TO: Chair and Members 
Audit and Administration Committee  
WARD(S) AFFECTED: CITY WIDE

COMMITTEE DATE: May 19, 2010

SUBJECT/REPORT NO: 
Audit Report 2009-12 – Public Works - Office of Energy Initiatives - Verification of Reported Savings (AUD10016) (City Wide)

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RECOMMENDATION


EXECUTIVE SUMMARY

As part of the 2009 Internal Audit Work Plan, the accuracy of the saved amounts reported for 2006-2008 to Council by the Office of Energy Initiatives was reviewed, including the reasonableness of the assumptions and principles used. Activity through the Energy Conservation Initiative Reserve was also examined.

The results of the review are presented in the report attached as Appendix “A” of Report AUD10016. Major conclusions drawn from the review by Internal Audit are: an overstatement of savings by approximately $206,000 or 2% of the reported savings of $10,510,933; all transactions through the Energy Conservation Initiative Reserve in accordance with the directions of Council; and a decline in the City’s energy use by more than 3% by the end of 2008, exceeding the consumption reduction targets for the period.

Alternatives for Consideration – Not Applicable
FINANCIAL / STAFFING / LEGAL IMPLICATIONS (for Recommendation(s) only)

Financial: None.
Staffing: None.
Legal: None.

HISTORICAL BACKGROUND (Chronology of events)

In November, 2007, Council directed that the performance and actions of the Office of Energy Initiatives as reported in its annual reports be verified as part of the 2009 Internal Audit Work Plan. This review was included in the work plan as approved by Council on January 28, 2009.

The work was carried out throughout late 2009 and early 2010.

POLICY IMPLICATIONS

Corporate Energy Policy

RELEVANT CONSULTATION

Management and staff of the Office of Energy Initiatives (Transportation, Energy and Facilities division of the Public Works Department)

ANALYSIS / RATIONALE FOR RECOMMENDATION

(include Performance Measurement/Benchmarking Data, if applicable)

In a report (PW09069) to Council, the Office of Energy Initiatives (OEI) reported that between May 2006 and December 2008, total energy and cost savings amounted to $10,038,000. This figure was based on information obtained from the Utility Manager Software database in March/early April 2009. However, by the time Internal Audit began its review, the database had undergone several updates which affected the balance showing as at December 31, 2008. Savings of $10,510,933 were indicated, an increase of over $470,000. Due to the numerous accounts affected and without an easily retrievable record of all the changes made, Internal Audit focused on the verification of the higher value for the sake of expediency and efficiency.

The savings identified in the report are made up of two major categories: cash savings and avoided costs.
Cash Savings
Within the Cash Savings category, there are two sub-categories: cash incentives received ($485,842 verified), representing grants and rebates and billing errors recovered ($2,410,437 verified) that identify overpayments recovered from billing errors. A $25,000 overstatement of the total cash savings resulted for funds claimed in error.

Avoided Costs
On the other hand, avoided costs represent an estimate of energy costs that would otherwise have been incurred if energy initiatives had not been taken. They do not necessarily translate into an inflow of cash to the City or a corresponding decrease in total operating budget amounts. Due to the various processes of evaluation and the various assumptions that can be considered, there is usually a lot of variation in avoided cost methodology. However, Internal Audit reviewed and assessed the rationale and assumptions used to calculate these avoided costs and found them appropriate, reasonable and adequately supported with documentation.

Within the avoided cost category, three sub-categories were addressed. These include:

- **Natural Gas Hedging** – Hedging agreements for the purchase of natural gas to mitigate the City’s exposure to price fluctuations resulted in a recalculation avoided cost amount of $1,990,229. Errors discovered in the prices used in the complex formula by OEI staff produced an understatement of this sub-category’s avoided costs by $181,000.

- **Conservation and Demand Management (CDM) Initiatives** – Monetary equivalents of energy savings directly related to initiatives (e.g. retrofits, low flow toilets and showerheads) undertaken by City departments to conserve energy are calculated under this sub-category. Internal Audit recalculated avoided costs through CDM initiatives in 2006-2008 amounting to $1,222,822 (minor understatement of $12,800 in amount originally reported by OEI).

- **Rate Structure Management** – OEI established an energy contract with an independent provider for the City’s street lighting as well as an agreement regarding treatment of electricity usage for individual units in City-owned buildings, resulting in Internal Audit’s recalculated amount of avoided costs of $4,195,553. This resulted in an overstatement of $374,698 of the amount originally reported.

In addition to the verification of the savings reported to Council by the OEI, activity in the Energy Conservation Initiative Reserve was reviewed. According to Council’s directive, funds received as incentives and rebates as well as over-billing recoveries were recorded as revenue but avoided costs did not flow through the reserve. Expenditures funded by the reserve included OEI’s operating costs, costs related to energy conservation projects and energy budget shortfalls in departments.

The Corporate Energy Policy set a 3% below 2005 levels by 2009 target for the reduction of consumption of electricity, natural gas, water and wastewater. Internal Audit reviewed documentation to support an overall 3.3% usage reduction over 2005 levels reported at the end of 2008, a year ahead of schedule.
Vision: To be the best place in Canada to raise a child, promote innovation, engage citizens and provide diverse economic opportunities.

Values: Honesty, Accountability, Innovation, Leadership, Respect, Excellence, Teamwork

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**ALTERNATIVES FOR CONSIDERATION**

(include Financial, Staffing, Legal and Policy Implications and pros and cons for each alternative)

Not applicable.

**CORPORATE STRATEGIC PLAN** (Linkage to Desired End Results)


**Financial Sustainability**

- Delivery of municipal services and management of capital assets/liabilities in a sustainable, innovative and cost effective manner

**Environmental Stewardship**

- Reduce the impact of City activities on the environment

**APPENDICES / SCHEDULES**

Appendix “A” to Report AUD10016.

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BACKGROUND
The Office of Energy Initiatives (OEI) was created in 2006 and is charged with guiding the implementation of the Corporate Energy Policy (CEP) and the Energy Commodity Policy (ECP) to reduce energy consumption and expense. The office provides ongoing monitoring, verification of energy usage and reporting of energy usage reductions and key performance indicators to ensure that the City meets its consumption reduction targets.

The OEI identifies energy and cost savings under five categories: Natural Gas Hedging, Conservation and Demand Management (CDM) Initiatives, Rate Structure Management Initiatives, Cash Incentives and Identified Billing Errors.

In an Information Report (PW09069) to Council in July 2009, the OEI reported that between May 2006 and December 2008, total energy and costs savings amounted to $10,038,000 based on information obtained from the Utility Manager software database in March/early April, 2009. By the time Internal Audit began its review in August, 2009, the database had undergone several updates for such occurrences as back billings on long estimates and performed reconciliations resulting in necessary adjustments. The data now indicated savings to December 31, 2008 of $10,510,933 but without an adequate, easily retrievable record of all the changes made. According to staff, it would have taken a review of thousands of accounts to itemize the differences, totalling $472,962. Therefore, Internal Audit focused on the verification of the higher value, e.g. $10,510,933.

The savings are made up of ‘cash savings’ (cash incentives and identified Billing Errors categories) and ‘avoided costs’ (Natural Gas Hedging, Conservation and Demand Management (CDM) Initiatives and Rate Structure Management Initiatives categories). Each of these savings and categories are discussed in detail in the identified sections below. Any inconsistencies and errors are noted within the appropriate section.

REVIEW OBJECTIVES AND APPROACH
In November 2007, Council directed that the performance and actions of the Office of Energy Initiatives as reported in its annual reports to Council be verified as part of the 2009 Internal Audit Work Plan. Therefore, the accuracy of the amounts reported in 2006-2008 was reviewed by evaluating the integrity of the processes used to calculate the cost savings and energy usage reductions. The reasonableness of the principles and assumptions used in the calculations was also assessed.

The review also examined the activity through the Energy Conservation Initiative Reserve to ensure that the funds were being deposited and expended in accordance with the provisions of the Corporate Energy Policy.

Key performance indicators, as reported, were reviewed in order to evaluate the effectiveness of the OEI’s conservation programs in meeting the City’s energy consumption reduction targets.
AUDIT FINDINGS

A. Cash Savings
Cash savings are direct cash inflows arising from cash incentives such as energy efficiency rebates and grants offered by utility companies and senior levels of government as well as cash refunds arising from identified over-billings by utility companies. The OEI has reported that the City received $2,921,379 in cash savings.

1. Cash Incentives Received
The OEI applies for and receives cash incentives, grants and rebates offered by utility companies, equipment vendors and senior levels of government for its energy conservation projects. Since 2006, the City has received nineteen (19) such payments of which Internal Audit was able to verify a total of $485,842 against receipts and other underlying records to ensure that the funds had been accounted for. A $25,000 cheque had been claimed in error resulting in the OEI’s reported savings of $511,000 being overstated by this amount.

2. Billing Errors Recovered
Staff from the OEI review and verify the accuracy of invoices received from utility companies in order to identify and recover overpayments arising from billing errors. For the 2006-2008 period reviewed, fourteen (14) recoveries amounting to $2,410,437 were made in respect of identified billing errors. Internal Audit verified the receipt of the recoveries as either a credit to a subsequent utility billing or the receipt of a cheque.

B. Avoided Costs
Avoided costs, on the other hand, are an estimate of energy costs that would otherwise have been incurred if energy saving initiatives had not been undertaken. They do not necessarily translate into an inflow of cash to the City. They also are not always indicative of a reduction in overall payments made to utility companies for energy related costs such as electricity, natural gas or water and waste water as there are other counteractive factors such as rate increases or growth-driven increases in facilities usage. For such reasons, there may not be a corresponding decrease in total operating budget amounts. The avoided costs are a computed monetary measure of the effectiveness of initiatives such as hedging, conservation and demand initiatives and rate structure management programs. The OEI calculated that between 2006 and 2008, the value of avoided costs amounted to $7,589,555.

1. Natural Gas Hedging
The Energy Commodity Policy requires the OEI to enter into hedging agreements for the purchase of commodities such as electricity and natural gas so as to mitigate the City’s exposure to market-driven price fluctuations inherent with such commodities. Presently, the OEI has negotiated hedging agreements only for the purchase of natural gas.

Using a complex formula and factoring in the monthly natural gas consumption and the difference between the hedge price and the price the City would have paid (under AMO bulk purchasing/Transit’s sole source vendor), the resulting amount is a measure of the cost that the City managed to avoid by hedging or forward purchasing its natural gas (i.e. the price efficiency of hedging).
The basis used to calculate the avoided cost is considered reasonable. Internal Audit verified prices and natural gas consumption volumes used in the calculation against contracts, publications and consumption reports. Errors were discovered in the prices used in the formula resulting in an understatement of the avoided costs of approximately $181,000. Avoided costs to December 2008 should be adjusted to $1,990,229.

2. **Conservation and Demand Management (CDM) Initiatives**
   In implementing the Corporate Energy Policy, the OEI monitors and measures the monetary equivalent of energy savings directly related to initiatives undertaken by City departments to conserve energy. Such initiatives are referred to as Conservation and Demand Management (CDM) initiatives and they include the installation of energy-saving low flow toilets, showerheads and electricity retrofits (i.e. lights, chillers) at various City-owned buildings.

   In the majority of cases, the savings are calculated using an estimate of the energy reduction which is provided by the manufacturer or contractor of the item replaced. The estimate assumes that the reduction in energy usage provided by the manufacturer would be sustained over time. For some retrofit projects, only the savings guaranteed by the manufacturer are claimed.

   The calculated avoided cost may not be as accurate as the actual benefit derived by the City. As it is not always practical to have an exact measure of the energy saving generated by each individual unit, the methodology used by the OEI remains the most objective and transparent way of measuring the energy reduction efforts.

   Several input errors in the calculation formula as noted by Internal Audit’s review resulted in a minor understatement of approximately $12,800, resulting in overall avoided costs through CDM initiatives in 2006-2008 amounting to $1,222,822.

3. **Rate Structure Management**
   Rather than enter into hedging agreements for electricity, the OEI established an energy contract (referred to as a Rate Structure Management contract) with an independent provider for the City’s street lighting. Through work with Horizon, the City’s larger interval metered accounts were switched from the rigid Ontario Energy Board’s Regulated Price Plan (RPP) rate to demand-driven hourly spot market rates known as the Hourly Ontario Energy Price (HOEP). Rate structure management has enabled the City to benefit from lower rates obtained during off-peak periods.

   In addition, under an agreement with Horizon Utilities, the change in treatment of electricity usage for individual units in City-owned, multi-residential buildings has resulted in lower overall billings.

   The total avoided costs in this regard are calculated based on the costs/prices that would have been paid had the OEI not taken the actions noted above.

   Based on Internal Audit’s verification of rates and consumption, the basis used to calculate the avoided costs is considered reasonable.
In addition to a minor rebate rate error made in the calculation (resulting in a $2,370 overstatement), it is the opinion of Internal Audit that $372,328 of the avoided costs total does not constitute a savings and its inclusion in the OEI figure attributable to Rate Structure changes overstates the savings reported.

The $372,328 arises from the discovery of a faulty natural gas meter which over-stated gas consumption, resulting in over-billings up to May 2007. The City successfully recovered many years of over-billings (amount is already included in the reported Billing Errors amount) and the meter was replaced. However, the OEI continues to claim the consumption over-statement as an avoided cost indicating that, had the over-billing not been discovered, the defective meter would have continued to register inflated consumptions to perpetuity.

Internal Audit has adjusted the avoided costs calculations for the above-noted items, lowering the amount to $4,195,553.

![Figure 1 - Cash Savings/Avoided Costs](image1)

* Amounts indicate the $ values originally reported by the OEI to December 31, 2008.
** Amounts indicate the $ values as provided to Internal Audit (August, 2009) to December 31, 2008.

![Figure 2 - Cost Savings By Category (2006-2008)](image2)

(Post adjustments resulting from Internal Audit review)
C. **Energy Conservation Initiative Reserve**

Internal Audit reviewed the activity in the Energy Conservation Initiative Reserve for 2006-2008. Funds received from utility companies and senior levels of government such as incentives, rebates and grants as well as over-billing recoveries in the form of actual funds received (not credits on subsequent billings) were recorded as revenues in the reserve. The avoided costs as calculated do not flow through the reserve. Expenditures recorded in the reserve included the OEI’s operating costs, costs related to energy conservation initiatives and the funding of energy related budget shortfalls in various departments. As such, the Energy Conservation Initiative Reserve is being used according to Council’s direction.

The balances in this reserve were:

- As at December 31, 2007: $1,815,183
- As at December 31, 2008: $1,747,896

D. **Key Performance Indicators and Targeted Energy Consumption**

The Corporate Energy Policy set 2005 as a baseline year against which future energy consumption levels would be measured. The policy requires the OEI to monitor the consumption of electricity, natural gas, water and wastewater by City departments to ensure that energy consumption is reduced to below 2005 levels. The policy set specific energy reduction targets of 3% below 2005 levels by 2009, 7.5% by 2012 and 20% by 2020.

Internal Audit reviewed various documentation (e.g. utility bills, reports from Utility Manager software database) to support the overall 3.3% usage reduction over 2005 levels reported at the end of 2008, therefore meeting the 2009 target a year earlier. A detailed 3-year energy consumption trend analysis by various departments was also examined and verified.

**Conclusion**

Based on the review performed, it is concluded that:

1. The rationale, principles and assumptions used to calculate and report costs savings, avoided costs and energy usage are appropriate and the various components are adequately supported. Taking into account the effects of various input errors and the inclusion of a “nominal” avoided cost, the savings as provided to Internal Audit by the OEI of $10,510,933 at the end of December 2008 are overstated by $205,951 or approximately 2%.

2. Funds received as cash incentives and rebates and cash refunds for over-billings are credited to the Energy Conservation Initiative Reserve. Expenditures charged against the reserve include the OEI’s operating costs, expenses related to energy conservation initiatives and the funding of energy related budget shortfalls in various departments. All these transactions are in accordance to the directions approved by Council.

3. The reported reductions in energy consumption are based on verifiable consumption information. Compared to 2005, the City’s energy use has declined by more than 3% by the end of 2008. As such, the City has exceeded the consumption reduction targets for 2008.