2019 Annual Report on Commodity Price Hedging
The Office of Energy Initiatives

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Introduction

The City of Hamilton’s 2019 Annual Report on Commodity Price Hedging deals exclusively with the City’s energy commodity price hedging agreements and utility rate transactions for natural gas, electricity and fuel.

As defined in the Corporate Energy Policy, “Energy Commodities” means electricity, green power, natural gas, methane and all other petroleum based fuel products such as, diesel, bio-diesel, gasoline, fuel oil, propane and any other bulk commodity primarily used by the City for the purpose of heating and cooling of buildings and other structures, electricity generation, cogeneration demand response programs, smart grid programs and the fuelling of City fleets, as determined by the Manager of Energy Initiatives.

Utility Rates and Commodity Strategies Results

The utility rates and commodity strategies results include Global Adjustment (GA) rate changes and natural gas hedging programs. For the 2019 calendar year, there was a $8.02 M cost benefit; $7.25 M as a result of Class A and $0.77 M savings from hedging of natural gas.

Figure 1: 2019 Utility Rates and Commodity Strategies Results

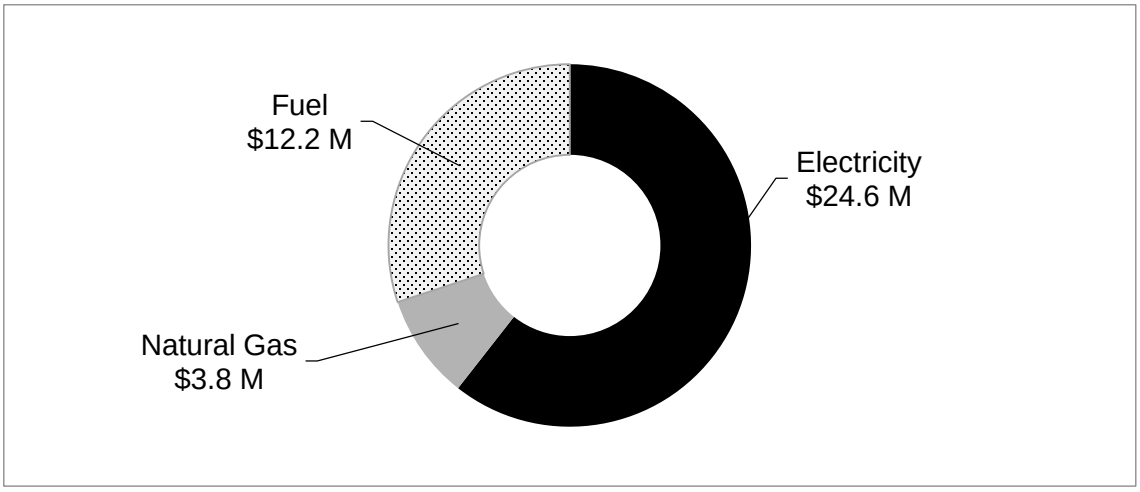
2019 Results	$M	% Levy	% Rate
Global Adjustment	$ 7.25	18%	82%
Natural Gas Hedging	$ 0.77	90%	10%
Total	$ 8.02	25%	75%

Further breakdown of these results can be found in the Global Adjustment and Natural Gas Risk Management sections in the report.

Overall Costs

In the City’s 2019 Annual Energy Report (refer to Report PW20024), the total actual energy costs for electricity, natural gas and fuels were reported at $40.6 M. Overall, this is a 2.8% decrease from 2018 energy costs. The breakdown is shown in Figure 2.

Figure 2: 2019 Total Energy Costs (Electricity, Natural Gas & Fuel) in Millions (M)



The electricity and natural gas costs, including those from district heating and cooling are incurred by City-owned buildings / facilities, Hamilton Water, Public Works Operations and Street and Traffic lighting. It excludes CityHousing Hamilton. Utilities include Alectra Utilities, Hydro One and Enbridge Gas Inc. Sites with only partial data may be excluded. Fuel includes diesel, unleaded gasoline and compressed natural gas (CNG) for all Fleet, Operations and Transit vehicles but does not include Hamilton Police Services or DARTS.

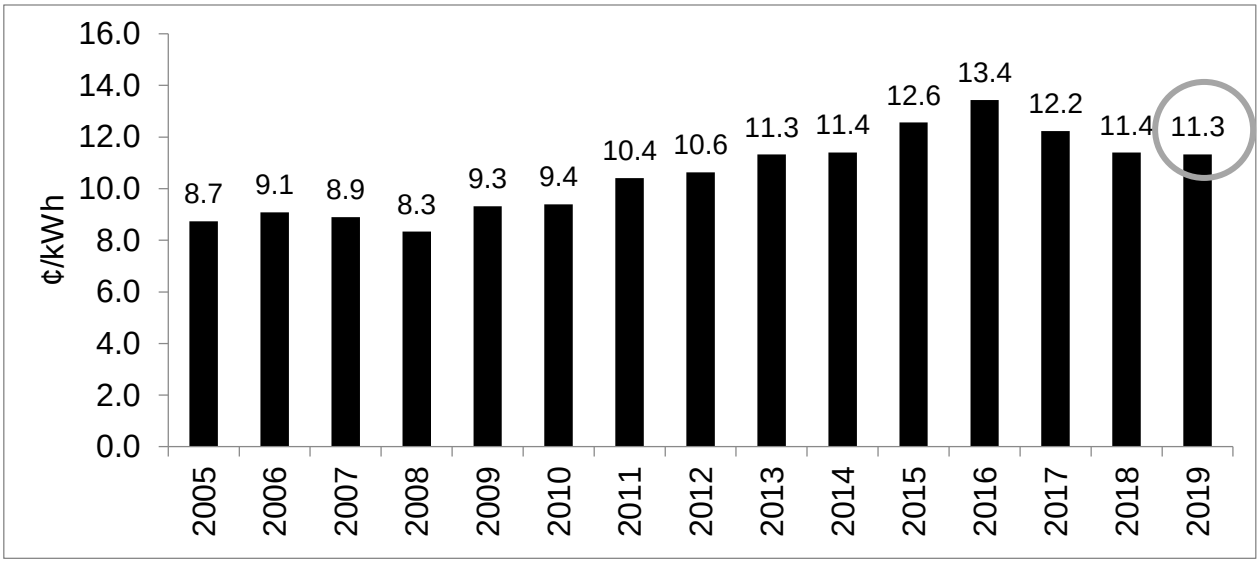
Electricity

The electricity price comprises commodity, as well as, costs for distribution, transmission, regulatory and delivery. Hamilton is served by two local distribution companies (Alectra Utilities and Hydro One). Both Alectra Utilities and Hydro One are regulated by the Ontario Energy Board (OEB) and must get approval for any rate changes.

In 2019, the City’s overall expenditure for electricity was $24.6 M. Overall, electricity costs in 2019 decreased by less than 1% compared to 2018. There was a slight increase of less than 1% in overall consumption when compared to 2018. The City’s overall average price of electricity per kilowatt-hour (kWh) decreased from 11.4 cents per kWh (¢/kWh) in 2018 to 11.3 ¢/kWh in 2019.

The average price for electricity, year over year, from 2005 to 2019 is outlined in Figure 3.

Figure 3: City of Hamilton Annual Average Electricity Price (¢/kWh)



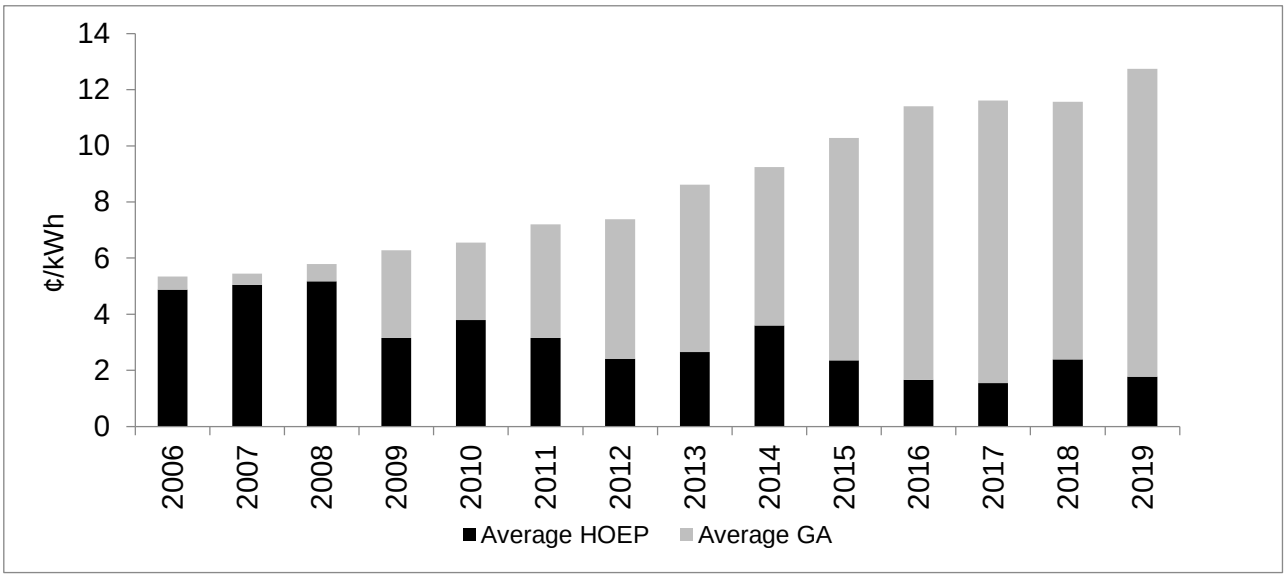
There are a variety of factors that impact electricity cost, some of which are consumption, process changes, regulatory changes, market activity and weather. In 2019, consumption remained flat when compared to 2018, despite an increase in corporate sites included (square footage). Weather has an impact as temperatures during the summer months of 2019 were less volatile than in previous years, reducing the overall cooling demand. The cooling degree days in Hamilton were 37% lower in 2019 versus 2018 and 19% lower than the five-year average.

Costs remained on par with those in 2018, with a decrease of less than 1%. One of the major reasons was the continuation of rate relief programs for residential and commercial customers, which saw no increases to the regulatory electricity rates. The commodity rate portion of electricity prices, detailed below, did increase in 2019, but the impact overall was lessened by consumption, conservation projects and peak day demand-reducing activities.

The electricity market in Ontario itself is complex and volatile. Ontario’s electricity commodity includes the Hourly Ontario Electricity Price (HOEP) and the Global Adjustment (GA). When the HOEP is low, the GA increases to cover the costs of generation. The monthly costs vary depending on consumer demand, the generation mix, weather conditions and how often each type of generation is offered into the market.

It is possible to fix the price on forward terms for the HOEP. However, doing so does little to protect against the greater fluctuations of the GA, which makes up the larger portion of commodity costs. Staff recommendations have been to not hedge against the HOEP due to unfavourable market conditions. While the HOEP has declined over recent years, this has been offset by significant increases to the price of the Global Adjustment, as illustrated in Figure 4.

Figure 4: Electricity - Annual Average Price of HOEP and Global Adjustment



The commodity portion of the electricity price includes HOEP and GA. The annual average HOEP in 2019 was 1.8 ¢/kWh which was a 26% decrease from 2018. The average GA price component in 2019 was 11.0 ¢/kWh. This represents a 19% increase over 2018. The overall combined commodity price for electricity (12.8 ¢/kWh) was a 10% increase over 2018.

Global Adjustment

The Global Adjustment (GA) is a market mechanism to account for differences between the market price and the rates paid to regulated and contracted generators and for conservation and demand management programs. Most of the GA costs arise from contracts that the Independent Electricity System Operator (IESO) has with generators, many of which are a fixed price or guaranteed revenue agreements. There is no market mechanism to hedge specifically against the GA rate.

When spot prices (HOEP) are lower, the generator does not earn enough revenue from power sales to meet its revenue guarantees. In that case, the IESO pays the generator to make up this difference and the costs are recovered from consumers through the GA. Therefore, in a month when the market price of electricity is low, the GA will be higher and conversely when market prices are high, the GA will be lower.

For billing of the GA costs, most commercial consumers are on a Class B rate. Class B consumers pay a regulated GA rate set monthly and posted by the IESO. Eligible, high electrical demand customers can opt for a Class A rate. Class A rate customers pay the GA costs based on their percentage contribution to the total monthly provincial GA costs, calculated on the top five peaks during a peak setting period. Class A customers can impact their GA costs by reducing demand during peak periods, resulting in lower costs. Class A sites within the City include 900 Woodward Avenue, 850 Greenhill Avenue, FirstOntario Centre, CUP Operations and Tim Hortons Field. The site at 78 Kenilworth Avenue North was added on July 1, 2019 and 1579 Burlington Street East was removed as of July 1, 2019. The results for 2019 was a cost benefit of $7.2 M as shown in Figure 5.

Figure 5: Annual Global Adjustment Class A Results 2011-2019

Year	Standard Global Adjustment Charge	Actual Global Adjustment Charge	Cost Benefit
2011	$ 2,703,065	$ 1,640,102	$ 1,062,963
2012	$ 3,852,903	$ 2,354,335	$ 1,498,568
2013	$ 5,720,669	$ 3,220,565	$ 2,500,104
2014	$ 5,574,562	$ 3,127,867	$ 2,446,695
2015	$ 7,931,504	$ 4,020,207	$ 3,911,297
2016	$ 9,132,962	$ 4,450,757	$ 4,682,206
2017	$ 10,218,507	$ 4,242,405	$ 5,976,103
2018	$ 10,417,523	$ 4,012,950	$ 6,404,572
2019	$ 11,613,062	$ 4,365,025	$ 7,248,037
TOTAL	$ 67,164,757	$ 31,434,212	$ 35,730,546

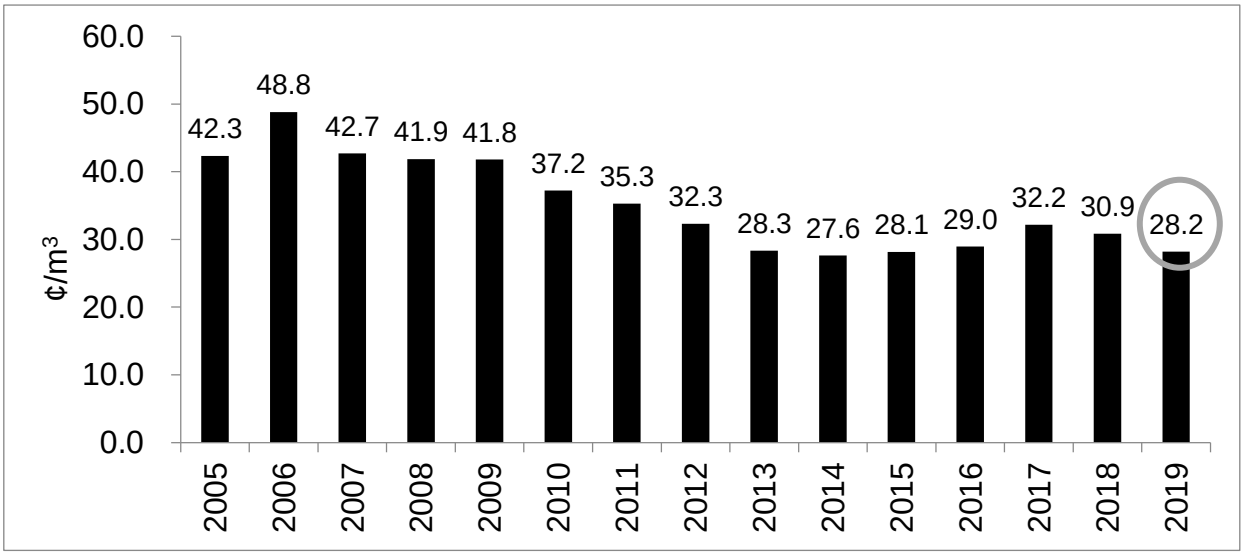
Note: Anomalies due to rounding

Natural Gas

The natural gas price includes commodity, transportation, regulatory and delivery. Hamilton is served by one local distribution company, Enbridge Gas Inc. (formerly Union Gas Ltd.).

The City’s overall expenditure for 2019 natural gas, including the commodity costs and utility charges for delivery, transportation and storage was $3.8 M. This is a slight decrease of 0.7% from 2018 costs. There was an increase of 5.4% in natural gas consumption compared to 2018 totals. The overall average unit price was 28.2 cents per cubic metre (¢/m^3), which was an 8.6% decrease compared to 2018’s price of 30.9 ¢/m^3. The average price for natural gas, year over year, from 2005 to 2019 is outlined in Figure 6.

Figure 6: City of Hamilton Annual Average Natural Gas Cost (¢/m^3)



The higher consumption in 2019 can be largely attributed to the weather and the increase in heating degree days, which were 1% higher in 2019 compared to 2018 and 4% higher than the 5-year average. Although the consumption increased, costs themselves remained relatively stable. Ongoing hedging activity, described below in the Natural Gas Risk Management section, helped to mitigate any market fluctuations due to the colder weather.

Another impact to costs was the repeal of Ontario's Cap and Trade program in October 2018 and the subsequent introduction of the federal carbon charge in August of 2019. The federal carbon tax program, mandatory for provinces without a designated carbon reduction plan, was approved for April 2019 and implemented in Ontario starting August 2019. The federal carbon tax is charged per cubic metre of consumption on Enbridge Gas bills. Despite the increase in consumption in 2019, there were no carbon-related charges included on the natural gas utility invoices from January to August 2019, which helped mitigate the costs of natural gas. However, the federal carbon tax is set to increase annually and will negatively impact natural gas regulatory costs going forward.

Natural Gas Risk Management

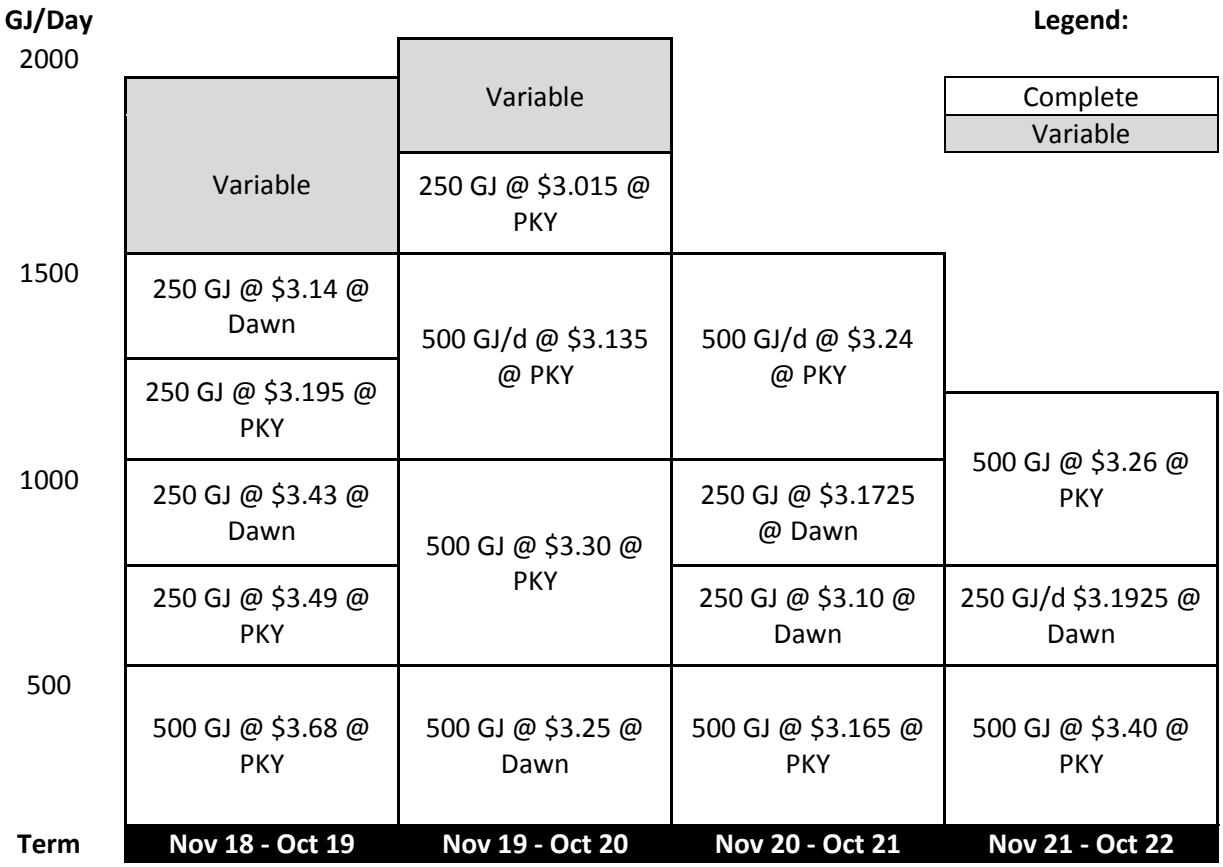
Natural gas can be a volatile commodity. There are many factors that can influence prices in natural gas markets including weather, supply, demand, geo-political events and changes to refining and extraction technologies. To maintain control of costs and minimize the degree of price volatility, the City has purchased its natural gas directly from the wholesale market (since June 2006). The City has supply agreements with multiple parties to allow for competitive purchasing.

Overall, the procurement strategy is dynamic as staff, in conjunction with industry experts and the retained consultancy firm, make purchasing decisions based on market conditions. A portion of natural gas supply may be purchased as much as two to three years in advance to protect against market volatility while other portions are purchased just a month or two in advance. Fixing the price on a portion of the City's natural gas volumes results in better budget predictability and protection against spot market fluctuations, particularly during extreme weather conditions or unforeseen market events.

The City purchases natural gas for City-owned facilities (excluding CityHousing Hamilton) and for compressed natural gas (CNG) for the Transit natural gas bus fleet. The average 2019 price for the natural gas commodity was only $3.31 per gigajoule (GJ) ($0.13/$m^3$) including a blend of hedged and unhedged volumes. This does not include any Enbridge Gas charges such as delivery or storage which make up the total price.

For the majority of 2019, an average of 80% of natural gas supply was fully hedged. This was based on 2019 volume requirements. At the end of 2019, volumes were hedged for the periods starting November 1, 2019, November 1, 2020 and November 1, 2021. Figure 7 provides a profile of the completed hedges. Staff monitors the market and continues to develop strategies for purchasing into the forward terms to further capture agreeable market opportunities.

Figure 7: Natural Gas Hedge Profile (as of December 2019)



Notes on Figure 7:

- GJ/Day = Gigajoule per day
- PKY = Parkway Ontario delivery point
- Dawn = Union Dawn Ontario delivery point

To evaluate the performance of the hedging program, the City benchmarks its natural gas hedging activities against the procurement program offered by the Association of Municipalities of Ontario / Local Authority Services (AMO / LAS). Although the City has enough volume to allow for wholesale purchase from market suppliers, smaller municipalities may not have the volume or expertise to manage their own programs and may benefit from the highly valued AMO / LAS purchasing program. The City and AMO / LAS program comparison is shown in Figure 8 with overall results shown in Figure 9.

Figure 8: Average Price Comparison of City to AMO/LAS Natural Gas Program

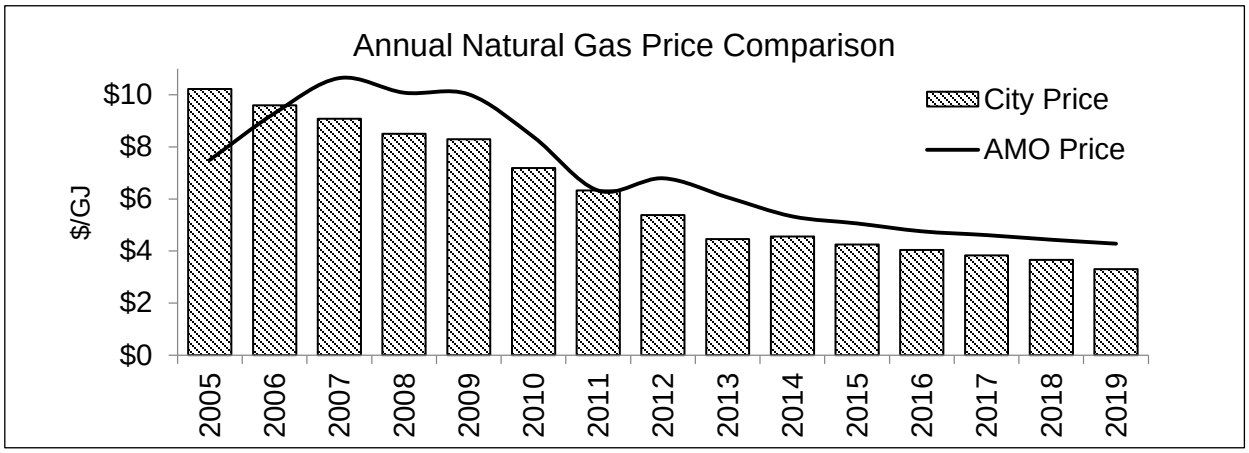


Figure 9: Performance of Natural Gas Hedging Activity Compared to AMO / LAS Program

Natural Gas Hedging Performance Results	2019 Results	Cumulative Results*
Levy (Tax) Supported Budget	$ 693,429	$ 7,184,883
Rate Supported Budget	$ 77,155	$ 1,208,251
Total Cost Benefits:	$ 770,584	$ 8,393,134

*Performance relative to AMO / LAS Natural Gas Hedging Program since 2007

Although hedging activities do serve to effectively manage the commodity portion of natural gas prices, controlling consumption plays a role in managing the overall costs of natural gas. Consumption reduction helps to mitigate the potential for increased costs of natural gas due to changes in utility or regulated rates (i.e. delivery, carbon programs), while further reducing the footprint of the City’s facilities by reducing carbon emissions.

Natural Gas Agreements for Supply, Transportation, Storage and Delivery

In 2019, the City had master agreements for natural gas supply in place with Shell Energy North America (Canada) Inc., EDF Trading North America, LLC, Tidal Energy Marketing Inc. and Royal Bank of Canada. All current supply counterparties have credit ratings that are compliant with the Corporate Energy Policy.

In addition, the City has contracts in place with Enbridge Gas that are required to facilitate the transportation, delivery and storage of the City’s natural gas supply. The utility agreements include a direct purchase agreement for City sites, a T1 rate storage contract for managing Transit CNG and M13 rate production contract for renewable natural gas.

Direct Purchase Agreements (DPA) with Enbridge Gas

DPAs outline the terms of service for delivery of natural gas, including designated delivery points, contract volumes and storage. The parameters are shown below in gigajoules (GJ) which is the unit in which gas is purchased to meet the requirements. Prices and consumption data on Enbridge Gas bills are reported in cubic metres (1 GJ = ~26 cubic metres). In 2019, the agreements and parameters on contract renewal were:

- SA7020 for 1,297 GJ/day – 250 miscellaneous City natural gas accounts which run from November 1 to October 31 each year.
- T1 for 598 GJ/day (increased from 439 GJ/day as of September 2018) - for Transit’s CNG bus fleet and transit site. The contract runs September 1 to August 31 each year.

Each DPA has its own specific delivery requirements, at different points along the variety of pipelines within North America and are reviewed and renewed annually. DPAs may also be amended throughout the year. For the T1 contract, additional volume (over the DCQ) is typically delivered to accommodate for increases in fleet size throughout the year.

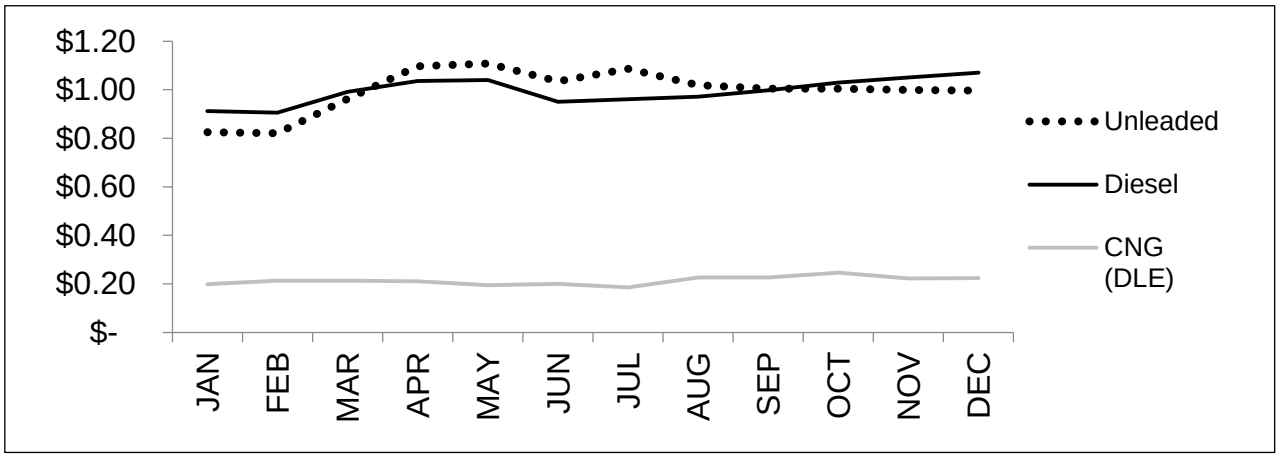
Compressed Natural Gas (CNG)

Natural gas is also purchased for Transit’s fleet of natural gas buses. The CNG station at the Mountain Transit Centre services the fleet of existing and growing number of natural gas buses for the City.

The CNG station operates under a natural gas storage contract (T1). The T1 contract is a daily-balanced contract with storage availability. The amount of storage volume is contracted annually and for the 2018 contract term (September 2018 to August 2019), the T1 was allotted 15,140 GJs of storage. The difference between the daily volumes purchased and consumed are injected or withdrawn from the storage account. The contract allows for greater flexibility in managing the supply but must be reviewed daily to adhere to specific storage parameters.

The Transit fleet of natural gas buses totalled around 140 by the end of 2019 and is expected to increase in the coming years. Natural Gas has a lower cost compared to diesel. However, it does operate at approximately 75% efficiency per diesel litre equivalent when compared to diesel bus usage. Despite its lower efficiency, its lower cost and lower GHG emissions is of benefit to the City. In 2019, the total cost of natural gas for the buses was $1.37 M. Figure 10 shows the City’s monthly fuel prices with CNG price converted to diesel equivalent (DLE).

Figure 10: 2019 Monthly Average Fuel Prices for Diesel, Unleaded Gasoline and CNG



*Prices include Fleet charge of 3.4 cents per litre for diesel and gasoline.

When converted to diesel equivalent dollars and adjusting for efficiency, Transit spent $3.29 M less in fuel costs using CNG buses than they would have using only diesel buses.

Figure 11: 2019 Cost Benefit of CNG as Compared to Diesel

CNG Diesel Litre Equivalent (DLE)		6,388,918
Number of DLE Litres of Diesel Required*		4,727,799
DSL cost at $0.99/L (Average Fuel Price)	$	4,661,610.18
2018 CNG Cost	$	1,366,873.62
Avoided fuel cost by using CNG	$	3,294,736.56

* Average of CNG buses run at ~75% of DLE compared to average DSL bus.

Traditional Fuel Supply

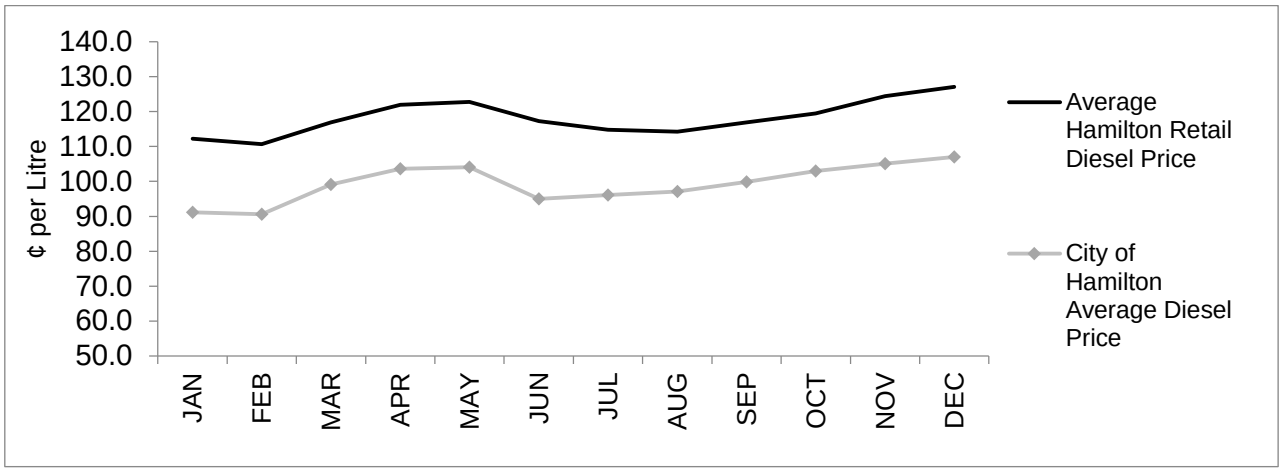
The City of Hamilton purchases diesel and gasoline fuel for its fleet of vehicles including buses, waste collection vehicles, snow removal trucks, street sweepers, forestry and parks vehicles, as well as, Fire and Emergency Services vehicles. In addition, the City purchases fuel for Hamilton Police Services.

In 2019, the City’s fuel procurement strategy involved utilizing a contractual bulk supply agreement with Suncor Energy Products Partnership. Fuel contracts are reviewed annually and based on pricing, deliverability and fuel types, the strategy can be adjusted accordingly.

The pricing arrangement for 2019 was based on the daily “rack” price of each required fuel type (diesel and gasoline) from a designated source terminal with negotiated discounts, delivery charges and taxes. Paying daily rack pricing for fuel assures customers are getting the lowest available price on the market for that day. Suncor Energy Products Partnership has a credit rating that is compliant with the Corporate Energy Policy.

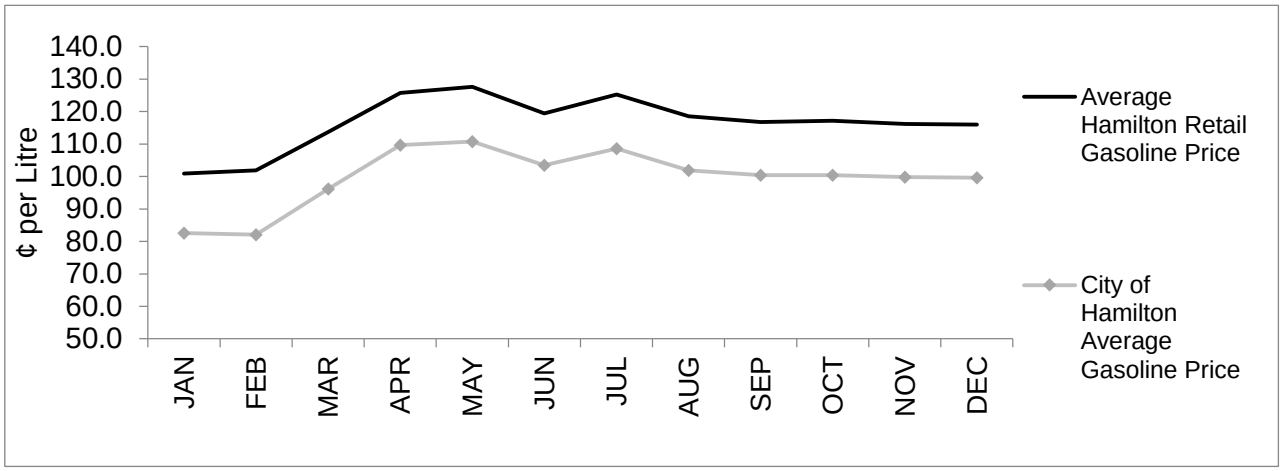
Wholesale purchase of diesel and gasoline offer lower prices than those at public fuel stations across the City. With data collected from reliable industry sources on average fuel pump prices in Hamilton, Figures 12 and 13 show the comparison between the average prices paid for diesel and gasoline purchased under City wholesale contracts versus the average retail prices paid at the pump (“Pump”) by the public at fuel stations throughout Hamilton.

Figure 12: 2019 Monthly Average Price of Diesel Paid by City versus at the Pump



*Average Canadian Diesel retail pump prices for Hamilton from data available by Kent Group Ltd read weekly.

Figure 13: 2019 Monthly Average Price of Gasoline Paid by City versus at the Pump



*Average Canadian gasoline retail pump prices for Hamilton from data available by Kent Group Ltd read weekly.

Fuel purchases for diesel and gasoline, as reported in the 2019 Annual Energy Report (refer to Report PW20024), excludes Hamilton Police Services. City departments used approximately 8.6 million litres of diesel, a 6% reduction from 2018. City departments used approximately 2.4 million litres of gasoline, a 5% increase over 2018. A large part of the continued decrease in diesel usage can be attributed to the increase in CNG usage for Transit buses.

The 2019 budget prices for diesel and gasoline were set at $1.06 per litre and $1.08 per litre, respectively. For 2019, the average diesel and gasoline unit prices were under budget, with overall costs at 7% below budget. Figure 14 shows the 2018 results as compared to budget.

Figure 14: 2019 Actual Fuel Consumption and Costs Compared to Budget

Fuel Type	2019 Budget	2019 Actual	2019 Variance (Actual - Budget)
Diesel Consumption (L)	8,741,311	8,595,617	- 145,695
Diesel Cost ($)	$ 9,265,790	$ 8,478,640	-$ 787,150
Diesel Unit Price ($)	$ 1.06	$ 0.99	-$ 0.07
Gasoline Consumption (L)	2,160,630	2,364,574	203,944
Gasoline Cost ($)	$ 2,333,480	$ 2,357,059	$ 23,579
Gasoline Unit Price ($)	$ 1.08	$ 1.00	-$ 0.08
Total Consumption (L)	10,901,942	10,960,191	58,249
Total Costs ($)	$ 11,599,270	$ 10,835,699	-$ 763,571

Note: Anomalies due to rounding

Purchasing wholesale fuel does help insulate the City from some of the costs associated with pump prices, largely the marketing fees. However, City prices do include Fleet’s fee of 3.4 cents per litre.

Fuel Risk Management

Like other commodities, diesel and gasoline markets are volatile and are impacted by many localized and global geopolitical factors. One method to manage volatility is to hedge volumes for a forward term at a set price. This is typically achieved by utilizing a financial hedge to manage fluctuations in the market. Although the City has hedged in the past and staff continues to monitor related markets for favorable opportunities, no volumes were hedged in 2019 or are currently hedged.

Operating Budget Variances - Commodity Stabilization Reserve (closed in 2019)

Considering the volatility of fuel costs, a Commodity Stabilization Reserve (110043) was established in 2011 by Council as a reserve to allow for energy related commodity budget over runs. During a review of reserves in 2019, the Commodity Stabilization Reserve (110043) was closed with the balance transferred to the Tax Stabilization Reserve (110046). Similar to other operating budget variances, surpluses and deficits in energy related commodity costs form part of the year end tax and rate operating budget variances and policies govern the disposition of all surpluses and deficits.

Contract Agents

Managing the annual energy cost of over $40 M requires continuous attention within an ever-changing energy industry. To maximize available expertise, the City uses outside consultants (Contract Agents) to assist staff in negotiating the unstable and complex energy commodity markets and associated regulatory frameworks. The use of these Contract Agents has proven valuable in that they are immersed daily in the energy commodity markets and have specialized expertise with respect to monitoring and responding to market changes. In 2019, the City had a professional services agreement with Agent Energy Advisors to assist with the day-to-day management of the City’s natural gas portfolio. Additionally, the City reviews several market-based publications and engages with outside parties to further gather information on factors influencing pricing both domestically and globally.

Consistency with City Energy Commodity Hedging Policy and Goals

The agreements executed during the reporting period are consistent with the City’s Commodity Price Hedging Policy and Goals:

- The agreements have provided for a price of natural gas that was more stable and therefore, less risky than it would have been omitting the agreements;
- The actions taken through the authority of the Energy Commodity Policy have reduced uncertainty about energy costs, which have a direct impact on the City’s financial position. It has also enabled staff to respond to favourable market conditions;
- Credit ratings for the City’s primary commodity suppliers remain above the minimum threshold outlined in the policy;
- Commodity hedging provides municipalities with added flexibility to potentially mitigate or manage potential price fluctuations.