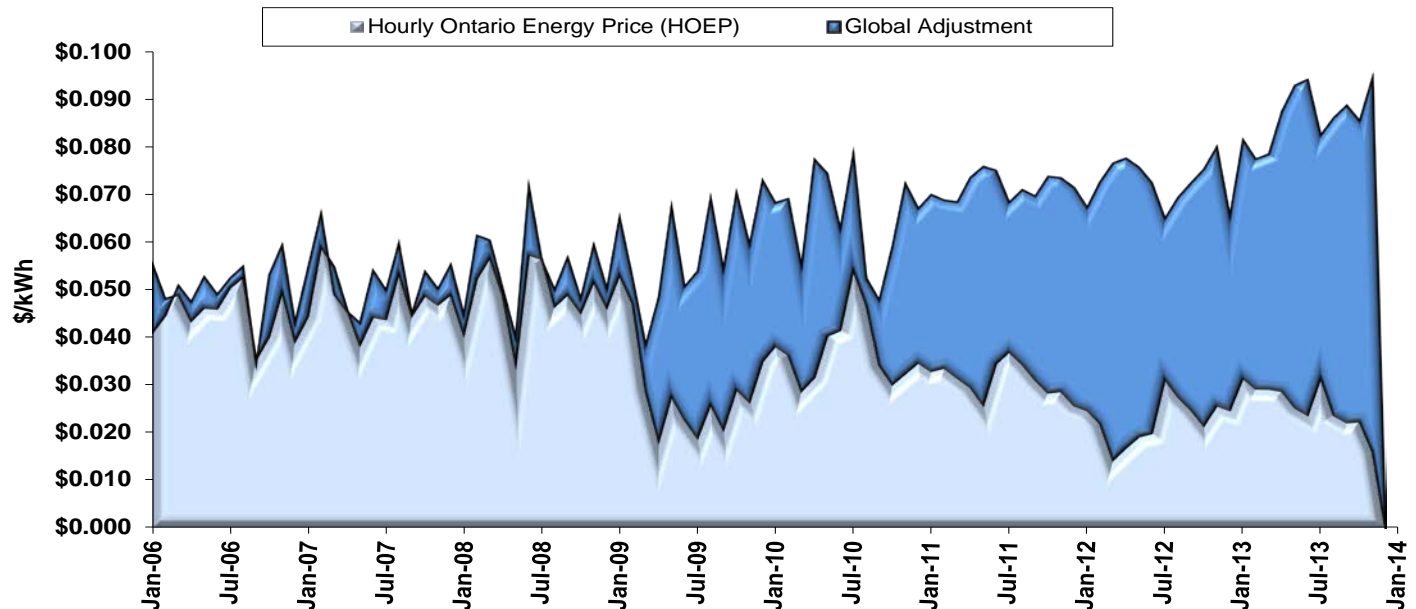
- Energy charges partially deregulated;
- Transmission and delivery charges are regulated (OEB);
- The regulated charges for 2013 were roughly 6% higher than 2012;
- GA annual average was 21.6% higher from 2012;
- 19% overall increase in the unit cost per kilowatt-hour of electricity since 2005.

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**Monthly Electricity Price**

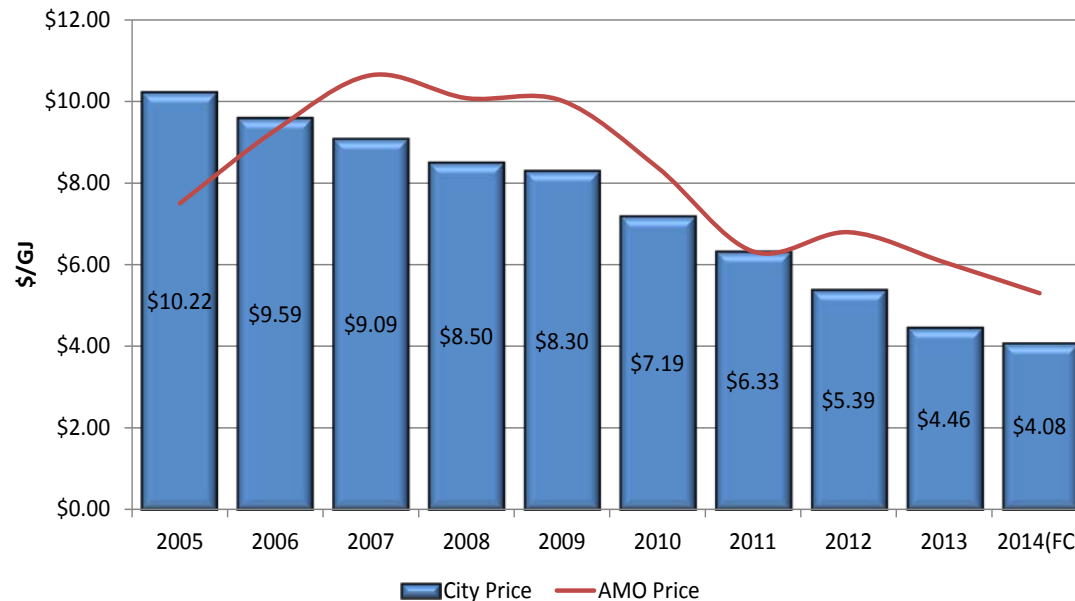


# Energy Procurement (continued)

## Natural Gas

- Direct purchase agreements with Union Gas and large wholesale suppliers;
- The pricing secured for 2013 reflected a reduction of 10% in the gas commodity price over that in 2012;
- Purchasing strategies help to mitigate price fluctuations;
- Weather is the largest driver for the natural gas usage of facilities within the City;
- Benchmark Natural Gas procurement program against the Association of Municipalities – Local Authority Services program.

City of Hamilton Annual Natural Gas Commodity Price



# Energy Procurement

## Fuel (diesel and gasoline)

- City purchases its fuel directly from two (2) large suppliers, discounted through wholesale contracts;
- 2013, the City purchased ~17 million litres;
- That was a 6% increase in consumption over 2012;
- The unit costs of fuel showed a modest overall increase of 2% in 2013 compared to 2012.

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# Green Energy Act

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- The GEA became legislation in 2009 to promote and develop green energy industries within the province;
- Provides a framework for all municipalities for reporting energy consumption and the associated emissions using 2011 data;
- Obligates municipalities to create and publish a plan for managing energy;
- 2013 was the first year reporting had to be submitted to the Ministry of Energy – ongoing annual reporting continues.

# 2013 Project Highlights

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- Energy efficient LED lighting for Fire Halls exterior lighting;
- Variable Speed Drives for Hamilton Place and Hamilton Convention Center Air handling systems;
- Central Composting Lighting;
- Central Library Lighting Controls;
- Solar Photo Voltaic (PV) at 330 Wentworth Street;
- LED Street Lighting - initial phase.



# Future Initiatives

- Chiller Optimization Program;
- Stoney Creek Town Hall BAS;
- Macassa Lodge Combined Heat & Power;
- Renewable Natural Gas credits;
- Additional LED Lighting:
  - Street lighting - additional phases;
  - Other LED applications.

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# Hamilton Renewable Power Inc.

- Revenue of \$1.7M in 2013;
- Annual emission reduction of over 100,000 tonnes CO<sub>2</sub>e;
- Since 2006, HRPI has generated \$10 million in incremental net benefit to the City.

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# Awards

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## Hamilton Water Biogas Purification Unit:

- “Renewable Energy Project of the Year” from the AEE.

(Association of Energy Engineers has 16,000 professionals in 89 countries).