# London Hydro Inc.

## 2013 Cost of Service Rate Application (EB-2012-0146/ EB- 2012-0380) Response to Supplementary Interrogatories

## Administrative Documents (Exhibit 1)

### School Energy Coalition Supplementary Interrogatories

*SEC 43*

*[1.0 SEC-1]*

*Please confirm from the Applicant's records that that the following customers have the following numbers of schools served by the Applicant:*

*a. Thames Valley District School Board – 198*
*b. London Catholic District School Board – 35*
*c. Cs public ddd Centre-sud-Ouest – 2*
*d. Csdde catholiques du Sud-Ouest - 7*

*If it is not possible to get this information, please explain the limitations in the Applicant's systems that prevent the Applicant from accessing this information easily. If it is possible to get this information, please also provide a breakdown of the rate classes of those schools between GS<50 and GS>50.*

RESPONSE SEC IR # 43

London Hydro cannot confirm that the number of schools serviced in its territory with the totals as provided by SEC. London Hydro has tried to match these totals through the use of many assumptions of its CIS data base information on schools, still resulting in no agreement with SEC figures.

Some of our calculations come fairly close to SEC figures if London Hydro assumes SEC numbers include connections of school portables which a School or School Board has requested to be a separate account. The other challenge is if SEC is including in its numbers the many private schools that are situated in the London area.

To assist in responding to this question, London Hydro has provided the following listing of schools in its service area, also providing customer class information:

| AcCl. | School | Sum of AD |
|---|---|---|
| ERES | SCHOOL MONTESSORI | 1 |
| **ERES Total** | | **1** |
| G<50 | A.E. DUFFIELD P.S. | 1 |
| | ABERDEEN PS | 1 |
| | ARTHUR FORD PS | 1 |
| | BISHOP TOWNSHEND P.S. | 1 |
| | BLESSED SACRAMENT | 1 |
| | BYRON SOUTHWOOD P.S. P87013 | 1 |
| | C.C. CARROTHERS P.S. | 1 |
| | COVENANT CHRISTIAN SCHOOL | 1 |
| | EALING P.S. | 1 |
| | EVELYN HARRISON P.S. | 1 |
| | FAIRMONT P.S. | 1 |
| | FOREST CITY MONTESSORI SCHOOL INC | 1 |
| | HILLCREST P.S.-LONDON | 1 |
| | HOLY CROSS SCHOOL | 1 |
| | HURON HEIGHTS FRENCH IMMERSION P.S | 1 |
| | HURON HEIGHTS P.S. | 1 |
| | Jack Chambers Children's Centre | 1 |
| | JEANNE SAUVE PS | 1 |
| | JOHN DEARNESS P.S. | 1 |
| | KNOLLWOOD PARK P.S. | 1 |
| | LDN&MIDDLESEX CTY RCSSB MTCE | 1 |
| | LONDON WALDORF SCHOOL | 1 |
| | LORD ROBERTS P.S. | 1 |
| | M.B. MCEACHREN PS | 1 |
| | MANOR & HIGHLAND PARK PS | 1 |
| | MONTESSORI ACADEMY OF LONDON | 5 |
| | NOTRE DAME SCHOOL | 1 |
| | ORCHARD PARK PS | 1 |
| | POND MILLS ENVIRONMENTAL CENTRE | 1 |
| | PRINCESS ANNE PS | 1 |
| | RYERSON P.S. | 1 |
| | SHERWOOD FOREST P.S. | 1 |
| | SIR ISSAC BROCK PS | 1 |
| | SIR WINSTON CHURCHILL P.S. | 1 |
| | ST ANNES SCHOOL | 1 |
| | ST BERNADETTE SCH | 1 |
| | ST GEORGES SCHOOL | 1 |
| | ST MARYS SCHOOL | 1 |
| | ST ROBERTS SCHOOL | 1 |
| | ST SEBASTIAN SCHL | 1 |
| | ST THOMAS MORE SCH | 1 |
| | TECUMSEH PS | 1 |
| | TRAFALGAR P.S. | 1 |
| | TWEEDSMUIR P.S. | 1 |
| | VICTORIA P.S. LONDON | 1 |
| | WESTDALE P.S. | 1 |
| | WESTMINSTER CENTRAL P.S. | 1 |
| | WORTLEY RD PS | 1 |
| **G<50 Total** | | **52** |

| | | |
|---|---|---|
| G>50 | ARTHUR STRINGER P.S. | 1 |
| | ASHLEY OAKS P.S. | 1 |
| | BANTING ANNEX | 1 |
| | BLESSED KATERI | 1 |
| | BONAVENTURE MEADOWS P.S. | 1 |
| | BYRON NORTHVIEW PS | 1 |
| | BYRON SOMERSET PS | 1 |
| | BYRON SOUTHWOOD PS | 1 |
| | Catholic Education Centre | 1 |
| | CENTRAL SECONDARY SCHOOL | 1 |
| | CHIPPEWA P.S. | 1 |
| | CLARA BRENTON P.S. | 1 |
| | Clarke Road S.S. | 1 |
| | CLEARDALE P.S. | 1 |
| | EAGLE HEIGHTS | 1 |
| | EMILY CARR P.S. | 1 |
| | F.D.ROOSEVELT P.S. | 1 |
| | G.A. WHEABLE -CONTINUING EDUCATION | 1 |
| | GLEN CAIRN P.S. | 1 |
| | H.B. BEAL S.S. | 1 |
| | HOLY FAMILY SCHOOL | 1 |
| | HOLY ROSARY SCHOOL | 1 |
| | JACK CHAMBERS P.S. | 1 |
| | JEAN VANIER | 1 |
| | JOHN P. ROBARTS P.S. | 1 |
| | JOHN PAUL II | 1 |
| | KENSAL PARK PS | 1 |
| | LESTER B. PEARSON SCHOOL FOR THE AR | 1 |
| | LONDON PARENTAL CHRISTIAN SCHOOL | 1 |
| | LORD ELGIN P.S. | 1 |
| | LORD NELSON P.S. | 1 |
| | LORNE AVENUE P.S. | 1 |
| | MASONVILLE P.S. | 1 |
| | MONTCALM S.S. | 1 |
| | Mother Teresa Catholic Secondary School | 1 |
| | MOUNTSFIELD PS | 1 |
| | NANCY CAMPBELL COLLEGIATE | 1 |
| | NICHOLAS WILSON P.S. | 1 |
| | NORTHBRAE P.S. | 1 |
| | NORTHRIDGE P.S. | 1 |
| | OAKRIDGE S.S. | 1 |
| | PRINCE CHARLES P.S. | 1 |
| | PRINCESS ELIZABETH'S P.S. LONDON | 1 |
| | REGINA MUNDI | 1 |
| | RICK HANSEN P.S. | 1 |
| | RIVERSIDE P.S. | 1 |
| | SAUNDERS S.S. | 1 |
| | SIR ARTHUR CARTY | 1 |
| | SIR FREDERICK BANTING SS | 1 |
| | SIR GEORGE ROSS S.S. | 1 |
| | SIR GEROGE E CARTIER PS | 1 |
| | SIR JOHN A. MACDONALD P.S. | 1 |
| | SIR WILFRID LAURIER | 1 |
| | SOUTH SS | 1 |
| | ST ANTHONY SCHOOL | 1 |
| | ST CATHERINE OF SIENA | 1 |
| | ST FRANCIS SCHOOL | 1 |
| | ST GEORGE'S P.S. | 1 |
| | ST JOHNS SCHOOL | 1 |
| | ST JUDES SEPARATE | 1 |
| | ST MARGUERITE D'YOUVILLE | 1 |
| | ST MARKS SEP SCHL | 1 |
| | ST MARTINS SCHOOL | 1 |
| | ST MICHAEL SCHOOL | 1 |
| | ST PATRICK SCHOOL | 1 |
| | ST PAULS SEP SCHOOL | 1 |
| | ST THERESA SCHOOL | 1 |
| | ST THOMAS AQUINAS SECONDARY | 1 |
| | ST. PIUS X SCHOOL | 1 |
| | STONEYBROOK P.S. | 1 |
| | THAMES S.S. | 1 |
| | TVDSB EDUCATION CENTRE | 1 |
| | UNIVERSITY HEIGHTS P.S. | 1 |
| | W. SHERWOOD FOX PS | 1 |
| | WESTMINISTER SS | 1 |
| | WESTMOUNT P.S. | 1 |
| | WHITE OAKS P.S. | 1 |
| | WILFRID JURY P.S. | 1 |
| | WILTON GROVE P.S. | 1 |
| | WOODLAND HEIGHTS PS | 1 |
| **G>50 Total** | | **80** |
| **Grand Total** | | **133** |

Therefore, London Hydro records reflect a total number of schools in its service area of 133 (includes schools under customer class of GS < 50 kW amounting to 52, GS > 50 kW amounting to 80, and one Montessori school classed as a Residential customer). Certain private schools and university and colleges are not included in these figures.

*SEC 44*

*[1.0 SEC-6]*

*Please confirm that the reduction in revenue requirement from CGAAP to MIFRS in the Test Year is $6,061,377. Please confirm that, but for that reduction, the weighted average rate increase would be 21.02%.*

RESPONSE SEC IR # 44

London Hydro can confirm that the difference in base revenue requirement from transition to MIFRS from CGAAP amounts to $6,061,377 (MIFRS $65,770,373 less CGAAP $71,831,750).

SEC has taken the approach to calculate a weighted average rate increase of 21.02% based on the following:

| | | |
|---|---|---|
| Test Year CGAAP Base Revenue | | $ 71,831,750 |
| Less: | | |
| London Hydro's Revenue Deficiency | 6,415,350 | |
| Difference in Base Revenue (CGAAP less MIFRS) | 6,061,377 | 12,476,727 |
| Total | | $ 59,355,023 |

Taking the total $12,476,727 (which is the total of London Hydro's Revenue Deficiency and Difference in Base Revenue -CGAAP less MIFRS) and then dividing by the above total of $59,355,022, SEC arrives at a percentage of 21.02%. This percentage would suggest the figures reflected above result in an increase of 21.02%.

London Hydro would suggest that the appropriate approach to determining the average rate increase would be to take the last approved 2009 Board Approved Base Revenue Requirement amount of $58,087,982 and subtract the 2013 Test Year Base Revenue Requirement (CGAAP) figure of $71,831,750. The calculated total would be $13,743,768. Taking this total and dividing by the base number (2009 Board Approved Base Revenue Requirement amount of $58,087,982) and dividing the resulting amount by 4 years, the appropriate average rate increase would be 5.9%.

London Hydro's intent in providing this alternate calculation is to hopefully better assist SEC in its review of London Hydro's Application. However, London Hydro cautions that the many factors that affect the results for determining the Application revenue requirement balances should be reviewed at the same time as analysing the 5.9% average rate increase.

*SEC #45*

*[1.0 SEC-7] With respect to this response:*

*a. (c) Please confirm that no net cost reductions are expected to result from the increase in self-service to offset the cost of pursuing that initiative. If cost reductions are expected, please provide details.*

*b. (g) Please estimate the reductions in OM&A costs and FTEs in or prior to the Test Year resulting from this initiative.*

RESPONSE SEC #45

a. Currently, the customer is able to access bill and usage information on-line through MyAccount. In 2013 and 2014 London Hydro will develop the website to give the customer the ability to "interact" with the system for the following:

    - Move In/Out Notification and bill forwarding

- Payment Notification
- Payment Arrangements
- Notifications related to Bill past due, Consumption usage exceeds range, Budget Billing out of Balance; Outages

All the above activities are currently handled by Customer Services either through phone or email communications. The full roll out of this self-service functionality will not be complete until 2014. The adoption rate by the customer is expected to increase throughout 2014 and 2015. London Hydro does not expect to see a significant decline in call centre volumes in the short-term. Other business environment changes such as TOU billing will continue to impact customer inquiry volumes.

There is no net cost reductions specifically related to this initiative in the 2013 Test Year. In future years as the customer adopts the on-line functionality, costs are expected to shift with increases in system maintenance offsetting reductions in internal labour currently supporting the call centre.

As stated in the response to 1.0 SEC-7, London Hydro has experienced declines in the number of phone calls, although the length of each call has changed since 2009. Please refer to Exhibit 4, page 46, lines 14 to 21. In 2009 the average call duration was 5:21 minutes. In 2012 this increased to an average of approximately 7.4 minutes and this seems to be levelling off at this new duration.

It is the belief of London Hydro, that had the on-line tools such as MyAccount not been available, additional call centre staff would be required to maintain adequate service levels.

In addition to using MyAccount for electronic service, London Hydro's customers are increasingly shifting to email inquiries. Statistics show this form of communication has doubled since 2010 to over 14,300 email inquiries annually. It is this trend toward on-line inquiries and customer expectations that are driving the expansion of web-based ("MyAccount") functionality.

b. There have not been any cost reductions in OM&A costs and FTEs in or prior to the Test Year resulting from this initiative.

*SEC #46*

*Ref: [June 30, 2012 Six Month Financials, p. 11]*

*Please explain why the total of PP&E that was fully amortized but still in use jumped from $5.6 million in June 2011 to $21.3 million in June, 2012.*

RESPONSE SEC #46

The comparative amount for June 2011 should have been listed at $17.4 million rather than $5.6 million. The $5.6 million is an IFRS amount that was not updated to CGAAP when preparing the June 2012 Notes to the Financial Statements due to inadvertence.

London Hydro had looking at prpeparing to issue financial statements under IFRS. However, when the Accounting Standards Board (AcSB) extended the changeover date to January 1, 2014 in March 2012, London Hydro did a quick turnaround and issued the financial statements under CGAAP.

The amount listed under IFRS is much lower than CGAAP since the opening balance sheet under IFRS records capital assets costs at their net book value, rather than original cost.

*SEC - 47*

*[December 19, 2012 Monthly Report, p. 2] Please reconcile the $250,000 impact of the change in overhead capitalization on page 2 with the $520,000 impact on page 3.*

<u>RESPONSE SEC #47</u>

There are two changes related to the overhead capitalization being reported in the above referenced report dated December 19, 2012.

Firstly, the change in the capitalization of overheads related to material handling impacts both operating and capital. As less material handling costs are being capitalized, operating cost (termed Controllable cost in the internal monthly report) will increase and capital will decrease.

The second impact is related to the change in the vehicle and equipment estimated service lives. New estimates result in longer service lives, and therefore lower depreciation expense. Depreciation expense is included as part of the overhead rate used to allocate fleet expense to operating and capital activities. Lower depreciation expense results in lower expense in operating and capital.

The following Table is provided to reconcile the changes as reported in the December 19, 2012 Monthly Report.

| **Impacts of Changes to MIFRS Overhead Rates** | | | |
|---|---|---|---|
| | Operating | Capital | Notes |
| Overhead related to Material Handling | 345,000 | (345,000) | less material handling costs allocated to capital |
| New Service Lives - vehicle and equipment | (95,000) | (175,000) | lower depreciation expense, allocated to both operating and capital |
| As reported in November KPI report | 250,000 | (520,000) | |

*<u>SEC - 48</u>*

*[Appendix 1C] With respect to this document:*

a. *Please confirm that this is in fact the 2013-2015 Strategic Plan. If confirmed, please explain why in numerous places it is written as planning to take actions in 2012 (e.g. pages 20, 31).*

b. *Please provide the current draft of Section 6.1.1.*

c. *P.. 6. Please provide the internal document(s) that set out the business case for the conversion of downtown core supply to 27.6 kV, including any spreadsheets or other financial analysis.*

d. *P. 17. Please describe the current status of each of the opportunities described in Section 6.2.3, including actions taken, results achieved, planned timing, etc.*

e. *P. 23. Please explain how the timing of the rate-making cycle affects decisions with respect to the "allocation of resources to various initiatives arising out of the Strategic Plan".*

f. *P. 31. Please identify where in the Application is the budget for the "detailed study" of environmental issues referred to, and the amount of that budget in the Test Year. Please provide any documents setting out the rationale for the study and the budget being proposed.*

<u>RESPONSE SEC #48</u>

a. London Hydro confirms that Appendix 1C included the draft 2013-2015 Strategic Plan. Although the document is the 2013 – 2015 Strategic Plan, the document was updated during 2012 and as such, there are a few references to the items that were still ongoing when the document was written.

b. The draft of 6.1.1 is as follows:

The Government appointed LDC Sector Review Panel has issued its report on the amalgamation of LDCs. The Panel's major recommendations are:

- 8 – 12 regional utilities with 2 or 3 specific LDCs serving the northern and remote communities.

- As much as possible, shoulder-to-shoulder contiguous utilities.

- Appointment of a transition advisor.
- Two year time-line to achieve the desired amalgamations.
- Failing which, a mandated amalgamation.
- Hydro One to lead and be engaged in creating regional utilities.

The Panel's report seems to be short on the practicality of amalgamations among LDCs. Even if parties agree to amalgamate, it would take more than two years to achieve the results. Additionally:

i. It appears that the majority of the remaining 73 LDCs might not be so amicable to amalgamations, at least not on a voluntary basis.

ii. Among the utilities that we have in our southwest region, every community small or large has a desire to either be the chief partner or an equal partner, but no less.

iii. By stating that mandated amalgamations, if any, could be based on the net book value of the assets, the Panel has predisposed the "corporate value" of LDCs. This alone would distract any premium that one could even expect in an acquisition or merger transaction. Therefore, any amalgamation voluntary or otherwise would have to therefore be on the basis of net book value assets i.e. any goodwill on the books is worth nil.

iv. What surprised us the most is that the Panel failed to give any significant incentives for voluntary amalgamations except providing guidelines to the OEB to fast track the approval of reasonable amalgamation/acquisition costs.

v. No private equity is at this time allowed to participate.

The wild-card is really Hydro One. How will Hydro One play its role? As you know, Hydro One is key to forming shoulder-to-shoulder regional utilities; as an example, London Hydro is surrounded by Hydro One's service territory around every corner of the city (even between St. Thomas and London). London Hydro could amalgamate with St. Thomas, Woodstock, Chatham-Kent, and West Huron (Goderich); still it would not be contiguous without Hydro One joining us. At the same time, it is a very difficult task to break Hydro One in such a manner that they could become part of various utilities all across Ontario; especially when Hydro One shares the linemen both for distribution and transmission, as well sharing all their IT applications between distribution and transmission, and their customer service department together with the IT department is outsourced to Cap Gemini on a long-term lease basis. Yet, Hydro One could blindside us (and other utilities) if they do decide to lead the regional amalgamation in accordance with the Panel's report.

Despite the Panel's report, challenges of amalgamation among LDCs have remained unchanged; at least in our neighbourhood these challenges are: local employment and local control, corporate evaluation issue and desire for a partnership of equals with London Hydro. Short of any mandated requirement, amalgamation, at least in southwestern Ontario, would not be as easy to achieve. One could take a very aggressive approach by pre-emptively acquiring as many utilities as possible so as to increase our leverage for the eventual merger of the remaining, but such an acquisition could come at a very hefty price, which may not be worth much in the final regional amalgamation effort.

Separately, Hydro One is also a major entity in our neighbourhood and in terms of assets, they are the largest. The Panel asked them to lead the regional amalgamation effort; Hydro One manages the service to all of the nearby towns including Delaware, Dorchester, Exeter, Ilderton, Arva, Komoka, Lucan, etc.

However, despite the Panel's report and London Hydro's initial efforts, London Hydro will remain focused on its core business and evaluate strategic options on a case by case basis.

c. The Strategic Plan, page 6, referenced "27.6kV supply to the downtown core" as an example of technology investment. Downtown London has both an existing modern 27.6kV interconnected supply and an older 13.8kV islanded supply. For over 30 years most new loads, including many larger downtown loads that replaced older buildings, have been connected to the 27.6kV system. Customers have also made requests to connect to the more reliable 27.6kV system. In 1980 the new 27.6kV Talbot TS was constructed to supply new growth in the northwest and core area and 27.6kV was run into downtown London. In 1990 Hydro One removed the end of life 13.8kV Highbury TS and provided an incentive to London Hydro to move load to 27.6kV. This left the remaining 13.8kV load islanded with the now 64 year old Nelson TS being the only remaining 13.8kV station. The London Hydro distribution system supplied by Nelson TS is of similar vintage. In 2005 Talbot TS #2 was placed in service providing an additional 8-27.6 kV breaker positions. The 27.6kV supply in the city core supplies major buildings such as One London Place, Citi Plaza (Galleria), London Life and the new Renaissance Buildings. The additional 27.6kV feeders referenced in this section are required to provide load relief and contingency backup to the 27.6kV downtown system.

Hydro One had indicated in 2009 that Nelson TS “cannot be expected to be in service longer than 15 additional years” which is now closer to 10 years. London Hydro has been requesting a firm commitment from Hydro One regarding the ‘end of life’ date of Nelson TS in order to finalize plans for the remaining 13.8kV system that now represents just 6% of London Hydro peak load.

d. Section 6.2.3 represent identified opportunities for London Hydro although a detailed plan has not been formed as to how to achieve any of these results. Therefore there is currently no information that can be provided.

e. As was answered in response to VECC #1,

“The rate Application is a major undertaking. London Hydro utilizes primarily internal resources to complete the Application. This involves utilizing resources from all departments and areas within the organization. As a result of the involvement of various key individuals, long-term strategic planning is done with one of the factors being how/where internal resources are already committed. The effect of this is there may be slightly less “Tier 3” work performed in 2012 compared to other years with all other things being equal. “

(“Tier 3” work was identified as work other than mandated programs and/or programs that would cause safety concerns to customers/employees. These Tier 3 programs/projects are done on a case by case basis as warranted/approved based on the availability of resources.)

f. Please refer to the Application Exhibit 4, pages 75 and 76 which provide details on the environmental expenses. As identified within the Application, the 2012 expenditures related to the clean-up of the substations. The 2013 costs relate to the Environmental study which will be undertaken during the year. The actual clean-up costs are unknown at this point in time and will be performed as required after the study results have been analyzed and will likely occur between 2014 and 2017.

*SEC - 49*

*[Appendix 1F] With respect to this document:*

*a. Please provide the equivalent document (i.e. Appendix A) for the 2013-2015 Strategic Plan.*

*b. P. 21-23. For each of the 2012 Q4 targets, please provide details of the actual achievement relative to the target, and any report to the Board of Directors or senior management reporting on that achievement against target.*

RESPONSE SEC #49

a. The requested document has not been approved by the Board of Directors and is undergoing revisions after the current draft was presented to the HR committee.

b. The following chart was provided to the Board of Directors for an overall summary of the targets for each quarter and the overall results.

Table 1: 2011 Scorecard for Strategic Priorities as per the 2011-2013 Strategic Plan

| | Q1 | Q2 | Q3 | Q4 | Year End | Overall | Comments |
|---|---|---|---|---|---|---|---|
| Distribution System &Technology (W1:30%) | 100% | 99% | 96% | 85% | 95% | 28.50% | ODS (Itron EE-SAP) challenges + management decision to postpone web enhancement for online ToU service |
| Finance (W2: 20%) | 70% | 100% | 100% | 100% | 93% | 18.50% | Though better than planned results, reduced NI/RoE due to IRM year + less than planned energy sales despite 3% under budget in controllable as well as delay in city approval for increase in water service fees |
| Human Resources (W3: 20%) | 83% | 100% | 60% | 100% | 86% | 17.15% | Some challenges in clearly defining the scope of work in Q3 |
| Customer Services (W4: 15%) | 100% | 80% | 83% | 83% | 87% | 13.00% | Better than planned results for MyAccount on-line service; excellent customer satisfaction results + challenges in launching of Watts lab |
| Green Energy (W5: 10%) | 73% | 74% | 100% | 100% | 87% | 8.68% | Surpassed expected results; Q1 and Q2 score less than 100% due to the late recognition by OPA of our successful completion of 2011 projects |
| Community Relations (W6: 5%) | 100% | 100% | 50% | 100% | 88% | 4.38% | Q3 challenges primarily relating to completion of Skate Canada promotion plan |
| Yearend Overall Score (90%) | 88% | 94% | 86% | 93% | 90.20% | 90.20% | A respectable accomplishment in spite of significant challenges from external factors; Furthermore the CDM penalties Q1 and Q2 are superfluous due to OPA's late recognition of our accomplishments |

## Annual London Hydro Score Card

| | | | |
|---|---|---|---|
| 75% score for the corporate goals (0.75*0.90) | | | 68% |
| Cost per customer among the lower quartile based on OEB year book | | | 0% |
| Rates for small consumers (<50kW) among the lower quartile | | | 5% |
| Return on Deemed equity of 7% (projected return of 6.2%) | | | 0% |
| Industry Award | | | 5% |
| Creative and Innovative initiatives | | | 5% |
| SAIDI and SAIFI targets 0.96 and 1.52 (<< 1.62 & 1.92) respectively | | | 5% |
| **Aggregate Score for 2012** | | | **88%** |
| Earnings | NI | $6.2M versus planned $5.7M | |
| | ROE | 5.00% | |
| | RODE | 6.2% vs. planned range of 5% - 8% | |
| **Recommended Score for 2012** | | | **90%** |

The controllable expenses are projected to be 3% favourable; nothing more could be done by the management to improve the returns. This is the last year of 3GIRM plus somewhat less than planned energy sales due to CDM and the economy.

*SEC - 50*

*[Appendix 1I] With respect to this document:*

a. *P. 9. Please describe the current status of the plan to get rid of "cottage industry systems", such as Excel spreadsheets and Access databases developed within departments.*

b. *P. 19. Please describe the current status of the mobile workforce strategy. If any business cases or similar analyses of the costs and benefits of that strategy have been prepared, please provide.*

c. *P. 24. Please provide details of the costs and benefits of the replacement of the JDEdwards ERP functionality with similar SAP ERP functionality. If any business cases or similar analyses of the costs and benefits of that strategy have been prepared, please provide.*

d. *P. 31. Please provide more details on the "consolidation of the IT and PMO organizations", and provide references in the Application to that strategy and the results that have been realized.*

RESPONSE SEC #50

a. Consolidation of "cottage industry systems"

The objective of system consolidation and removal of cottage industry systems (databases and spreadsheet applications outside of the IT supported landscape) is to facilitate a more unified approach to data governance, reduce operational overhead, reduce complexity and promote a 'single source of truth' in one of our major enterprise systems, SAP, GIS, OMS, ODS. Examples of LH progress in this area include:

| "Cottage Application" | "Usage" | "From" | "To" |
| --- | --- | --- | --- |
| Kovan's application | Meter data management | Access & VB | SAP |
| Storm/Outage Database | Track reported outages in storms | Excel | OMS |
| Russ' Tool | Smart Meter Data Correction | SQL | ODS |

b. Mobile Workforce strategy

The goal of the mobile workforce strategy is to provide better field communications and access to systems/technology at the work site. The strategy envisions deploying new capability to include GPS, graphical data (drawings and maps), work orders, electronic forms, and video feeds. These capabilities will further enhance work safety and performance in planned and unplanned outages to minimize duration and impact to the customer.

In 2013, the IT department is working with London business units to:

- prepare the business requirements for implementations
- assess and select the appropriate technology to best support those requirements
- determine priority and schedule of those initiatives approved for implementation

Cost / Benefit - Mobile Work Force

| Cost Driver | Benefit |
|---|---|
| **Enhance Safety in Field by leveraging technology advancements** | • "Know the job site" before you arrive<br>• Employee training material and support in the field<br>• Field validation of service scope/ techniques/ equipment status |
| **Provide timely and multi-media Communications** | • Access to engineering expertise in the field and supervisory advice<br>• Better interaction between field staff and Dispatch/Call Center<br>• "Pictures" to enhance problem identification |
| **Improve business processes and tighter system integration with mobile work platforms** | • Reduce outage times<br>• More "wrench" time<br>• Reduce paperwork and backlog |

c. Rationale for ERP system replacement

The replacement of the JDE Edwards system with a SAP ERP is strategic direction with planning phase to begin in 2014. The high level business case considerations for this replacement are presented below:

| Cost | Benefit |
|---|---|
| **Business Functions Risks**<br>• Current JDE software version is at "end of life"<br>• Potential risk to Customers since a software bug could impact meter to cash processing.<br>• Employee skills in JDE support being lost to attrition / retirement and not easily replaced | • Higher system reliability and availability with timely support, latest vendor hot fixes/patches and escalation within the vendor support organization<br>• Existing staff skills needed by SAP CIS can be leveraged to support SAP ERP |
| **Cost Control**<br>• Avoid Time & Material costs from consultants to fix out of support bugs with JDE<br>• Avoid upgrade to newer version of JDE that is required to maintain support by a third party | • Leverage existing SAP license without any incremental cost for ERP modules<br>• Better value of software maintenance contract by staying current with systems of one vendor (SAP)<br>• SAP supported " Life Cycle" plan will minimize the customer impact on process supported by the JDE system |
| **Simplify the environment**<br>• Eliminate legacy custom interfaces to JDE system<br>• Avoid any JDE customization that could be delivered with SAP ERP<br>• More complex environment and tightly integrated systems requires coordinated upgrades for end-to-end testing | • SAP ERP is tightly integrated with the current SAP CIS and requires no custom interfaces<br>• SAP ERP is considered a market leader with out-of-box functionality<br>• |

d. Consolidation of the IT and PMO departments

The consolidation of the IT department accountable for day-to-day support/services with the Project Management Office (PMO) resulted in better resource planning to satisfy the demands of business based on overall capacity and capability of both organizations.

The consolidated organization lead by the CIO, has:

- Developed and executing on "3 year rolling IT strategy "
- Delivered and supporting technology to support TOU billing and Web presentment to satisfy the OEB mandate , and exceeding the average performance of all LDC's in all categories, on a regular monthly basis as measured by the IESO
- Reduced on the reliance on consultants for both project and on-going support
- Actively participating in Ministry of Energy initiates such as "Ontario Green Button"

## VECC Supplementary Interrogatories

*VECC #46*

*Reference: LPMA #3, SEC #5, LPMA #4*

*London states that is does not include actual 2012 data in the application. Yet it appears that London does undertake monthly variance analysis and in response to LPMA #4 it appears that actual 2012 data (unaudited) has been used in the interrogatory responses. Please explain why not adjustment is being proposed for changes to the 2012 capital projects data.*

RESPONSE VECC #46

Actual results for 2012 provide for a higher than projected net book value at December 31, 2012 since capital additions were slightly higher than anticipated. As actual results are not materially different from those projected and are currently under audit, required schedules and the RRWF have not been updated.

*VECC #47*

*Exhibit 2, pg. 44 / LPMA #8 / VECC #6*

*a) Please file an up-to-date tracking sheet and final RRWF form (in Excel format) for the 2013 Application.*

RESPONSE VECC - #47

Please see response to Board staff supplementary question # 72.

Contained in response are both a Log of Proposed Correction and Adjustments as well a copy of London Hydro's Revenue Requirement Work Form ("RRWF"), reflecting modifications and updates as accepted by London Hydro.

A copy of the updated RRWF, in live excel format, can be found on the OEB website for London Hydro's 2013 Cost of Service Application filings.

## London Property Management Association Supplementary Interrogatories

*LPMA #45*

*Ref: LPMA #2*

a. *Is it London Hydro's position that the Board should set rates based on the use of MIFRS in 2013 even though the utility will continue to use CGAAP (along with the changes in capitalization and depreciation rates) for 2013?*

b. *Has London Hydro changed the capitalization policy and depreciation rates effective January 1, 2012? If not, please update the bridge and test year evidence to reflect the continuation of the existing capitalization and depreciation rates in 2012.*

c. *If the response to part (b) is that London Hydro has used the new capitalization policy and depreciation rates effective January 1, 2012, please provide the equivalent schedule as for the PP&E deferral account, only based on account 1576 rather than 1575.*

RESPONSE LPMA #45

a. London Hydro has filed the 2013 COS rate application under MIFRS pursuant to section 2.3.4 of the Ontario Energy Board Filing Requirements for Electricity Transmission and Distribution Applications last revised on June 28, 2012, as well as the Board's further correspondence in this regard dated July 17, 2012. Differences between CGAAP and MIFRS have been removed as addressed in item b) below.

b. London Hydro confirms that it has changed its overhead burden rates and capital asset life spans under CGAAP effective January 1, 2012, as encouraged in the Board's correspondence of July 17, 2012.

c. In light of the AcSB decision to extend the existing deferral of the mandatory IFRS changeover date to January 1, 2014, London Hydro's PP&E deferral account amount does belong in account 1576 rather than 1575, as it results from the election to make accounting changes under Canadian GAAP in 2012. Although this has no impact on the amount of the transitional adjustments amount, the RRWF has been amended in this regard.

# London Hydro Inc.

**2013 Cost of Service Rate Application (EB-2012-0146/ EB- 2012-0380)**
**Response to Supplementary Interrogatories**

## RATE BASE (Exhibit 2)

### London Property Management Association Supplementary Interrogatories

**Question LPMA #46**

**Ref: LPMA #8 & Exhibit 2, page 47**

a) *Please explain why the amounts shown in the response to part (b) for line items D and E are different from the figures shown in Table 2-19 in the original evidence.*

b) *The original question in part (b) asked for the percentage calculation of the capital contributions for the line items. Please provide a response based on each of the line items. In other words, please provide the calculation for the percentage of the capital contributions relative to the gross amounts for D City works projects and a similar calculation for capital contributions relative to the gross amounts for E developer works projects.*

c) *The table provided in the response to part (b) shows that the average net capital additions over the 2007 to 2012 period are 47.5% of the gross capital additions. Please explain the jump forecast for 2013 to 67%, a level not recorded over the historical period shown.*

**Response LPMA #46**

a) Table 2-19 differs from the response to LPMA #8 part (b) since Table 2-19 relates to capital spending where part (b) relates to capital additions. In addition, the response to part (b) was previously illustrated with the change in ending work-in-progress which has been removed in the table displayed below.

b) Net capital additions as a percentage of gross demand capital additions have been provided in the table below. Capital additions in connection with City Works projects have been excluded from this illustration since City Works projects pertain to relocations only which require cost recoveries and not capital contributions.

| Gross Demand Capital Additions in comparison to Contributions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2007 Actuals | 2008 Actuals | 2009 Actuals | 2009 Budget | 2010 Actuals | 2011 Actuals | 2012 Bridge | 2013 Test |
| **Amounts** | | | | | | | | |
| Developer works projects (E) | 5,798,299 | 5,914,622 | 6,640,852 | 7,324,000 | 6,370,619 | 6,604,004 | 5,927,049 | 4,828,000 |
| Capital Contributions | (3,325,389) | (3,478,094) | (3,695,508) | (3,202,900) | (2,695,120) | (4,218,741) | (3,780,997) | (1,832,000) |
| Net Capital Additions | 2,472,910 | 2,436,528 | 2,945,344 | 4,121,100 | 3,675,499 | 2,385,263 | 2,146,052 | 2,996,000 |
| **Percentages** | | | | | | | | |
| **Net Capital Additions** | **43%** | **41%** | **44%** | **56%** | **58%** | **36%** | **36%** | **62%** |

c) The average of net capital additions over 2007 to 2010 is 46%. Net capital additions for 2011 and 2012 have been left out for comparative purposes, as there were projects in these years associated with a landfill and large industrial project that do not occur on a regular basis.

As mentioned in response to LPMA #8, there are varying factors associated with amounts required as contributed capital which include the type of project as well as the load to be consumed. Capital contributions forecasted for 2013 are projected based on historical activities and one of the main factors leading to a decreased projection in contributed capital is the decline in Distribution Circuit Expansions, as displayed in Table 2-24 of the original filing. Average capital spending in this area during 2007 to 2011 was $1,739,847 where spending for 2013 is forecasted to be $614,000 during 2013.

## Question LPMA #47

***Ref: VECC #6 & LPMA #8***

*Please explain the reduction in City of London capital contributions to $0 in 2013 (VECC #6), despite the increase in city works projects forecast for 2013 (LPMA #8b).*

**Response LPMA #47**

There are no capital contributions forecasted with respect to the City of London for 2013 since capital deposits on hand at December 31, 2012 from the City of London relate to projects which will not reach the end of their connection horizon, and there are no new projects that may require capital contributions, during 2013.

As noted LPMA #46 b), City Works projects have been determined to relate to relocations only which require cost recoveries and no capital contributions.

## School Energy Coalition Supplementary Interrogatories

**Question SEC #51**

***Ref: [2.0 SEC-8]***

*Please provide a location for Appendix 2H, which does not appear to be in the package sent to us (the Appendices appear to jump from 2G to 2K).*

**Response SEC #51**

London Hydro confirms that the package submitted February 4, 2013 did not include Appendix items 2H – “Reclosers on London Hydro’s Electric System”, 2I – “Quality of Supply Report 2009” or 2J – “Quality of Supply Report 2010” due to oversight.

These three Appendix items have been provided with this submission and London Hydro apologizes for any inconvenience.

**Question SEC #52**

***Ref: [2.0 SEC-9]***

*Please explain why the OMS project is included under TOU/Customer Service in 2013, rather than Engineering and Operations as was the case in 2011 and 2012.*

**Response SEC #52**

The OMS project costs have been assigned to two groups over different timeframes as displayed in 2.0 SEC-9 in order to allocate and account for specific deliverables provided to Customer Service and Engineering and Operations (E&O).

In 2011 and 2012, the project delivered new functionality for E&O's control room operator. For example, the OMS system now provides an on-line map and reports of outages in London Hydro's distribution network. This enables an accurate count of customers impacted during outages to be shared outside the control room and a system to continuously update the estimated repair time (ERT).

During 2013, the project will improve customer interaction through voice and on-line systems. For example, one goal is ensure "no busy" signal to customers during a major event and make outage information available to customers, media and other public services. The additional features for Customer Service will include: enhanced customer call taking, customer alerts, pro-active notifications and ERT.

## Question SEC #53

***Ref: [2.0 SEC-10]***

*Please reconcile this table with the figures set out in Question SEC-46 above.*

## Response SEC #53

Question SEC-46 relates to London Hydro's Notes to the Financial Statements in connection with the disclosure of the original capital cost of assets that have been fully depreciated, but are still in service and accounted for on London Hydro's balance sheet.

This disclosure represents the dollar amount as at a given point in time and only pertains to those assets which are tracked individually (i.e.: vehicles, buildings), rather than through grouped accounting.

On the other hand, SEC-10 provides a list of assets reaching the end of their useful life during the past 10 years, and includes both assets tracked individually as well as those assets accounted for as a group.

London Hydro has not provided a reconciliation between these two items since SEC-46 represents a balance sheet amount for non-grouped assets only, where SEC-10 essentially relates to different periods for both grouped and non-grouped assets.  This makes it difficult to reconcile these two items, especially given the time constraints surrounding this reply submission.

**Question SEC #54**

***Ref:  [2.0 VECC-10]***

*Please provide the internal business case document referred to, including all related spreadsheets or other financial analyses.*

**Response SEC #54**

All relevant information related to VECC-10 has been supplied.  No additional documentation is available.

## VECC Supplementary Interrogatories

### Question VECC #48

***Reference: Exhibit 2, pg. 44 / LPMA #8 / VECC #6***

*a) The most recent capital contributions for 2012 are $3.781 million as compared to the original forecast of $2.011 million (Table 2-16). Please explain the reasons for the significant difference in these figures.*

*b) Why are no capital contributions being forecast to be paid by the City of London in the 2013 test year?*

### Response VECC #48

a) Capital contributions are forecasted based on historical activities and projected opening deposit account balances. However, actual results are dependent of varying factors such as the type of project, the anticipated load consumption, and the timing of completion of projects. The variance for 2012 is mainly a result of higher than anticipated capital deposits on hand at December 31, 2011, as well as higher than projected deposits invoiced during 2012.

b) There are no capital contributions forecasted with respect to the City of London for 2013 since all capital deposits on hand at December 31, 2012 from the City of London relate to projects which will not reach the end of their connection horizon, and there are no new projects anticipated, during 2013.

### Question VECC #49

***Reference: Appendix 2-A Capital Projects Table_xlsx_20121016 / Exhibit 2, pg. 44 Table 2-16, LPMA #8***

*a) Please provide the 2013 rate base and revenue requirement adjustment for the variance in 2012 forecast capital projects (27,244,000) and capital contributions (2,011,000) from the actual 2012 capital projects ($23,792,255) and capital contributions ($3,780,977).*

*b) The total capital spending (net of contributions) differs in the Excel Spreadsheet Appendix 2-A and Tables 2-16 (original and IRR). Please explain why and show the reconciliation.*

**Response VECC #49**

Preamble to this response for clarification purposes: The actual capital projects amount ($23,792,255) noted above represents dollars spent on capital projects during 2012, details of which are provided in updated Table 2-16 provided with the submission on February 4, 2013. Capital additions for 2012 amount to $27,706,380 as listed in Table 2-8.

a) Actual results for 2012 provide for a higher than projected net book value at December 31, 2012 since capital additions were slightly higher than anticipated. Albeit immaterial, this increase in net book value creates an increase in average net fixed assets and the corresponding revenue requirement. However, since actual results are not materially different from those projected and are currently under audit, required schedules and the RRWF have not been updated.

b) These two items differ because Appendix 2-A represents 2013 capital projects under MIFRS, where Table 2-16 represents 2013 capital spending under CGAAP. A reconciliation is provided as follows:

| | |
|---|---|
| Capital spending per Table 2-16 (CGAAP), before contributed capital | 28,590,000 |
| Less: stores overhead burden reduction under MIFRS | (496,000) |
| Less: lower fleet overhead under MIFRS (due to lower vehicle life spans) | (240,600) |
| Capital projects for 2013 per Appendix 2-A (MIFRS) | 27,853,400 |

# RATE BASE APPENDICES

| | |
|---|---|
| SEC #51 **/** SEC #8 | **Reclosers on London Hydro's Electric System** |
| SEC #51 **/** VECC #3 | **Quality of Supply Report 2009** |
| SEC #51 **/** VECC #3 | **Quality of Supply Report 2010** |

London Hydro Inc

# Use of Reclosers on London Hydro's Electrical System

Issued: Sept 2003

# Use of Reclosers on London Hydro's Electrical System

## Background

Reclosers operate in much the same way as circuit breakers and have been used for decades by utilities to improve the reliability performance of their feeders. The majority of reclosers in use are pole mounted devices with a modest fault current rating installed on long rural feeders. When used midstream on long feeders, they can protect upstream customers from seeing downstream faults and they can also sense end of line fault current levels that may be too low to be seen by the circuit breaker.

Recently, padmounted reclosers with higher fault interrupting capability have become available and London Hydro has used these to replace circuit breakers in metalclad switchgear because of their lower cost.

Reclosers have not been commonly used in urban environments until recently. Newer designs have a higher fault current rating, a higher insulation level (BIL) and are also now available in a vertical phase over phase design that is better suited to the multiple circuit pole lines used in cities.

The availability of new vertical design reclosers opens up the possibility that they can be used to replace or augment automated switches which have been widely used in urban environments to reduce the length of time required to isolate a faulted area and transfer customers to adjacent feeders. Automated switches improve the duration of outages (SAIDI)[1], however, they do not prevent customers from seeing an outage once a fault occurs – they only speed up the restoration time.

Reclosers on the other hand, can prevent upstream customers from seeing some downstream faults altogether by opening and isolating the downstream problem area before the main feeder breaker operates. Reclosers can therefore improve both the duration of outages (SAIDI) and the number of customers who see the outage in the first place (SAIFI)[2].

## How Many Reclosers Should be Installed?

Now that these newer reclosers are available, how many should be installed on London Hydro's system? Should they be installed in the same location as our existing automated switches or should they be used only on feeders that have not yet been automated?

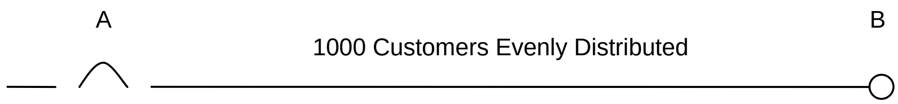
To answer these questions, we need to determine how effective reclosers can be in improving reliability and at what cost. Since reclosers are unique in their ability to improve SAIFI, all of the following discussions will centre only on potential improvements in SAIFI.

### Theoretical Improvement in SAIFI

If one were to consider a single uniformly loaded feeder that had an equal probability of failing along its entire length, the following illustrates how reclosers would improve the average interruption frequency on the feeder.

1. SAIDI = System Average Interruption Duration Index
2. SAIFI = System Average Interruption Frequency Index

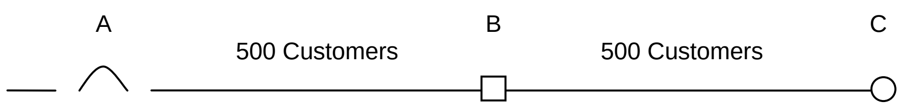
## *Case 1 – No Recloser*




Suppose there are 1000 customers between points A and B, and they experienced an average of 6 outages per year, the average interruption frequency per customer on the entire feeder would be 6.

$$\frac{\text{6 outages x 1000 Customers}}{\text{1000 Customers}} = \text{Interruption Frequency of 6}$$

## *Case 2 – One Recloser midstream*

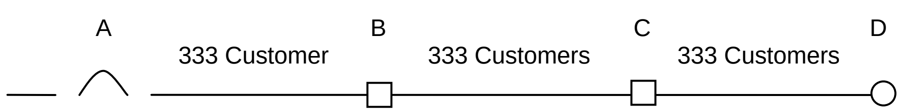



If we assume the same number of faults and if we assume that they are uniformly distributed along the feeder, the 500 customers between B and C would still continue to see all 6 outages, however the 500 customers between A and B would only see 3 outages (1/2 of the original 6). All of the outages downstream of B would be interrupted by the recloser and would not be seen by the upstream customers.

The average interruption frequency on the feeder would now be:

$$\frac{\text{3 outages x 500 Customers (A to B)}}{\text{1000 Customers}} + \frac{\text{6 outages x 500 Customers (B to C)}}{\text{1000 Customers}} = \frac{3}{2} + \frac{6}{2} = 4.5$$

## *Case 3 – Two Reclosers*




In this case, the customers from A to B would theoretically only see 2 outages (1/3 of the original 6), the customers from B to C would see 4 outages (2/3 of the original 6) and the customers from C to D would continue to see all 6 outages.

The average interruption frequency on the feeder would now be:

$$\frac{\text{2 x 333 Cust. (A to B)}}{\text{1000 Cust.}} + \frac{\text{4 x 333 Cust. (B to C)}}{\text{1000 Cust.}} + \frac{\text{6 x 333 Cust. (C to D)}}{\text{1000 Cust}} = \frac{2}{3} + \frac{4}{3} + \frac{6}{3} = 4$$

This logic can be continued for multiple reclosers as follows:

| Number of Reclosers | Average Feeder Interruption Frequency | Improvement Multiplier |
|---|---|---|
| 0 | $\frac{6}{1}$ | 1 |
| 1 | $\frac{\text{½ of } 6}{2} + \frac{6}{2} = 4.5$ | .75 (i.e., $\frac{4.5}{6}$) |
| 2 | $\frac{1/3 \text{ of } 6}{3} + \frac{2/3 \text{ of } 6}{3} + \frac{6}{3} = 4$ | .66 |
| 3 | $\frac{1/4 \text{ of } 6}{4} + \frac{2/4 \text{ of } 6}{4} + \frac{\text{¾ of } 6}{4} + \frac{6}{4} = 3.75$ | .625 |
| 4 | $\frac{1/5 \text{ of } 6}{5} + \frac{2/5 \text{ of } 6}{5} + \frac{3/5 \text{ of } 6}{5} + \frac{4/5 \text{ of } 6}{5} + \frac{6}{5} = 3.6$ | .6 |
| 5 | $\frac{1/6 \text{ of } 6}{6} + \frac{2/6 \text{ of } 6}{6} + \frac{3/6 \text{ of } 6}{6} + \frac{4/6 \text{ of } 6}{6} + \frac{5/6 \text{ of } 6}{6} + \frac{6}{6} = 3.5$ | .583 |
| 6 | $\frac{1/7 \text{ of } 6}{7} + \frac{2/7 \text{ of } 6}{7} + \frac{3/7 \text{ of } 6}{7} + \frac{4/7 \text{ of } 6}{7} + \frac{5/7 \text{ of } 6}{7} + \frac{6/7 \text{ of } 6}{7} + \frac{6}{7} = 3.43$ | .571 |

TABLE 1

## Actual Feeder Data

This information can now be applied to actual feeder data. By looking at the recorded performance of all of London Hydro's 27.6 kV feeders over the past 3 ½ years we can calculate how much each feeder contributed to London Hydro's overall SAIFI. Both the number of faults and the number of customers affected by each fault have to be taken into account to gauge the overall affect on system SAIFI.

A full chart is included in Appendix A, but for illustrative purposes, Table 2 below shows in absolute terms how much the 5 worst feeders and the 5 best feeders have contributed to London Hydro's overall SAIFI.

| Feeder # | Average Yearly Contribution to overall system SAIFI over the past 3 1/2 years |
|---|---|
| (Worst Feeder) | |
| 19M28 | 0.192 |
| 26M53 | 0.164 |
| 70M3 | 0.126 |
| 70M7 | 0.121 |
| 70M4 | 0.112 |
| … | |
| … | |
| 4M14 | 0.012 |
| 70M6 | 0.008 |
| 19M25 | 0.007 |
| 26M43 | 0.006 |
| 19M26 | 0.002 |
| (Best Feeder) | |

TABLE 2

Cost to Improve SAIFI

Assuming it costs approximately $40,000 to install each recloser, the above information can be used to calculate the theoretical cost/benefit of installing any number of reclosers on a feeder. In Table 3 below, the theoretical improvement in SAIFI is calculated if we installed a single recloser on both the worst and the best feeders on our system. This improvement is then divided by the cost of the recloser and normalized to illustrate an equivalent rate for achieving a .1 improvement in London Hydro's SAIFI.

To illustrate, if Project A cost $120,000 and it could be demonstrated that it would likely achieve a .03 improvement in overall system SAIFI, we could normalize that to say that Project A would cost:

$$\frac{\$120{,}000}{.03} \times .1 = \$400{,}000 \text{ for a .1 improvement in SAIFI.}$$

Similarly if Project B cost $30,000 and would likely achieve a .006 improvement in SAIFI, that would normalize to:

$$\frac{\$30{,}000}{.006} \times .1 = \$500{,}000 \text{ for a .1 improvement in SAIFI.}$$

In this example, Project A is more cost effective than Project B for improving SAIFI.

For the historically worst and best feeders on our system, the installation of a single recloser would theoretically improve SAIFI by the amounts shown below:

| Feeder # | Average Historical System SAIFI attributable to this Feeder | New SAIFI if a single recloser was installed. (x .75 Improvement Multiplier) | Theoretical Improvement in System SAIFI | Cost for a .1 Improvement in System SAIFI |
|---|---|---|---|---|
| 19M28 | 0.192 | 0.144 | 0.0480 | $83,333 |
| 19M26 | 0.002 | 0.00150 | 0.00050 | $8,000,000 |

TABLE 3

Clearly, a recloser installed on the worst feeder is far more cost effective than one installed on the best feeder. This raises the question of whether it would be more cost effective to put a second recloser on the worst feeder rather than one on the best feeder. What about a third or fourth recloser? How many reclosers should be put on each feeder to provide the greatest return on investment?

Using the theoretical improvement multipliers in Table 1, the method in Table 3 can be extended to calculate the cost/benefit of installing any number of reclosers on each of London Hydro's 27.6 kV feeders. Appendix A shows the results. In order to assist in the decision making process, only the incremental cost for a .1 improvement in system SAIFI is calculated for each additional recloser.

With all the calculated results in Appendix A all that remains now is to select a cost/benefit threshold – that is, how much we are willing to pay for a nominal .1 improvement in SAIFI.

Cost/Benefit Threshold for SAIFI Improvement

Three examples are presented to try to determine what London Hydro's cost/benefit threshold should be for a .1 improvement in SAIFI. Each example looks at alternative ways to improve SAIFI and develops an estimated cost for comparison.

*Dry Ice Cleaning of SEs*

On average, outages due to flashovers in SEs have contributed approximately .04 to London Hydro's total annual SAIFI.

With enough dry ice cleaning it's possible that we might be able to eliminate all SE flashovers.

The cost of providing this improvement can be estimated as follows:

- Assume we could eliminate all flashovers by cleaning all SEs once every three years.

- Out of 160 three phase 27.6 kV SEs, assume that 50% of them are the most critical and contribute to 80% of the .04 in SAIFI unreliability.

- The cost to clean 80 SEs every 3 years at $1,000 each would be approx. $27,000 per year. Since this is an ongoing cost, it can be equated to a one time investment of $27,000/.07 = $386,000 using a 7% investment rate.

- Since an equivalent investment of $386,000 could theoretically improve SAIFI by 80% of .04, this equates to:

  $386,000/.032 x .1 = **$1,206,000 for a .1 improvement in system SAIFI**

- For further comparison we can calculate the cost benefit of cleaning the remaining SEs. Assuming again that the remaining 80 SEs are only responsible for 20% of the .04 in SAIFI unreliability, this equates to:

  $386,000/.008 x .1 = **$4,825,000 for a .1 improvement in system SAIFI**

*Installation of Lightning Arrestors*

On average, lightning has accounted for approximately .4 of London Hydro's total system SAIFI value of 2.5 over the past few years.

With the installation of more lightning arrestors on the system it's possible that we might be able to reduce lightning related outages. Because of the variable nature of lightning it would be impossible to eliminate all lightning problems, and it's difficult to calculate what type of improvement could be expected. But for comparison purposes, let's assume that we could reduce lightning related outages by 50% if we installed extra lightning arrestors on every phase of the 27.6 kV system approximately every 5th pole.

The cost of providing this improvement can be estimated as follows:

- We have approximately 500 km of 3 phase 27.6 kV overhead line installed. If we assume approximately 35 meters between poles, we can estimate that there are 500,000 meters/35 meters = 14,300 poles on the 3 phase 27.6 kV system.

  (There would actually be fewer than 14,300 poles because a number of pole lines are double circuited. However each circuit would require separate arrestors so the assumption is self correcting)

- To install an arrestor on each phase at every 5th pole would require:
  14,300/5 x 3 arrestors = 8580 arrestors.

- Further, we have approximately 136 km of 1 phase 27.6 kV line. Using the same assumptions, we can estimate that there are 136,000 meters/35 meters = 3885 poles on the 1 phase 27.6 kV system.

- To install an arrestor on each phase at every 5th pole would require:
  3885/5 = 777 arrestors.

- At approximately $100 apiece and $75 labour to install, it would cost $1,600,000 to install all the arrestors.

- Let's further assume that 50% of the arrestors could be installed in known trouble areas and provide 80% of the improvement. An investment of $800,000 could then potentially provide an improvement of 80% of half the system SAIFI attributed to lightning, or .8 x ½ x .4 = .16 improvement. This equates to:

  $800,000/.16 x .1 = **$500,000 for a .1 improvement in system SAIFI**

- The cost/benefit of installing the remaining arrestors can be calculated by assuming the remaining 50% of arrestors would only provide 20% of the improvement. So a further investment of an additional $800,000 would only provide .2 x ½ x .4 = .04 improvement. This equates to:

  $800,000/.04 x .1 = **$2,000,000 for a .1 improvement in system SAIFI**

*Replace Aging Infrastructure*

Another way to improve reliability is to replace aging and defective equipment. Ideally aging infrastructure should be replaced just before it begins to fail or pose a safety hazard to employees or the public. Practically, it's difficult to pinpoint the ideal replacement date, but it's clear that even with the best maintenance and automation programs, aging equipment eventually needs to be replaced. This makes it a challenge to assign a comparative cost for reliability improvement if infrastructure needs to be rebuilt anyway.

Take for example London Hydro's subdivision cable replacement program. In 2003 we decided to replace all the cables and transformers in Berkshire subdivision for a cost of $300,000. This area consists of 3 km of cable and we experienced 4 cable faults in 2002. On average, each fault contributed 0.000875 to total system SAIFI.

One way to assign a comparative cost for a .1 improvement in SAIFI might be to reason that by rebuilding the subdivision now instead of say 3 years from now, we estimate that we will prevent 'X' outages that would have otherwise occurred in the meantime. By varying the number of expected outages and by calculating the cost of advancing the subdivision rebuild by 3 years, we can calculate a range of values for the estimated cost related to a .1 improvement in SAIFI.[3]

Recall that if it costs you $100 to do a certain amount of work this year, and if you estimate a 3% inflation rate, it would cost you $100 $\times (1.03)^3$ = $109.27 to perform the same work in 3 years. However if you invested your capital today at 7%, you would only need to invest $109.27 $/ (1.07)^3$ = $89.20 in order to have enough capital in 3 years to perform the work. So assuming a 3% inflation rate and a 7% investment rate, a project that costs $100 to perform today would only cost $89.20 in present value funds if it could be deferred by 3 years. Similarily, it would cost you 100/89.2 = 1.12 times more to advance a project by 3 years.

In the Berkshire subdivision, let's assume three separate scenarios. Suppose we deferred the rebuilding work by 3 years to when it became absolutely necessary due to customer complaints, and assumed in the meantime, that we would experience a total of either 2, 4, or 8 faults over the three year period. Using the figures above, if we waited three years to rebuild the subdivision instead of rebuilding it now, we could save $300,000 – ($300,000 x .892) = $32,400.

On average each fault in Berkshire adds .000875 to London Hydro's system SAIFI, so for the three scenarios this equates to:

If 2 faults were prevented:

$32,400/(.000875 x 2) x .1 = **$1,851,429 for a .1 improvement in system SAIFI**

If 4 faults were prevented:

$32,400/(.000875 x 4) x .1 = **$925,714 for a .1 improvement in system SAIFI**

If 8 faults were prevented:

$32,400/(.000875 x 8) x .1 = **$462,857 for a .1 improvement in system SAIFI**

3. Keep in mind that the rebuild could not be put off indefinitely - at some point in time the number of faults experienced by the individual customers would become unbearable even if the faults did not have a considerable affect on system SAIFI. All aging infrastructure eventually has to be rebuilt.

## *Summary*

We have developed 3 separate ways to determine what London Hydro's cost/benefit threshold should be for a .1 improvement in SAIFI. Using various methods, we have developed a range of costs from $463,000 to $4,825,000 for different methods of providing a .1 improvement to system SAIFI.

As shown in Table 3, at a cost of $83,333 for a .1 improvement in SAIFI, the installation of a single recloser on London Hydro's worst feeder is a very cost effective way of improving reliability. However, installing a recloser on the best feeder at a cost of $8,000,000 for a .1 improvement is not cost effective – there are better ways to improve SAIFI.

It should also be noted that although dry ice cleaning is not the most cost effective way to improve reliability, the condition of SEs can only ever get worse. It's therefore prudent to continue cleaning the most critical SEs. Another point to note regarding SEs is that the amount of improvement possible is limited since SE flashovers only contribute .04 to the total system SAIFI. Reclosers on the other hand, have a theoretically unlimited capacity to improve SAIFI.

Comparing various methods of improving SAIFI, it seems reasonable to select $2,000,000 per .1 improvement in SAIFI as the threshold below which it would be cost effective to install reclosers.

## Analysis

Using the $2,000,000 threshold, we can see from Appendix A that for 19M28, London Hydro's poorest performing feeder, it appears to be cost effective to install as many as 6 reclosers on that feeder. Likewise, the $2,000,000 threshold is reached after installing 5 reclosers on the 2nd to 4th poorest feeders, etc.

However, in practical terms, it would be very difficult if not impossible to coordinate the protection on more than 3 reclosers in series on a feeder. Therefore using 3 reclosers as a practical limit, it would follow that we should install 3 reclosers on the 15 worst performing feeders, 2 reclosers on the 16th to 20th, and 1 recloser on the 21st to 31st worst feeders for a total of 66 reclosers. Reclosers on feeders ranked better than the 31st feeder would exceed the cost/benefit threshold.

Although the details are not shown here, the theoretical improvements in SAIFI have been calculated using the data in Appendix A and the installation of 66 reclosers as described above could result in a total improvement of approximately .68 in system SAIFI. If the dry ice cleaning program and the installation of lightning arrestors performed as well as we've estimated, that could add a further improvement of .1 and .2 respectively to overall system SAIFI.

As a final note, it should be noted that all of London Hydro's poorest performing feeders have already been outfitted with automated switches. Wherever we would be installing 2 or more reclosers on a feeder, the automated switches are likely already installed in the exact locations where reclosers would provide the most benefit. At approx. $5,000 each to move, it is clear however that it is worth the cost to relocate the switches in order to get the maximum benefit from the reclosers. The automated switches will still be useful at feeder open points and at frequently used switching locations. The cost to move the switches is included in the incremental cost calculations in Appendix A in the column for the 2nd recloser.

## Conclusion

Reclosers are a cost effective way of improving SAIFI reliability.  Comparing various methods of improving reliability we have been able to develop a cost/benefit threshold of $2,000,000 per .1 improvement in SAIFI.  Any project that has an equivalent cost equal to or less than this amount is worth doing.  Going forward, London Hydro should therefore plan to install as many as 66 reclosers on the 27.6 kV overhead system.

This method of defining the cost for an equivalent .1 improvement in system SAIFI can also be used to prioritize worthwhile projects.  The lowest cost improvement involved the replacement of cables in Berkshire subdivision (assuming the prevention of 8 or more faults).  It also appears to be cost effective to select the most critical SEs and continue the dry ice cleaning program on a yearly basis, although the actual results will have to be monitored to confirm that flashovers can in fact be prevented.  Similarly we should invest some resources to study the assumptions made in the lightning arrestor example to determine if the widespread installation of additional arrestors should be considered.

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# 2009 Quality of Supply Report


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~ August 2010~

Many thanks go to Hassan El-Madhoun, E.I.T. who had a big contribution to updating most of the graphs and other valuable material in this report.

# Executive Summary

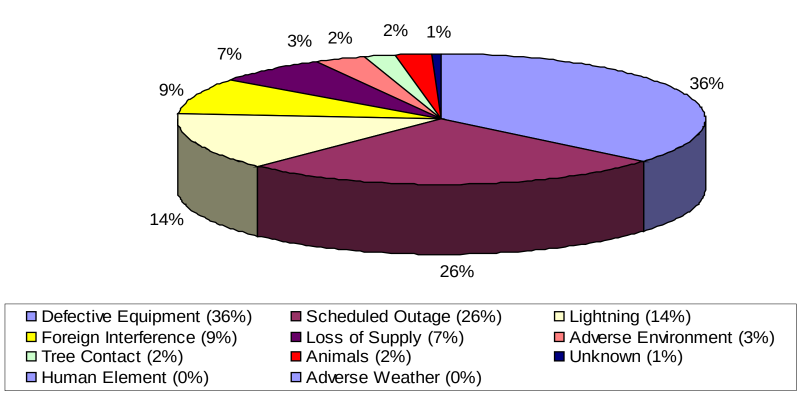
This report is intended to provide documentation to support budget allocations for next year's asset management plan. It provides an opportunity to ramp up investment in areas which lack adequate funding, particularly in the area of rehabilitation of the residential underground distribution system, as the build-up of old cable reflects in its poor performance.

London Hydro, as one of the largest utilities in southern Ontario, is striving to provide high standards of reliability when delivering electricity to its customers. It is a practice to publish internally the reliability metrics reported to the OEB at the end of each year. On the other hand it is valuable to conduct an annual benchmark assessment, to reflect our latest performance compared to industry peers as well as all the utilities in the province. This year it is also worth recognizing that in 2009 we met our target service quality indicators (SQI), as mandated by the provincial regulator. Further more, 2009 represents our best year on record in terms of reliability scores. The initial part of this report accomplishes all of the above utilizing the outage data recorded throughout 2009.

Over the last decade it was found essential at London Hydro to continuously analyze our reliability data in the context of our own environment and not only through yearly comparison. Since 1994, London Hydro streamlined the process of acquiring outage data and developed multiple avenues to establish correlations between investment, performance improvement, and various other trends. The EDRO analysis (*Engineering and Design Related Outages),* which was developed more recently, takes advantage of known system factors that affect the performance in a more deterministic way than others, factors for which significant investment can make a difference in the short and long-term. This combination of elements gives value to the forecast and the trends for future performance at London Hydro.

The 2008 QSR issued last year pointed out that in spite of the conscious efforts to eliminate system deficiencies over the years, *Defective Equipment* forms a category of elements that will always need attention as their contribution to the total system underperformance continues to remain a large share. The same is valid for this past year's analysis. Year 2009 contributed 36% to the total SAIDI from this category alone, while year-end SAIFI contributed even more (43%).

**Cause Category Contribution to the 2009 SAIDI**



This large contribution comes from the fact that defective equipment involves multiple sub-causes and pieces of equipment. The budgets allocated at the beginning of the past decade focused on multi-year programs that tackled problematic equipment that was presenting evidence and trends of deteriorated performance. As the impact from these problems faded away in the overall numbers (broken porcelain insulators, pole fires configurations, flashovers in air-insulated switchgear, etc.), another serious problem escalated and still remains outstanding: ***cable faults***.

Our underground distribution system is aging faster than the old cable is being replaced. An internal updated report on the rehabilitation of aging underground infrastructure identifies a large quantity of cable past its life-expectancy which continues to operate in the system with decreased reliability. Without an accelerated plan of cable rehabilitation (i.e, 30 to 50 km per year at a minimum), this old cable could amount to an unmanageable quantity in the next decade. In 2009 cable faults continued to represent approximately 30% of SAIDI and SAIFI in the equipment failure category. If the impact of cable faults in 2009 would hypothetically be mitigated or minimized to a negligible value, at least 0.07 in SAIDI could be saved yearly, and SAIFI would be decreased by as much as 0.15 from the yearly total.

* * *

## Table of Contents

# 1 Introduction

This annual report offers a broad overview of London Hydro's system reliability performance for the previous year. While comparing the year-end corporate reliability indices to the internal performance targets as established by the Ontario Energy Board, the report also provides an in-depth analysis of our outage data.

No high impact events were experienced in 2009 that affected the reliability numbers greater than usual. Although lightning activity was quite visible, the year was not marked by any abnormal weather related events. The availability of the bulk supply electricity system was adequate but once again equipment failures on our own distribution system made up the largest factor contributing to a decreased system performance overall.

Nevertheless, year 2009 scored the best SAIDI and SAIFI indices ever in 15 years of reliability history at London Hydro. Both performance indicators represented only a fraction of the targets of the previous year (2008).

Year 2009 marked the beginning of the design and re-construction of the primary network in the downtown core by creating a *ring bus* supplied from Talbot TS. The 13.8 kV supply is being maintained until the network ring bus will be energized, tested and operational in 2010.

This report is separated into two sections for ease of reading:

- The main body of the report - contains a synopsis of the performance measures, programs aimed at improving the system's reliability, and specific tasks accomplished in 2009, as well as projects proposed for 2010.
- A series of appendices - containing detailed reliability analysis of the system performance using historic outage data, and updates to previous action items.

# 2 Distribution System Overview

London Hydro supplies the vast majority of its customers at low voltage, i.e. 120/240 V or 120/208Y V or 347/600Y V. Sometimes commercial and industrial load facilities (including generation facilities) are supplied at higher distribution voltage levels for practical and economical reasons. The number of customers at the end of 2009 was 145,302 equivalent to a 1% increase from the previous year.

# 3 Classification of Interruptions by Cause

A customer interruption is defined in terms of the primary cause of the power outage. These causes have been assigned to 11 codes; they are as follows:

**I. Adverse Environment**

Customer interruptions due to equipment being subjected to abnormal environment such as salt spray, industrial contamination, humidity (flashovers), corrosion, vibration, fire or flooding.

**II. Adverse Weather**

Customer interruptions resulting from rain, ice storms, snow, winds, extreme ambient temperatures, freezing fog or frost.

**III. Animals**

Customer interruptions caused by creatures such as birds, squirrels, raccoons.

**IV. Defective Equipment**

Customer interruptions resulting from equipment failures such as deterioration due to age, incorrect maintenance or imminent failures detected by maintenance.

**V. Foreign Interference**

Customer interruptions beyond the control of the utility such as vehicle accidents, dig-ins and foreign objects.

**VI. Human Element**

Customer interruptions due to the interface of utility staff with the system such as incorrect records, incorrect use of equipment, incorrect construction or installation, incorrect protection settings, switching errors.

**VII. Lightning**

Customer interruptions due to lightning striking the distribution system resulting in an insulation breakdown and/or flashovers.

**VIII. Loss of Supply**

Customer interruptions due to problems in the bulk electricity supply such as under frequency load shedding, transmission system transients, or system frequency excursions.

**IX. Scheduled Outages**

Customer interruptions due to the disconnection at a selected time for the purpose of construction or preventive maintenance.

**X. Tree Contacts**

Customer interruptions caused by faults due to trees or tree limbs contacting energized circuits.

**XI. Unknown/Other**

Customer interruptions with no apparent cause or reason which could have contributed to the outage.

# 4 Reliability Summary for 2009

## 4.1 Quality of Supply Measures

The performance measures of a distribution system, which are referenced throughout this document, are defined by the following equations:

- **SAIDI** Average customer interruption[1] duration (in hours) per year. (***Unavailability of Supply***)

$$SAIDI = \frac{Total\ Customer\text{ - }Hours}{Total\ Customers\ Served}$$

- **SAIFI** Average number of interruptions[1] per customer per year. (***Security of Supply***)

$$SAIFI = \frac{Total\ Customers\ Interrupted}{Total\ Customers\ Served}$$

- **CAIDI** Average customer interruption duration (in hours) per interruption. ***(Outage Restoration Time)***

$$CAIDI = \frac{Total\ Customer\text{ - }Hours}{Total\ Customers\ Interrupted}$$

## 4.2 Reporting on Performance Indicators

The Ontario Energy Board has requested from all the LDCs in the province to report their reliability indices at the end of each year with and without *Loss of Supply*. At the same time, no more segregation of the Major Event Days (MEDs) is allowed in the reporting numbers due to the inconsistency between utilities in the way their reliability statistics were calculated and reported. As such, London Hydro provides the reliability statistics to the OEB including any MED experienced throughout the year. Those special events continue to be monitored internally.

Last year was the first year when London Hydro included all the MEDs[2] in the yearly calculations (retroactively) to better reflect the actual performance of the system even in the years with high impact events. The comparison of the 2009 year-end indices in this section to the previous year (when London Hydro experienced two MEDs) is a bit distorted by the impact of those 2008 events and therefore it is less relevant.

[1] An interruption is any disruption in service that causes customers to lose their supply for more than one minute.
[2] Year 2003 experienced the Loss of Supply event known as the *blackout*; the abnormal indices values associated with it were however disregarded since they do not characterize the state of our system.

Similar to last year, the *2009 Quality of Supply Report* uses historic data exclusively to forecast future reliability performance. The trends observed are using real data but ignoring the effects of the *Loss of Supply* related outages which are specifically excluded from the analysis. This creates an objective image of our system performance, while still being compliant with OEB's requirements. The SAIDI and SAIFI in this section are plotted similar to last year, using all the outage data collection since 1994 and including all the MEDs less the 2003 blackout.

The *EDRO Analysis (Equipment and Design Related Outages),* formulated for the first time in the *2007 Quality of Supply Report* (Section 7), was updated with one more year of outage data. The breakdown of the defined categories continues to create an emphasis on the positive contribution of the key factors which reflect the system robustness: *Adverse Environment, Adverse Weather, Animal Contacts, Defective Equipment, Lightning, Tree Contacts.* The non-EDRO components, *Foreign Interference, Human Element, Scheduled Outages* and *Unknown* are evaluated as a subset of cause categories which do not reflect the state of our infrastructure. Overall, the purpose of the future outlook is to leverage the complete data and provide a more realistic relationship between investment and performance.

### 4.2.1 SAIDI – Performance Analysis

## SAIDI: 0.89 HOURS PER CUSTOMER PER YEAR

London Hydro's SAIDI performance for 2009 surpassed any historic value finishing with less than one hour of interruption duration (53 minutes) – this is over a 50% reduction from the average of the previous five years. SAIDI excluding Loss of Supply at the end of 2009 measured 0.82. As mentioned at the beginning of the report, SAIDI in 2009 represented a fraction (39%) of SAIDI in 2008.

A linear regression was used on outage data between years 1994 and 2009 to forecast the SAIDI index out to year 2015. Figure 1 below illustrates the various trends observed from the last 16 years of data, providing different indicators of future performance. With the addition of all the MEDs from the original historic data to the previously normalized curve, several noticeable peaks in the total SAIDI history are now displayed; they correlate to the years when MEDs were experienced. In between these peaks, there are the natural occurrences of "average" years but as it can be easily seen, over the long-term the outage duration has gradually diminished corresponding to a better SAIDI index.

The values on the EDRO curve oscillate similar to the SAIDI overall historic totals, which leads to the fact that these cause categories are indeed the driving force in reducing the outage duration long term. The EDRO trend shows a significant overall reduction: about 60% decrease in outage time over a two decade time span. Once again as pointed out in last year's analysis, the system's improvement characterized by the EDRO factors can only be sustained with continuous funding. The non-

EDRO components of the SAIDI model are limited in contribution so any shift in their trend may not seriously affect the reliability.

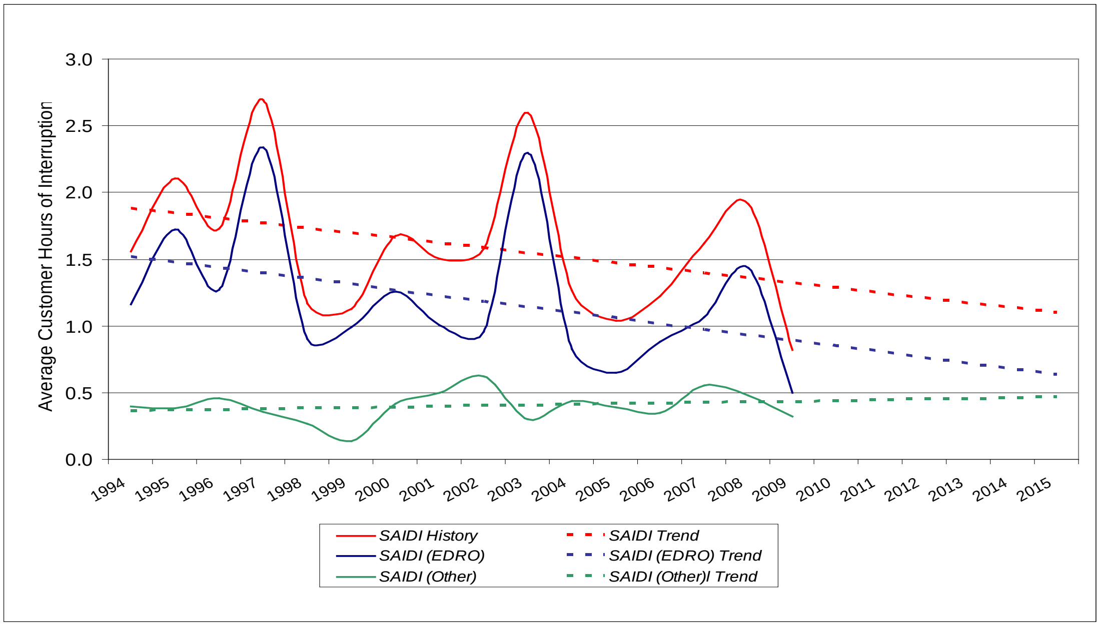



**Figure 1, SAIDI – Historical analysis and trends**

Figure 2 compares London Hydro's SAIDI performance for each of the last five years to the average value of a select group of larger Ontario utilities[3], and to the average of all Ontario LDCs over the same time period. Needless to say, London Hydro has always observed a remarkable SAIDI index compared to the average of the other utilities in the province, and generally competitive to that of our peers in the industry.

[3] Eight large utilities are considered for separate benchmarking: Enersource, Brampton, Powerstream, Horizon, ENWIN, Ottawa, Toronto and Veridian.

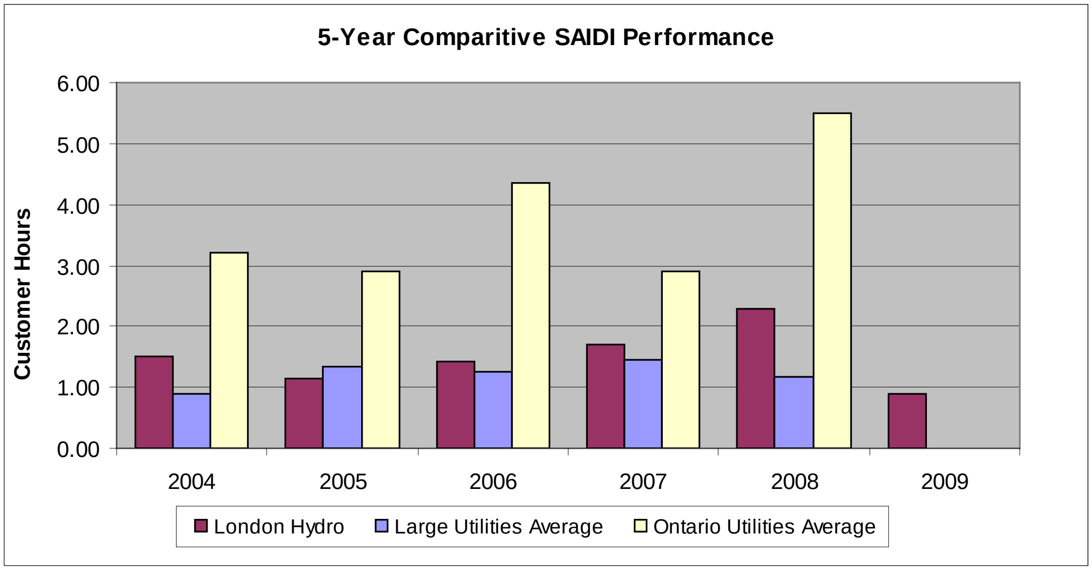



**Figure 2, SAIDI Performance – London Hydro vs. other LDCs**

The historical yearly values for SAIDI between 1994 and 2009 with MEDs included are plotted by cause in Appendix 5. To help illustrate which categories have a larger contribution, the interruption duration uses the same scale in all the graphs. Apart from *adverse weather* and *loss of supply,* which oscillate throughout the years due to natural or external factors in nature, *defective equipment* remains the significant contributor. Yet, with all the money invested in the infrastructure over the last decade, the trend of a slow but continuous improvement is unquestionable.

### 4.2.2 SAIFI – Performance Analysis

## SAIFI: 1.59 INTERRUPTIONS PER CUSTOMER PER YEAR

The SAIFI performance achieved in 2009 also made the best record in history for London Hydro, much below the average of the last five years of 2.18 interruptions per year. Yet, it should be noted that four of the previous five years experienced at least one MED. The year-end recorded 1.39 service interruptions per customer when excluding the Loss of Supply related outages. Again, SAIFI ended at a fraction of the 2008 year-end value (67%).

Regression analysis was again used on outage data from 1994 to-date for the SAIFI index outlook. In general, the trend lines (SAIFI and SAIFI – EDRO) maintain yearly correlation with SAIDI. The years which experienced MEDs (now included in the analysis) also display the poorest performance in SAIFI. Figure 3 illustrates the trend line for SAIFI is generally descending, which is consistent with the SAIDI graph.

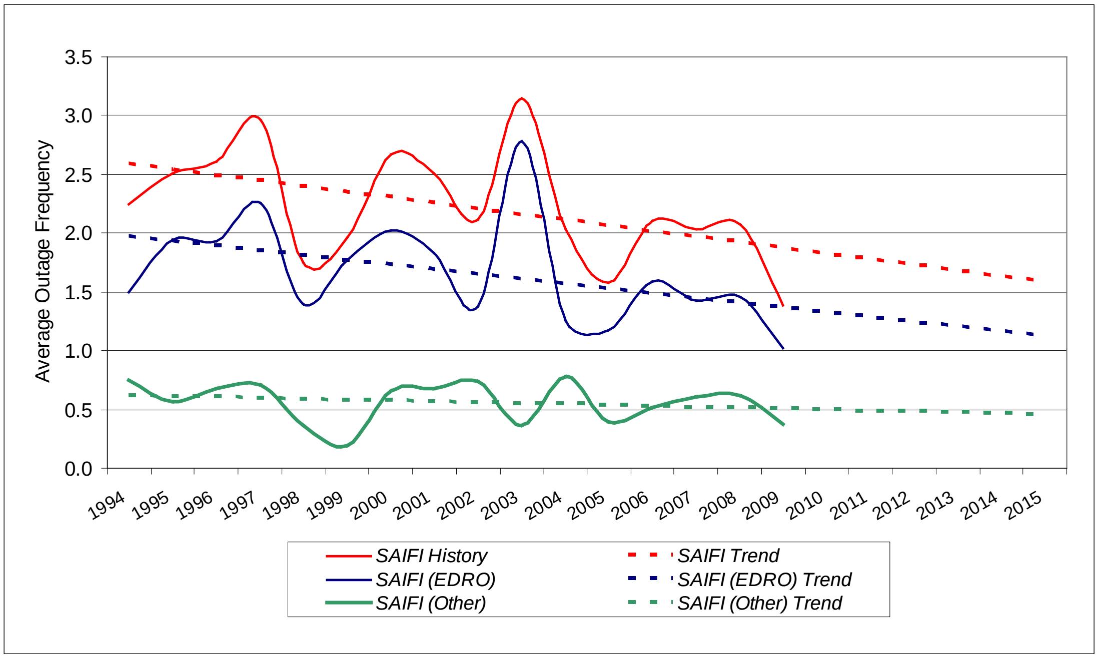



**Figure 3, SAIFI – Historical analysis and trends**

The EDRO model plotted for the same time interval with the total SAIFI values illustrates steady and continuous improvement: approximately 40% drop in customer interruptions on average between 1994 and 2015. While the peaks mostly coincide for these two curves, the non-EDRO elements factored in are not indicative of 'good' versus 'bad' years. They only represent a smaller but fairly stable contribution to the SAIFI index overall. Even with significant year to year fluctuations, the SAIFI outlook continues to follow that of its EDRO trend; that is consistent improvement demonstrated by the EDRO components as a whole.

London Hydro's SAIFI performance for the last five years (Figure 4) is compared to the average value of the same eight larger utilities used in the SAIDI comparison, as well as the average of all Ontario LDCs indices since 2004. While the average of eight equivalent utilities has been better than our SAIFI for the most part, year 2009 marks not only our best record in history but also one of the best compared to the provincial average as well as our industry peers.

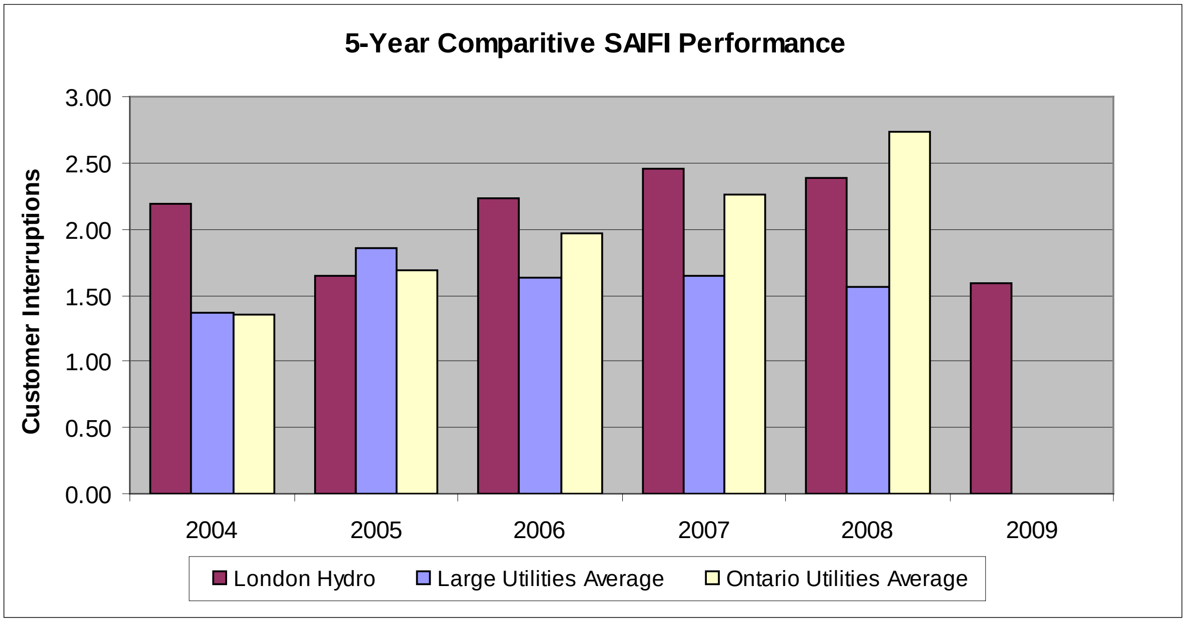



**Figure 4, SAIFI Performance – London Hydro vs. other LDCs**

Appendix 6 presents the contribution of the SAIFI components using historic data since 1994 (MEDs included). Each cause category is illustrated individually to illustrate its part in the overall total. While *adverse weather* and *loss of supply* have large fluctuations, the majority of categories are showing moderate progress. Most important *lightning* and *defective equipment,* the two leading components are following an encouraging, steady course of improvement.

### 4.2.3 CAIDI – Performance Analysis

## CAIDI: 34 MINUTES PER INCIDENT

In terms of outage response time, CAIDI in 2009 measured an average interruption duration of 34 minutes per incident (i.e. 0.56 hours per incident). By definition CAIDI is a measure of SAIDI over SAIFI; the incredibly low SAIDI in 2009 drove a significantly low value for CAIDI as well. In 2008, CAIDI finished at 58 minutes or 0.96 hours per incident on average.

London Hydro's response time to power outages for the past five years is illustrated in Figure 5. The out of range 2004 and 2005 provincial values are assumed to be the result of inconsistent data collection among many LDCs, hence it is irrelevant. What is noticeable on the graph for the past three years (and including 2009) London Hydro's CAIDI has been under one hour – not only is this in line with the average of the eight larger utilities but much better than the provincial average.

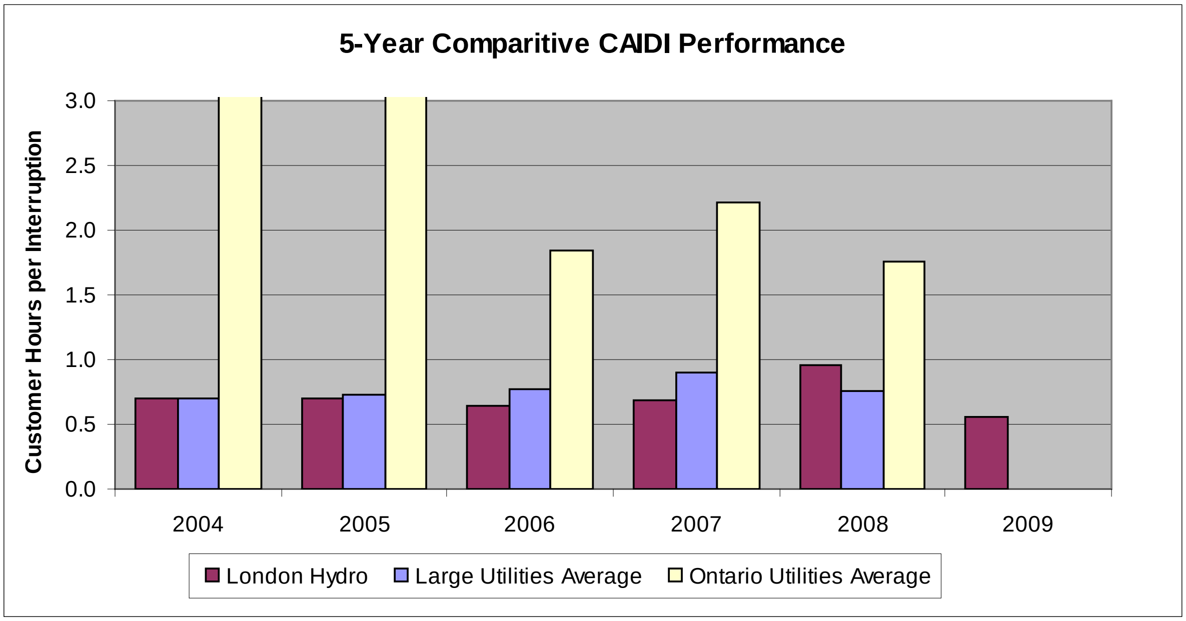



**Figure 5, CAIDI Performance – London Hydro vs. other LDCs**

# 5 Analyzing Outage Data

The MEDs, due to their sheer magnitude, tend to mask underlying distribution system weaknesses. As such, for internal purposes the remainder of the QSR analyzes outage data without MEDs even if there was one experienced throughout the year. Year 2009 fortunately did not have any; hence the analysis is straight forward.

As in the past, it is valuable to analyze the system performance based on voltage class to provide a sense of certainty of where money should be spent to improve reliability. Planned outages, loss of supply and interruptions on the Nelson Network are segregated from the rest of the data. However, when evaluated together, they seem to add up to a considerable portion of the total SAIDI and SAIFI. The 27.6 kV system as a whole is the prevalent outage contributor year after year; it is undoubtedly the one in most need of funding to achieve better performance.

Figure 6 indicates that over 50% of SAIDI in 2009 came from outages occurring on the 27.6 kV system. It should be noted that planned outages also contributed significantly to the interruption duration (25%). The other voltage classes in the breakdown were minimal. Nelson Network interruptions did not contribute anything to the totals.

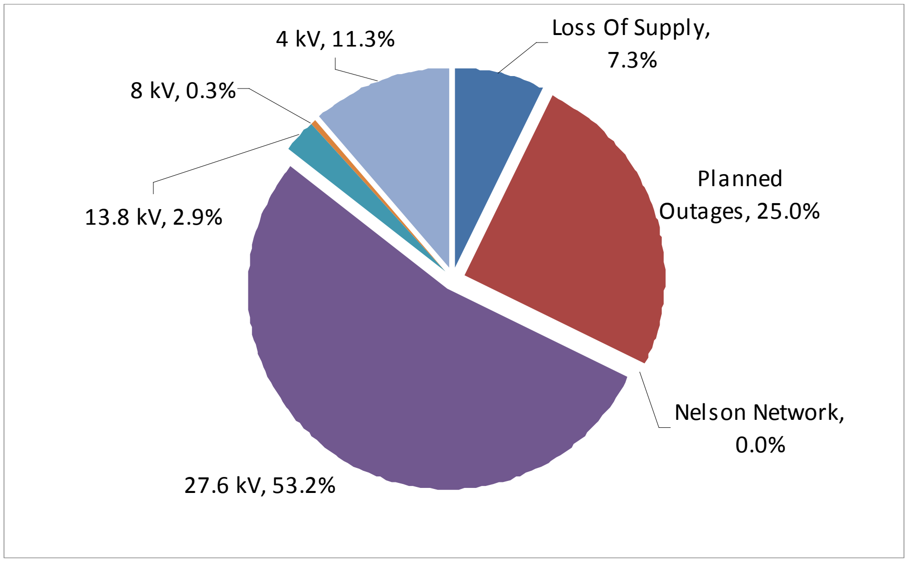



**Figure 6, Interruption Duration (SAIDI) breakdown by Distribution Voltage**

On the other hand, the SAIFI breakdown represented in Figure 7 pinpoints a much larger role played by the 27.6 kV system than in the outage duration (68% vs. 50%). For the most part, breaker operations are the reason for a higher contribution to SAIFI than to SAIDI. Also, loss of supply had a larger effect on SAIFI – twice as large as on SAIDI; in contrast planned outages contributed less to SAIFI than to SAIDI, only 9%. Again, no contribution from the Nelson Network was observed.

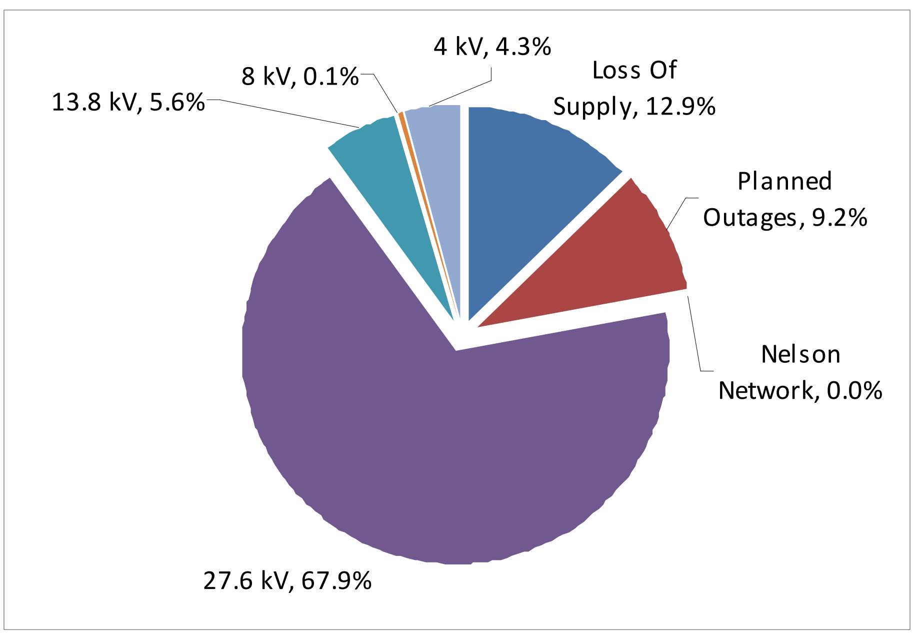



**Figure 7, Interruption Frequency (SAIFI) breakdown by Distribution Voltage**

Outage duration in 2009 broken down by cause category is illustrated in Figure 8. Not unusual, *Defective Equipment* is the leading contributor to the total outage duration with 36%. It is a clear indication that equipment wear-out and failures are problems that greatly affect a distribution system and as such, they require constant attention. The next highest contribution to SAIDI came from *Scheduled Outages* (26%); in this category construction was the major reason for its high position. Significant activity in the *Lightning* category during 2009 placed it as the third largest contributor to SAIDI. Lightning and its effects are reviewed again later in this report.

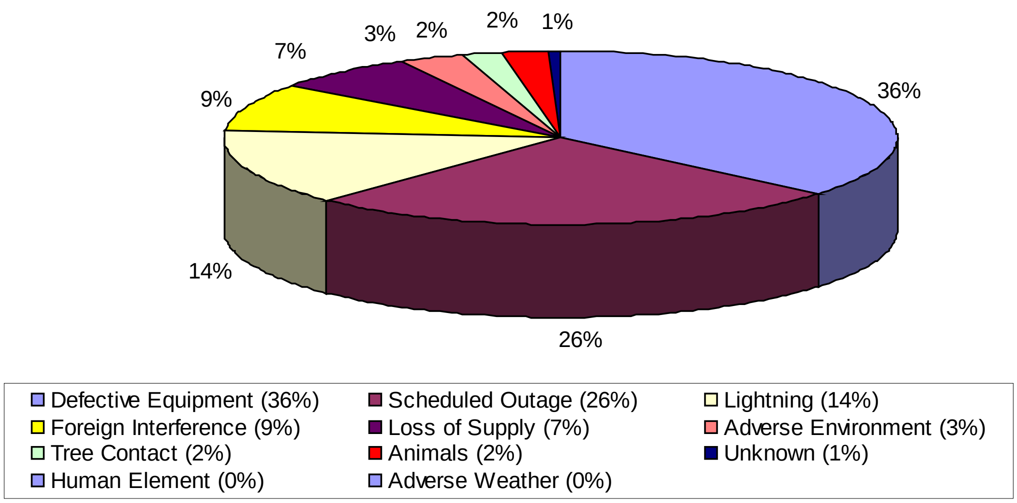



**Figure 8, Proportion of Customer Minutes of Interruption (SAIDI) by Cause**

*Defective Equipment* was also the largest cause responsible for the frequency of interruptions (43%). Figure 9 illustrates the disproportion of customers affected by this category versus anything else on the system. SAIFI's next largest contributor was *Loss of Supply* at 13%. Loss of supply outages will likely affect a large number of customers since the problems are usually at the transformer stations, involving one or more breakers. Buchanan TS for example had a fault on one of the buses supplying multiple feeders and interrupted over 10,000 customers in one day. *Lightning* dominated SAIFI in almost equal proportion as it did in the SAIDI breakdown. This is addressed in Section 7.2.1.

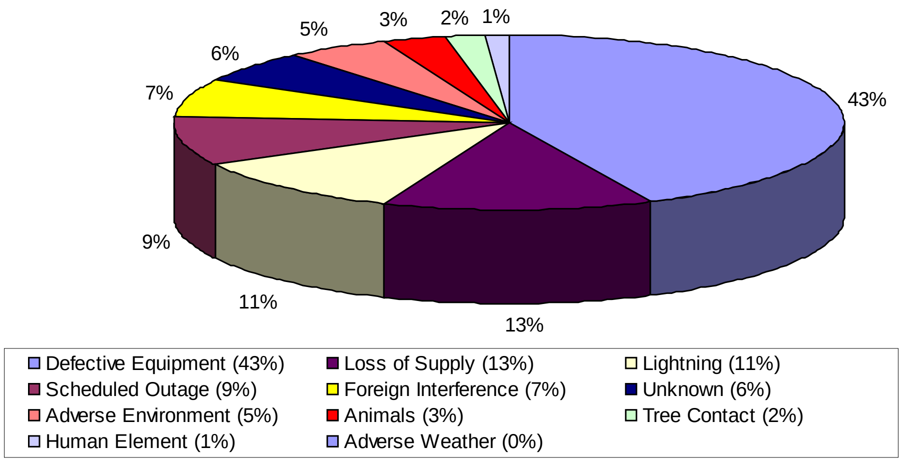



**Figure 9, Proportion of Number of Customers Affected (SAIFI) by Cause**

Of all the categories, *adverse environment* and *defective equipment* are grouped together every year in the equipment-related outage performance analysis; Figure 10 represents the impact from each piece of apparatus by voltage class. This tool has helped prioritize the categories of equipment identified as problematic over the years for which solutions have been sought. Primarily, the result of equipment aging but also the poor design and/or other manufacturing deficiencies necessitated multi-year plans to be implemented to correct those problems. Although we have maintained the focus on replacing electrical equipment, weaknesses in the infrastructure will always creep in and affect our system.

Many projects have proven successful over the last several years in that the related outages were eliminated or minimized as a result of the actions taken: replacement of vintage porcelain insulators susceptible to breaking, eliminating pole fire configurations, and decommissioning of air-insulated switchgear have all improved the overall performance. By contrast, failures on old polymeric cable are an increasing concern as the system is getting older and the quantity of underground cable that has passed its life expectancy is not being replaced at an adequate rate. The updated cable rehabilitation report[4] published in 2010 speaks about the upcoming challenges in our utility to scale up our cable rehabilitation program by allocating increased funding.

[4] Engineering Report Update 2010 – *Rehabilitation of Aging Underground Residential Distribution Systems* – April 2010

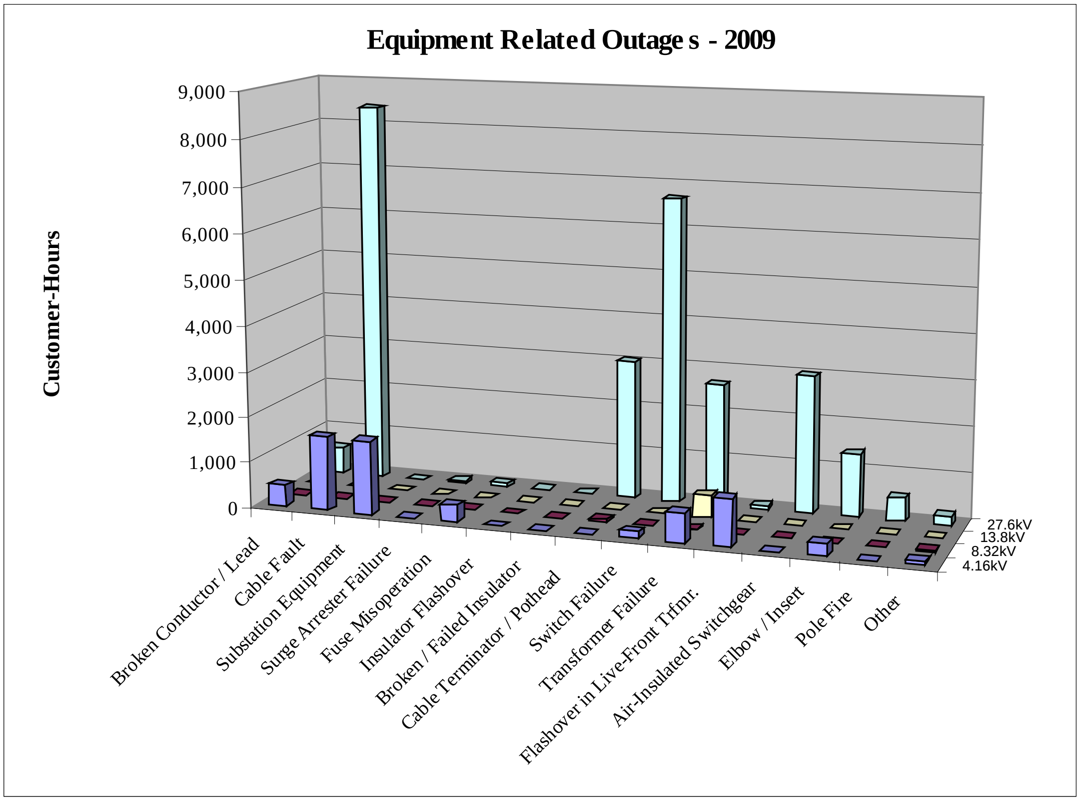



**Figure 10, Customer Hours of Interruption by Voltage and Equipment Type (SAIDI)**

The outage duration in customer hours associated with the performance exhibited by various types of equipment is illustrated in Figure 10. Similar to 2008, the cable faults in 2009 peaked in their contribution to the defective equipment category. Over 10,000 customer hours of interruption were experienced (across all voltage levels) counting a total of 27 outages: 18 on the 27.6 kV system; another 8 happened at 4.16 kV and one on the 13.8 kV system (three of the 27 were on lead cable, the remaining were failures of polymeric cable). This leading cause was responsible for the underperformance similar to the previous year; the yearly number of cable faults counted in 2009 remains one of the highest in the last decade. Historic outage records define the average age of failure for cables rated 28 kV around 24 years while the cables rated at 5 kV have an average failure age of 30 years.

Further to the analysis presented in the cable rehabilitation report it was concluded that approximately 130 km of old cable have been replaced to-date since year 2000. At the same time, an estimated 345 km of cable past its life expectancy remain in service today. The build-up of aged cable will continue to increase reaching up to potentially 500 km of cable by 2020, **if** no rehabilitation takes place. This very argument urges the need for a future financial structure focused on preventing cable failures or mitigating their effect at a minimum, by tackling the rehabilitation of older subdivisions in a priority sequence over the next decade. The SPOORE analysis[5]

[5] The *SPOORE* acronym reflects the following factors utilized in the analysis: *Safety*, *Performance*, *Outage*, *Operability*, *Risk*, *Environment.*

has been used for many years and it will continue to be applied in order to determine what projects to recommend from year to year, based on yearly outage performance analysis. Using up-to-date outage data and GIS based tools such as *GeoMedia* provides dynamic support in the analysis, integrating the most recent information on our infrastructure.

A prominent second contributing component to equipment related underperformance in 2009 were *defective switches*. With 25 incidents counted in this sub-category, several had a much larger impact since they involved breakers at the stations; a couple of examples are a failure experienced at a load break switch (at an open point), as well as a Cooper oil recloser on a main circuit. The destructive failure of the oil recloser caused great safety concern due to the oil spill and as such, three other existing oil reclosers remaining in the system were replaced. Altogether, defective switches accounted for almost 7,000 customer hours of interruption, the above two examples added up to 48% of the total. Together with the cable faults contribution, these two sub-categories added up to half of the outage duration time (equipment related outages only) depicted in the graph in Figure 10.

Among the next three leading components to equipment related SAIDI outages, *air-insulated switchgear* surprisingly showed up again after several years of impeccable performance; this was unexpected but otherwise the impact was minor. Flashovers were experienced four times, two inside the same enclosure that was later changed out with a motorized SCADA-controlled load centre since it is located on a main 600 amp circuit from Talbot TS.

Of the above major contributors to outage duration, London Hydro will continue to actively address the cable aging process by means of yearly subdivision rehabilitation; switches that failed at risers or on overhead transformers have been addressed this year by transitioning from porcelain to polymeric cutouts. Also air-insulated enclosures are part of a continuing multi-year program to reduce flashovers in this equipment all across the system.

In 2009 equipment-related outages contributed 26% to the total outage duration, slightly more than in 2008 (21%).

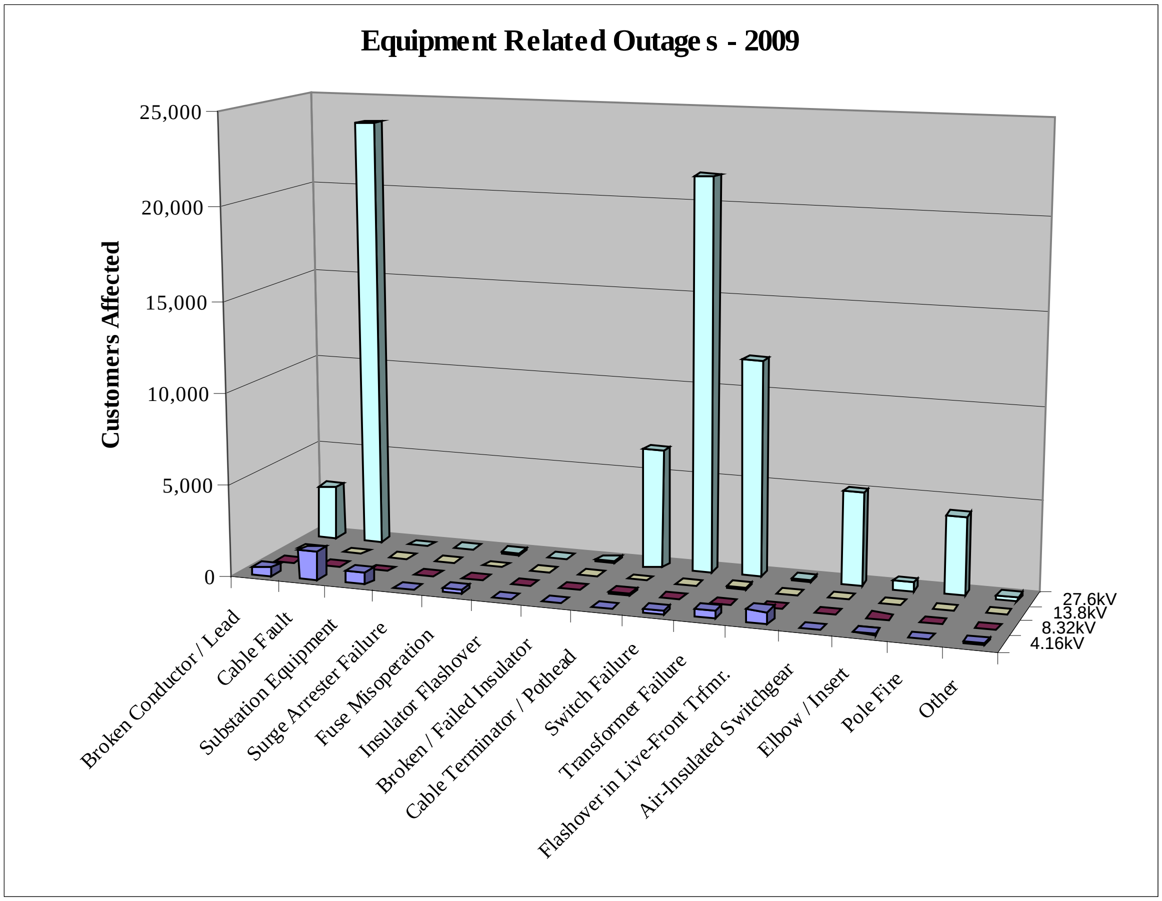



**Figure 11, Affected Customers by Voltage and Equipment Type (SAIFI)**

Figure 11 lists all the contributors to SAIFI caused by equipment related outages. Overall, outage frequency for these components represented as much as 35% of the total system SAIFI, 6% higher than in 2008.

The impact of numerous *cable failures* experienced in 2009 is reflected in outage frequency as much as in outage duration. With a contribution of over 25,000 customer interruptions, cable faults were as significant as they were last year. The majority of these events happened on the 27.6 kV system; with four breaker operations experienced at this voltage level, the impact on SAIFI was high. From the rest of the sub-categories the contribution from *switch failures* was significantly higher in proportion than in SAIDI for equipment related outages. As many as 21,000 customer interruptions were attributed to switch failures. Incidents of a certain nature, such as the failure of the oil recloser, happen occasionally on the system and can be followed up but prevention is harder unless a trend becomes noticeable. *Transformer failures* were also noticeable; some were due to changing units that were leaking badly in the field which and were replaced under emergency. For this type of equipment there is no proactive program at London Hydro since it is hard to predict failures other than through the annual audits on the underground system. The budget has been tailored accordingly to keep pace with the need of transformer replacements.

# 6 Advanced Technological Implementations

Research into state-of-the-art technologies and their implementation have always played a strong role in the engineering efforts at London Hydro. For the past ten years the goal has been to increase automation in the system, to build robustness through implementation of new designs and engineering practices, and finally to achieve the best models of safety and success in serving our customers. Continuous efforts have been geared throughout the years to increase and/or maintain the positive trends in reliability as presented in Section 4.2.

In 2009, investment continued in order to populate the system with more Viper reclosers, counting another ten in-service by the end of the year: one was installed on the 32M6 (a feeder reroute) and three more to replace the old Cooper oil reclosers; in addition six units were installed at brand new locations. Over 30 reclosers are now in service providing the ability to remotely isolate and/or restore healthy portions of faulted circuits; this has given our operators tremendous flexibility in bringing the customers back on line in a reduced amount of time. Our performance target is to continue to score lower yearly SAIFI values in line with our peers, which should lower SAIDI as well.

The advanced technology of solid dielectric gear spread further throughout the entire underground system; motorized units are now installed in new industrial areas while standard load centres continue to populate our residential distribution system as well as retrofit older subdivisions in need of rehabilitation. In 2009, eight more solid dielectric gear were purchased and installed for this purpose.

A new project of monumental importance was initiated at London Hydro in 2009 and will be brought to completion and commissioning in the fall of 2010: **refurbishment of the electrical supply of the downtown network**. The city core is home to hundreds of businesses which rely on their electricity to be supplied from an interconnected secondary network system, energized by five 13.8 kV feeders emanating from Nelson TS. Each feeder is split into two underground circuits of lead conductor by one of five oil switches. The ten resulting ‘children' feeders, -1 and -2, support the load of approximately ninety network transformers which step down the 13.8 kV delta system to a 3-phase, 4-wire 208Y/120 V network system. A simplified diagram of the system as it exists is presented in Figure 12; the existing system will continue to operate until the new system is commissioned.

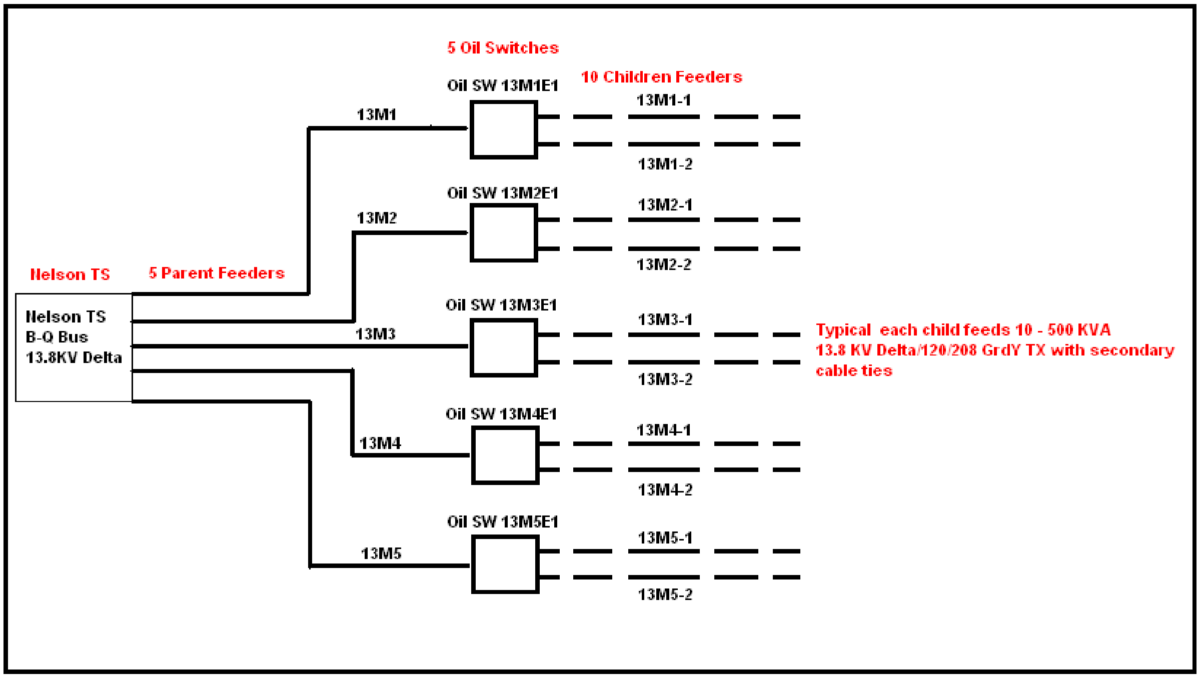



**Figure 12, Existing supply for the downtown network**

The existing system, although constructed to be capable of withstanding dual failure contingencies, has begun to show its age and is no longer worth sustaining in its current configuration. The 13.8 kV supply from Nelson TS is also becoming less reliable. It is expected that the Nelson network bus will reach end-of-life prior to the re-build date proposed by Hydro One.

The network load is less than 30 MW and it can be supplied from the excess capacity at Talbot TS. Building four new load centre based substations will enable the functionality of the oil switches to be replicated and the switches retired. Finally, installation of a new feeder from Talbot along with ten 27.6/13.8 kV transformers will allow the five Nelson feeders to be removed from service.

The new system will penetrate the downtown core through multiple load centres to form a *ring bus.* The load centres located at Sub-10, Sub-11 and Sub-12 are solid dielectric switches, similar to the ones utilized on the regular distribution system but with enhanced Schweitzer protection. The advanced protection will instantly separate any faulted component, while maintaining continuity of supply to the network.

This extensive work, spreading over two years, is now projected to be a $6M investment when fully commissioned. The project required a multi-step approach and intensive engineering. Although a preliminary schedule estimated completion by November 2009, the project scope and strategy were re-visited numerous times to ensure sufficient and adequate attention was given before “going live”.

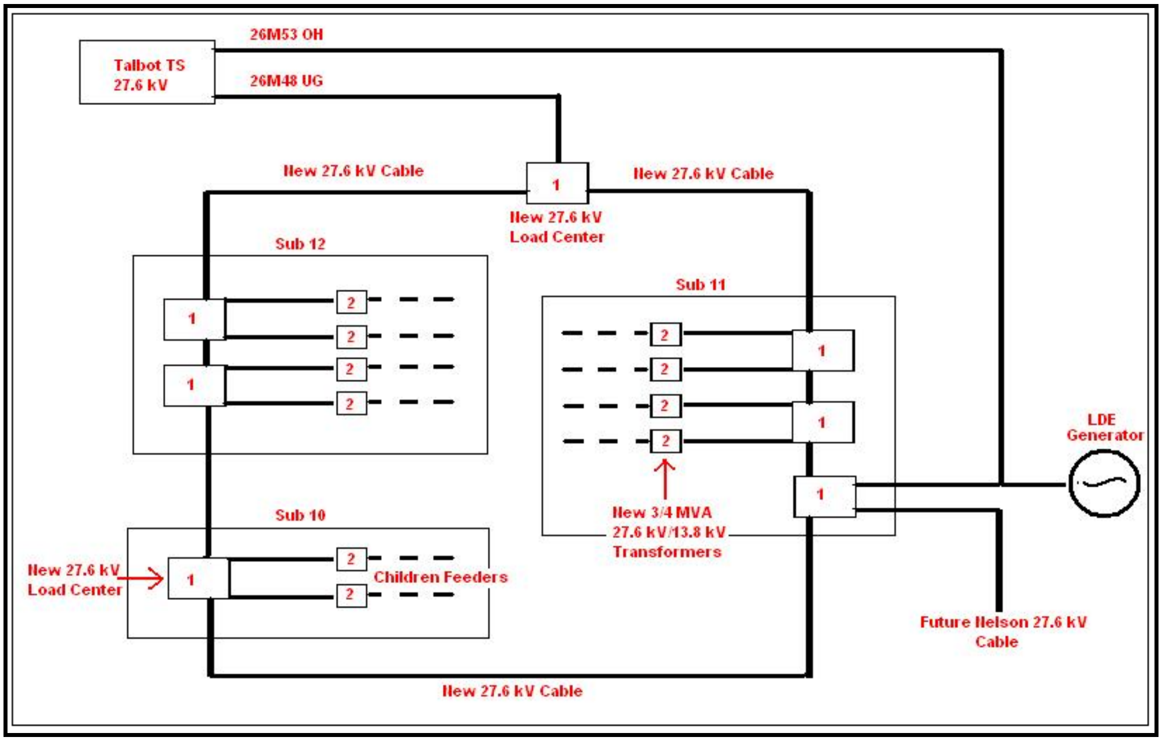



**Figure 13, Configuration of the new 27.6 kV supply to the downtown network**

The schematic of the new 27.6 kV supply for the downtown network which will be commissioned in 2010 is presented in Figure 13.

# 7 Reliability Improvement Measures

Reliable power supply at London Hydro has been and continues to be an equally strong commitment to our residential, commercial and industrial customers. This section provides highlights of the various programs implemented both on the underground and on the overhead systems during 2009.

## 7.1 Rejuvenating the U/G System

### 7.1.1 Residential Underground Primary Distribution Plant

After Phase 1 of the subdivision rebuild in two main areas of the city, year 2009 finalized the reconstruction of the underground plant in White Hills and in Park Lane Estates (Phase 2). This was the ninth year in a large rehabilitation program of rebuilding aging subdivisions. These two residential areas were identified for rebuild in 2008 but due to the large scope (cable replacement and partly voltage conversion) the work was carried out over two years (2008 and 2009).

The risk of failures that were prevalent among cables, transformers, etc. should be virtually eliminated now since the subdivisions were rebuilt; the two areas should significantly improve their performance.

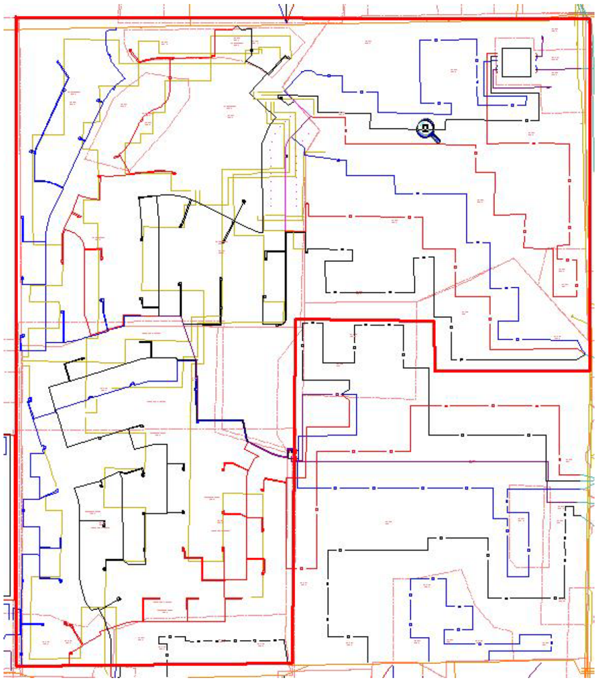


**Figure 14-A, White Hills cable rebuild project**

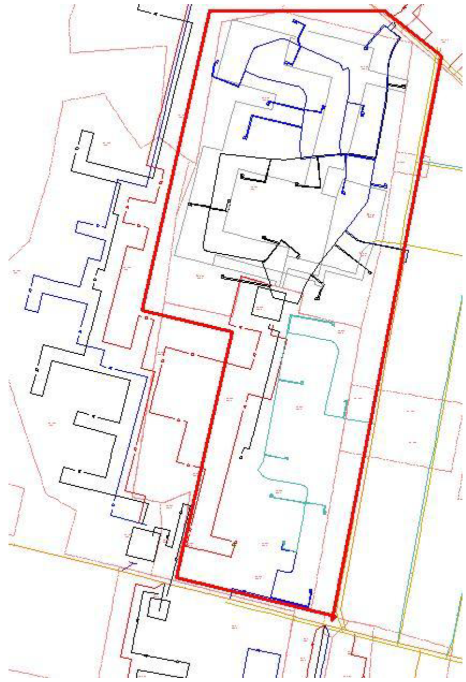


**Figure 14-B, Park Lane Estates rebuild**

The analysis to help prioritize rebuilding the underground supply for areas most prone to experiencing failures identified further subdivisions where rehabilitation can no longer be delayed. They will be addressed in 2010 (see Section 8.2).

## 7.1.2 Pad-mounted Sectionalizing Switchgear

Several failures of air-insulated enclosures were experienced in 2009. After repetitive flashovers inside a 600 amp unit it was decided to replace it with a motorized load centre since it was on a main circuit from Talbot TS. This unplanned event does not invalidate our effort to eliminate flashovers that was initiated in 2006 with the introduction of the new solid dielectric switchgear. Eight new units were purchased and installed in the field last year: four 600 amp load centres and four 200 amp units; some air-insulated switchgear were decommissioned. Unlike the first couple of years into this multi-year plan[6] when replacement took place aggressively to address severely degraded units with intense corona activity, only five units were dealt with last year of the ten originally budgeted for. The scope of work in this area was gradually diminished as the first year of switchgear replacement improved our system performance for this equipment considerably. The program will continue at a reduced pace unless switchgear failures become an issue again.

[6] Distribution Reliability Report, *Performance Review and a New Perspective for In-service 27.6 kV Three-Phase Air Insulated Sectionalizing Enclosures*, May 2006.

## 7.1.3 The Downtown Network

The downtown network which feeds customers in the core area of the city is comprised of many elements that also need to be modernized: old network transformers, unsafe vaults that need to be rebuilt and an extensive network of interconnected secondaries. Some improvement to the potential damage caused by the secondary faults was achieved recently through the installation of cable limiters on the secondary interconnected grid; they are meant to quickly isolate faulted sections. It is expected that the fault values on this secondary grid can easily reach 100,000 amps.

Among the achievements in 2009 was the installation of eight more PILC fault indicators; five had been originally installed in 2008. These devices are installed on three-conductor cable; they proved useful during an outage caused by a lead cable fault where crews reported that fault indicators helped reduce the fault locating time. Year 2009 was also the year when the last customer on a spot network was automated: London Free Press is now communicating back to SCADA.

# 7.2 Reducing Risk in the Overhead System

## 7.2.1 Lightning Capital of Canada

Lightning data within the boundaries of the City of London for 2009 was collected from Vaisala Inc. Figure 15 illustrates the 2009 flash density. A visible concentration of flashes can be observed to the west of the city boundary.

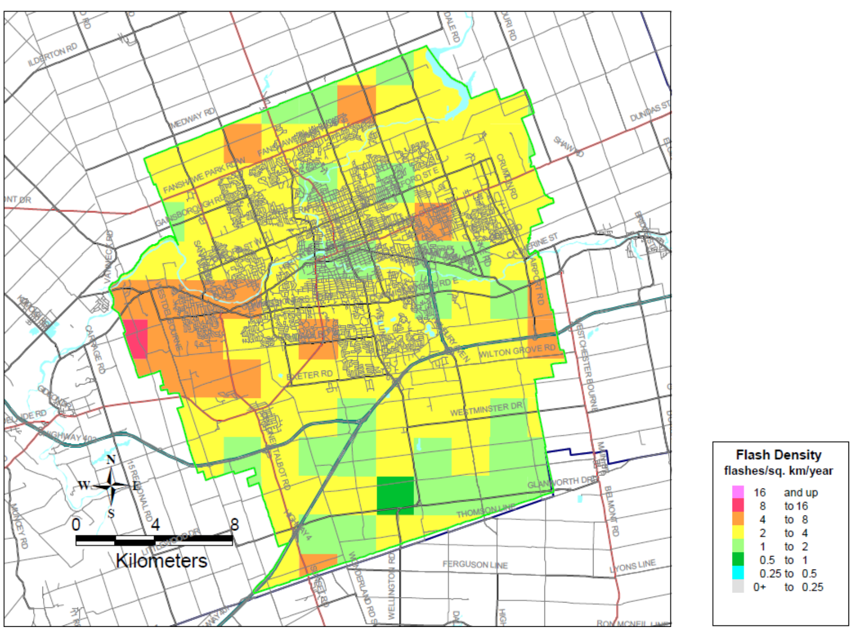



**Figure 15, Flash Density in 2009**

Year 2009 experienced 1,238 flashes within the city's boundary compared to a total of 1,447 the previous year; the annual average derived from the past five years is 1,500 flashes per year. The 2009 flash point plot calculated for the city boundary is depicted in Figure 16.

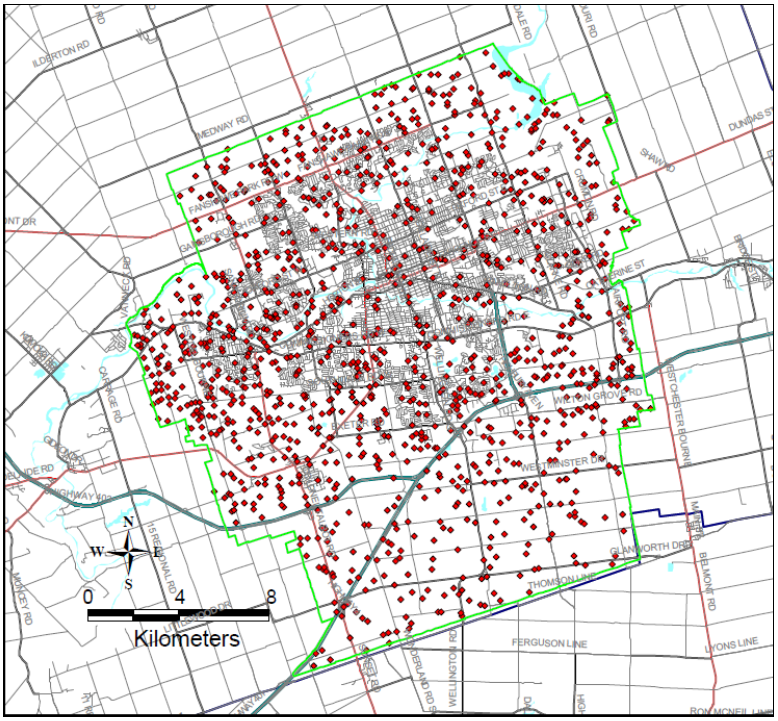


**Figure 16, Flash Point Plot for 2009**

The correlation between number of power interruptions due to lightning and the annual number of flashes counted in our city boundary has been monitored for a number of years. Year 2009 has been added to the comparison in Figure 17. Over the last two years, it seems we have been more immune to lightning as in previous years.

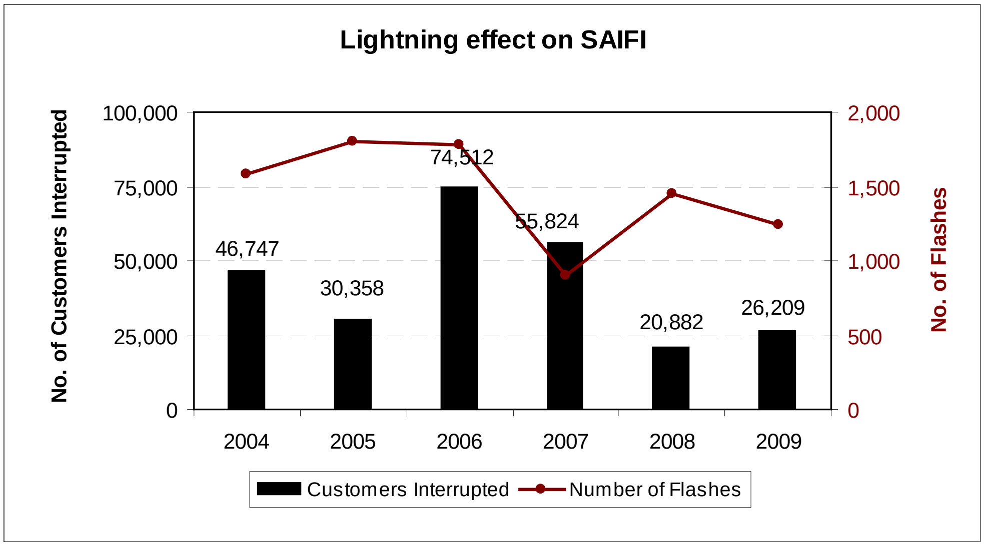



**Figure 17, Correlation between Lightning Flashes and Interrupted Customers**

In 2009 there were 69 lightning-related outages experienced at London Hydro (compared to 89 in 2008), yet slightly higher number of interruptions than in the previous years. This is the first year London Hydro decided to tackle this issue rather than just observing the effects and budgeted $250K to provide solutions to mitigate lightning impact.

Historic lightning data for London was provided to Kinectrics whom London Hydro engaged last year to study the lightning effects on its system. Some of the recommendations that came out of the report indicated two effective methods for protection of an aerial distribution system against direct and induced lightning strokes: a shield wire or lightning arresters. While the first method is not considered practical nor economical for existing structures, lightning arresters installed at every pole and for every top phase conductor can be effective in reducing lightning effects from both direct and induced strokes. London Hydro will be implementing this latter recommendation on several feeders with sensitive customers as a pilot project in 2010. It is hoped that by using the recommended technique, the number of momentary outages as well as sustained interruptions will be noticeably reduced.

### 7.2.2 Pole Maintenance

After many, many years of money invested in the maintenance of the overhead system, London Hydro has almost completed the replacement of Grey Munsell poles. These poles were believed to pose a safety hazard due to their poor painting technique which traps moisture internally causing premature failure. Hundreds were identified in the field and practically all have been eliminated from the system. Even though to the best of our knowledge this type of poles no longer exist in our distribution system, if more are found through inspections they will then be addressed. The Grey Munsell program is otherwise complete.

## 7.2.3 Porcelain Insulators Impact

Thousands of porcelain insulators of different types and vintages that were susceptible to failure have been exchanged over the course of many years. Of the originally 5,400 identified insulators, about 450 were scheduled for replacement in 2009 and they were changed out. With less than 200 units left to replace in 2010, this undertaking initiated in 2001 is finished. It is estimated that a total of around 5,600 insulators were replaced during the multi-year program.

No broken insulator was reported in 2009 and it is highly expected that the improvement in their performance will remain visible year after year.

## 7.2.4 Live Contact from Animals

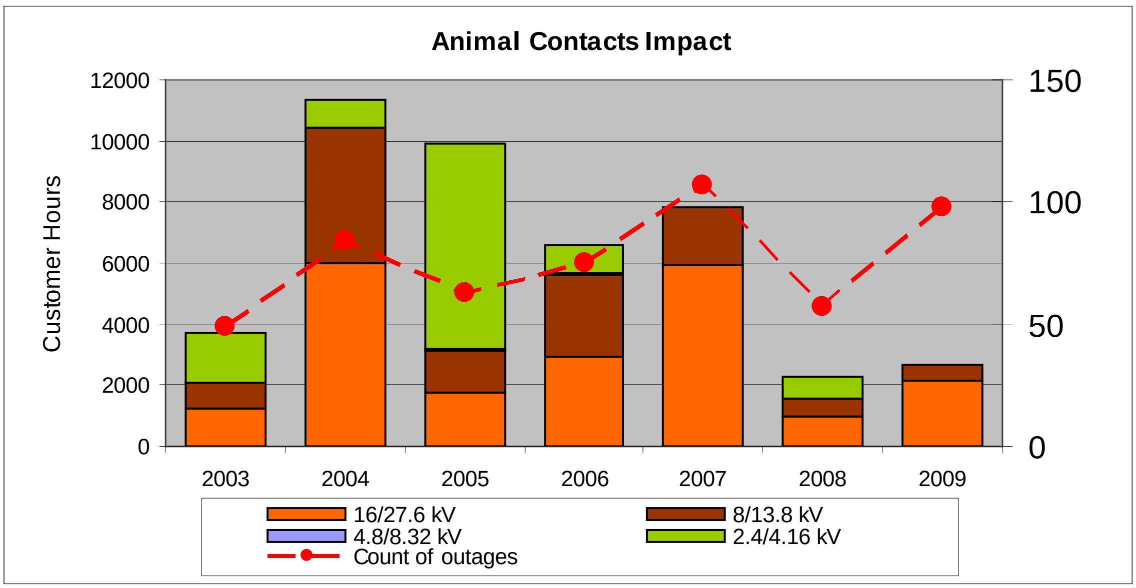



**Figure 18, Impact of Animal-Caused Outages by Voltage Class**

As it was noted in last year's report, the influence from animal contacts on the system does not seem to have any correlation with the state of the infrastructure. Furthermore, it seems to affect the system differently irrespective of the number of incidents (see Figure 18). Even though the new standard practices of animal contact prevention are applied to any riser or overhead transformer, animals are still contacting our live equipment causing interruptions of various lengths of time. What is noticeable from the breakdown of outages by voltage class is that the 27.6 kV system continues to be affected the most.

Year 2009 experienced a much larger number of animal contact related outages, 98 versus 57 the previous year. It was also larger than the average of the past five years (77). As the graph in Figure 18 indicates, 2009 experienced a smaller outage duration for a much larger number of incidents compared to other years. In spite of the random activity, the last two years have diminished effect from animal contacts in general.

### 7.2.5 Pole Fire Mitigation

Year 2009 counted three incidents when a pole ended up on fire or simply burnt. Without extensive investigation the locations do not correlate with circuits pre-determined to be prone to pole fires (i.e., Christmas tree, or pin style insulators on wood cross arms). Neither one of the situations involved known failure mechanisms (Christmas tree configuration has in fact been eliminated). However, two out of the three are sites nearby areas identified as pole fire risks.

After rebuilding all the pole lines that are prone to pole fires, this sub-category should be a much lower risk to our system reliability. The multi-year program is still underway and it has achieved about 60% completion to-date including the work carried out in 2009.

# 8 Reliability-driven capital projects

## 8.1 Summary of 2009 Work Completed

A subset of projects completed in 2009 are identified in this section; many of them were proposed for improving the system's overall reliability, and also to re-enforce the infrastructure in places that were critical to the safe operation of the system.

- **Replacing Aging Underground Infrastructure**

  Two main residential areas which contained aged cable and were deteriorating in performance were recommended for rebuild in the 2007 updated Addendum 6 of the *Multiyear Rehabilitation Plan for Aging Underground Residential Distribution Systems.* The subdivisions are known as White Hills and Park Lane Estates. The projects had an extended scope so each was scheduled over a 2-year period of time: 2008 and 2009. Phase 2 was completed by the end of 2009.

- **Conversion of 27.6 kV Air-Insulated Switchgear to Load Centres**

  Ten existing air-insulated enclosures on the 27.6 kV system were proposed for removal/replacement in 2009. The budget permitted only eight to be addressed. It is estimated that one third of the total population of air-insulated switchgear planned for replacement has now been completed.

- **Fault Indicators**

  Approximately 30 fault indicators were placed inside transformers supplying power at 27.6 kV in the general area of Byron. Extended outages have been experienced in the subdivision earlier due to the difficulty in troubleshooting and the challenging configuration of the distribution system.

- **Fault Indication on the Nelson TS Network Conductors**

A new technology that was tried at London Hydro towards the end of 2008 was a fault indicator that works on three-conductor cable such as PILC (used on the primary network system). Due to its successful implementation in 2008 it was deemed worthwhile investing in several more units. Another eight fault indicators on the PILC cable were deployed on network feeders in 2009.

- **Network Rebuilds**

The condition of concrete manholes, vaults and roof slabs is monitored annually by a structural engineer and recommendations are made to the Engineering department. The money budgeted last year for work on the network allowed for the following:

- Vaults VT01 and VT45 (housing NT35 and NT54 respectively) were rebuilt; the network transformers were replaced at the same time;
- Manhole M549 was eliminated; the system had to be reconfigured to accommodate its removal;
- The Police Station, originally fed from the network, installed a customer-owned substation which permitted elimination of three NTs and VT079.
- Roof slabs were replaced on VT050 (containing NT64 and NT67) and two out of ten sections of roof slab on VT051 were also replaced; this vault contains NT5, NT82 and NT91;
- Several roof slabs were also replaced on MH051, MH338, MH449, MH813, MH503 and MH193;
- Two additional manholes had the floor and the walls repaired: MH526 and MH527.

- **New 27.6 kV Capacity**

A new feeder was constructed out of Talbot TS #2 (26M22) which allowed the 32M6 feeder from Wonderland to be off loaded. The released capacity at Wonderland TS will now support the developing load in the new Lambeth and Talbot planning districts. The project included re-routing a portion of the 32M6 circuit.

- **New Automation on the System**

  - Four Viper reclosers went into service at various locations on existing feeders (three replacing Cooper oil reclosers that were retired); six more units were installed at brand new locations for a total of ten.

  - During 2009, SCADA communication was installed at London Free Press, the last customer on the spot network that did not have telemetry.

- **Reinforcing the Overhead System**

  - All the remaining depreciated poles that were recommended for replacement prior to the 2009 pole testing were completed at the end of 2009.

  - In 2004 London Hydro identified 182 Grey Munsell poles that posed a safety hazard and initiated a replacement program. The last 24 poles remaining in the system were replaced.
  - All the vulnerable makes and vintages of porcelain insulators on the 27.6 kV system that were identified for replacement in 2001 have been changed out (5,400 in total). The multi-year program was almost completed by the end of 2009.
  - One large project to mitigate pole fires was completed in 2009: a main feeder pole line along Clarke Side Road between Gore and Trafalgar St. including Firestone Blvd.

## 8.2 Summary of 2010 Work Planned

A listing of the projects with brief description of the scope is presented in this section. These proposals form part of the Asset Management Plan for 2010. The projects which target reliability improvements are as follows:

- **Subdivision Rehabilitation through Cable Silicone Injection**

  The updated report for rehabilitation of aged residential distribution infrastructure published in 2010 identifies a big gap between our cable replacement rate and the build-up of cable past its lifetime expectancy. In order to increase the amount of cable to be rehabilitated every year, London Hydro's approach shifted from a subdivision rebuild to silicone injection of the polymeric insulation of old cable. This constitutes a pilot project utilizing silicone injection technology. A similar technique by another vendor was successfully applied in 2002 in Westmount. The technology selected this time provides a more flexible approach to injection from a field constraint standpoint and longer warranty. Up to 30 km of old cable is budgeted for silicone injection in 2010 covering three subdivisions: Westminster Park North East (Phase 1), Westmount West and a large portion of Grenfell. Judging the success of this extensive project and the expected savings, silicone injection may become a long term alternative to rehabilitate hundreds of kilometers of old cable which continue to deteriorate in performance.

- **Voltage Conversion in Nelson Park**

  This old subdivision contains many live-front transformers, some as old as 45 years and many started to leak oil. The existing 28 kV rated cable is presently operating at 4.16 kV. By replacing these transformers and converting the voltage from 4.16 kV to 27.6 kV, several items will be accomplished: environmental concerns, improvement in operability and voltage support during peak loading. Approximately 72 transformers will be replaced under this budget item.

- **Conversion of 27.6 kV Air-Insulated Gear to Load Centres**

  Year 2010 is the fifth year in this program; however, the budget has been reduced from previous years. It is believed the program can continue at a slower pace while maintaining the reliability of the system. Up to three units will be addressed in 2010.

- **Backup Supply Installations for Underground Radials**

  Multiple outages in two areas without backup supply (Meadowbrook and Scenic View - Byron) led to the decision to create “looped” systems in these 30-year old subdivisions where outages have been prolonged by their inherent design. The operators will thus have the ability to restore power during an outage using the additional supply in these areas.

- **Fault Indicators**

  New fault indication technology allows for fault indication on outside of the transformer via an LED allowing our crews to quickly locate the fault without opening every transformer, isolate the faulted cable and return power to the affected customers quickly. This item includes the installation of fault indicators in areas with complex or lengthy underground distribution systems.

- **Part Conversion of Sub-97**

  This project will soft convert two of three 8.32 kV feeders at Sub-97 (97F1 and 97F3) to the 32M1 and 32M6 feeders from Wonderland TS using stepdown transformers; Sub-97 was identified as the most deficient substation at London Hydro. Currently, if one of the Sub-97 station transformers fails during system peak the other transformer would be unable to support the entire 8.32 kV load. This would cause extended outages to many of the customers on the 8.32 kV system. This conversion will permit for the entire load to be carried by one of the station transformers, increasing system reliability.

- **Network Rebuilds**

  This item involves the design and installation of structural entities such as concrete manholes, vaults, roof slabs and steel vault grating at various locations. The condition of the above items is monitored through inspections by a structural engineer and our operations staff. This item is used to resolve all safety and reliability issues resulting yearly from these inspections.

- **Reinforcing the Overhead System**

  A multitude of programs have been in place for several years to address equipment on the overhead system which is prone to failure.

  - Further pole testing in 2009 yielded just over in 60 poles being fully depreciated. All these poles will be replaced in 2010.
  - Of the total population of 5,400 porcelain insulators identified originally, all have been replaced and some additional discovered later on. The last 180 are being completed in 2010 which will bring the total population addressed during this multi-year program to +5,650 insulators.
  - After completing many projects for the mitigation of pole fires, their impact has dropped significantly. For the year 2010, the budget item includes pole lines on Byron Baseline Road, from Colville Blvd to Griffith St; also, Wellington Rd from Chelster St to Baseline Rd will see some re-construction for 28 poles in total.

  A pilot project will be carried out to address prevention of lightning effects on our overhead distribution circuits, particularly with respect to momentary interruptions. Based on the Kinectrics study report received in 2010, the decision was made to install arresters on every pole for every top phase conductor on several feeders beginning with the 26M53 connecting a large generator who had multiple complaints (Fort Chicago); statistics indicate that on this feeder over 30% of the momentary interruptions in the last five years were due to lightning.

As they leverage the engineering analysis at London Hydro, projects such as the ones described above aim to improve reliability, as well as introduce enhancements to our distribution system through new designs and state-of-the-art equipment.

# 9 Under-Performing Feeder Analysis

Performance at London Hydro has also been analyzed for many years also at the feeder level; various means of reliability improvement have been proposed for the top ten worst feeders in each year. This type of analysis merges outage duration and frequency based on the number of customers on the individual feeder. The feeder-specific reliability indicators are known as FAIDI (*Feeder Average Interruption Duration Index*) and FAIFI (*Feeder Average Interruption Frequency Index*). To rank the most unreliable circuits, equal weight is being applied to both indices and the resulting value determines the position of each feeder (worst is the highest number). In the future, based on the targeted improvement, the weighting may be changed between the two coefficients (i.e., FAIFI ranking more dominant than FAIDI).

In 2009 the feeder analysis was performed similarly as in the past by excluding the planned outages; also, any MED would have been removed if one was declared during the year. The analysis results constitute an internal tool for establishing specific action items where deemed necessary, or simply evaluating the events with higher impact that ranked a feeder highly unreliable. This year five of the worst ten have also been identified to have made the top ten under-performing feeders in the last five years. They are listed in Table 1 below.

| 13M15 | 32M7 | 44F1 | 19M28 | 19M22 |
|---|---|---|---|---|
| 4X | 2X | 2X | 2X | 2X |

**Table 1, Repetitive Worst Performing Circuits**

Unlike previous years where the system indicated more weakness on various feeders at different voltage levels, 2009 ranked high seven feeders on the 27.6 kV system, two at 4 kV and recurrently for the fourth year, the 13M15 (at 13.8 kV). This shift is documented in the details presented in Appendix 2 on the performance of each of the ten. Further to this, Appendices 3 and 4 contain an update to action plans / recommendations from previously published reports.

The underperformance of Hydro One feeders for our customers does not go unnoticed. Since London Hydro cannot improve their system, we can only advocate on their behalf to Hydro One.

# Appendix 1

## ANNUAL PERFORMANCE DATA 2009

The table below shows London Hydro's performance for the past three years[7] measured in duration, frequency and number of outages; also, the percent changes between 2008 and 2009 are highlighted in red in the last column. The reliability measures improved significantly while the customer base increased by 1.0%.

| Distribution System Supply Reliability | | | | | |
|---|---|---|---|---|---|
| | | **2007** | **2008** | **2009** | **2009 vs. 2008** |
| **Customer Base** | | **142,106** | **143,801** | **145,302** | **1.0%** |
| Customer-hours off supply | Unplanned | 196,650 | 291,567 | 95,654 | -67% |
| | Planned | 37,373 | 34,269 | 31,815 | -7.2% |
| | **Total** | **234,023** | **325,836** | **127,469** | **-61.0%** |
| Customer Interruption Frequency (SAIFI) | | 2.18 /yr | 2.39 /yr | 1.59 /yr | **-33.5%** |
| Average Interruption Duration (SAIDI) | | 1.67 hrs | 2.29 hrs | 0.89 hrs | **-61.0%** |
| Number of Outages | Unplanned | 578 | 704 | 515 | -27.0% |
| | Planned | 430 | 453 | 447 | -1.3% |
| | **Total** | **1,008** | **1,157** | **962** | **-17.0%** |

[7] The three-year interval was suggested to utilities by the OEB in order to set internal performance targets.

# Appendix 2

## 2009 WORST PERFORMING FEEDER CIRCUITS

The feeder analysis in 2009 revealed that the majority of the ten worst performing circuits were on the 27.6 kV system. The indices that determine the ranking are calculated by using the duration and frequency of outages on the feeder, with respect to customers on that feeder only. Approximately 45% of all the customer minutes of interruption (less the planned outages) are attributed to these ten feeders, one of the highest percentages compared to previous years; the same affected customers on these feeders represent almost a similar percentage of the total interruptions: 43% (less the unplanned outages). These ten feeders were also responsible for 158 outages of a total of 661 unplanned outages in 2009.

**1.**

| **Supply Station:** | **Nelson** | **Feeder Circuit Designation:** | **13M15** |
|---|---|---|---|
| **Location: Nelson St. and William St.** | | | |
| Number of Customers on Feeder: | **816** | Position in 2008:<br>Average position in the last 5 yrs: | **8**<br>**17** |
| Customers Affected: | **7,630** | Unplanned Customer-Minutes of Interruption: | **178,462** |
| FAIFI: | **9.35** | FAIDI: | **3.65** |
| **Assessment and Planned Action:** | | | |

This feeder was ranked the most unreliable on the system in 2009. It has also been in the top ten worst feeders repeatedly in 2004, 2005 and again 2008. Previous reports have identified issues related to the state of the infrastructure (audit proposed in 2005) or the need to improve the lightning protection (in 2008). The poor performance of 13M15 in 2009 is attributed mainly to ***Foreign Interference:*** one particular customer substation caused five outages all resulting in breaker operations. These were responsible for more than half of the customer interruptions in this category. The privately owned switchgear was found defective and so the customer substation was disconnected after multiple outages occurred. Three additional breaker operations were attributed to the ***Lightning, Loss of Supply and Unknown*** categories. Lightning was also one of the noticeable contributors to poor indices on this feeder in the analysis of the previous year; mitigation methods will be implemented now that the lightning study is completed.

It has been recognized for a while that breaker reclosing functionality on 13M15 could be beneficial. Many of the above cause categories would have possibly created only an auto-reclosure given the nature of the temporary faults (such as lightning or unknown). It is recommended to contemplate upgrading the protection of the breaker to incorporate/activate reclosing functionality. Although none of the 13.8 kV feeder breakers reclose on a fault, in the case of a circuit with mainly overhead construction, reclosing could limit the number of breaker operations, hence contributing to better FAIFI and FAIDI for this feeder. If the transmitter's costs for protection enhancement at the station are not justified, then in-line reclosers at various locations may also be considered once further analysis is carried out.

Also, an audit was performed on this feeder in 2009; the results indicate opportunities for improvement which should be implemented.

**2.**

| Supply Station: | Wonderland | Feeder Circuit Designation: | 32M7 |
|---|---|---|---|
| Location: Southdale Rd. W/O Wonderland Rd. | | | |
| Number of Customers on Feeder: | **1925** | Position in 2008:<br>Average position in the last 5 yrs: | **4**<br>**36** |
| Customers Affected: | **11,487** | Unplanned Customer-Minutes of Interruption: | **350,173** |
| FAIFI: | **5.97** | FAIDI: | **3.03** |
| **Assessment and Planned Action:** | | | |
| This feeder also exhibited poor performance in 2008; it was ranked the seventh worst feeder on the system in 2009. However, no action was deemed necessary at the time since ***loss of supply*** was the major source for power outages. This very same cause was found responsible for about half of the interruptions in 2009. The other half of customers lost their power due to ***defective equipment*****:** several defective transformers – three in the Westmount East subdivision (scheduled for rehabilitation this year); also one cable fault (on cable 22 years old) accounted for the large FAIFI. In total, four breaker operations were associated with failure of equipment. London Hydro is aware that in parts of the city our infrastructure is aged and underperforming, and that a complete rehabilitation requires extensive resources. A priority sequence will continue to be applied while selecting critical subdivisions as candidates for rebuild; part of the rehabilitation process is to perform a transformer audit which identifies deteriorated units which are replaced in the field. Hopefully, these measures will in time mitigate the impact of the defective equipment on our system performance. London Hydro will also require HONI to advise on improvement plans at their transformer stations (including Wonderland) as loss of supply reached a higher than acceptable percentage in 2009 (Figure 6 and Figure 7 in the report). | | | |

**3.**

| Supply Station: | Sub-96 | Feeder Circuit Designation: | 96F1 |
|---|---|---|---|
| Location: Commissioners Rd. & Wharncliffe Rd. | | | |
| Number of Customers on Feeder: | **279** | Position in 2008:<br>Average position in the last 5 yrs: | **105**<br>**70** |
| Customers Affected: | **718** | Unplanned Customer-Minutes of Interruption: | **85,710** |
| FAIFI: | **2.57** | FAIDI: | **5.12** |
| **Assessment and Planned Action:** | | | |
| Only two outages occurred on this feeder during the entire year. The largest one in the ***adverse environment*** category was triggered by a flashover inside a live-front transformer. Although this type of occurrence is not rare, live-front transformers are gradually being faded out of the system. It is considered that this type of incident does not pose a risk for the customers supplied by this feeder so no action is proposed at this time. | | | |

**4.**

| Supply Station: | Sub-44 | Feeder Circuit Designation: | 44F1 |
|---|---|---|---|
| **Location: Riverside Dr. E/O Hyde Park Rd.** | | | |
| Number of Customers on Feeder: | **481** | Position in 2008:<br>Average position in the last 5 yrs: | **12**<br>**36** |
| Customers Affected: | **926** | Unplanned Customer-Minutes of Interruption: | **146,425** |
| FAIFI: | **1.93** | FAIDI: | **5.07** |
| **Assessment and Planned Action:** | | | |
| This is the second time in the last five years this feeder's performance is under question. Previously identified issues such as heavy load and mis-operation of outdated protection devices (using old-style expulsion links) prompted the installation of a refurbished hydraulic recloser in place of a breaker on the single feeder at Sub-44. This work was completed in 2006 and since then, the feeder has been performing satisfactorily. In 2009, the recloser at the substation had to be taken out of service since it malfunctioned during a feeder fault; however it tested fine in the shop. As such, ***defective equipment*** dominated the downtime on this feeder, with 66% of the customer minutes accumulated from this event only. The new standard practice for protection at a municipal substation will become an automated horizontal solid dielectric recloser which will also permit SCADA communication from substations that currently have no visibility (i.e., no voltage / current information are available to the control room operators). | | | |

**5.**

| Supply Station: | Wonderland | Feeder Circuit Designation: | 32M5 |
|---|---|---|---|
| **Location: Southdale Rd. W/O Wonderland Rd.** | | | |
| Number of Customers on Feeder: | **4,496** | Position in 2008:<br>Average position in the last 5 yrs: | **21**<br>**35** |
| Customers Affected: | **21,037** | Unplanned Customer-Minutes of Interruption: | **420,448** |
| FAIFI: | **4.68** | FAIDI: | **1.56** |
| **Assessment and Planned Action:** | | | |
| This feeder has had average performance in previous years. In 2009, a large cable fault outage was experienced which resulted in multiple breaker operations during the restoration process, due to the hold-off on the feeder during the trouble shooting process. This outage alone caused 80% of the interruptions on the entire feeder throughout the year, which explains its high FAIFI. In addition, another ***defective equipment*** related incident accounted for 15% more customer interruptions: a broken porcelain cut-out at a riser. In 2010 our new standard for fuse cut-outs was changed from the porcelain style to equivalent polymeric fuse cut-outs. Among the other five categories responsible for this feeder's performance no other outage was significant. Without the large outage impact created by the cable fault, this feeder would have performed satisfactorily as in the past. | | | |

6.

| Supply Station: | Buchanan | Feeder Circuit Designation: | 19M28 |
|---|---|---|---|
| **Location: Bradley Rd. E/O Pond Mills Rd.** | | | |
| Number of Customers on Feeder: | **5,991** | Position in 2008:<br>Average position in the last 5 yrs: | **7**<br>**22** |
| Customers Affected: | **20,128** | Unplanned Customer-Minutes of Interruption: | **684,401** |
| FAIFI: | **3.36** | FAIDI: | **1.90** |
| **Assessment and Planned Action:** | | | |
| This feeder experienced a large number of customer minutes throughout the year, mostly from ***defective equipment*** (50%) and also due to ***lightning*** (40%) which caused a recloser to operate - although failing to communicate back to SCADA, adding to 90% of the total outage duration in this cateogry**.** In the defective equipment category nine cable faults accounted for three quarters of the customer minutes. Of the nine, there were three re-occurring faults on the same cable segment in Pond Mills subdivision, which will likely be a candidate for rebuild next year due to the frequency of the cable faults in the last five years. Cable faults and their impact to the system reliability are monitored and will gradually be addressed through a rehabilitation program which will ramp up investment in this area. | | | |

7.

| Supply Station: | Talbot | Feeder Circuit Designation: | 26M25 |
|---|---|---|---|
| **Location: Talbot St. S/O Oxford St.** | | | |
| Number of Customers on Feeder: | **3,404** | Position in 2008:<br>Average position in the last 5 yrs: | **135**<br>**135** |
| Customers Affected: | **14,206** | Unplanned Customer-Minutes of Interruption: | **214,459** |
| FAIFI: | **4.17** | FAIDI: | **1.05** |
| **Assessment and Planned Action:** | | | |
| More than 80% of the downtime on this feeder was due to one incident: ***lightning*** stroke a switch and it failed at a riser. The switch interrupted the supply to 14 transformers fed by a radial which will be changed to a loop supply in 2010. This new feeder otherwise had an impeccable performance. The new circuit took over a portion of the load previously supplied by the 32M7 so its inherent reliability is linked to that of the 32M7. No further action is warranted. | | | |

8.

| Supply Station: | Buchanan | Feeder Circuit Designation: | 19M22 |
|---|---|---|---|
| **Location: Bradley Rd. E/O Pond Mills Rd.** | | | |
| Number of Customers on Feeder: | **598** | Position in 2008:<br>Average position in the last 5 yrs: | **28**<br>**27** |
| Customers Affected: | **2,407** | Unplanned Customer-Minutes of Interruption: | **41,970** |
| FAIFI: | **4.03** | FAIDI: | **1.17** |
| **Assessment and Planned Action:** | | | |
| The large FAIFI on this feeder is attributed to four breaker operations counted throughout the year. Each was due to a different cause: ***loss of supply, lightning, unknown*** and ***defective equipment.*** The one event that was also responsible for a large outage duration was a pole that went on fire. As the report details in Section 7.2.5, although categorized as a pole fire this event was in fact failure of equipment that resulted in the pole burning. | | | |

**9.**

| **Supply Station:** | **Wonderland** | **Feeder Circuit Designation:** | **32M3** |
|---|---|---|---|
| **Location: Southdale Rd. W/O Wonderland Rd.** | | | |
| Number of Customers on Feeder: | **2,251** | Position in 2008:<br>Average position in the last 5 yrs: | **77**<br>**55** |
| Customers Affected: | **6,931** | Unplanned Customer-Minutes of Interruption: | **241,943** |
| FAIFI: | **3.08** | FAIDI: | **1.79** |
| **Assessment and Planned Action:** | | | |
| This feeder's underperformance in 2009 was entirely due to ***defective equipment.*** Among eight events, one failure at a riser and the failure of the 32CA-1 at the station contributed 90% to the total customer minutes. These are not completely uncommon occurrences but they are yet not indicative of underperformance trends specific to one piece of equipment. Given this feeder's past performance no further action will be sought. | | | |

**10.**

| **Supply Station:** | **Buchanan** | **Feeder Circuit Designation:** | **19M38** |
|---|---|---|---|
| **Location: Bradley Rd. E/O Pond Mills Rd.** | | | |
| Number of Customers on Feeder: | **2,610** | Position in 2008:<br>Average position in the last x yrs: | **100**<br>**--** |
| Customers Affected: | **9,315** | Unplanned Customer-Minutes of Interruption: | **396,521** |
| FAIFI: | **3.57** | FAIDI: | **3.05** |
| **Assessment and Planned Action:** | | | |
| Several ***foreign interference*** incidents caused by drivers made up the majority of this feeder's outage duration (89%). Infrastructure exposed to vehicles can always be the cause of vehicle accidents which result in equipment damage and sometimes very large outages, as the events occur on a main line. Three other categories had minimal contribution. No action can be deemed for this feeder at this time. | | | |

# Appendix 3

## UPDATE ON 2008 WORST PERFORMING CIRCUITS

The ten worst performing feeders for 2008 were reviewed in detail. Described below are actions considered to improve performance where it was found to be justified.

| Ranking in 2008 | Proposed Work | Status | Ranking in 2009 |
|---|---|---|---|
| **1 (97F2)** | The performance of the SUB-97 feeders, particularly the F2 self-improved in 2009. However the Substation Deficiency report identifies the station highly unreliable so London Hydro is converting most of the load on the F1 and F3 by installing step-down transformers. Yet, the F2 will not benefit of any enhancements so the only reliability geared improvements remain the fault indicators added on some radials in 2008. | **Completed** | 108 |
| **2 (26K6)** | No action was proposed last year as the outages on this feeder were not indicative of decreased performance; it was a bad year for this feeder. | **N/A** | -- |
| **3 (8K4)** | Most of the load on this feeder has been converted to 27.6 kV. Animal contacts which have been frequent in the past could now result only in temporary faults cleared by an auto on the 27.6 kV. | **In progress** | 77 |
| **4 (32M7)** | Loss of supply was the major cause for which this feeder ranked highly unreliable last year. In 2009, the availability of the bulk electricity system deteriorated on this feeder. London Hydro will require from HONI an action plan to minimize the interruptions at the station. | **Outstanding** | **2** |
| **5 (49F3)** | This feeder ranked high last year because of one adverse environment related event. No action was warranted; in 2009 its performance was impeccable although the station is one of the last with open bus construction. | **N/A** | -- |
| **6 (43F1)** | There was no action item for this feeder last year; tree contacts were the main contributor to its underperformance. In 2009, this feeder did not experience any interruption. | **N/A** | -- |
| **7 (19M28)** | Last year this feeder ranked high mostly due to uncontrollable causes. There was some contribution from adverse environment and defective equipment. Cable faults on this feeder which were numerous in 2008 and again in 2009 have not yet been addressed. | **In progress** | 7 |
| **8 (13M15)** | Lightning mitigation remains to be addressed on this feeder since it was a major contributor to poor performance in 2008. Due to its high ranking in 2009 again, it is proposed to enhance its protection with auto-reclosing functionality if permitted to allow possible temporary outages to clear and thus reduce the number of breaker operations. As well, problems identified by the recent audit should be corrected. | **Outstanding** | 1 |
| **9 (9F2)** | This feeder self-improved in performance after one year of abnormal performance caused by a vehicle accident. | **N/A** | 92 |
| **10 (35F2)** | This feeder disappeared off the radar in 2009 after performing poorly in the last couple of years. Animal contact prevention helped improve its performance. | **Completed** | -- |

Appendix 4

# UPDATE ON OUTSTANDING WORK ON PRIOR WORST PERFORMING CIRCUITS

Described below are actions proposed in the past in order to improve performance and the current status of the proposed work.

| Year | Circuit | Proposed Work | Status | Ranking in 2009 |
|---|---|---|---|---|
| 2008 | 35F2 | This feeder improved its performance after several measures have been implemented (eliminating radials through load conversion, animal contact prevention) | **Completed** | -- |
| 2007 | 97F3 | The load of this feeder is being converted to 27.6 kV. | **In Progress** | 58 |
| 2007 | 97F1 | Same as for the 97F3. | **In Progress** | 75 |
| 2007 | 8K6 | Due to the high density of animal contacts in the downtown area, the feeders from SUB-8 should be subjected to an audit to ensure proper animal protection guards are in place, both at transformers and on riser brackets. | **Outstanding** | 69 |
| 2007 | 32M1 | This feeder was reduced in length when the 19M22 was constructed, inherently reducing its exposure and number of customers. Further, with the reconstruction and routing of the 32M6, the 32M1 was shortened even more. Its exposure should be reduced which should translate in potential reliability improvement. | **In Progress** | 59 |
| 2006 | 35F2 | This feeder was supplying in part a 4 kV subdivision which was converted to 27.6 kV. While the feeder has disappeared off the 2009 list of feeders experiencing outages, it is hoped its performance will continue to show in the years to come. | **Completed** | -- |
| 2006 | 26M14 (former 26M56) | The former 26M56 feeder was transferred onto a new breaker (26M14) at Talbot TS. The protection implementation in the two reclosers is still outstanding. | **Outstanding** | 26 |
| 2005 | 6K4 | An audit was planned for this feeder to highlight non-compliant locations with respect to animal guards (Guthrie guards are to be replaced with our standard bushing guards). The improvements on the feeder were completed by the end of 2004. | **Completed** | 17 |
| 2005 | 13M15 | An audit proposed in 2005 to reveal potential deficiencies leading to outages was completed in 2009. The audit identified many locations where improvement can be accomplished. The feeder continues to exhibit very poor reliability so alternate plans may be considered (Appendix 3) including lightning protection. | **Outstanding** | 1 |
| 2004 | 2K2 | Although animal contacts have been very frequent, years 2008 and 2009 showed better performance. An audit should still be completed to ensure proper animal protection is in place (i.e., bushing guards). | **Outstanding** | 89 |

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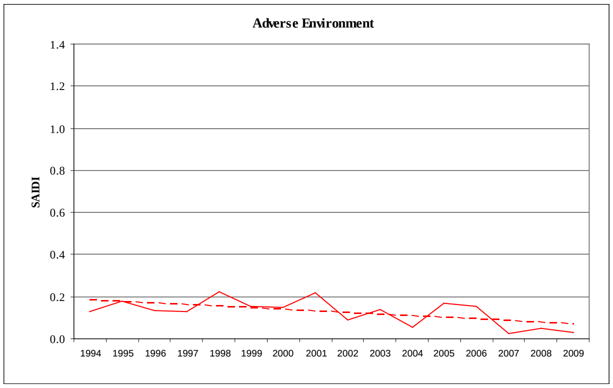
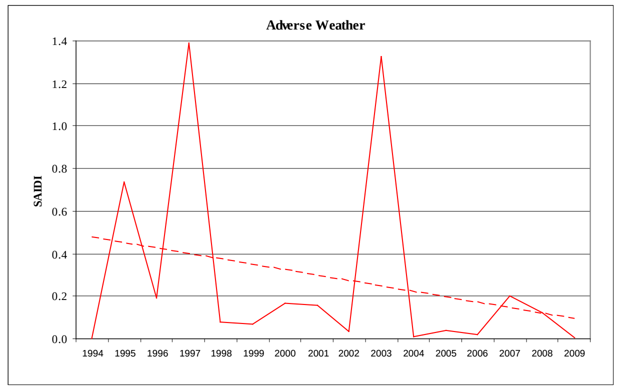
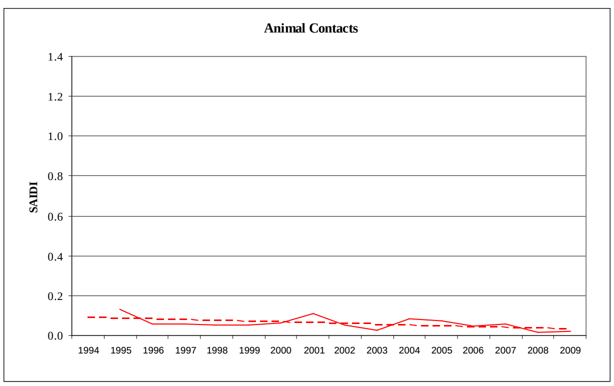
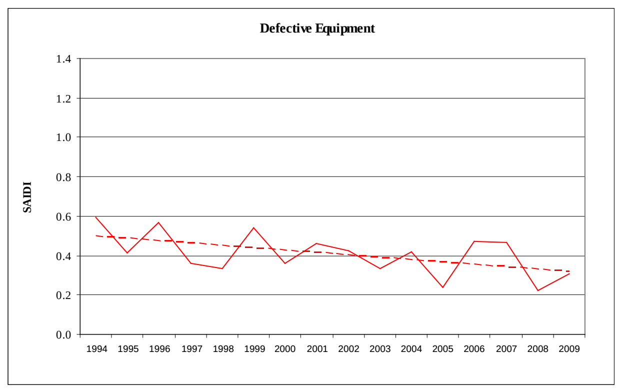
# Appendix 5

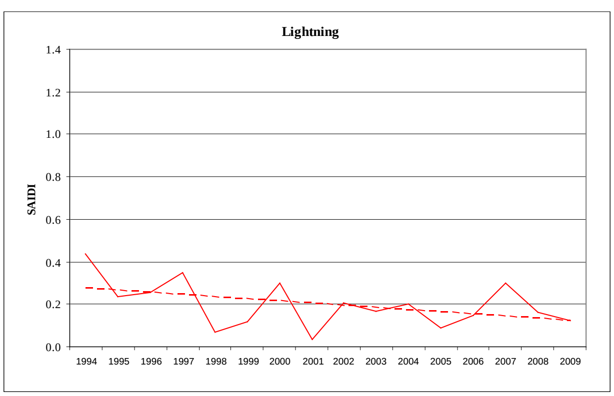
## SAIDI – EDRO Categories

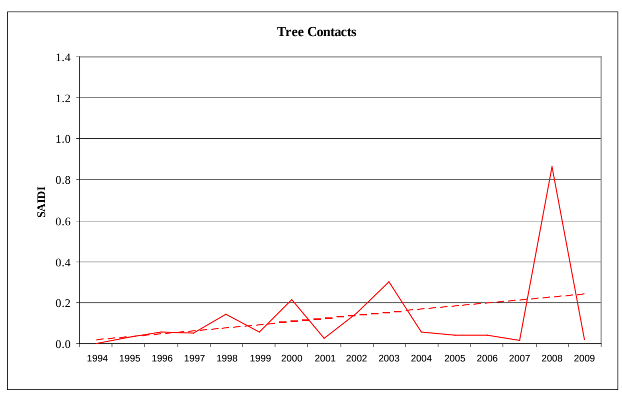


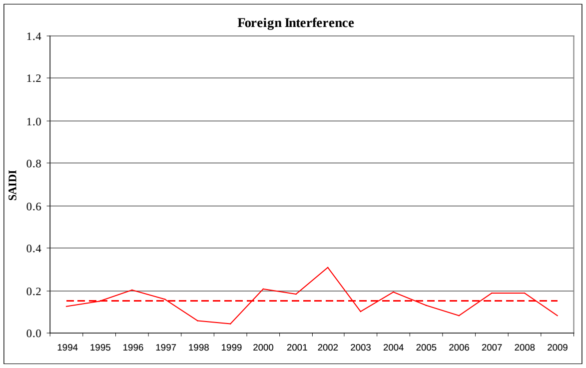



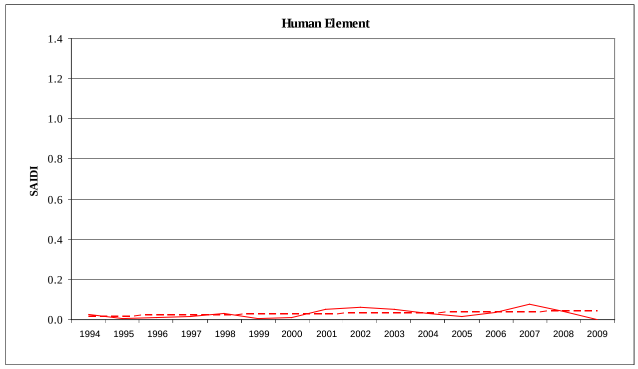



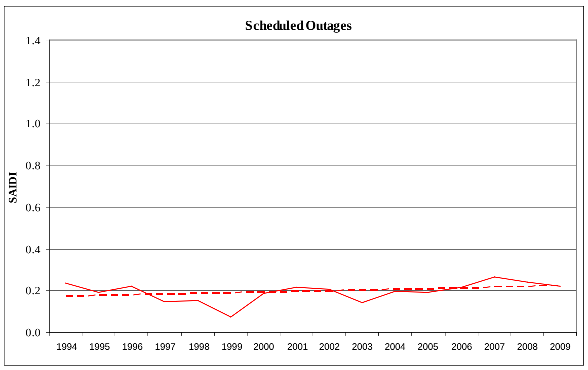



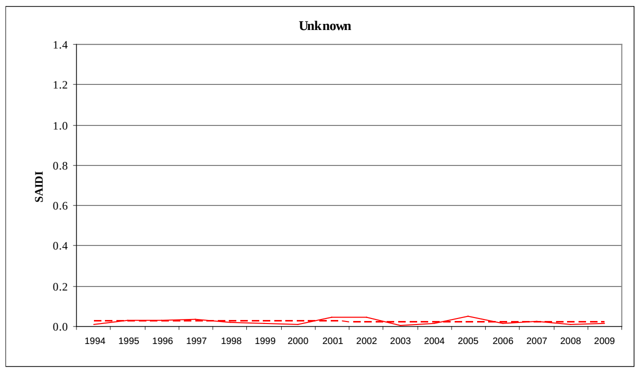



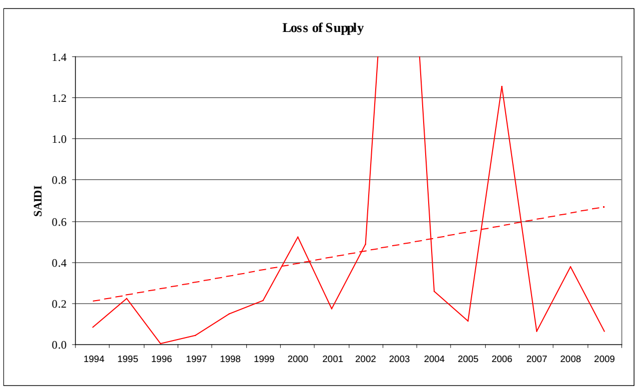
# SAIDI – Non-EDRO Categories



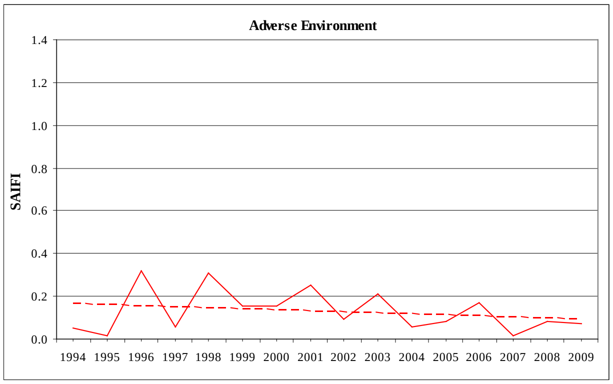



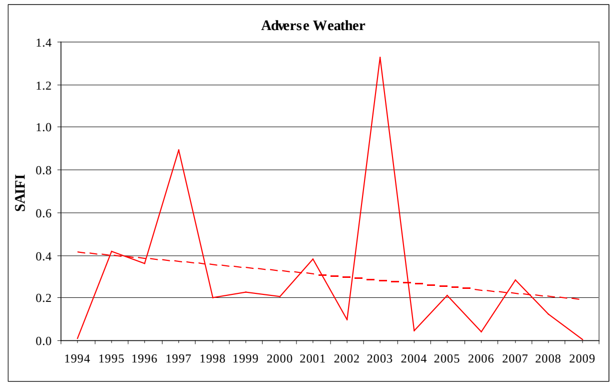



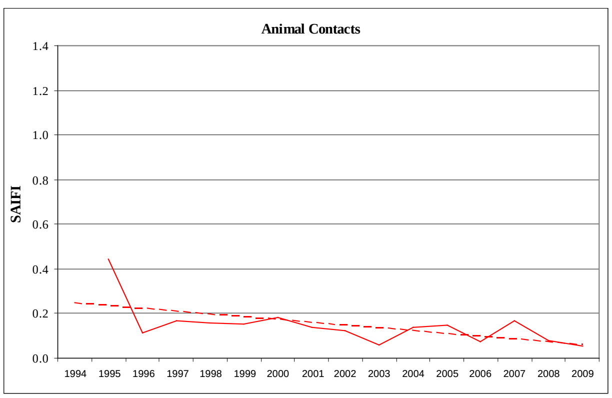



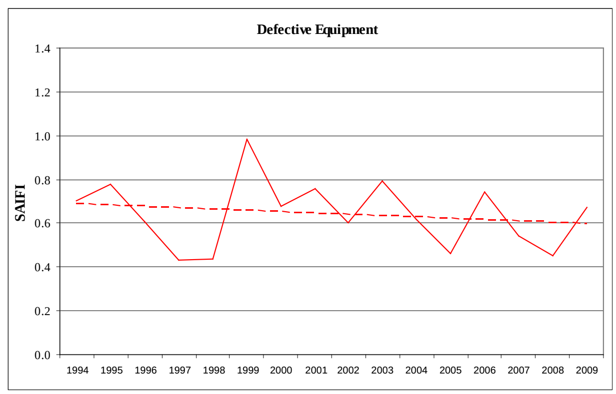
# Appendix 6

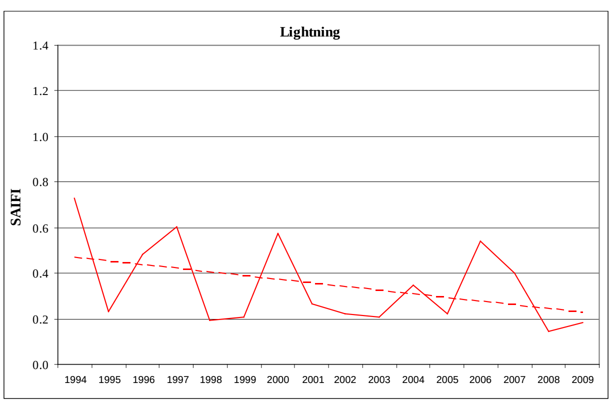
## SAIFI – EDRO Categories

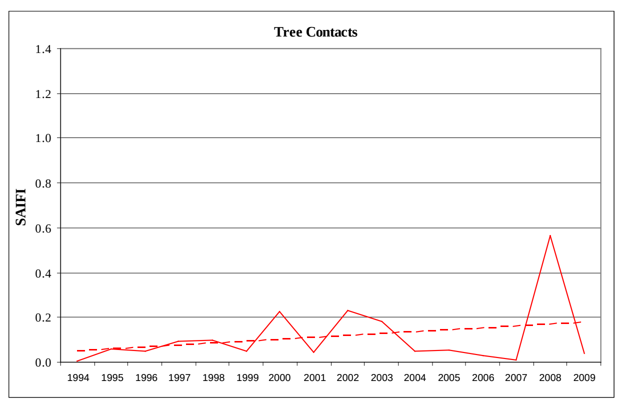


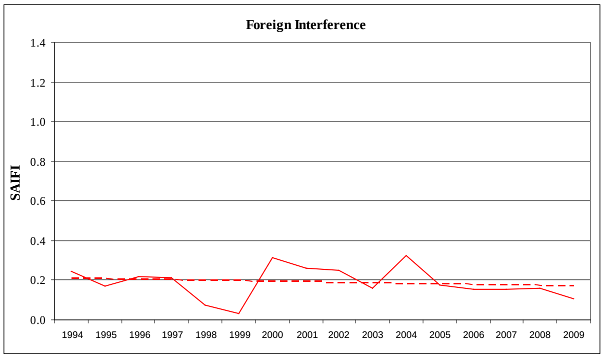



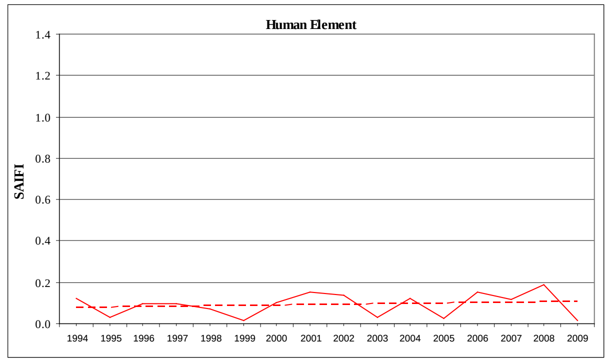



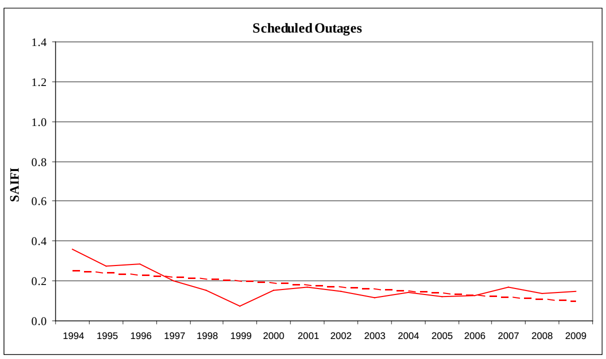



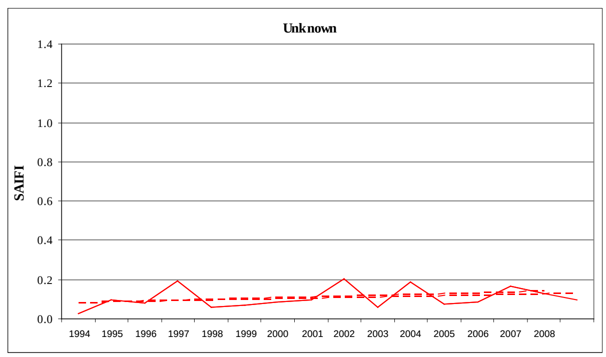



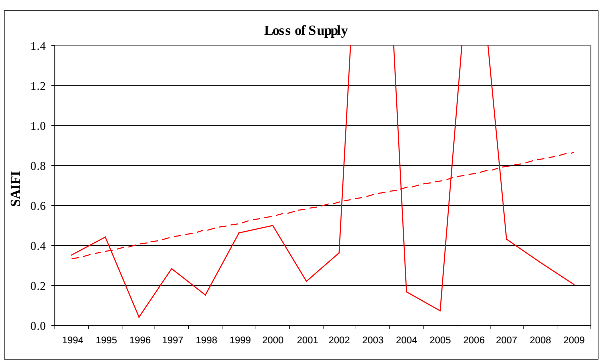
# SAIFI – Non-EDRO Categories



# 2010 Quality of Supply

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# Executive Summary

This report is intended to summarize the Quality of Supply of London Hydro's electrical distribution system for the year in review, 2010. Aside from the 2010 year in review analysis, this report contains annual reliability trend analyses which are used to develop capital and maintenance projects aimed at improving system reliability.

Typically, the report is used to identify poor and emerging reliability trends which affect the overall system performance. Then capital projects are developed, outside of the scope of this report, to improve the system performance. Finally, improvements in system performance due to these capital investments are monitored for several years. For Example, in 2010, London Hydro has identified an emerging trend of equipment failures due to lightning storms. A pilot program has been developed to mitigate the impact of lightning on the system. The annual Quality of Supply reports will continue to monitor the reliability gained from this capital program.

The overall system reliability for the year in review was exceptional. Both **SAIDI (Availability of Supply) of 0.89** and **SAIFI (Security of Supply) of 1.15** were the best recorded indices in London Hydro's history. Prior to 2009 and 2010, the lowest SAIDI ever recorded occurred in 2005 and was 1.15. In 2009 and 2010, the SAIDI index was 30% better than any previous year.

In 2010, unlike other years, the number one cause contributing to the total SAIDI index was Planned or Scheduled Outages; representing 42.8% of all customer hours of interruptions. Defective Equipment, Adverse Environment, Adverse Weather and Lightning cause categories were nearly at records lows when measured in customer hours of interruption.

There has been a significant increase in planned outage interruptions when compared to other years. This increase of planned interruptions can be attributed to London Hydro's recent initiative to rehabilitate its underground cables using silicone injection. As much as 30% of the planned hours of customer interruptions can be attributed to work related to silicone cable injection and padmounted transformer replacement in residential subdivisions. In terms of SAIDI, cable faults were the number one sub-cause under the Defective Equipment cause category. The impact of broken overhead conductors and defective distribution transformers were also measureable in this cause category.

## Table of Contents

# 1 Introduction

London Hydro's distribution system reliability indicators in 2009 and 2010 were the best indices ever recorded. Section 3 of this report reviews the long term historical reliability trend analysis of the system. It also compares London Hydro's Quality of Supply Indicators (SAIDI, SAIFI, CAIDI) with other utilities in Ontario.

A more detailed reliability based analysis for the year in review is covered in Section 4 of this report. Power interruptions, measured using the Quality of Supply Indicator (QSI), are grouped by either one or a combination of voltage class, cause category and planned/unplanned outages. The impact of Defective Equipment on system reliability is analyzed in further detail. As part of the OEB's new reporting requirement, Utilities are now required to report on their MAIFI index and this is covered in section 4 as well.

Section 5 – Reliability Improvement Measures contains several discussions on system components where capital investments have been or will be made to improve system reliability. The impact of primary residential cable failures, padmounted sectionalizing enclosure flashover, porcelain insulators failures, live animal contact, and finally the impact of lightning on system reliability are discussed within.

The latter section of this report contains the Appendix which includes annual reliability performance data, analysis of underperforming feeders, and performance trending of the Equipment and Design Related Outages (EDRO) categories.

# 2 Classification of Interruption by Cause

A customer interruption is defined in terms of the primary cause of the power outage. These causes have been assigned to 11 codes; they are as follows:

**I. Adverse Environment**

Customer interruptions due to equipment being subjected to abnormal environment such as salt spray, industrial contamination, humidity (flashovers), corrosion, vibration, fire or flooding.

**II. Adverse Weather**

Customer interruptions resulting from rain, ice storms, snow, winds, extreme ambient temperatures, freezing fog or frost.

**III. Animals**

Customer interruptions caused by creatures such as birds, squirrels, raccoons.

**IV. Defective Equipment**

Customer interruptions resulting from equipment failures such as deterioration due to age, incorrect maintenance or imminent failures detected by maintenance.

**V. Foreign Interference**

Customer interruptions beyond the control of the utility such as vehicle accidents, dig-ins and foreign objects.

**VI. Human Element**

Customer interruptions due to the interface of utility staff with the system such as incorrect records, incorrect use of equipment, incorrect construction or installation, incorrect protection settings, switching errors.

**VII. Lightning**

Customer interruptions due to lightning striking the distribution system resulting in an insulation breakdown and/or flashovers.

**VIII. Loss of Supply**

Customer interruptions due to problems in the bulk electricity supply such as under frequency load shedding, transmission system transients, or system frequency excursions.

**IX. Scheduled Outages**

Customer interruptions due to the disconnection at a selected time for the purpose of construction or preventive maintenance.

**X. Tree Contacts**

Customer interruptions caused by faults due to trees or tree limbs contacting energized circuits.

**XI. Unknown/Other**

Customer interruptions with no apparent cause or reason which could have contributed to the outage.

# 3 Reliability Summary for 2010

## 3.1 Reporting Requirements and Quality of Supply Indicators

Effective May of 2010, the Ontario Energy Board (OEB) has revised the reporting requirements related to the quality of service pertaining to the electrical system reliability. Previously, London Hydro and other utilities have reported only on three indices – SAIDI, SAIFI and CAIDI. As part of the OEB's new reporting requirements, all utilities in Ontario are now required to report on the Momentary Average Interruption Duration Index [1] (MAIFI) as well.

Local Distribution Utilities (LDC's) are still required to report their SAIDI, SAIFI and CAIDI indices with and without Loss of Supply. In addition, all Major Event Day's (MED's) with unusually high SAIDI/SAIFI are to be included in the reported reliability indicators.

- **SAIDI** Average customer interruption duration (in hours) per year.

  (***Unavailability of Supply***)

  $$SAIDI = \frac{Total\ Customer{-}Hours}{Total\ Customers\ Served}$$

- **SAIFI** Average number of interruptions[1] per customer per year.
  (***Security of Supply***)

  $$SAIFI = \frac{Total\ Customers\ Interrupted}{Total\ Customers\ Served}$$

- **CAIDI** Average customer interruption duration (in hours) per interruption.

  ***(Outage Restoration Time)***

  $$CAIDI = \frac{Total\ Customer{-}Hours}{Total\ Customers\ Interrupted}$$

- **MAIFI** Average number of momentary customer interruptions normalized per customer served

[1] In the Electricity Reporting and Record Keeping Requirements report (May 2010), a Momentary Interruption is defined as an interruption lasting less than one minute.

$$MAIFI = \frac{Number\ of\ Momentary\ Interruptions\ for\ all\ Customers}{Total\ Customers\ Served}$$

## 3.2 Trending of Historical Reliability Performance Indices

### 3.2.1 SAIDI – Performance Analysis

The SAIDI performance in 2010 matched London Hydro's record low SAIDI index of 0.89 (53 minutes of interruption per outage) which was set in the year 2009. Prior to 2009, the lowest SAIDI ever recorded occurred in 2005 and was 1.15. In 2009 and 2010, the SAIDI index was 30% better than any previous year.

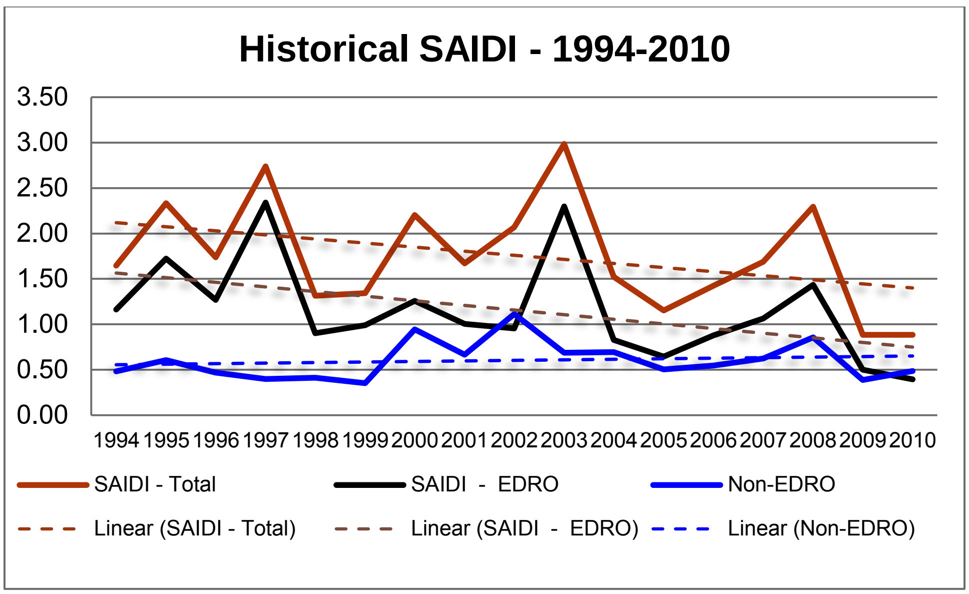



**Figure 3-1 - Historical SAIDI (1994-2010)**

In the last 5 years, London Hydro has achieved a SAIDI index that is less than the Ontario industry average. But when compared with SAIDI averages of larger utilities[2] , London Hydro has only outperformed the large utility average in 2009 and 2010.

[2] Larger Utilities include: Enersource, Power Stream, Ottawa, Horizon, Toronto, Enwin, and Veridian.

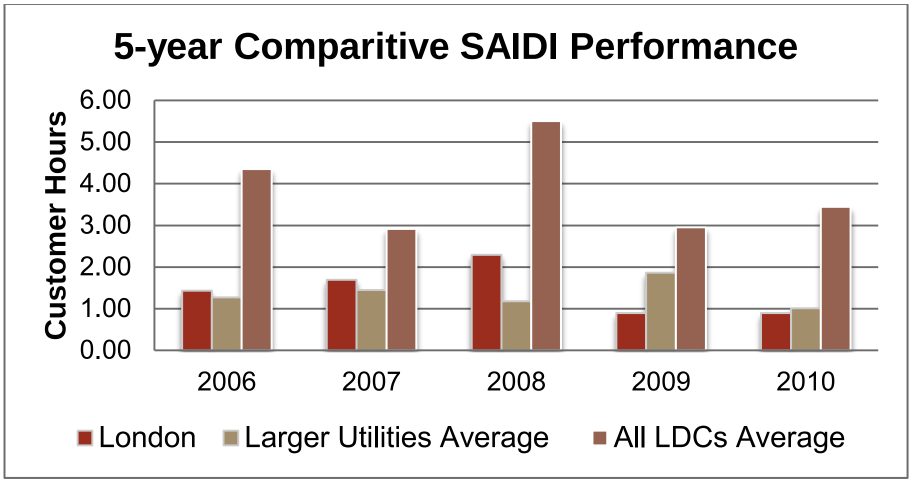



Figure 3-2 - Comparative SAIDI performance

### 3.2.2 SAIFI – Performance Analysis

As seen in Figure 3-3 - Historical SAIFI (1994-2010) below, London Hydro's frequency of customer interruption, SAIFI, shows to be steadily improving over the last 4 years. 2010's SAIFI index is London Hydro's best recorded SAIFI following 2009's SAIFI of 1.59.

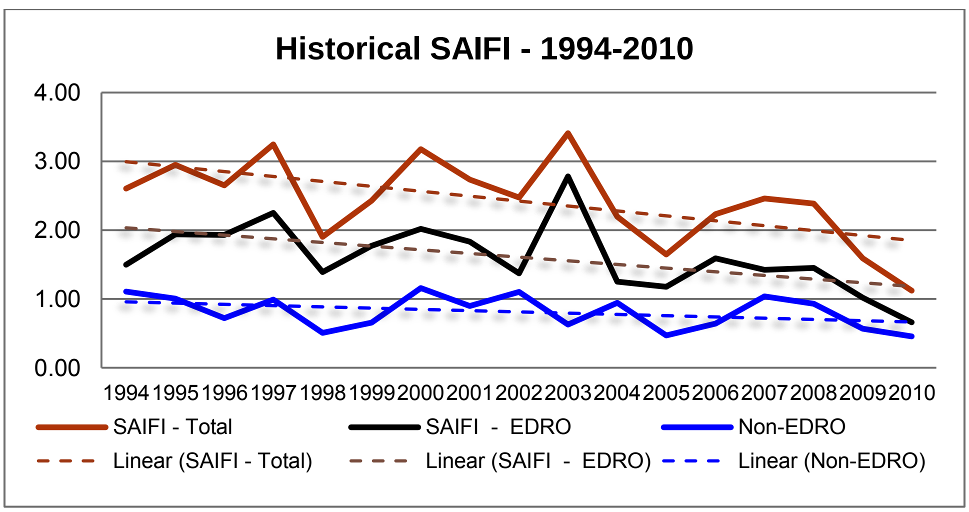



Figure 3-3 - Historical SAIFI (1994-2010)

Similar to the SAIDI index, the 5-year comparative SAIFI performance below, shows that London Hydro has outperformed the average SAIDI of large utilities and all LDC's in 2009 and 2010.

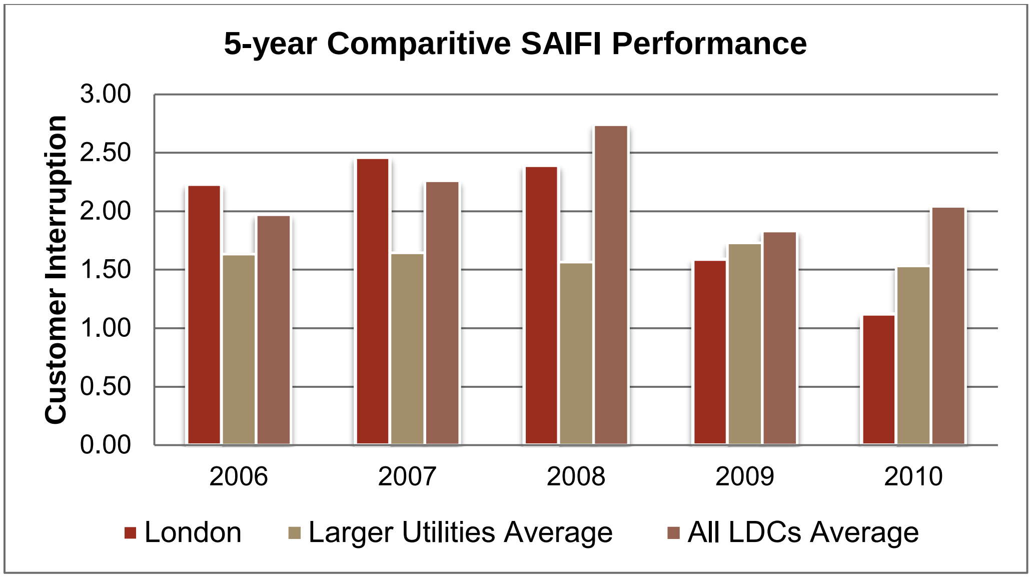



Figure 3-4 - Comparative SAIFI performance

### 3.2.3 CAIDI – Performance Analysis

Figure 3-5 and Figure 3-6 show the long term trend and 5 year comparative trends of the CAIDI index; respectively.

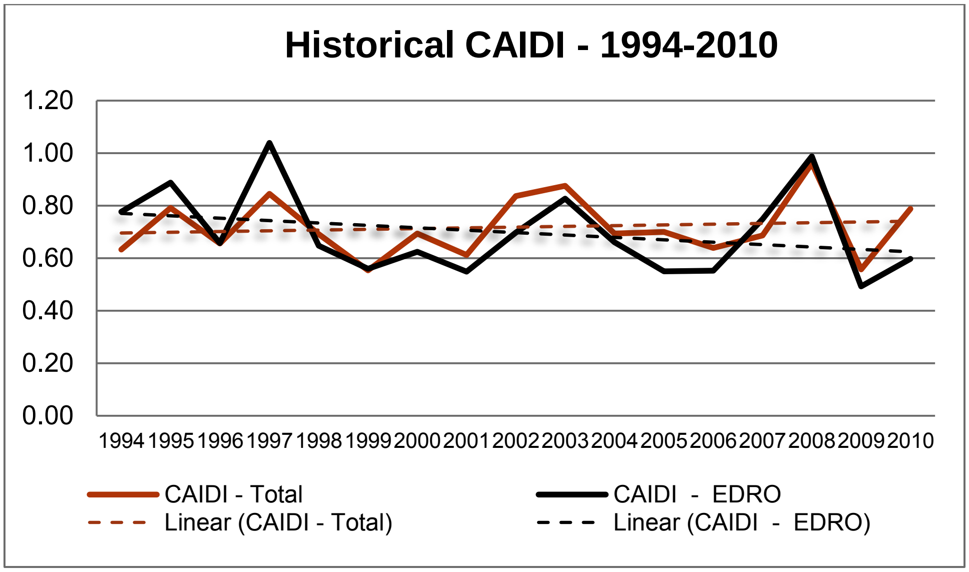



Figure 3-5 - Historical CAIDI (1994-2010)

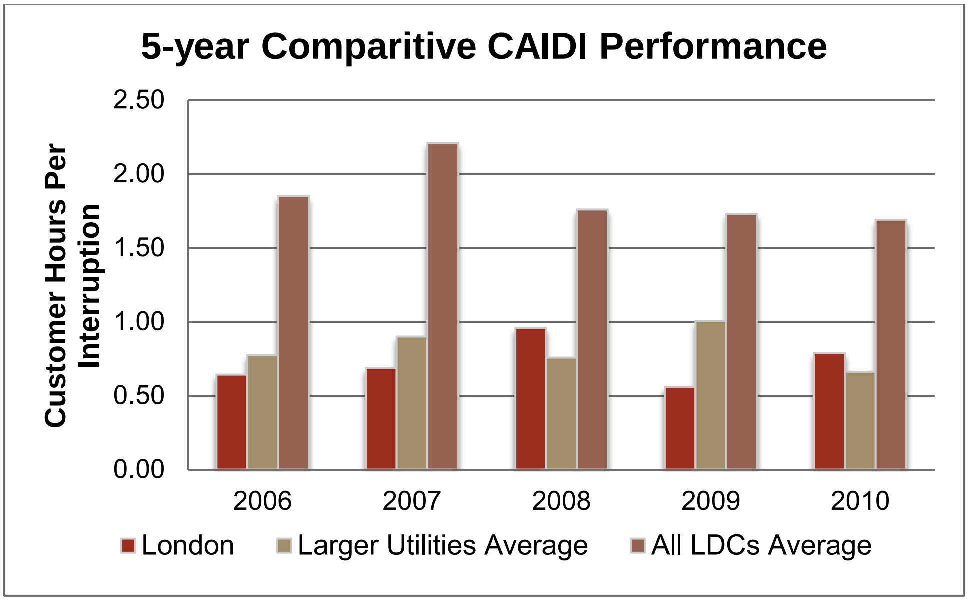



Figure 3-6 - Comparative CAIDI performance

# 4 Analysis of Outage Data

Throughout the years, London Hydro has experienced Major Event Days where a vast number of customers are without power for extended periods of time; these outages are typically caused by storms or Loss of Supply events. These outages skew the reliability indices and can become misleading when trending the reliability performance of the system on a yearly basis. Although, it is OEB's reporting requirement to report on reliability numbers without segregating Major Event Days, for the purpose of this report, London Hydro typically excludes MED's from the analysis. However, as was the case in 2009, no MED's where experienced in 2010.

The following section will include discussions on the outage statics broken down by voltage class and/or cause category. Also, a detailed analysis of defective equipment caused outages is included.

### 4.1.1 SAIDI / SAIFI – Unplanned/Planned Outages per Voltage Class

The following two graphs show the duration and frequency of interruptions of planned vs. unplanned outages broken down per voltage class. Excluded from these unplanned outages are the Loss of Supply related events. Outages on the 27.6kV system represent 70% of the total SAIDI of unplanned outages.

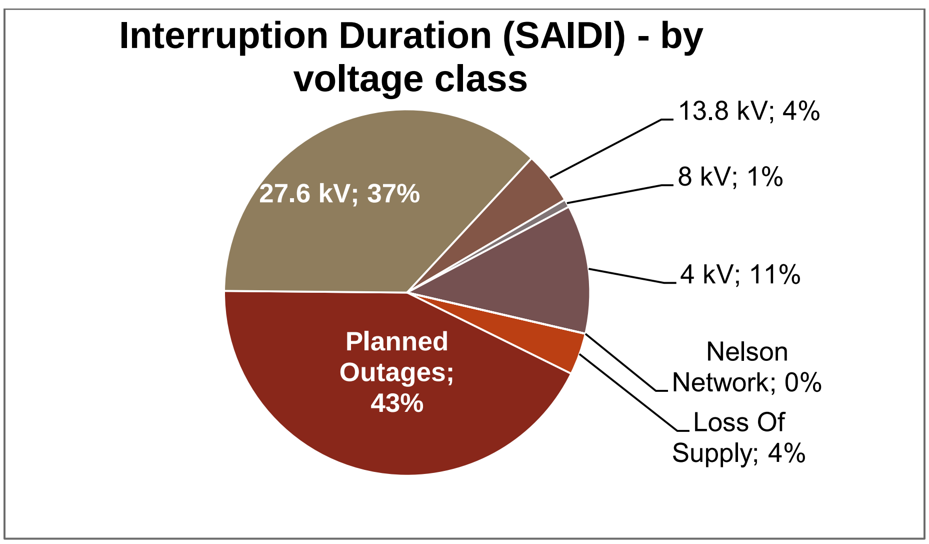



**Figure 4-1 - Interruption Duration (SAIDI) breakdown by Distribution Voltage**

Also, Outages on the 27.6kV system represent 76% of the total SAIFI of unplanned outage events.

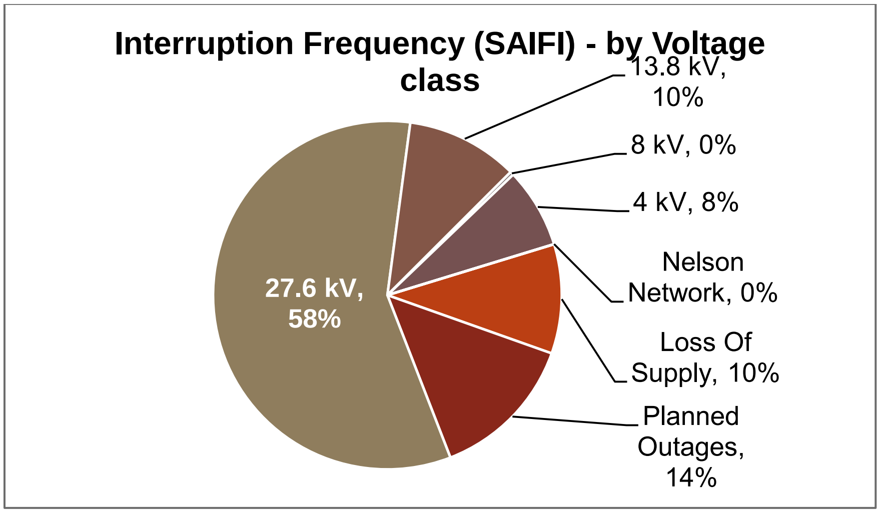



Figure 4-2 - Interruption Frequency (SAIFI) breakdown by Distribution Voltage

### 4.1.2 Outage Statistics per Cause Category

Power interruptions on London Hydro's distribution system are logged under one of the eleven cause categories discussed in section 2. In 2010, unlike other years, the number one cause contributing to the total SAIDI index was Planned or Scheduled Outages; Representing 42.8% of all customer hours of outages.

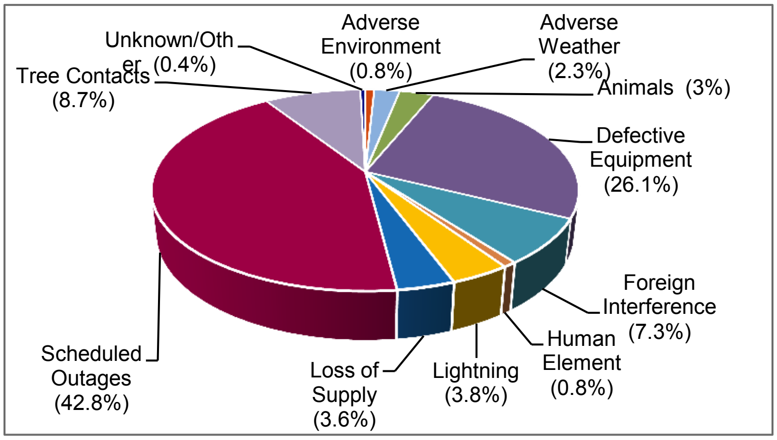



Figure 4-3 - Customer Hours of interruption by cause (SAIDI)

This is a substantial increase from 2009's 29.5% contribution to SAIDI. One must consider, however, that the percent contribution of a cause code to the SAIDI index is relative to the performance of the other cause categories. In 2010, Defective Equipment, Adverse Environment, Adverse Weather and Lightning cause category were nearly at records lows when compared in number of customer hours of interruption. Nonetheless, Scheduled Outages did also set a record high of approximately 55,000 customer hours of interruption; that is twice the 15 year annual average.

This increased rate of planned hours of customer interruption can be attributed to London Hydro's recent initiative of rehabilitating its underground cables using silicone injection technologies. In order to treat the aging underground cables, they must first be de-energized for the duration of the treatment of cable. In 2010, silicone injection was responsible for 20% of the scheduled outages cause category; this does not include the outages required to replace depreciated transformers which is approximately 10% of the planned outage statistics.

Defective Equipment related outages are the second highest cause category contributing to the SAIDI index in 2010. It is typical to report that defective equipment is responsible for around 25% of the yearend's SAIDI index. In 2010, however, customer hours of interruption due to defective equipment were 55% less than the 15 year average. Similarly, in the case of adverse weather and adverse environment, a decrease in their contribution to SAIDI was a key element in achieving the lowest SAIDI index to date.

This year's SAIFI was the lowest in 15 years and unlike the SAIDI index, Defective Equipment is the largest contributor to the SAIFI in 2010.

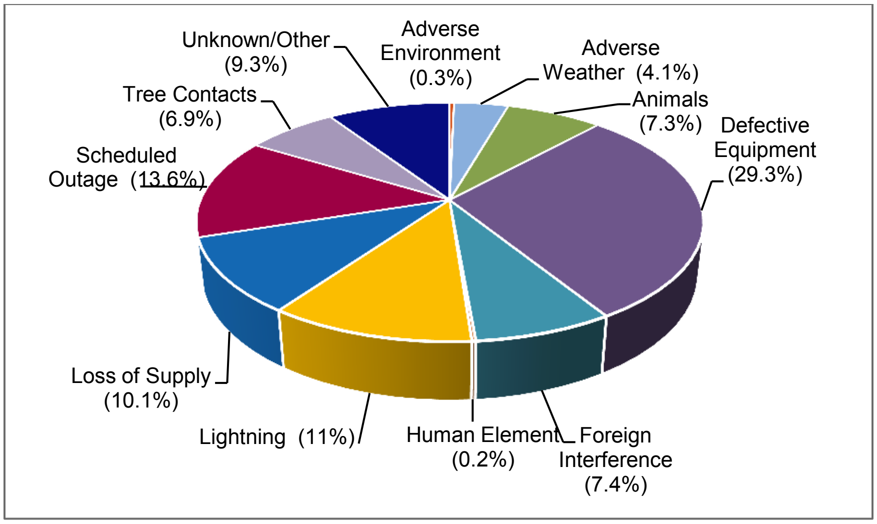
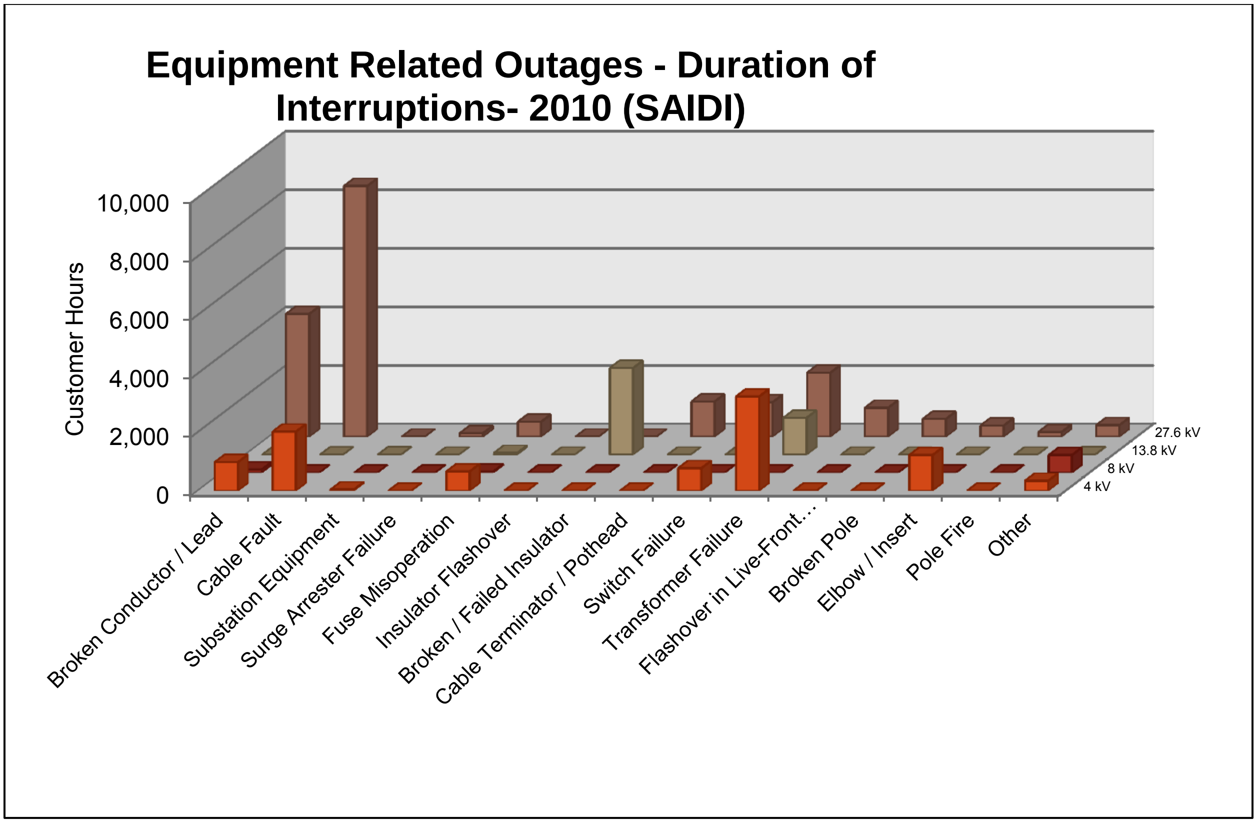



**Figure 4-4 - Number of Customers Interrupted by Cause (SAIFI)**

### 4.1.3 Equipment Related Outages - Effect on the durations of customer interruptions (SAIDI)




In 2009 and 2010, **cable faults** were the number one sub-cause under Defective Equipment. The impact of cable faults directly affected both the SAIDI and SAIFI indices in 2010. There were a total of 10,500 customer-hours of interruption (30% of Defective Equipment) due to cable faults alone. In 2009 there was a total 10,000 Customer-Hours of interruptions, 5% less than in 2010.

In total, there were 30 cable faults on the 27.6 kV system, 2 on the 4 kV, and 4 on the 13.8kV[3]. In comparison to 2009, there were 18 cable faults on the 27.6kV and 8 faults on the 4kV system. Cable faults on the 27.6 kV system are responsible for 80% of the customer minutes of interruption, and they occurred predominantly in residential subdivisions.

London Hydro has previously recognized the need for a more cost effect rehabilitation program to target and mitigate cable failures on both the 27.6kV and 4kV system. In 2010, London Hydro

[3] Number of cable faults on the 13.8kV system only includes events that led to a power interruption.

has initiated a multi-year program to rehabilitate the aging cable infrastructure by means of cable silicone injection. This approach had been previously piloted in 2002 where 14 km's of cable were treated with silicone. To date, no cable faults have occurred on these cables. London Hydro has now accepted silicone injected technology and in 2010 a total of approximately 30 km of cables in three residential subdivisions. In future years, London Hydro aims to inject close to 50 km of cable each year.

The failure of multiple **overhead primary and secondary conductors** resulted in over 5,000 customer minutes (15% of Defective Equipment) of interruption in 2010. However, only a handful of outages were responsible for the majority of these customer hours of interruptions. Namely, the failure of a Hendrix Cable (inadvertent contact between phases where the insulation had been removed) and a failure of a 556 Alum conductor (conductor detached at sleeve) account for 52% these outages. Although the type of these failures is infrequent they affect a large number of customers and hence they are visible in the yearend reliability review.

The failure of a **municipal substation transformer** (Sub 15) added 1,250 customer hours of interruption. The impact of this transformer failure is presented under the 'Transformer Failures' category.

**Distribution transformer** failures were responsible for approximately 4,300 customer hours of interruptions (12% of Defective Equipment). 65% of these customer hours of interruption were a result of transformer failures on the 27.6 kV system and 6% were a result of failures on the 4kV system. The remaining 29% was the result of a single OH transformer failure on the 13.8kV system. The defective overhead transformer resulted in an outage that affected all the customers on the 2K2 feeder. Similarly, these outages have shown a measureable impact on the SAIFI performance shown in Figure 4-2.

The ratio of pole mounted to padmounted transformer failures was 1.57:1; but 85% of the customer hours of interruption were due to the failure of padmounted transformers. 6 of the 14 padmounted transformer failure were live-front transformer flashovers.

4.1.4 Equipment Related Outages - Effect on the frequency of customer interruptions (SAIFI):

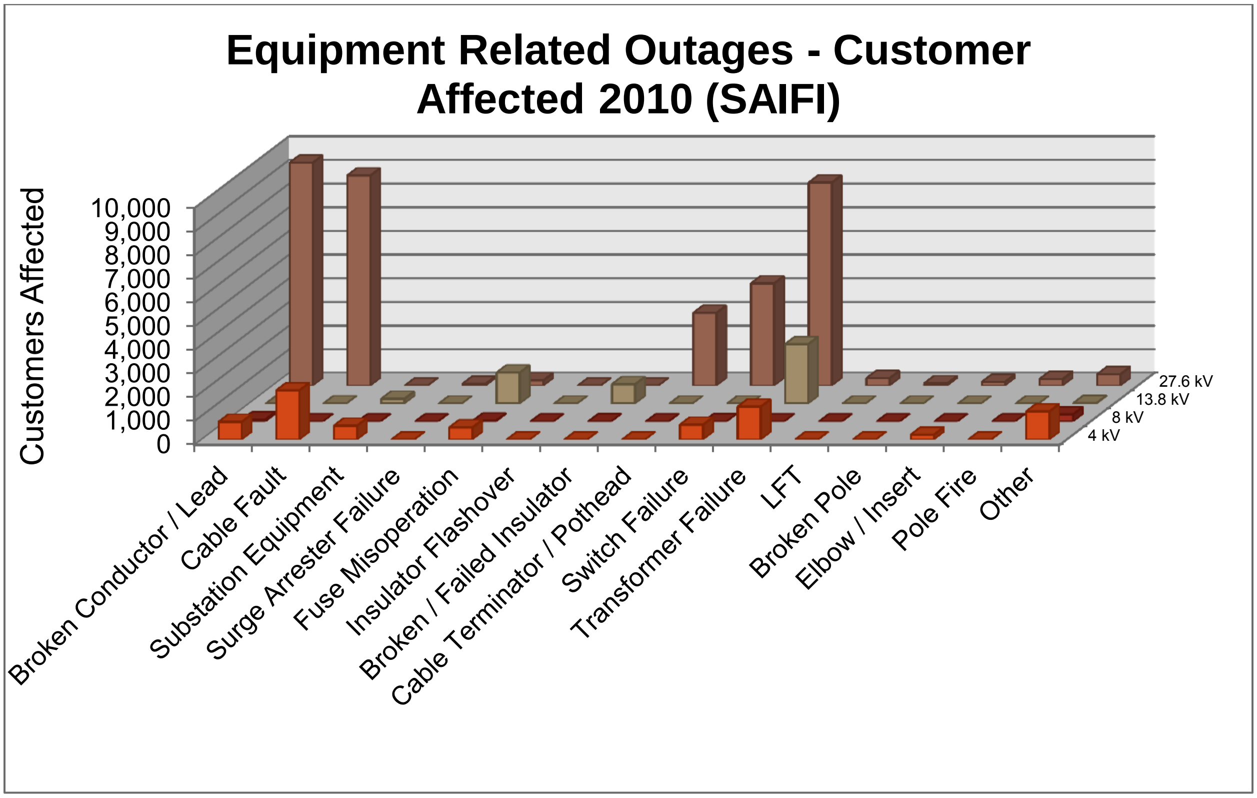



Figure 4-5 - Equipment Related Outages - Customers Affected. (SAIFI)

**Broken Conductor/Lead** related outages affected the most number of customers in the defective equipment category (see Figure 4-5). 90% of SAIFI was caused by three outages where fallen conductors caused an interruption on three separate 27.6kV primary circuits. The root causes of these outages are unique. One was caused by an inadvertent contact between two phases where the insulation had been removed. Another was caused by a conductor falling to the ground due to a broken conductor sleeve.

Cable faults continued to add a substantial number of customer interruptions to the yearly SAIFI index. A detailed analysis will be covered under section 5.1.1 Residential Underground Primary.

### 4.1.5 MAIFI – Momentary Average Interruption Frequency Index

As discussed in section 3.1, the OEB's reliability reporting requirements mandate all utilities to report on their momentary outages (MAIFI). A Momentary Outage is defined as a power interruption lasting less than one minute in duration.

The following table shows the frequency and the number of customers (in percentage) who experienced a momentary interruption.

**Table 1 – Year End MAIFI contribution in percentage per cause category**

| Cause Category | Customers Affected (% of total yearend) | Frequency |
|---|---|---|
| **Adverse Environment** | 2.25% | 2 |
| **Adverse Weather** | 0.82% | 13 |
| **Animals** | 11.98% | 17 |
| **Defective Equipment** | 24.47% | 42 |
| **Foreign Interference** | 4.05% | 6 |
| **Human Element** | 2.50% | 3 |
| **Lightning** | 30.57% | 46 |
| **Loss of Supply** | 0.06% | 20 |
| **Tree Contacts** | 0.54% | 3 |
| **Unknown/Other** | 22.76% | 41 |
| **Grand Total** | **100.00%** | **193** |

London Hydro has auto-reclosing schemes on most of its feeders. Successful auto reclosures are logged as Momentary Outages and are grouped per their outage causes. If an auto reclosure fails to immediately restore power because a permanent fault is present, the outage is then classified as a sustained outage (SAIDI and SAIFI).

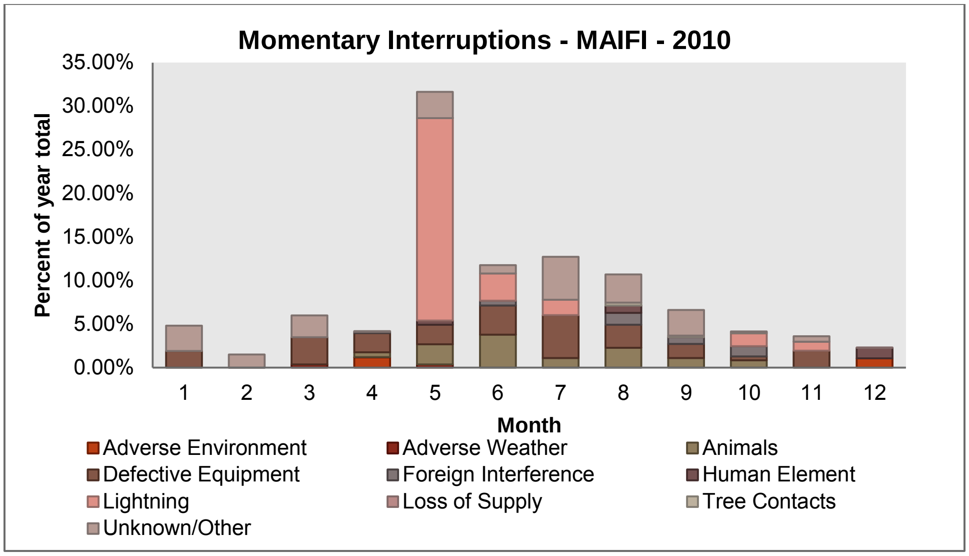



Figure 4-6 - Momentary Interruptions - MAIFI - 2010

In 2010, approximately 410,000 customers experienced a momentary interruption. The top three cause categories for this year were lightning (31%), defective equipment (24%), and unknown (22%) interruption causes.

Each month, the defective equipment cause category typically adds 0-5% of the year's total MAIFI. In 2010, London Hydro feeders experienced, on average, 3-4 momentary interruptions each due to defective equipment caused faults. 75% of the momentary interruptions caused by lighting occurred in the month of May and were caused by two thunderstorm events.

# 5 Reliability Improvement Measures

## 5.1 Rejuvenating the Underground System

### 5.1.1 Residential Underground Primary

London Hydro has been engaged in a multi-year plan to rehabilitate and improve the reliability of its underground residential distribution plant. Since 2001, London Hydro has addressed approximately 130km of aging underground residential cable by replacing it with new cable. In 2002-2003 London Hydro completed a pilot project to rehabilitate aging cable via Silicone Injection technology, but has found it more cost effective, at the time, to replace the cable. Almost a decade after, advancements in Silicone Injection technology and lower costs of injection have rendered this option a viable solution for rehabilitating the aging underground cable infrastructure.

London Hydro's proprietary SPOORE analysis[4] System has been used for many years and will continue to be the fundamental tool for ranking capital projects related to the rehabilitation of aging cable in residential subdivisions. Up-to-date outage data and GIS based tools such as GeoMedia provide dynamic support in the analysis by integrating the most recent information on our infrastructure.

The GIS based engineering analysis tool, *GeoMedia,* has been utilized to incorporate the SPOORE analysis methodology used to assess and rank subdivision rebuilds projects. Using a rolling 5-year window of equipment failure data pertaining to underground residential plant, poor performing subdivisions are identified, audited, assessed and prioritized for capital investments.

The following figure shows an increase of cables failure between the years 2007-2010. A record high of 31 cable faults[5] was recorded for the year 2010; this is an increase of 8 cable faults in comparison to the last record set in 2009.

[4] The *SPOORE* acronym reflects the following factors utilized in the analysis: *Safety*, *Performance*, *Outage*, *Operability*, *Risk*, *and Environment*.
[5] Primary cable in residential subdivisions only

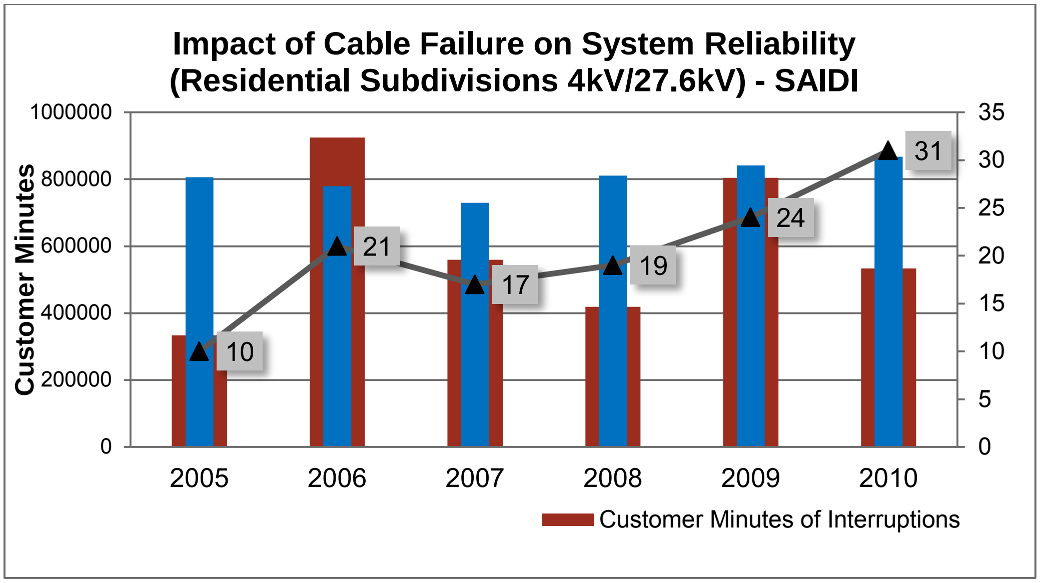



Figure 5-1 - Impact of Cable Failures on System Reliability – SAIDI

On average, London Hydro addressed 13kms of cable per year between the years 2001-2009. In 2010, however, 30kms of cable were rehabilitated via silicone injection. The plan for 2011 capital work will be to inject up to 50 km's of cable. This rapid increase in rate of cable rehabilitation should have a positive impact on system reliability as this investment is expected to eventually decrease the rate of failure on London Hydro's aging cable population.

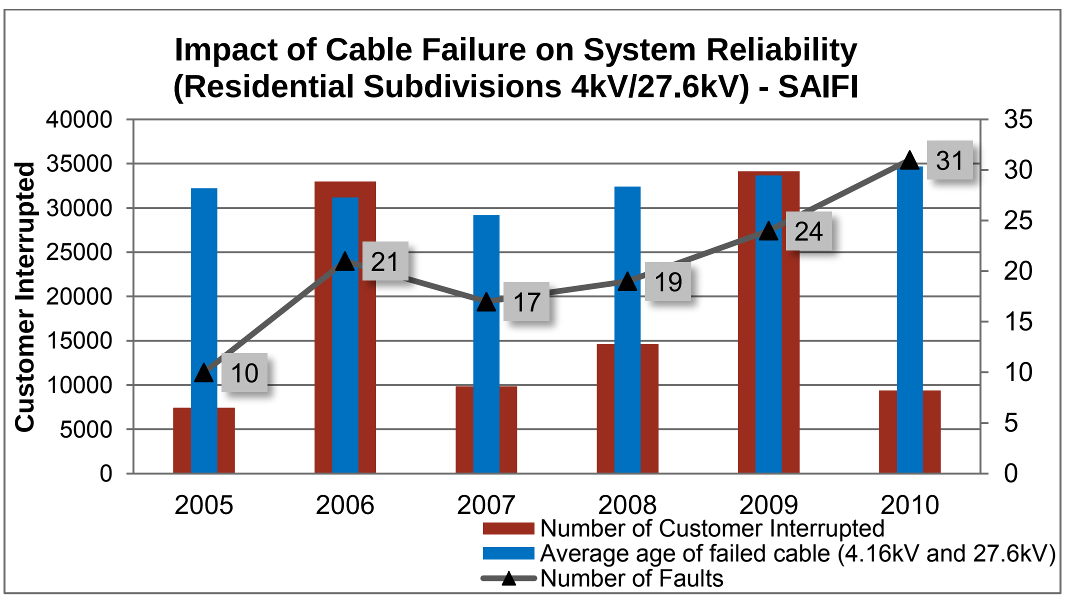



Figure 5-2 - Impact of Cable Failures on System Reliability - SAIFI

### 5.1.2 Pad-mounted Sectionalizing Switchgear

Unlike the year 2009, there were no flashover failures in 2010 in padmounted switchgear equipment energized at 27.6kV. 2010 was the fifth year into London Hydro's multiyear plan[6] intended to eliminate air-insulated switchgear from the 27.6 kV distribution system. Nearly half of the targeted 3-phase switching enclosures have been replaced as of the end of 2010.

There has been a significant decrease in customer interruptions due to switchgear flashover failures, but nearly half of the original suspect switching enclosures are still on the system and their risk of failure is still unchanged. Hence, the systematic replacement/elimination of these units is required to ensure the continuation of improved reliability of the underground system.

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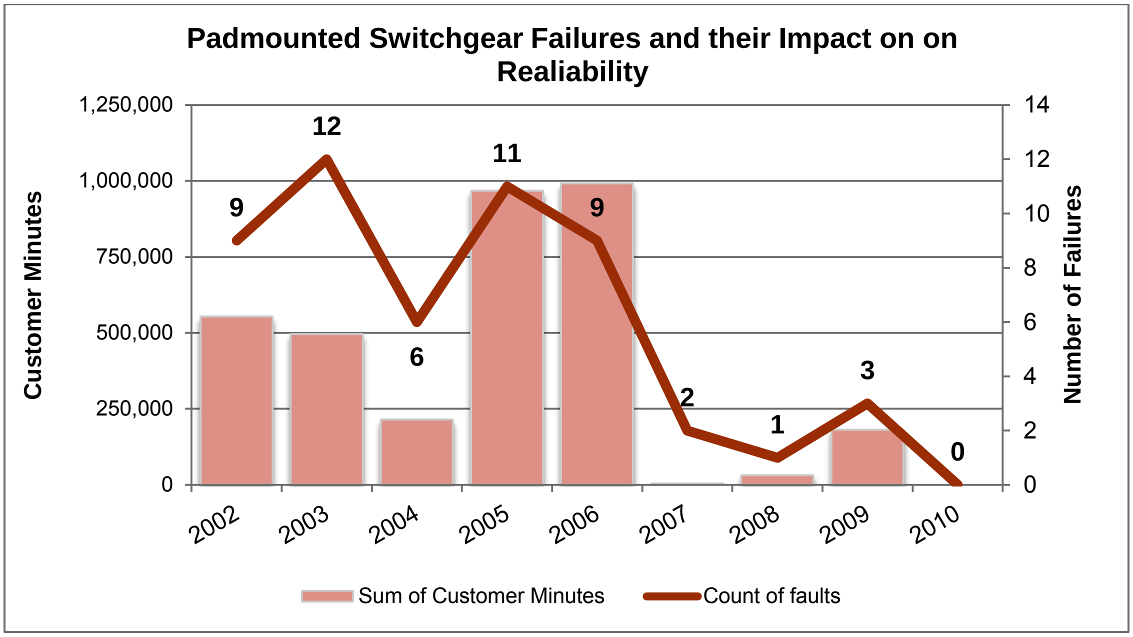



Figure 5-3 - Impact of Switching Enclosure Flashover Failures on System Reliability

[6] Distribution Reliability Report, Performance Review and a New Perspective for In-service 27.6 kV Three Phase Air Insulated Sectionalizing Enclosures, May 2006

## 5.2 Reducing Risk in the Overhead System

### 5.2.1 Long-Term Reliability Trends

As in previous years, London Hydro acquired yearly lightning data from Vaisala Inc. The available 7 year historical records indicate that the City of London experienced the lowest Ground Flash Density (GFD) in the year 2010 (see Figure 5-4). Correspondingly, the reliability metrics (SAIFI, SAIDI, MAIFI) also exhibited a decreasing trend for the year 2010.

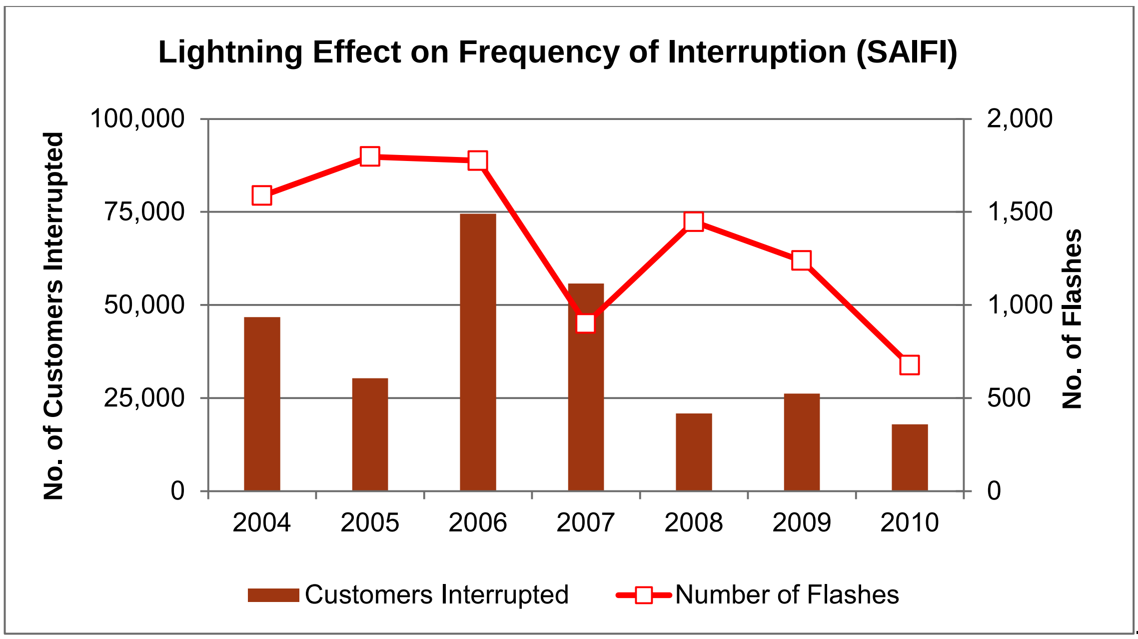



**Figure 5-4 - Lightning Effect on Frequency of Interruption (SAIFI)**

Lightning related outages were responsible for 4% and 11% of this year's total SAIDI and SAIFI indices, respectively. Lightning related outages have consistently contributed an average of 13% to the yearly SAIFI index. Furthermore, Lightning storms are a larger contributor, in percentage, to the momentary outage index, MAIFI (30% for 2010). It is worth noting that a closer correlation can be drawn between momentary outages and lightning flashes occurring in the boundary of the City of London (see Figure 5-5). These momentary interruptions are typically caused by direct lightning strokes which always results in a flashover and A/R operation.

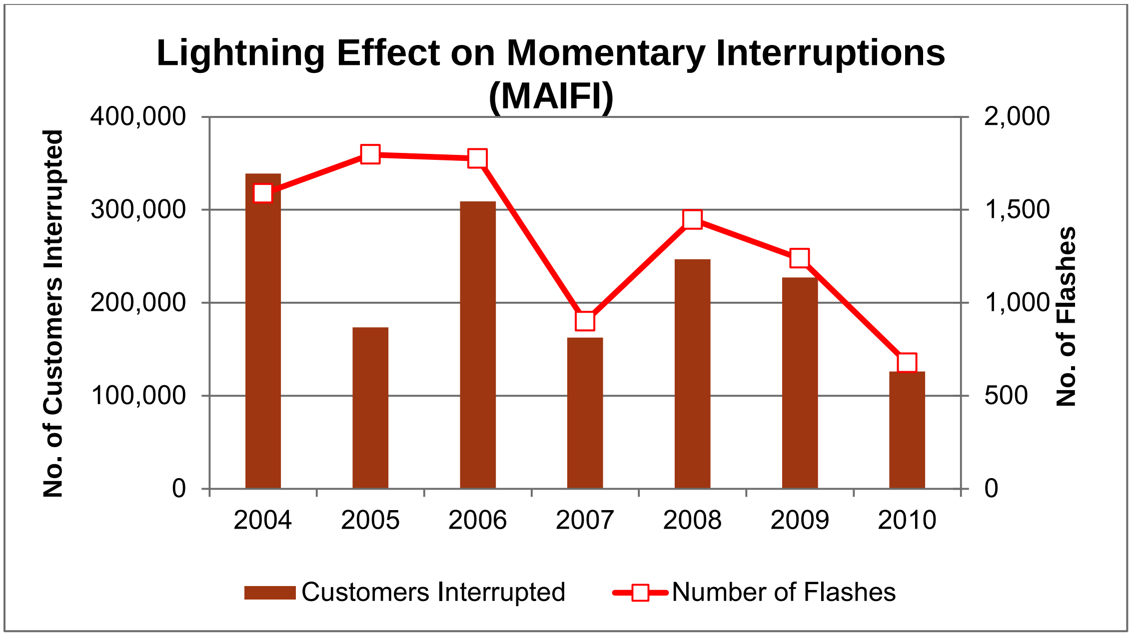



Figure 5-5 - Lightning Effect on Momentary Interruptions (MAIFI)

### 5.2.2 The Kinectrics Lightning Report

In 2010, a study of lightning protection practices on London Hydro's distribution system was completed by Kinectrrics Inc. - the results were concluded in a formal report[7]. The analysis utilizes our historic lightning outage data as well as the lightning reports obtained from Vaisala.

The ground flash density (GFD) of London Hydro's service area was determined from maps provided by Vaisala. Compared to other regions in Canada, London Hydro has one of the highest recorded GFD in the country[4].

The Kinectrics report recommended some options to mitigate the effect of lightning on the system such as installing grounded shield wires above the phase lines to protect against lightning strokes, or installing lightning arresters that can safely and effectively discharge lightning energy to ground and avoid breaker operations. Another means of extending protection against induced flashovers due to nearby lightning strokes is to install guy wire insulators to maintain a higher critical impulse flashover voltage (CFO).

[7] Lightning Protection Study for London Hydro (July 2010)

## Exposure to Lightning

London Hydro's 6 year lightning outage data indicates that two thirds of these outages occur on 27.6kV overhead circuits. (See Table 2).

**Table 2 - Lightning caused outages per voltage class**

| System Voltage | Number of Outages |
|---|---|
| 13.8 kV | 2.78% |
| 27.6 kV | 67.45% |
| 4 kV | 15.20% |
| 8 kV | 14.56% |
| **6- year window** | **464** |

### 5.2.3 MAIFI Performance of Feeders – Lightning Caused Events

There are number factors that can be used to shape and develop a system to monitor the performance of feeders against lightning inflicted events:

- Figure 5-5 suggests that there is a close correlation between the number of momentary interruptions caused by lightning and the frequency of lightning strikes for that year.
- London Hydro has auto-reclosing breakers on most of its feeders.
- Most of the sustained outages occur on the 27.6 system
- 90% of the outages are directly on the overhead system
- Exposure of overhead circuit to lightning (length of circuit)

The following Table illustrates London Hydro's worst performing circuits based on their 6 year average MAIFI. An index is also calculated which measures the performance of the feeder's momentary interruptions based on the length of the overhead circuit.

**Table 3 - MAIFI - Top 10 performing feeders (lighting caused interruptions)**

| Feeder ID | System Voltage | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 6 year Average Number of Interruptions | 6 year Max | OH Feeder Exposure (km) | Performance Index* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **32M1** | 27.6kV | 3 | 5 | 2 | 9 | 6 | 0 | **4.17** | 9 | 43 | ***1.93*** |
| **32M5** | 27.6kV | 5 | 7 | 5 | 6 | 1 | 0 | **4.00** | 7 | 43 | ***1.88*** |
| **32M8** | 27.6kV | 0 | 7 | 5 | 3 | 1 | 1 | **2.83** | 7 | 13 | ***4.46*** |
| **26M54** | 27.6kV | 1 | 4 | 2 | 5 | 3 | 2 | **2.83** | 5 | 32 | ***1.75*** |
| **19M22** | 27.6kV | 1 | 7 | 1 | 1 | 6 | 0 | **2.67** | 7 | 32 | ***1.65*** |
| **70M6** | 27.6kV | 2 | 4 | 3 | 2 | 1 | 1 | **2.17** | 4 | 6.4 | ***6.77*** |
| **4M12** | 27.6kV | 3 | 5 | 0 | 1 | 3 | 1 | **2.17** | 5 | 13 | ***3.47*** |
| **19M27** | 27.6kV | 7 | 2 | 0 | 3 | 0 | 0 | **2.00** | 7 | 8.5 | ***4.71*** |
| **26M42** | 27.6kV | 1 | 1 | 2 | 2 | 1 | 5 | **2.00** | 5 | 11 | ***3.54*** |
| **4M18** | 27.6kV | 2 | 0 | 2 | 0 | 6 | 0 | **1.67** | 6 | 6.9 | ***4.83*** |

***Average Number of A/R per km's**

Figure 5-6 illustrates a thematic of the top 20 worst performing feeders based on their momentary interruptions pro-rated by the length (km) of overhead circuit. As expected, the worst performing feeders run in exposed areas of the city.

In 2010 London Hydro selected one poor performing circuit to pilot the installation of multiple lightning arrestors in 2011 to determine if this will be an effective way to harden the system against lightning as suggested by the Kinectrics report. The performance of this circuit will be monitored over the next few years.

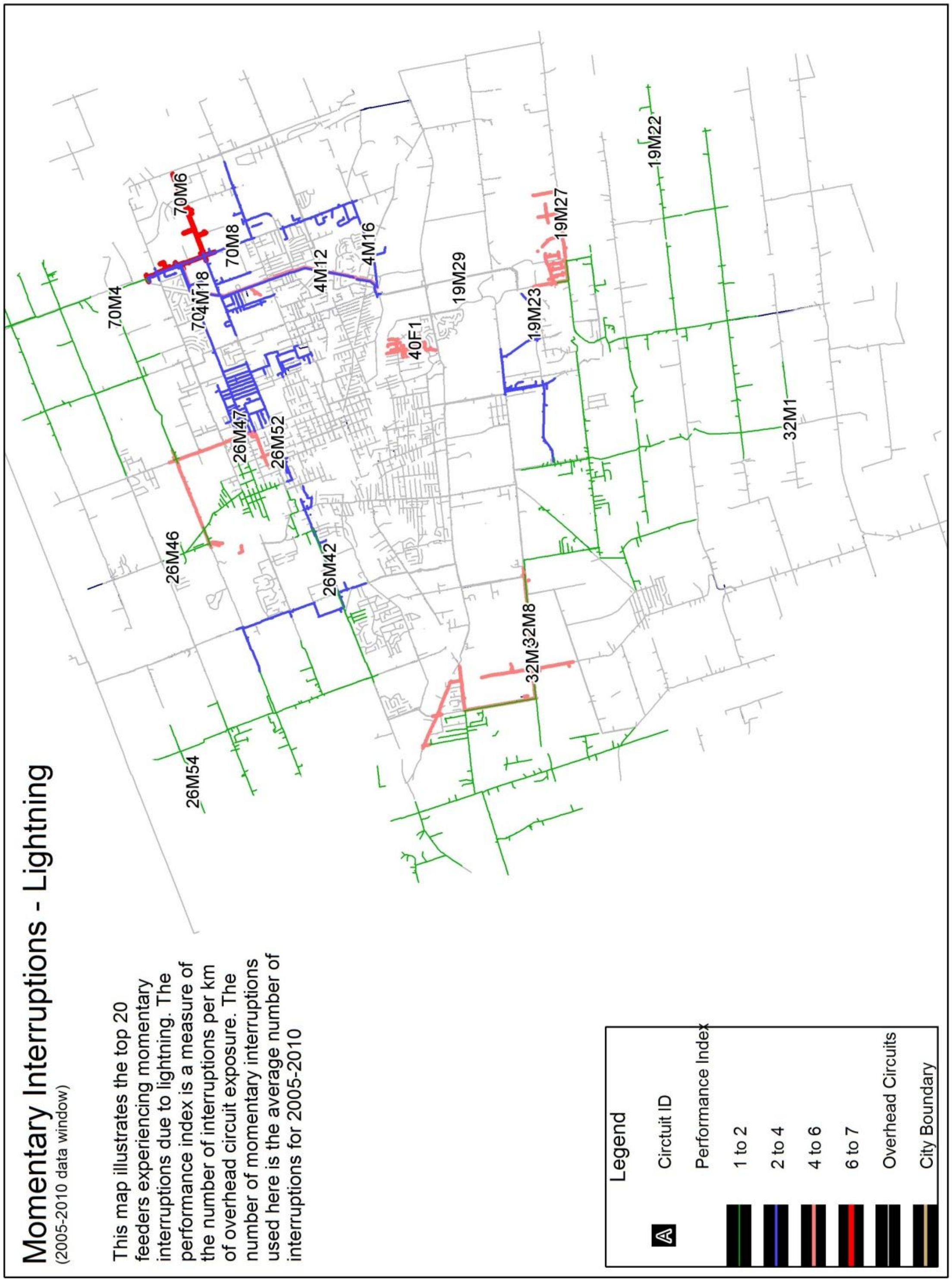



**Figure 5-6 - Momentary Interruptions Caused by Lightning**

### 5.2.4 Porcelain insulator impact

For a number of years, porcelain insulators have been addressed in an ongoing project which was responsible for identifying and replacing porcelain insulators susceptible to mechanical failure. Certain brands and vintages of these insulators had started to fail several years ago. The mode of failure was severe – the insulator would break and the energized line would fall and cause damage. This also posed a safety risk to the line maintainers who work on these circuits on a regular basis.

Since 2002 London Hydro has spent over $2 million replacing all the areas where these insulators were known to be in use. In 2010, all known locations (estimated at 5,600 insulators) have been replaced.[8]

### 5.2.5 Live contact from Animals

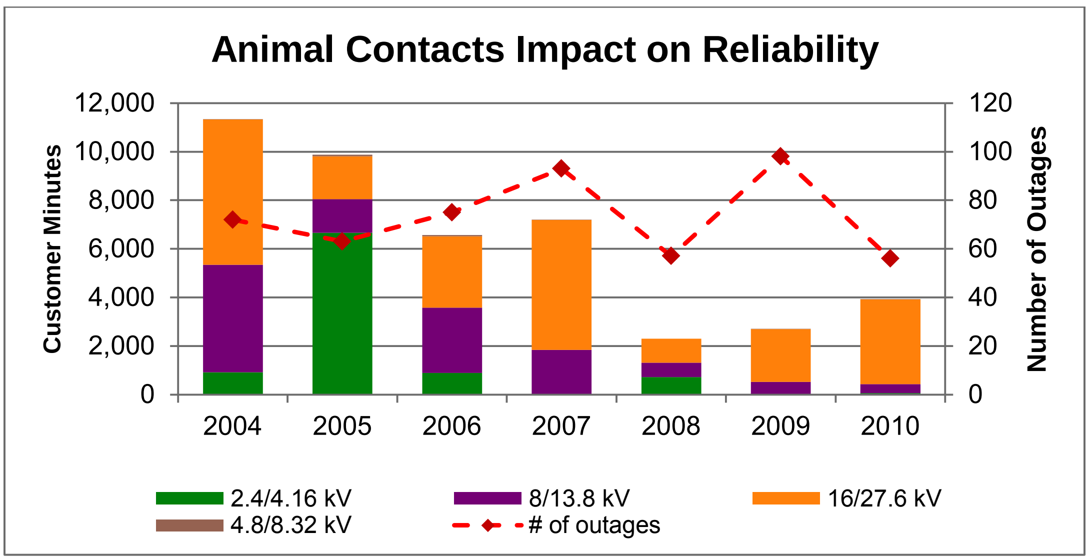



Figure 5-7 - Animal Contacts Impact on Reliability

Even though the new standard practices of animal contact prevention are applied to any riser or overhead transformer, animals are still contacting our live equipment causing interruption of

[8] In 2011, a post line insulator failure made it apparent that there may still be some unknown pockets where these problem insulators are still in service. A program is scheduled to start in mid-2011 to visit all 29,000 poles in the city to conduct a thorough inspection and to document a number of issues such as the presence of these insulators.

various length of time. As the figure above shows, it is difficult to draw a correlation between the number of incidents to the customer minutes of interruption from the 7 year trend analysis.

Like most other years, in 2010, 27.6kV related outages represent the majority of the customer minutes of interruptions. In terms of the reliability indices, SAIDI and SAIFI, the animal contact cause category represents 3% and 7% of 2010's year-end stats, respectively. The typical interruption of an animal contact on the 27.6kV system affects, on average, 20 customers for duration of 1.5 hours.

# Appendix

## Annual Performance Data

| Distribution System Supply Reliability | | | | | |
|---|---|---|---|---|---|
| | | 2008 | 2009 | 2010 | 2010 vs. 2009 |
| ***Customer Base*** | | | | | |
| | | **142,106** | **143,801** | **145,302** | **1.0%** |
| ***Customer-Hours off Supply*** | | | | | |
| | Unplanned | 291,567 | 95,654 | 73,574 | -30.0% |
| | Planned | 34,269 | 31,815 | 55,141 | 42.3% |
| | **Total** | **325,836** | **127,469** | **128,715** | **1.0%** |
| ***Number of Outages*** | | | | | |
| | Unplanned | 704 | 515 | 462 | -11.5% |
| | Planned | 453 | 447 | 545 | 18.0% |
| | **Total** | **1,157** | **962** | **1,007** | **4.5%** |
| **Customer Interruption Frequency (SAIFI)** | | | | | |
| | | **2.39 /yr** | **1.59 /yr** | **1.12 /yr** | **-42.0%** |
| **Average Interruption Duration (SAIDI)** | | | | | |
| | | **2.29 hrs** | **0.89 hrs** | **0.89 hrs** | **0.0%** |

## Under-performing Feeder Analysis

The feeder analysis in 2010 highlighted poor performing feeders supplied by three voltage classes; the 4.16kV, 13.8kV and the 27.6kV system. The SAIDI and SAIFI indices, representing the customer minutes of interruptions as well as the frequency of interruptions, are used to calculate the performance of each feeder. Each feeder's performance is benchmarked against itself using the total number of customers fed by the circuit itself. Collectively, and considering unplanned outages only, the top 10 under-performing feeders represent 31% and 26% of the total SAIDI and SAIFI (less unplanned) for the year 2010. The majority of the worst performing feeders are 4kV feeders supplying several hundred customers each. This year's record breaking overall system reliability performance can be attributed to the decreased number of major outage events on the 27.6kV system.

**1.**

| **Supply Station:** | **Nelson** | **Feeder Circuit Designation:** | **13M15** |
|---|---|---|---|
| Number of Outages | **9** | Position in 2009: | **1** |
| Number of Customers on Feeder: | **816** | Average position in the last 5 yrs: | **2** |
| Customers Affected: | **7,630** | Unplanned Customer-Minutes of Interruption: | **241,137** |
| FAIFI: | **4.1** | FAIDI: | **4.5** |
| **Assessment and Planned Action:** | | | |
| This is the second year in a row that the 13M15 feeder ranked worst performing feeder in the under-performing feeder analysis. In 2009's QSR report, a planned action item to enhance the reliability of this feeder resulted in capital investment to achieve better reliability. The proposed work started later in the year in 2010. Hence, the reliability of this feeder was not expected to be significantly improved for 2010; but it is anticipated the performance of the feeder will show improvements as the rehabilitation work is completed. | | | |

**2.**

| **Supply Station:** | **Sub 6** | **Feeder Circuit Designation:** | **6K4** |
|---|---|---|---|
| Number of Outages | **12** | Position in 2009: | **17** |
| Number of Customers on Feeder: | **1,225** | Average position in the last 5 yrs: | **26** |
| Customers Affected: | **7,630** | Unplanned Customer-Minutes of Interruption: | **25,140** |
| FAIFI: | **7.2** | FAIDI: | **3.7** |
| **Assessment and Planned Action:** | | | |
| Before 2010, The 6K4 feeder made the top 10 worst feeder list in 2004 and 2005. The frequency of interruption on this feeder is 4 times the system average. Animal contacts and several unknown cause outages have led to interruptions affecting all customers on this feeder; these interruptions, however, are 1-3 minutes in duration. As the 5 year average performance of this feeder is ranked at 26, no immediate action plan is urgent and the performance of this feeder will be monitored in the coming years. | | | |

**3.**

| **Supply Station:** | **Sub 51** | **Feeder Circuit Designation:** | **51F1** |
|---|---|---|---|
| Number of Outages | **4** | Position in 2009: | **13** |
| Number of Customers on Feeder: | **165** | Average position in the last 5 yrs: | **16** |
| Customers Affected: | **176** | Unplanned Customer-Minutes of Interruption: | **51,480** |
| FAIFI: | **1.1** | FAIDI: | **5.2** |

**Assessment and Planned Action:**

This 4kV feeder is located in the north-west area of the city and is lightly loaded with 165 customers. Given the small number of customers and long durations of outages experienced on this feeder in 2010, the FAIDI (length of outage durations) have been significant and has led to the poor raking of this feeder.

An underground radial feed with older styles of transformer installations (pozitech and livefront) have experienced multiple outages, one of which was due to a cable fault. Older style transformers impede the operational efforts to restore and sectionalize faults safely. For reasons such as this, outage durations are typically longer. The cable fault records will be added to the yearly SPOORE analysis for assessment and prioritization. No further action is required.

**4.**

| **Supply Station:** | **Highbury** | **Feeder Circuit Designation:** | **4M13** |
|---|---|---|---|
| Number of Outages | **5** | Position in 2009: | **13** |
| Number of Customers on Feeder: | **1,671** | Average position in the last 5 yrs: | **47** |
| Customers Affected: | **4,942** | Unplanned Customer-Minutes of Interruption: | **293,212** |
| FAIFI: | **3.0** | FAIDI: | **2.9** |

**Assessment and Planned Action:**

The overall historical ranking of this feeder has been positive. However, in 2010 this feeder experienced two unique outage events that greatly impacted the customers on this feeder. One of these events was caused by an inadvertent contact between two phases of a Hendrix style conductor where the insulation was stripped; multiple outages were required to repair and restore the customers. The second major outage event was due to a vehicle hitting and breaking a pole. The other several outage were localized but material enough to affect the overall performance of the feeder. Due to the uniqueness of these events and the historical performance of the feeder, no further action will be required on this feeder.

**5.**

| **Supply Station:** | **Talbot** | **Feeder Circuit Designation:** | **26M54** |
|---|---|---|---|
| Number of Outages | **9** | Position in 2009: | **14** |
| Number of Customers on Feeder: | **2,000** | Average position in the last 5 yrs: | **27** |
| Customers Affected: | **10,409** | Unplanned Customer-Minutes of Interruption: | **77,437** |
| FAIFI: | **5.2** | FAIDI: | **0.6** |
| **Assessment and Planned Action:** | | | |
| The performance of this feeder in terms of duration of interruption is well below the system average for 2010. However, the frequency of interruptions is 4 times the system average. There were three major interruptions on this feeder which were caused by a cable fault, lightning and a fallen conductor; these outages tripped the main breaker for brief durations (1-5minutes). This is the first time this feeder makes it to the top 10 worst feeder list; its performance will be revisited next year to identify a poor performance trend, if any. | | | |

**6.**

| **Supply Station:** | **Sub 25** | **Feeder Circuit Designation:** | **25F2** |
|---|---|---|---|
| Number of Outages | **1** | Position in 2009: | **63** |
| Number of Customers on Feeder: | **215** | Average position in the last 5 yrs: | **54** |
| Customers Affected: | **184** | Unplanned Customer-Minutes of Interruption: | **64,400** |
| FAIFI: | **0.9** | FAIDI: | **5.0** |
| **Assessment and Planned Action:** | | | |
| The only outage on this feeder was caused by a storm which resulted in an extended outage affecting the majority of the feeder’s customers. Historically, there were no signs of poor performance on this feeder. No further action is required. | | | |

**7.**

| **Supply Station:** | **Sub 17** | **Feeder Circuit Designation:** | **17F1** |
|---|---|---|---|
| Number of Outages | **4** | Position in 2009: | **39** |
| Number of Customers on Feeder: | **411** | Average position in the last 5 yrs: | **45** |
| Customers Affected: | **290** | Unplanned Customer-Minutes of Interruption: | **125,320** |
| FAIFI: | **2.0** | FAIDI: | **3.2** |
| **Assessment and Planned Action:** | | | |
| Multiple outages were caused by defective transformers on both the overhead and underground system. In particular, one outage caused by a padmounted transformer elbow failure resulted in a 6 hour interruption affecting over 200 residential customers. This subdivision located at the corner of Fanshawe Pk and Adelaide St along Glenora Dr, is mostly equipped with older backyard construction live front transformers. Furthermore, during the initial A/R of the breaker following the elbow failure, another fuse, feeding a radial group of customers, was found blown. It later became evident that a second outage had occurred on in other parts of the subdivision; no fault was found on the radial run and it is suspected that cold load pickup caused this outage. No further action is required. | | | |

**8.**

| Supply Station: | Talbot | Feeder Circuit Designation: | 26M12 |
|---|---|---|---|
| Number of Outages | 6 | Position in 2009: | 16 |
| Number of Customers on Feeder: | 2,000 | Average position in the last 5 yrs: | 52 |
| Customers Affected: | 4,037 | Unplanned Customer-Minutes of Interruption: | 384,660 |
| FAIFI: | 2.0 | FAIDI: | 3.2 |
| **Assessment and Planned Action:** | | | |
| This feeder experienced major interruptions caused by a tree contact and another caused by an animal contact. In both events, the feeder breaker locked out causing an interruption to all customers for durations up to 2 hours. These outages significantly increased the customer minutes of interruptions of the feeder and led to the poor ranking. The 5 year average interruption of this feeder has been in good standing and, hence, no warranted action is necessary. | | | |

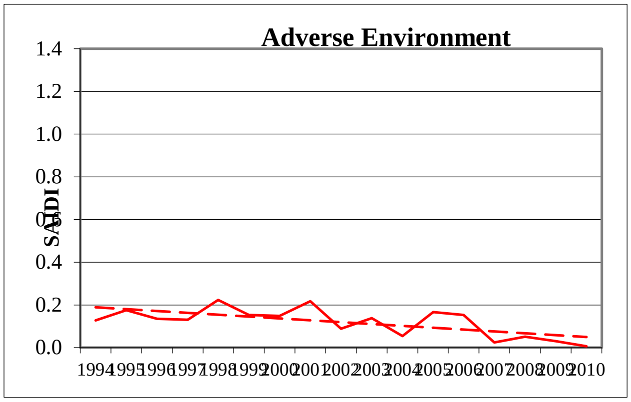
**9.**

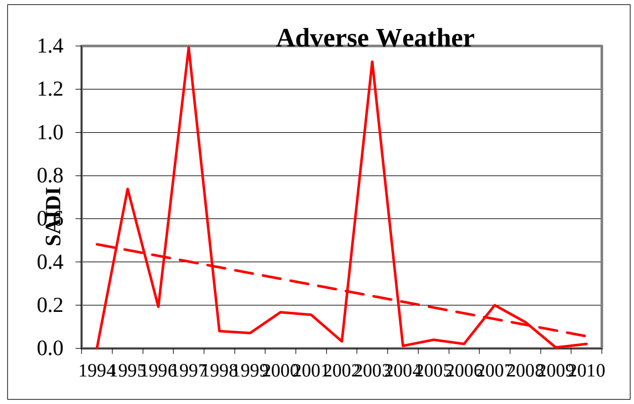
| Supply Station: | Sub 39 | Feeder Circuit Designation: | 39F1 |
|---|---|---|---|
| Number of Outages | 3 | Position in 2009: | 61 |
| Number of Customers on Feeder: | 343 | Average position in the last 5 yrs: | 57 |
| Customers Affected: | 1,041 | Unplanned Customer-Minutes of Interruption: | 34,171 |
| FAIFI: | 3.0 | FAIDI: | 1.7 |
| **Assessment and Planned Action:** | | | |
| Stormy weather resulted in multiple interruptions lasting anywhere from 3 minutes to over two hours. The line was patrolled and restored in sections. In previous years, the performance of this feeder has been acceptable and its poor performance this year can be considered a unique event. No further action is required. | | | |

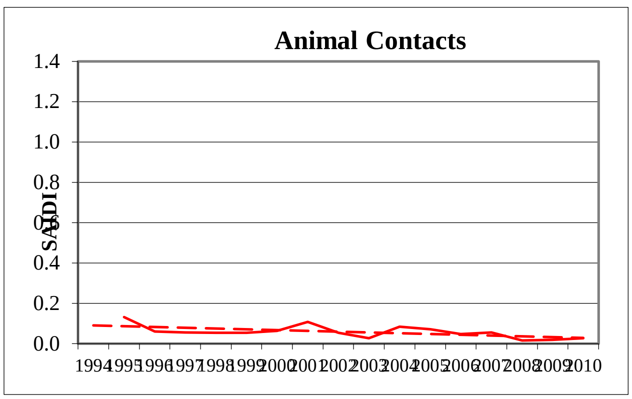
**10.**

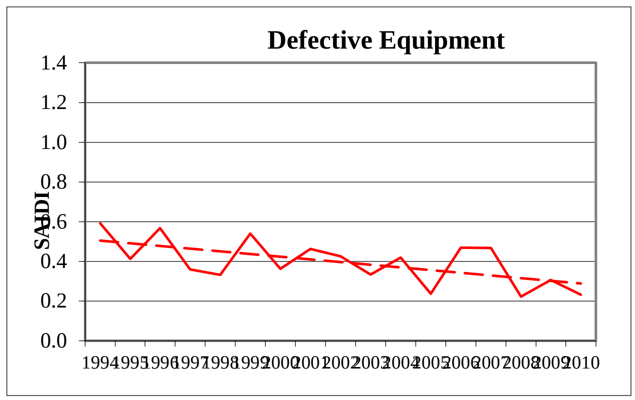
| Supply Station: | Wonderland | Feeder Circuit Designation: | 32M1 |
|---|---|---|---|
| Number of Outages | 9 | Position in 2009: | 59 |
| Number of Customers on Feeder: | 1,307 | Average position in the last 5 yrs: | 31 |
| Customers Affected: | 3,973 | Unplanned Customer-Minutes of Interruption: | 93,338 |
| FAIFI: | 3.04 | FAIDI: | 1.19 |
| **Assessment and Planned Action:** | | | |
| On three occasions, the main feeder breaker tripped causing an interruption to all customers on the feeder. Two were short interruptions caused by a lightning strike and a vehicle accident, while the third large interruption was due to a loss of supply from Hydro One. There were 6 other outages on this feeder, but they were localized to few customers and were caused by defective equipment related outages such as defective fuses and switches. This feeder had no outages associated with it in two of the 5 years of historical data. Given the relatively good performance of this feeder it is not expected that any capital expenditure is required on this feeder. | | | |

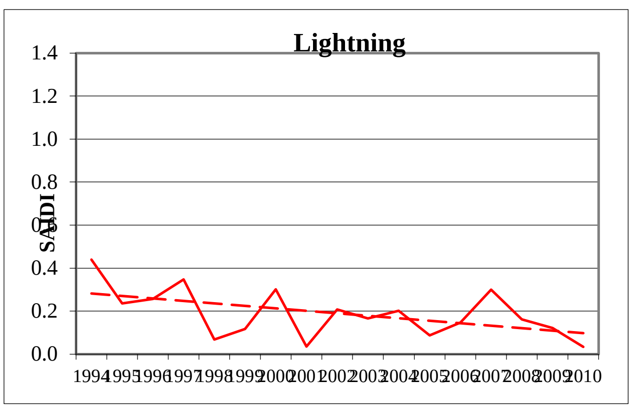
## SAIDI – EDRO* Categories

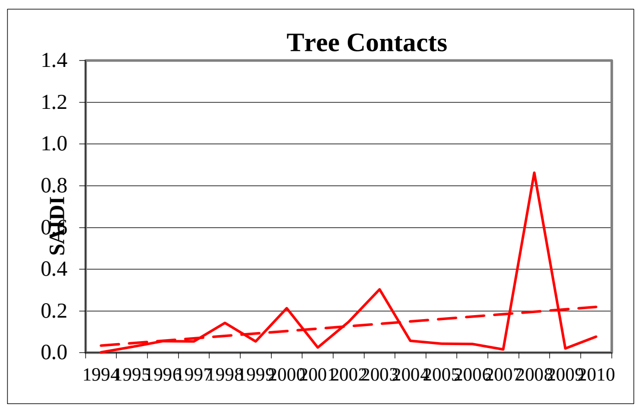


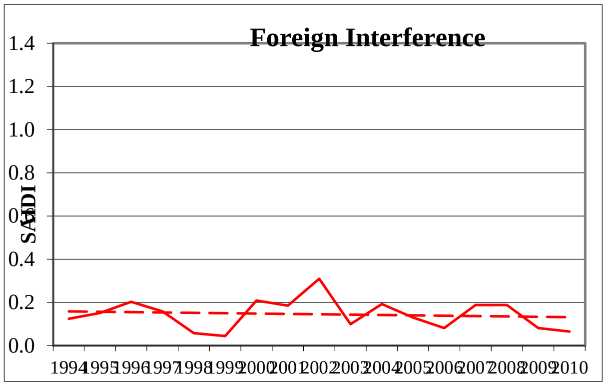



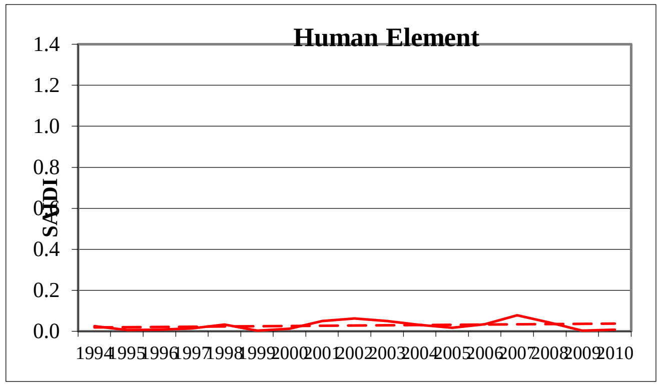



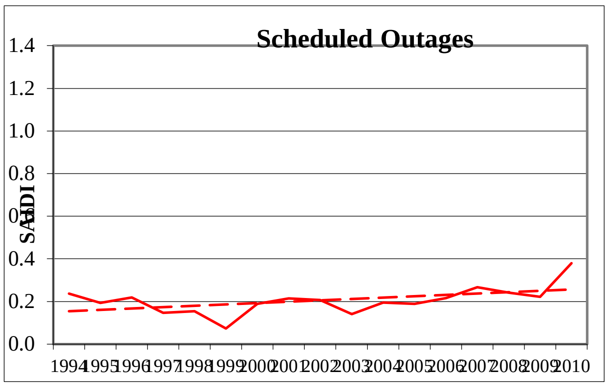



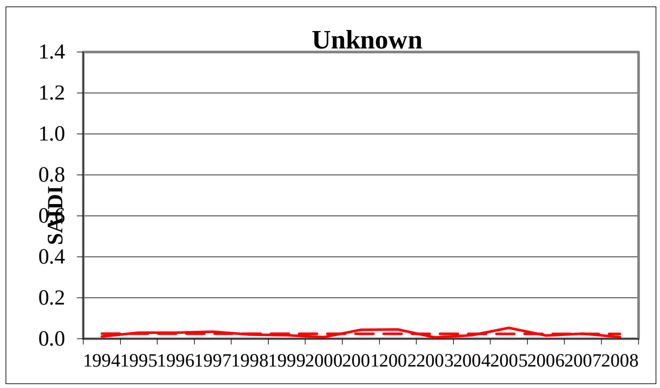

*EDRO – Equipment and Design Related Outages

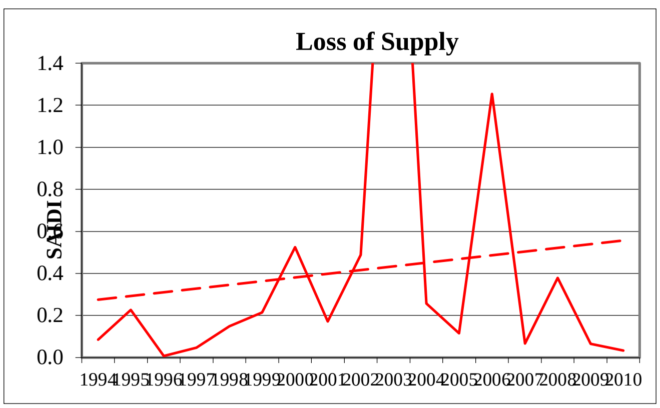
## SAIDI – Non-EDRO Categories



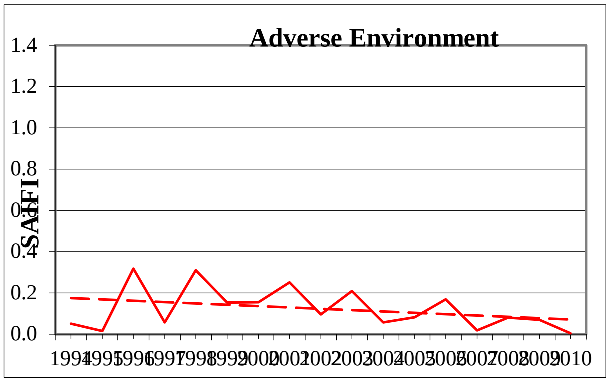



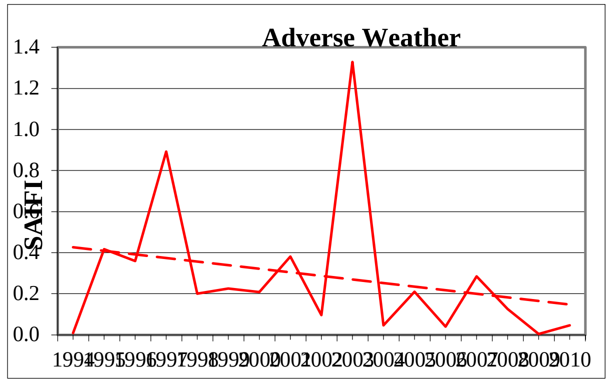



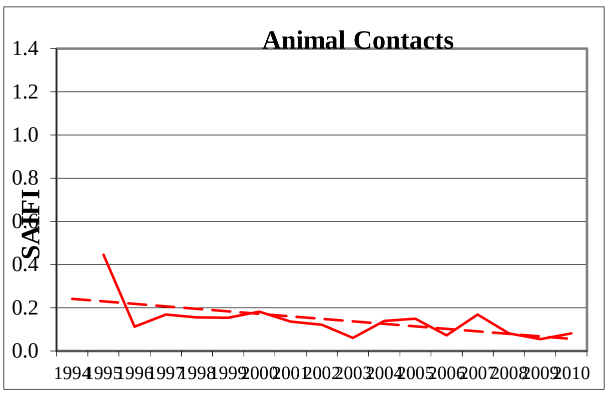



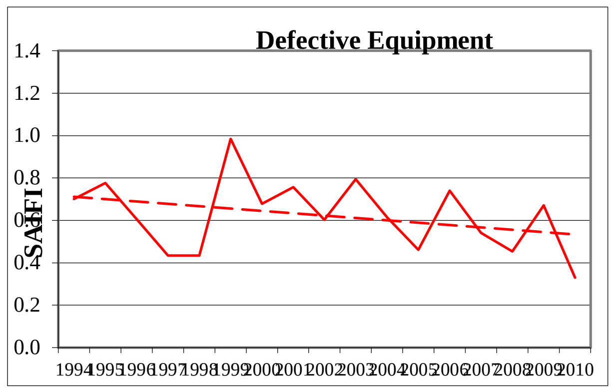



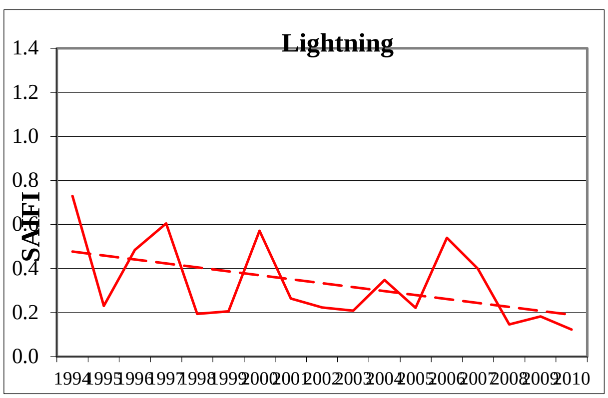
## SAIFI –EDRO Categories

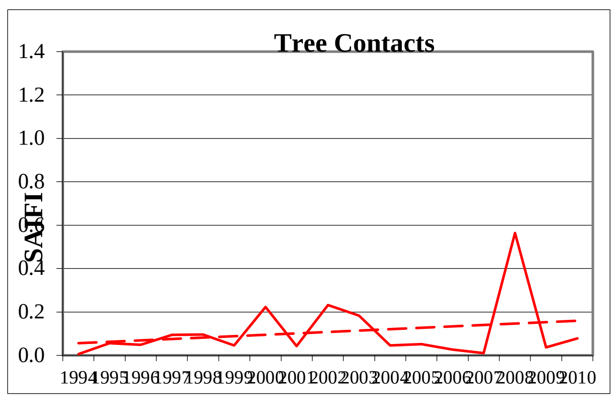


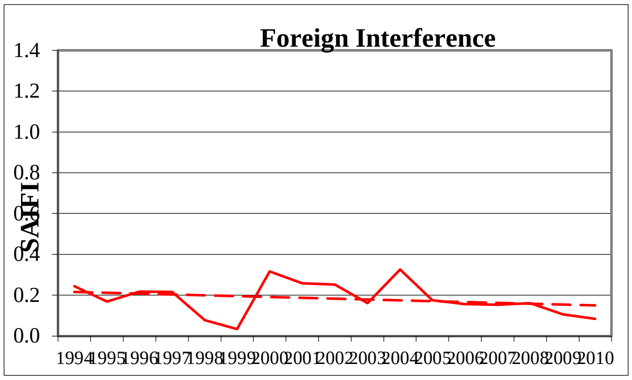



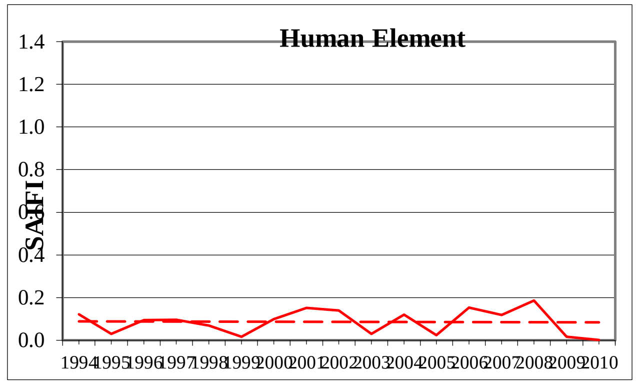



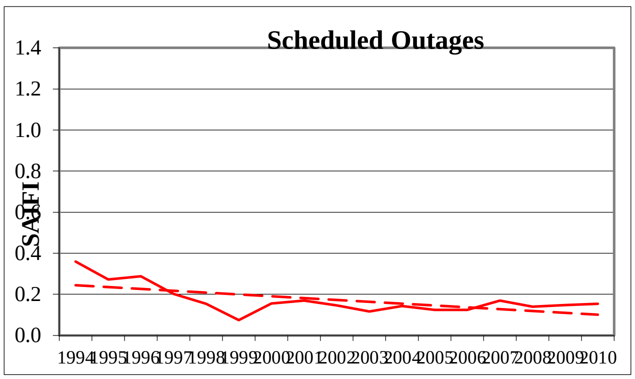



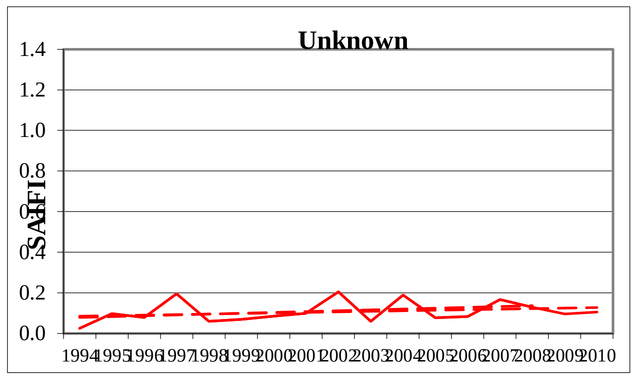



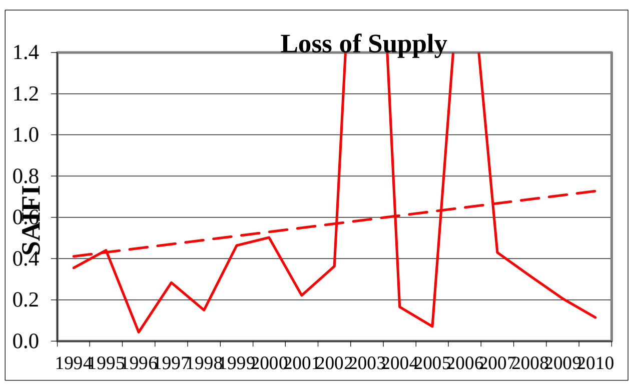
## SAIFI – Non-EDRO Categories



# London Hydro Inc.

## 2013 Cost of Service Rate Application (EB-2012-0146/ EB- 2012-0380) Response to Supplementary Interrogatories

## Operating Revenue (Exhibit 3)

### VECC Supplementary Interrogatories:

VECC #50

*Reference: Staff #20 b) and c) VECC #16 b) /Exhibit 3, pages 15-16*

a. *Please confirm that in the original Application the forecast of 2013 purchased kWh developed using the regression equation used a CDM variable value for 2013 that included the persistence of both 2006-2010 CDM program savings and 2011 CDM program savings – based on preliminary OPA estimates.*

b. *Please confirm that the projection provided in response to Staff 20 b) only included in the 2013 value for the CDM variable the 2013 persistence associated with the 2006-2010 CDM programs.*

c. *If parts (a) and (b) are confirmed, please explain why the basis for the 2013 value of the CDM variable was changed.*

d. *If part (b) is confirmed, please re-calculate the 2012 and 2013 purchased energy forecasts using the equation from Staff 20 b) but where the value of the CDM variable in each year also reflects the persisting savings from the 2011 CDM programs as reported by the OPA in its final 2011 CDM report*

e. *Please revise the response to Staff 20 c) such that the "Base" values include the persisting impact of 2011 CDM programs and the "CDM Manual Adjustment" includes only the impact of 2012 and 2013 CDM programs.*

RESPONSE – VECC #50

a) It is confirmed that in the original Application the forecast of 2013 purchased kWh developed using the regression equation used a CDM variable value for 2013 that included the persistence of both 2006-2010 CDM program savings and 2011 CDM program savings – based on preliminary OPA estimates.

b) No, the projection provided in response to Staff 20 b) used a CDM variable value for 2013 that included the persistence into 2013 from both 2006-2010 CDM program savings and 2011 CDM program savings – based on OPA final results.

c) Not applicable

d) Not applicable

e) The table that supports response to Staff 20 c) is shown below but has been adjusted to provide "Base" values that include the persisting impact of 2011 CDM programs and the "CDM Manual Adjustment" includes only the impact of 2012 and 2013 CDM programs. The resulting table supports the forecast provided in Staff 20 b).

| Billed (kWh) - CDM Activity Variable reflects 2006 to 2011 OPA programs and CDM manual adjustment includes 2012 to 2013 programs | | |
|---|---|---|
| | 2012 | 2013 |
| Base | 3,305,254,630 | 3,347,208,812 |
| CDM Manual Adjustment | (19,889,592) | (39,779,184) |
| Total | 3,285,365,038 | 3,307,429,628 |

*VECC # 51*

*Ref: LPMA #11*

a. *The response suggests that for the years 2009-2011 the distribution revenues shown in Table 3-2 are based on weather normalized loads for each customer class. Please confirm if this is the case.*

b. *If yes, please indicate how the actual loads for each customer class were "weather normalized" and provide an example of the procedure using 2011 actual loads.*

c. *If yes, please provide the weather normalized loads (kWhs and kWs where applicable) for 2011.*

RESPONSE VECC #51

a. Table 3-2 Normalized Distribution Revenues reflects the weather actual distribution revenue for years 2009-2011. The "weather normalized" expression refers to forecasted revenue only. The weather normalized information is utilized in the forecasting process of Distribution Revenue for the 2012 Bridge Year and the 2013 Test Year. The forecasted distribution revenues are associated with the weather normalized customer/connection and weather normalized load forecast information.

b. "London Hydro does not have a process to properly adjust weather actual data to a weather normal basis", as referenced in Exhibit 3 Page 10 Line 13-15.

c. N/A

*VECC # 52*

*Ref: LPMA #16*

a. *Please provide a schedule that sets out the 2012 actual kWh sales for all customer classes.*

b. *Please provide the actual weather normalized loads for each customer class for 2012.*

RESPONSE VECC #52

a. The following table reflects the actual billed energy data for 2012.

**Billed Energy by Rate Class**

| Year | Residential | GS<50 | GS>50 | Customers | Connections | Street Lighting | Sentinels | USL | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Billed Energy (GWh)** | | | | | | | | | |
| 2012 Actual | 1,103.9 | 400.2 | 1,495.1 | 183.4 | 39.4 | 23.8 | 0.8 | 5.6 | 3,252.1 |

b. As per Exhibit 3, Page 10 of 56, Line 13-15 "London Hydro does not have a process to properly adjust weather actual data to a weather normal basis."

*VECC #53*

*Reference: VECC #13 b)*

a. *Please confirm that the equation set out in the response is based on the OPA's final CDM results for 2011. If not, please re-estimate the equation.*

b. *Please provide a forecast for 2013 purchased kWh based on the results of VECC 13 b) – where: i) the equation is estimated using the OPA`s final 2011 CDM results and ii) the value of the CDM variable for 2013 includes the persisting savings from the 2011 CDM programs as well as the persisting savings from the 2006-2010 programs.*

RESPONSE – VECC #53

a. Please see response to LPMA #51b

b. Please see response to LPMA #51b

*VECC #54*

*Reference: VECC #16 b)*

*a. Please confirm that, for any given year, the difference between gross and net OPA reported savings does not reflect all of the CDM activity that will take place without any incentive being provided. If not confirmed, please explain why.*

*b. Does London agree that the historical consumption values for each customer class will have been impacted by the total CDM activity that has occurred each year without any incentive being provided (and not just that associated with OPA CDM programs)?*

*c. Can London provide any estimates of the total savings in each year 2002-2011 from CDM activity that has would have taken place in its service area without any incentive (as opposed to just that associated with OPA programs)? If so, please do so and indicate how the savings amounts were determined.*

RESPONSE – VECC #54

a. The statement is confirmed

b. If, by this question, you mean that is there natural energy conservation taking place within London Hydro's franchise service territory, then the answer is Yes. If one refers to the various editions of the OEB's "Yearbook of Electricity Distributors", one will see the following trend for London Hydro:

| OEB Yearbook | Billed kWh | Number of Residential Customers | Average Annual Billed kWh per Customer |
|---|---|---|---|
| 2011 | 1,128,889,459 | 134,714 | 8,380 |
| 2010 | 1,146,514,255 | 133,452 | 8,591 |
| 2009 | 1,067,984,894 | 131,734 | 8,107 |
| 2008 | 1,119,770,671 | 130,245 | 8,597 |
| 2007 | 1,117,283,048 | 128,587 | 8,689 |
| 2006 | 1,088,755,114 | 126,516 | 8,606 |

Energy consumption is of course affected by temperature (i.e. an unseasonably hot summer will result in significant energy sales attributable to air conditioners). Basically the trend (average annual energy consumption per residential customer) is going down in this tabulation, and likely by a greater amount than one might expect from just the saveONenergy FRIDGE & FREEZER PICKUP program, the saveONenergy HEATING & COOLING INCENTIVE program, and the saveONenergy COUPONS program.

The marketplace reality is that consumers buy big screen TV's, high-speed computers, and other electrical appliances within their homes that are inherently more energy efficient than the appliances and devices that they replace. The motivation for such consumer purchases is unlikely energy conservation – rather energy conservation is the natural by-product of consumerism.

c. Conceptually, this could only be done for the residential class as there is a certain degree of homogeneity within this tariff classification. For the business customers, their electrical load is so highly dependent upon production levels and similar factors, that any model would have dubious accuracy.

For the residential customer class, one could start with the average annual billed kWh per customer over the 2002 to 2011 timeframe, and then weather-normalize this data i.e. adjust the load to what it likely would have been if the weather in that year was consistent with the published 30-year weather patterns. Next, one would deduct the GROSS energy savings reported by the OPA for London Hydro's franchise service territory for each of those years, and divide it by the number of customers each year. Theoretically, what is left is the energy conservation that occurred naturally in each year due to consumerism, changes in building codes, awareness campaigns, etc.

This is not a calculation that London Hydro has carried out in the past, nor do we see now how such knowledge would further our business endeavours.

## LPMA Supplementary Interrogatories:

*LPMA # 48*

*Ref: LPMA #19 & Exhibit 3, page 41*

a. *Please confirm that the evidence in Exhibit 3 at page 41 refers to the May 11, 2005 Report of the Board on the 2006 Electricity Distribution Rate Handbook (RP-2004-0188) and specifically to page 28.*

b. *Please confirm the following is accurately taken from the 2006 Electricity Distribution Rate Handbook:*

   *"4.6.1 Assets Sold to a Non-Affiliate*

   *The treatment of capital gains and losses on non-depreciable assets sold to a non-affiliate will be determined by the Board on a case-by-case basis, subject to the materiality thresholds outlined in Section 4.2. A capital gain or loss that falls below the materiality threshold shall be shared between the ratepayers and the shareholder on a 50/50 basis in determining the revenue requirement."*

RESPONSE LPMA - #48

a. The evidence in Exhibit 3 at page 41 (titled 4355 – Gain on Disposition of Utility and Other Property) complies with The Report of the Board on the 2006 Electricity Distribution Rate Handbook (RP-2004-0188) as located on Page 27 Treatment of Gains and Losses: Conclusions. It is London Hydro's belief that it is the Board's intent for electricity distributors to follow the directives of The Report of the Board on 2006 Electricity Distribution Rate Handbook (RP-2004-0188).

b. The above referenced paragraph accurately taken from Page 28 of the 2006 Electricity Distribution Rate Handbook.

*LPMA #49*

*Ref: LPMA #21*

a. *Please explain how the interest forecast for 2013 shown in the response to part (c) is derived based on an interest rate of 1.75% (or perhaps 1.25%) and an average bank balance of $321,333.*

b. *Please explain the dramatic drop in the average bank balance between 2012 and 2013, from about $9 million per month to $321,000 per month.*

c. *Please provide the actual average bank balance for the month of January, 2013, and the average balance for the month of February, 2013 based on the most recent information available.*

RESPONSE – LPMA #49

a. There is no direct correlation between the interest rate of 1.25% (based on current rates), the $321,333 average month end projected balance and the $50,000 projected as the interest revenue for the year. If simply using the $321,333 average balance, London Hydro would have estimated only interest revenue of $4,016. Based on the $50,000 interest revenue, London Hydro has estimated an average balance of $4,000,000.

b. There is a significant difference between the month end values and the average values. The average month end values for 2011 and 2012 were as follows:

   2011: $1.9M dollars

   2012: $5.7M dollars

   Using only the average month end balances for the two year periods, the interest expense would have been $24,534 (2011) and $71,452 (2012).

   During the two year period, the month end cash balances fluctuated more than $20 million dollars. Cash balances fluctuate significantly on a monthly basis due to the timing of cash receipts and the significant payment of the IESO invoice which also fluctuates based on energy usage and the delay between the amount paid for energy in high demand months and the subsequent cash collections from customers.

London Hydro is anticipating lower cash balances in 2013 and beyond compared to previous years as a result of the increasing variance between the monies received through the revenue requirement from depreciation expense and the cash required to be spent on capital infrastructure. As explained in the Application, simply adjusting the burden rates and useful lives to comply with MIFRS reduces the cash flow received by London Hydro in excess of $4,000,000 per year.

With all other things remaining equal, lower depreciation expenses recovered through rates combined with higher capital additions result in lower cash balances on hand.

c. The month end balances for January and February were: $1.7M (Jan) and $3.0M (Feb). The average balances for January and February were: $9.7M (Jan) and $13.1M (Feb)

*LPMA #50*

*Ref: VECC #12 & OEB #20*

*Please confirm that if the revised GDP forecast found in the response to part (a) of VECC #12 was used to forecast 2013 volumes based on the equation estimated in the response to part (b) of OEB #20, the increase in the forecast is approximately 3.3 GWh, based on the GDP coefficient of 1,099,164. If this cannot be confirmed, please provide a revised Table 3-9 using the 2013 forecast for GDP taken from VECC #12.*

RESPONSE – LPMA #50

The response to OEB # 20b did not reflect the GDP forecast found in response to part (a) of VECC #12. A revised Table 3-9 using the 2013 forecast for GDP taken from VECC #12 along with the updated CDM Activity Variable referenced in OEB # 20b is provided below.

| Table 3-9: Total System Purchases Updated CDM Activity Variable and GDP | | | |
|---|---|---|---|
| **Year** | **Actual** | **Predicted** | **% Difference** |
| **Purchased Energy (GWh)** | | | |
| 1996 | 2,928.4 | 2,917.4 | (0.4%) |
| 1997 | 2,913.9 | 2,934.1 | 0.7% |
| 1998 | 3,015.4 | 3,047.4 | 1.1% |
| 1999 | 3,214.5 | 3,161.1 | (1.7%) |
| 2000 | 3,211.3 | 3,202.0 | (0.3%) |
| 2001 | 3,266.8 | 3,275.2 | 0.3% |
| 2002 | 3,396.5 | 3,420.9 | 0.7% |
| 2003 | 3,339.3 | 3,355.8 | 0.5% |
| 2004 | 3,384.2 | 3,361.2 | (0.7%) |
| 2005 | 3,559.6 | 3,537.6 | (0.6%) |
| 2006 | 3,463.6 | 3,461.1 | (0.1%) |
| 2007 | 3,513.7 | 3,518.6 | 0.1% |
| 2008 | 3,442.6 | 3,460.9 | 0.5% |
| 2009 | 3,315.9 | 3,319.9 | 0.1% |
| 2010 | 3,428.2 | 3,418.9 | (0.3%) |
| 2011 | 3,408.6 | 3,410.2 | 0.0% |
| **2012 Weather Normal** | | **3,433.8** | |
| **2013 Weather Normal** | | **3,473.1** | |
| **2013 Weather Normal - 10 year average** | | **3,482.1** | |
| **2013 Weather Normal - 20 year trend** | | **3,494.3** | |

*LPMA #51*

*Ref: VECC #13 & OEB #20*

a. *Please provide the 2013 forecast of purchases based on each of the equations estimated in the response to VECC #13.*

b. *Has the equation in VECC #13(b) been estimated using the updated CDM variable used in OEB #20? If not, please update the equation to reflect the updated CDM variable and provide the regression statistics and the resulting forecast for 2013.*

c. *Please provide the forecast for local employment for 2012 and 2013 and identify the source of the forecast.*

RESPONSE – LPMA #51

a. The 2013 power purchased forecast for VECC #13 b) is 3,437.7 (GWh) and for VECC #13 c) it is 3,451.0 (GWh).

b. The equation in VECC #13(b) has not been estimated using the updated CDM variable used in OEB #20. The equation has been revised to reflect the updated CDM variable and the following table provides the regression statistics. The resulting power purchased forecast for 2013 is 3,439.1 (GWh).

| **Statistics** | | |
|---|---|---|
| R Square | 94.8% | |
| Adjusted R Square | 94.5% | |
| F Test | 366.4 | |
| Variable | Coefficients | T-stat |
| Intercept | (127,236,851) | (6.25) |
| Heating Degree Days | 56,675 | 19.02 |
| Cooling Degree Days | 581,741 | 25.69 |
| Ontario Real GDP Monthly % | 762,452 | 6.54 |
| Number of Days in Month | 5,534,912 | 9.13 |
| Spring Fall Flag | (8,071,024) | (6.56) |
| Number of Customers | 111 | 2.39 |
| CDM Activity | (1.7) | (5.87) |
| Number of Peak Hours | 73,465 | 2.49 |
| London Employment (000's) | 239,117 | 3.10 |

c. The monthly forecast for local employment for 2012 and 2013 was held constant at the December 2011 actual value since London Hydro did not have a source for a forecasted value. The actual local employment monthly values was sourced from Statistic Canada Table 282-0062 Labour Force Survey for London, Ontario

## Board Staff Supplemental Interrogatories

*Board Staff - #64s*

*References:*

- *Exhibit 3/Page 24/Table 3-19*
- *Exh 3 – VECC # 12*
- *Exh 3 – VECC # 15*

*London Hydro has proposed to take into account the CDM savings achieved in 2011 to develop the CDM adjustment for the 2013 load forecast amount to take into account the persistence of 2011 and 2012 CDM programs, and the impact of 2013 CDM programs on 2013 demand (consumption, measured in kWh), on an assumption of achieving 100% of its 4-year target of 156,640,000 kWh and the corresponding kW demand target over the period 2011 to 2014. The derivation, shown in Table 3-19 of Exhibit 3, is originally based on the preliminary 2011 CDM report from the OPA.*

*An update to this would be to use the final 2011 OPA results for the effect of 2011 CDM programs and their persistence, as measured and reported by the OPA for London Hydro, and then to assume an equal increment for each of 2012, 2013, and 2014 so as to achieve London Hydro's CDM target of 156,640,000 kWh. Board staff views that this approach is preferable as there are results on what the utility has achieved to date, and hence what more will be needed to achieve the cumulative four-year target. In using the measured and reported results from the 2011 programs, including the persistence into 2013, Board staff views that an improved estimate of the CDM impact of 2011-2013 programs on the LRAMVA threshold for 2013 (and 2014) would result, along with the corresponding adjustment to the 2013 test year load forecast.*

*Based on the final 2011 OPA filed by London Hydro, Board staff has prepared the following table, which is also provided in working Microsoft Excel format:*

# *Load Forecast CDM Adjustment Work Form (2013)*

***London Hydro Inc.*** ***EB-2012-0146***

| | | | | | |
|---|---|---|---|---|---|
| | 4 Year (2011-2014) kWh Target: | | | | |
| | 156,640,000 | | | | |
| | 2011 | 2012 | 2013 | 2014 | Total |
| | % | | | | |
| 2011 CDM Programs | 13.49% | 13.40% | 13.40% | 13.36% | 53.65% |
| 2012 CDM Programs | | 7.73% | 7.73% | 7.73% | 23.18% |
| 2013 CDM Programs | | | 7.73% | 7.73% | 15.45% |
| 2014 CDM Programs | | | | 7.73% | 7.73% |
| **Total in Year** | **13.49%** | **21.13%** | **28.85%** | **36.53%** | **100.00%** |
| | kWh | | | | |
| 2011 CDM Programs | 21,134,911 | 20,990,325 | 20,990,325 | 20,921,557 | 84,037,117 |
| 2012 CDM Programs | | 12,100,480 | 12,100,480 | 12,100,480 | 36,301,441 |
| 2013 CDM Programs | | | 12,100,480 | 12,100,480 | 24,200,961 |
| 2014 CDM Programs | | | | 12,100,480 | 12,100,480 |
| **Total in Year** | **21,134,911** | **33,090,805** | **45,191,286** | **57,222,998** | **156,640,000** |
| | | | | Check | 156,640,000 |

| | Net-to-Gross Conversion "Gross" | "Net" | Difference | "Net-to-Gross" Conversion Factor ('g') |
|---|---|---|---|---|
| 2006 to 2011 OPA CDM programs: Persistence to 2013 | 1 | 1 | 0 | 0.00% |

| | 2011 | 2012 | 2013 | 2014 | Total for 2013 |
|---|---|---|---|---|---|
| Amount used for CDM threshold for LRAMVA | 20,990,325 | 12,100,480 | 12,100,480 | | 45,191,286 |
| Manual Adjustment for 2013 Load Forecast | 20,990,325 | 12,100,480 | 6,050,240 | | 39,141,046 |
| *Manual adjustment uses "gross" versus "net" (i.e. numbers multiplied by (1 + g)* | | | *Only 50% of 2013 CDM impact is used based on a half year rule* | | |

*The methodology for this is as follows:*

*For the top table*

- *The 2011-2014 CDM target is input into cell B4;*
- *Measured results for 2011 CDM programs for each of the years 2011 and persistence into 2012, 2013 and 2014 are input into cells C13 to F13;*
- *Based on these inputs, the residual kWh to achieve the 4 year CDM target is allocated so that there is an equal incremental increase in each of the years 2012, 2013 and 2014.*

*The second table is to calculate the conversion from "net" to "gross" results. While the LRAMVA is based on the "net" OPA-reported results, the load forecast is impacted also by CDM savings of "free riders" and "free drivers" and other factors, as discussed in the response to VECC-15.*

*While Board staff has input values of "1" in each of cells D24 and E24, in the absence of information, these should be populated with the measured "gross" and "net" CDM savings for the persistence of all CDM programs from 2006 to 2011 on 2013, as reported in the final OPA reports.*

*For the last table, two numbers are calculated:*

- *The "Amount used for CDM threshold for LRAMVA" is the sum of the persistence of 2011 and 2012 CDM programs and the annualized impact of 2013 CDM programs on 2013; and*
- *"Manual Adjustment for 2013 Load Forecast" represents the amount to be reflected in the 2013 load forecast. This amount uses the "gross" impact, which is calculated by multiplying each year's CDM program impact or persistence by (1 + g) from the second table. In addition, the impact of the 2013 CDM programs on 2013 "actual" consumption is divided by 2 to reflect a "half year" rule. Since the 2013 CDM programs are not in effect at midnight on January 1, 2013, the "annualized" results reported in the OPA report will overstate the "actual" impact. In the absence of information on the timing and uptake of CDM programs in their initial year, a "half-year" rule may proxy the impact.*

*Requests:*

a. *Please input the "gross" and "net" cumulative kWh CDM savings from all CDM programs from 2006 to 2011 on 2013 as measured in the final OPA reports into, respectively, cells D24 and E24.*

b. *Please verify the inputs and results of the model.*

c. *Please derive the class CDM kWh and kW savings that would correspond with the "net" CDM savings above.*

d. *Please provide THI's comments on the methodology above to develop the CDM savings that will underlie the 2013 CDM amount for the LRAMVA and the corresponding CDM adjustment for the 2013 test year load forecast. What refinements to this approach should be considered? For example, since the 2011 actual results are impacted by 2011 CDM programs, should some adjustment (e.g. a half-year rule) be used to account for the fact that 2011 CDM programs would have* *impacted the 2011 actual results and, in a stochastic manner the resulting regression models and base forecast? Also provide London Hydro's views on whether this approach integrates with the adjustment to account for historical CDM impacts factored into London Hydro's base forecast through the CDM variable.*

RESPONSE – Board Staff #64s

a. The "gross" and "net" cumulative kWh CDM savings from all CDM programs from 2006 to 2011 on 2013 as measured in the final OPA reports have been entered, respectively, into cells D24 and E24 and provided in the live spreadsheet titled "BdStaff_SuppIR_64s_London_Hydro"

b. London Hydro has verified the inputs and results of the model.

c. The class CDM kWh and kW savings that would correspond with the "net" CDM savings shown in "BdStaff_SuppIR_64s_London_Hydro" is provided below

| 2013 Expected Savings for LRAM Variance Account | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Residential | GS<50 | GS>50 | Large User | Cogeneration | Street Lighting | Sentinels | USL | Total |
| kWh | 14,896,090 | 5,412,015 | 21,361,865 | 2,576,753 | 552,808 | 315,677 | 10,286 | 65,791 | 45,191,286 |
| kW where applicable | | | 53,402 | 5,104 | 2,680 | 886 | 28 | | 62,100 |

d. London Hydro agrees with the methodology used to determine the CDM savings that will underlie the 2013 CDM amount for the LRAMVA. With regards to the manual CDM adjustment for the 2013 test year load forecast, London Hydro agrees it should be a value that represents the gross level. However, the 2011 value should not be included in the manual CDM adjustment. The results of the 2011 programs and how they persist into 2013 have been reflected in the CDM Activity variable since the 2011 programs impacts on the actual 2011 power purchases used in the regression analysis. In London Hydro's view to include the 2011 value in the manual CDM adjustment would be a double count. With regards to the 2013 value used in the manual CDM adjustment, London Hydro is concerned with using the "half year rule" since it is London Hydro's understanding that there should be consistent treatment on how the load forecast is adjusted and how the LRAMVA threshold is determined. Since a full year amount is used in the LRAMVA threshold calculation for 2013 then a full year for 2013 should be used in the manual CDM adjustment.

**All Respectfully Submitted**

# London Hydro Inc.

## 2013 Cost of Service Rate Application (EB-2012-0146/ EB- 2012-0380) Response to Supplementary Interrogatories

## Operating Costs (Exhibit 4)

### Board Staff Supplementary Interrogatories:

*Exhibit 4 – Board Staff – 65 s*

*GIS Survey Technician Positions*

*Reference: Exh 4 – Board Staff # 31(a)*

*Do the duties of the three new positions replace or update duties of existing positions or contracted labour? If so, how many positions or full-time equivalent contract positions do they take the place of, and to what extent do the new positions represent an increase in productivity if at all? If the new positions are not replacements or updates, please explain why London Hydro's maps and drawings require additional effort to this extent.*

Response OEB 65 s

The three new GIS Technician positions did not replace existing positions or contracted labour. London Hydro was underutilizing the potential benefits of its GIS as a result of understaffing. The existing staff (3 FTEs) were fully occupied attempting to keep up with new work orders and as-built drawings. Additional resources were required to maintain the GIS properly, eliminate the periodic backlog of updating as-built drawings, and expand on the use of the system for analysis.

A significant amount of effort and expertise is required to maintain and utilize a modern GIS system. In conjunction with London Hydro's plan to also purchase an OMS system in 2012, and to integrate the GIS data with CYME for load flow analysis, it was evident that the connectivity, attribute data, and as-builts needed to be maintained in a timely fashion. London Hydro reviewed staffing levels at other LDCs prior to increasing staff in this area. The table below reflects the review of resource capabilities at other LDCs that London Hydro conducted in 2010.

| Utility | # of Services | # of GIS Techs | GIS Tech to Service Ratio | Notes |
|---|---|---|---|---|
| **London Hydro** | **147,000** | **3** | **49,000** | |
| | | | | |
| LDC A | 80,000 | 3 | 26,667 | |
| LDC B | 121,000 | 8 | 15,125 | 6 technicians & 2 analysts |
| LDC C | 186,000 | 10 | 18,600 | 8 technicians & 2 advanced techs |
| LDC D | 290,000 | 17 | 17,059 | |
| LDC E | 235,000 | 7 | 33,571 | 5 technicians & 2 technologists |
| LDC F | 78,000 | 3 | 26,000 | 39,000 Hydro and water customers |
| | | | | |
| **AVERAGE** | **162,429** | **7** | **26,575** | |

*Exhibit 4 – Board Staff 66 s*

*Bad Debt*

*References:*

*Exh 4 – Energy Probe # 27 (c) & (d)*

*Exh 4 – LPMA # 25(a)*

*In its response to Exh 4 – Energy Probe # 27, London Hydro states that both its field collection calls and its actual disconnections had increased in 2012, which indicates continued financial pressure experienced by its customers. However, in its response to Exh 4 – LPMA # 25(a), London Hydro states that its current year bad debt expense, based on account aging and risk assessment, is $750,000, which is close to the four-year average of $767,500. How does London Hydro reconcile this recent experience with its request for approval of $1,000,000 annually?*

Response – OEB 66 s

Forecasted bad debt in the 2013 Test Year and beyond will be impacted by the following factors, among others:

- End of Ontario Clean Energy Benefit program
- Impact of Time of Use Rates
- Future energy price increases

- Regulated collection practices, including new regulation related to low-income customers, extended payment terms, use of security deposits to pay arrears
- Prolonged high unemployment rates in London

Although the 2012 bad debt expense is close to the four year average, London Hydro is predicting increased risk, and higher levels of bad debt expense in the future. The customer's ability to pay and London Hydro's ability to collect will be impacted by the factors above.

*Exhibit 4 – Board Staff – 67 s*

*Miscellaneous Revenue from Generation Assets*

*References:*

*Exh 4 – SEC # 30;*

*Exhibit 4 / pp. 98-9;*

*Affiliate Relationships Code for Electricity Distributors and Transmitters, revised March 15, 2010*

*On pages 98-99 of Exhibit 4, London Hydro states that, in addition to third party costs actually incurred, London Hydro carried out a series of steps to ensure that the interactions between the regulated distribution business and its renewable Board Staff Supplemental Interrogatories London Hydro Cost-of-Service Rate Application EB-2012-0146 / EB-2012-0380 generation assets are consistent with the Affiliate Relationship Code for Electricity Distributors and Transmitters. This included charging the renewable generation project an interest rate at prime less 1.75%, which was subsequently changed by London Hydro in its response to 4 – SEC # 30.*

*The Affiliate Relationship Code provides at section 2.4.3 that: "any loan, investment or other financial support provided to an affiliate may be provided on terms no more favourable than what the distributor could obtain directly for itself in the capital markets if the loan, investment or other financial support is for the purpose of financing the ownership of one or more qualifying facilities."*

*Requests:*

*a) Please provide the calculations showing the derivation of the $50,500 and $128,500 interest expense for 2013 documented in 4-SEC # 30.*

*b) Did London Hydro increase the amount that it borrowed from any source in order to accommodate the renewable generation project?*

*c) Is London Hydro obtaining debt financing for its distribution operations at the Prime Interest Rate (Series V122495) as documented on the Bank of Canada website http://www.bankofcanada.ca/rates/interest-rates/canadian-interest-rates/ ?*

*d) Please provide London Hydro's views on whether, in order to hold its distribution ratepayers harmless, the interest expense should be calculated as the greater of the deemed long-term debt rate and London Hydro's weighted average long-term debt rate.*

*e) Please provide an estimate, showing calculations, of what would be the interest expense from the generation project to be included as a revenue offset, based on the greater of the Board's deemed long-term debt rate of 4.12% as issued on February 14, 2013 and London Hydro's weighted average long-term debt rate for 2013 (after adjusting for any debt financing for specifically identified capital projects such as smart meters).*

Response OEB 67 s

a) The following table shows the calculations for the interest expense associated with the generation project.

The table calculates the amount due to the LDC before interest at the end of the year and then applies simple interest on the ending balance times the interest rate to provide the interest expense. These two amounts provide the final due to LDC balance.

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Due to LDC (opening) | - | 23,314 | 909,818 | 3,651,718 |
| Revenue | - | 89,468 | 202,000 | 280,000 |
| Capital Asset - Opening | - | - | 903,416 | 3,635,404 |
| Capital Asset - Closing | - | 903,416 | 3,635,404 | 4,479,642 |
| Purchases | - | 903,416 | 2,731,988 | 844,238 |
| Expenses | 22,191 | 26,815 | 48,300 | 48,600 |
| Amortization | - | 31,821 | 118,000 | 215,800 |

| | | | | |
|---|---|---|---|---|
| Management Fee | 444 | 19,241 | 57,252 | 22,575 |
| | | | | |
| Due to LDC | 22,635 | 883,318 | 3,545,358 | 4,287,131 |
| Interest | 679 | 26,500 | 106,361 | **128,614** |
| Final - Due to LDC | 23,314 | 909,818 | 3,651,718 | 4,415,745 |
| | | | | |
| Interest rate charged | 3.00% | 3.00% | 3.00% | 3.00% |

(as taken from the Bank of Canada website - Business Prime rate).

b) London Hydro has not borrowed any long term funds as a result of the generation project. There were a few days in 2011 where the bank balance dropped below $0, although the amount owing from the generation business unit was minor at that point in time and had no impact on the short term operating loan.

c) Yes, London Hydro used the Business Prime Interest rate (Series V1222495) from the Bank of Canada website to determine the applicable interest rate.

d) London Hydro feels that neither of those rates would be the appropriate rate if the goal was to ensure the ratepayer is held harmless from the generation activities. If the goal was for the ratepayer to be held harmless, then the 1.25% as initially filed would have been the appropriate rate as that is the amount of revenue that would have been provided had the cash remained in the bank account rather than been spent on generation activities.

This response would change if London Hydro were required to borrow funds as a result of these expenditures and then the interest rate charged by the lending institution would be the required interest rate paid by the generation business unit so that the ratepayer continues to be held harmless as a result of the generation activities.

e) If excluding the specific debt (smart meters), then London Hydro's weighted average cost of borrowing would be 6% as London Hydro currently has no additional debt.

As a result, applying the 6% debt rate from inception (rather than the 3%) would result in a 2013 Test Year revenue offset of $257,228 as calculated below.

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Due to LDC (opening) | - | 23,993 | 936,317 | 3,758,079 |
| | | | | |
| Revenue | - | 89,468 | 202,000 | 280,000 |
| | | | | |
| Capital Asset - Opening | - | - | 903,416 | 3,635,404 |
| Capital Asset - Closing | - | 903,416 | 3,635,404 | 4,479,642 |
| Purchases | - | 903,416 | 2,731,988 | 844,238 |
| | | | | |
| Expenses | 22,191 | 26,815 | 48,300 | 48,600 |
| Amortization | - | 31,821 | 118,000 | 215,800 |
| Management Fee | 444 | 19,241 | 57,252 | 22,575 |
| | | | | |
| Due to LDC | 22,635 | 883,318 | 3,545,358 | 4,287,131 |
| Interest | 1,358 | 52,999 | 212,721 | **257,228** |
| Final - Due to LDC | 23,993 | 936,317 | 3,758,079 | 4,544,359 |
| | | | | |
| Interest Rate per OEB request | 6.00% | 6.00% | 6.00% | 6.00% |

## London Property Management Association Supplementary Interrogatories

*LPMA #52*

*Ref: Exhibit 4, pages 3 and 13*

*At page 3 of Exhibit 4, it is stated that the transition to MIFRS has increased OM&A by $336,000 for the test year. At page 13 of the same exhibit it is stated that the proposed test year OM&A is $496,000 higher due to the change in the allocation of overhead on materials between OM&A and capital. Please reconcile and indicate what is the impact on OM&A in 2013 of the change in accounting related to the capitalization changes.*

Response LPMA #52

Page 3 of Exhibit 4 contains summarized impacts related to the transition to MIFRS. The total impact to OM&A is an increase of $336,000 for the test year. This total is made up of two items as detailed on Pages 12 - 13 of the same Exhibit. The two items are:

1) Changes to Overhead Rates Applied to **Material** (page 13, Lines 1 – 4) which is an increase of $496,000 for the 2013 Test Year
2) Changes to Overhead Rates Related to **Fleet** (page 13, line 5 -14) which is a decrease of $160,000 for the 2013 Test Year

These two items total a net increase of $336,000 in OM&A related to the transition to MIFRS.

*LPMA #53*

*Ref: LPMA #22 & VECC #30*

*a) With respect to the actual OM&A costs shown for 2012 in the responses to LPMA #22 (Table 4-8) and to VECC #30 (Table 4-42) provided in Appendix E-4, please confirm that both responses are based on CGAAP without the change in capitalization. If this cannot be confirmed, please indicate whether both responses are based on CGAAP with the change in capitalization applied.*

*b) If both responses noted in part (a) are based on the same accounting methodology, please explain the difference in the recoverable OM&A shown for 2012 in Table 4-8 of $31,416,942 and the figure of 31,516,942 shown in Table 4-42. Is the difference solely related to the inclusion of*

*LEAP related charitable donations? If so, please explain why this amount is not included in Table 4-18.*

*c) Please explain the $100,000 difference shown in Tables 4-8 and 4-42 provided in Appendix E-4 for 2013 under both CGAAP and MIFRS. Is the difference solely related to LEAP related charitable donations? If so, please explain why this amount is not included in Table 4-18.*

Response LPMA #53

a) Effective January 1, 2012, London Hydro implemented the new estimated service lives for property plant and equipment, as well as the new capitalization policies for overhead rates. Figures resulting from this change are identified as "MIFRS". Tables with 2012 Actual figures provided in response to all intervenor questions including those referenced above are based on MIFRS. To assist in identifying this transition, 2012 Actuals should have been labelled in this way.

b) Table 4-8 (totalling $31,416,942) is total OM&A only and excludes donations. Table 4-42, is presented in the OEB's prescribed format. The total on this Table ($31,516,942) is entitled "Total Recoverable OM&A **and** Donations". The difference is solely related to inclusion of LEAP related charitable donations in Table 4-42.

   London Hydro has presented information related to Charitable Donations and LEAP separately in Exhibit 4 starting on Page 32. Tables in Exhibit 4, such as Table 4-1, 4-3, 4-4, and 4-7 present Donations (LEAP) separately. Other Tables that provide more detailed information for OM&A such as the Table referenced in this question (Table 4-8) are related to total OM&A only.

c) The explanation above is also applicable to the 2013 Test Year presentations. Table 4-8 excludes LEAP and 4-42 includes LEAP.

   In both part b) and c) of this question, LPMA is referencing Table 4-18. This Table from Exhibit 4, Page 33 relates only to the LEAP contribution and provides London Hydro's Annual Contribution by year. London Hydro's 2012 Actual contribution to LEAP was $100,000 and remains unchanged for the 2013 Test Year. Table 4-18 is related only to Donations and excludes OM&A costs.

*LPMA #54*

*Ref: Exhibit 4, Table 4-8 & LPMA #22, Table 4-8*

*A comparison of Table 4-8 in Exhibit 4 with that provided in the response to LPMA #22 for 2012 shows that the forecasted incremental OM&A expenses associated with smart meters were $746,000, while the preliminary actual figure is about $461,000. Please explain the reasons for the significantly lower costs than forecast for 2012. In particular, please show the breakdown of the actual costs into the categories shown in the original Table 4-8 in Exhibit 4 of operations, billing and collections, administrative and general expenses, and advertising expenses.*

Response LPMA #54

There is an approximate $285k variance between forecasted and preliminary actual OM&A expenses associated with smart meters.

This is primarily due to the following factors:

- $97k lower than forecasted Tower Gateway Base station ("TGB") maintenance fees. The forecast included $100k in additional maintenance for extra units required to be installed to reach required performance. Issues with the vendor performance resulted in London Hydro not being charged maintenance for 8 TGB units in 2012.

- $183k lower than forecasted expense for non-recurring, temporary labour in the call centre over the initial TOU roll out period. The forecast included 5 temporary staff to assist with TOU related calls. In actual fact, there were only 3 staff required for a shorter than anticipated period.

- System acceptance testing is still not complete and a portion of this cost will be spent in 2013 - $15k

- There will need to be additional cyber security implementation going forward, and these incremental costs will hit in 2013 and onward.

The 2012 breakdown into the categories of operations, billing and collections, administrative and general expenses, and advertising expenses is shown below in the same format as Table 4-8 in Exhibit 4, Page 16.

| SUMMARY OF TOTAL Distribution Expense (Before PILs) | | |
|---|---|---|
| **Description** | **2012 ACTUAL** | **2012 CGAAP BRIDGE** |
| **OM&A Expenses** (excluding SM) | | |
| Operations | $ 8,431,764 | $ 8,327,337 |
| Maintenance | 7,280,971 | 7,533,455 |
| Billing and Collections | 3,957,103 | 3,813,234 |
| Community Relations | 143,487 | 197,052 |
| Administrative and General Exp | 10,054,761 | 10,483,575 |
| Insurance Expense | 403,635 | 416,400 |
| Bad Debt Expense | 325,000 | 1,000,000 |
| Advertising Expenses | 358,833 | 486,132 |
| Other Distribution Expenses | | |
| **OM&A expense** (excluding SM) | 30,955,554 | 32,257,186 |
| **Incremental Smart Meter Expense** | | |
| Operations | 854 | 5,000 |
| Billing and Collections | (132,205) | 49,900 |
| Administrative and General Exp | 487,844 | 561,100 |
| Advertising Expenses | 104,896 | 130,000 |
| **Incremental Smart Meter Expense** | 461,388 | 746,000 |
| **Total OM&A Expense** | **31,416,942** | **33,003,186** |
| **Charitable Donations** | 100,000 | 100,000 |
| **Amortization Expense** | 19,994,228 | 20,012,000 |
| **Total Distribution Exp Before PILs** | $51,511,169 | $53,115,186 |

*LPMA #55*

*Ref: LPMA # 28*

*The response to part (b) indicates that an updated Table 4-45 that reflects actual data for 2012 is included in Appendix E-4. However it does not appear that this table is included in Appendix E-4. Please provide the updated version of Table 4-45 referred to in the response to part (b).*

Response LPMA #55

The updated version of Table 4-45 (Employee Compensation Breakdown) is now included in the updated Appendix E-4.

## School Energy Coalition Supplementary Interrogatories

*SEC – 55*

*[4.0 LPMA-27] Please provide, with respect to the 16 planned hires in 2013,*

*a) the total amount of compensation included in the OM&A and capital budgets with respect to those new employees, broken down into the normal compensation categories, and*

*b) the annualized compensation for those new employees, with the same breakdown.*

Response SEC 55

a) The following Table provides the total compensation related to the 16 planned hires in 2013 by major compensation categories with the total compensation included in OM&A. Variable compensation is not applicable to these hires. Overtime is not forecasted at the position level.

| | FTE | Base Wages ($) | Overtime ($) | Benefits ($) | TOTAL ($) |
|---|---|---|---|---|---|
| Executive | 0 | - | - | - | - |
| Non-Union | 9 | 752,700 | 3,600 | 226,400 | 982,700 |
| Union | 5 | 344,000 | 28,400 | 117,400 | 489,800 |
| Non-Permanent | 1.5 | 77,500 | 400 | 10,200 | 88,100 |
| | 16 | 1,174,200 | 32,400 | 354,000 | 1,560,600 |
| Capital and Billable Allocation | | | | | (483,800) |
| OM&A | | | | | 1,076,800 |

b) As stated in the response to LPMA 27, "London Hydro has included a full year of salaries, wages and benefits in the forecasted compensation costs for 2012 and 2013 for all new employees. The assumption is made that the new employee will be on staff effective January 1, 2012 for the Bridge Year, and effective January 1, 2013 for the Test Year". Therefore the annualized compensation for these new employees is as provided in part a) above.

*SEC 56*

*[4.0 LPMA-30] Please confirm that the Applicant's standard depreciation method regularly produces annual depreciation about 1% below the depreciation calculated using the half-year rule. Please confirm that this pattern can reasonably expected to continue into the future. If not confirmed, please provide the reasons this pattern is expected to change.*

Response to SEC 56

The review that was provided in response to LPMA-30 compared depreciation expense calculated using the OEB's prescribed method (½ year rule) and the depreciation calculated by London Hydro's system which considers the in-service date. London Hydro has submitted its Application following OEB direction for the calculation of depreciated expense for rate making purposes.

For the years reviewed (2009-2012), London Hydro can confirm that the annual depreciation expense using London Hydro's method has resulted in approximately 1% lower depreciation expense annual, then would be if using the OEB's ½ year rule method.

This pattern could be impacted if a significant project was completed and put in service either early or late in the year, therefore London Hydro cannot confirm that this pattern is expected to continue in the future. The type and completion timing of capital projects could change the result.

*SEC 57*

*[4.0 SEC-16] Please explain the approximately $1 million dip in Customer Care Labour and Benefits in 2012 relative to either 2011 or 2013.*

Response SEC 57

London Hydro has revised the presentation that was previously provided in 4.0 SEC-16 and has provided new Tables below.

| | 2009 APPROVED | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 ACTUAL | 2012 BUDGET | 2013 TEST |
|---|---|---|---|---|---|---|---|
| | CGAAP | CGAAP | CGAAP | CGAAP | MIFRS | CGAAP | MIFRS |
| OM&A | $5,036,300 | $ 5,855,909 | $ 6,089,553 | $ 6,413,894 | $ 5,692,892 | $6,423,400 | $6,501,800 |
| PILs | (2,480,566) | (2,884,254) | (2,865,672) | (2,556,587) | (2,052,539) | (2,315,920) | (2,344,186) |
| Revenue Requirement | $2,555,734 | $ 2,971,655 | $ 3,223,881 | $ 3,857,307 | $ 3,640,353 | $4,107,480 | $4,157,614 |
| Number of Customers | 145919 | 145298 | 146973 | 148331 | 149785 | 149785 | 151747 |
| Cost per customer | $ 17.51 | $ 20.45 | $ 21.94 | $ 26.00 | $ 24.30 | $ 27.42 | $ 27.40 |

| | 2009 APPROVED | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 ACTUAL | 2012 BUDGET | 2013 TEST |
|---|---|---|---|---|---|---|---|
| Labour and Benefits | 2,712,700 | 3,135,983 | 3,283,149 | 3,413,482 | 3,583,652 | 3,675,400 | 3,713,900 |
| Professional Services | 609,400 | 824,344 | 562,283 | 983,885 | 507,762 | 553,000 | 555,500 |
| Materials & Supplies | 145,900 | 143,826 | 109,867 | 128,216 | 134,899 | 102,300 | 104,800 |
| Office Equipment Serv & Maintenance | 29,800 | 34,623 | 29,484 | 27,532 | 27,583 | 26,000 | 26,000 |
| Postage | 975,000 | 874,451 | 963,197 | 1,044,152 | 1,119,462 | 1,035,000 | 1,070,000 |
| Bad Debt Expense | 535,000 | 825,000 | 1,120,000 | 800,000 | 325,000 | 1,000,000 | 1,000,000 |
| Corporate Training & Employee Expenses | 13,500 | 5,712 | 6,265 | 6,898 | 4,118 | 7,900 | 7,800 |
| Rental, Regulatory & Other Expenses | 1,500 | 2,022 | 342 | (1,828) | (21,421) | 8,200 | 8,200 |
| Fleet & Stores Allocation | 13,500 | 9,949 | 14,966 | 12,708 | 11,837 | 15,600 | 15,600 |
| Cost Recoveries | - | - | - | (1,152) | - | - | - |
| | 5,036,300 | 5,855,909 | 6,089,553 | 6,413,894 | 5,692,892 | 6,423,400 | 6,501,800 |

## *SEC 58*

*[4.0 SEC-18] Please confirm that the OM&A cost of fleet has dropped by $122,700, but the cost of ownership of fleet assets (depreciation, cost of capital, and PILS) has increased by $780,763. Please reconcile these results with the strategy to move to more ownership vs. leasing of transportation equipment in order to reduce costs. Please explain why, in a period of increasing ownership of fleet assets, the tax shield from CCA is dropping rather than increasing.*

Response SEC 58

London Hydro confirms that the operating cost of the fleet has dropped $122,700 and the cost of ownership of fleet assets has increased $780,763.

These results are not primarily driven by the strategy to reduce the number of vehicles that are leased. The change in the cost of ownership is predominately related to the increase in the number of vehicle and equipment replacements required during 2009 – 2013. As described in Exhibit 2, Page 84, Lines 17 to 25, London Hydro revised its Replacement Schedule in 2003 which extended the anticipated usable length of service and deferred replacement without significantly increasing maintenance cost, while reducing depreciation expense. This resulted in a significant reduction in fleet capital spending for several years from 2003 to 2007 (see Exhibit 2, Table 2-30, Page 83 for 2007 vehicle and equipment capital spending). Depreciation expense and the cost of capital was lower than normal during the transition to this new policy. Many units were fully depreciated, and maintenance costs were not significantly impacted.

During 2009 to 2013, capital investment has increased based on this new replacement schedule. Without this replacement, or with further replacement deferrals, maintenance costs would have increased significantly, and safety and equipment reliability would have declined. The change in the cost of capital and depreciation between 2009 and 2013 is impacted by the deferrals in 2003 through 2007.

The tax shield from CCA is impacted primarily from the drop in tax rates from 2009 (2009 – 33%, 2013 – 26.5%).

*SEC 59*

*[4.0 SEC-28] Please confirm that the total revenue requirement associated with IT is proposed to increase 96.2% from 2009 to 2013, a compounded rate of approximately 18.5% per year. Please provide any reports, presentations, memos, analyses or other documentation provided to senior management or the Board of Directors explaining the reasons for this increase and/or justifying the level of increase.*

Response SEC 59

London Hydro confirms that the total revenue requirement associated with IT is proposed to increase 96.2% from 2009 to 2013 a compounded rate increase of approximately 18.5% per year.

It is important to note that this increase has been significantly impacted by the implementation of Smart Meters, and the introduction of TOU billing. Prior to 2013, capital and incremental operating costs related to smart meters were reported as regulatory assets and were recovered through special rate riders and therefore not reflected in the 2009 revenue requirement figures presented. For the 2013 Test Year, smart meter rate riders will no longer be used, and capital and incremental operating costs have been combined in the 2013 revenue requirement. The

OEB has received and approved London Hydro's Smart Meter Application and the inclusion of these costs into the calculation of revenue requirement for 2013.

London Hydro has provided, within its Application and within its responses to numerous interrogatories, many reports, presentations, analysis and other documentation related to the increase in the total revenue requirement associated with IT. These include, among others:

- The Strategic Plans of 2012-2014, and 2013-2015 (developed by Senior Management and approved by London Hydro Board of Directors)
- The IT Strategic Plan (approved by Senior Management)
- Annual Budgets (approved by London Hydro Board of Directors)
- Monthly, Quarterly, and Annual Financial Reports (reviewed and/or approved by the London Hydro Board of Directors)

*SEC 60*

*[4.0 EP-20] Please provide a breakdown of the 46.5 FTEs being added by department.*

Response SEC #60

Please refer to Exhibit 4, Table 4-22 on Page 44 for a breakdown of the 46.5 FTEs added by department (2009 Actuals to 2013 Test Year).

## VECC Supplementary Interrogatories

*VECC 55*

*Reference: VECC #27 (b); LPMA #28*

a) *Interrogatory 27(b) is seeking to understand the corporate (as opposed to individual) performance metric that Executive and Management are compared against when determining the incentive rewards. What are the corporate metrics that were used by the Executive group and management group in 2009 through 2012 and will be used in 2013?*

Response VECC 55

The only individuals who are evaluated on “corporate metrics” are the four members of the senior executive team which consists of the CEO; VP Operations; VP Corporate Services; and VP Finance.

The senior executive Team (identified above) and the Board of Directors have determined that for the best overall success of the company it is imperative that the company is heading in the direction that is best for the Corporation overall. It was thereby determined that the incentive pay for the senior executives would be directly linked to corporate performance so that no senior executive member would have the incentive to make a decision that would reward them personally, while negatively impacting the overall success of the company.

The metrics utilized for senior executive compensation are based upon the targets approved by the Board of Directors on a yearly basis. For a copy of the 2012 targets, please refer to SEC #7 which had an Appendix 1F in the interrogatory responses filed on February 4, 2013.

All other individuals within the organization who receive incentive compensation receive such amounts based on their own individual performance. Although the total amount of compensation available to be divided to these individuals is based on the overall corporate performance, there is no direct correlation between the corporate performance levels and the individual’s incentive reward.

## *VECC 56*

*Reference: VECC # 30; LPMA # 22*

*a) Please update the response to VECC #30 so as to show 2012 Actuals in MIFRS (i.e. in same format at Excel Spreadsheet Appendix 2-G_OM&A Expense_xlms_20120928).*

*b) Please also update the 2013 test year so as to reconcile the response to LPMA #22 which states that the CGAAP OM&A request is $33,708,563 and $34,044,563 MIFRS format.*

*c) VECC was unable to locate the tables in Excel format as requested. In updating the tables above please provide them both in summary (PDF) and Excel format.*

*d) Please provide all final figures for 2012 and 2013 in these updated tables so as to provide a complete and final format comparable to the original OM&A filing.*

Response VECC #56

a) All 2012 Actual results prepared and presented in response to LPMA #22 and VECC #30 are reported in MIFRS. Effective January 1, 2012 London Hydro implemented the new estimated service lives for property plant and equipment, as well as the new overhead allocation rates for the capitalization of material handling costs.

   Table 4-42 (Appendix 2-G), provided in the interrogatory responses submitted on February 4, 2013, mislabelled the 2012 Actual column. This column and all columns reporting 2012 Actuals should have been identified as MIFRS.

b) London Hydro has updated Table 4-42 (Appendix 2 – G) to include an additional column taking the 2013 Test Year from CGAAP to MIFRS at the OEB USoA account level, as requested. A reconciliation of impacts to OM&A related to the transition from CGAAP to MIFRS was also provided in the Application, Exhibit 4, Table 4-7, Page 15, as well as in Exhibit 10.

c) London Hydro has provided Table 4-42 (Appendix 2-G) in Excel format as requested.

d) The only revision to the original submission for OM&A is related to the 2013 Test Year. In the Addendum to the original submission (Addendum #3), issued October 26, 2013, London Hydro identified a change in the amount to be recovered from the City of London related to the provision of water billing services.  This increased OM&A by $200,000.

Table 4-42 has been updated with this adjustment as requested so as to provide a complete and final format comparable to the original OM&A filing.

## Energy Probe Research Foundation Supplemental Interrogatories

*EP #41*

*Ref: Board Staff IRR #39 &*

*Appendix B London Hydro _Copy_2006-2010 Final OPA CDM 20130204.xls*

*Preamble: Please find London Hydro's LRAM recovery rate application contained in Appendix B: 2013 Lost Revenue Adjustment Mechanism ("LRAM") Recoveries Rate Application Persistence of 2010 OPA CDM Program. London Hydro is applying to the Board for the approval to recover a LRAM amount of $266,877.56, including carrying costs.*

*a) Please confirm the persistence of 2006 EKC kw and kwh savings (ref 2 lines 3)*

- i. *The breakdown of the 0.114 kw peak savings by measure*
- ii. *The breakdown of the 9679 kwh 2006-2009 by measure*
- iii. *The breakdown of the 1248 kwh 2010-on by measure*
- iv. *The input assumptions for savings from CFLs installed in 2006 (number, life and unit savings).*

*b) Please provide the breakdown by measure of the kw and kwh savings from 2010 consumer programs (lines 53-55 OPA Results and Table 2 Page 9 Appendix B).*

RESPONSE EP #41

a) London Hydro is not filing for the persistence of 2006 EKC savings in its Application. In its 2009 Cost of Service filing, London Hydro stated that it would not be seeking either CDM or SSM recoveries for the years previous to 2008. The Board in its Decision for IRM 2012 disallowed London Hydro from filing for 2009 LRAM/ SSM.

   As London Hydro has decided not to claim for any OPA Programs for 2006, and persistence of 2006, the Applicant would respectfully request that a reply to this question would be unnecessary.

b) See the following table.

# OPA Conservation & Demand Management Programs

## Measure Results at End-User Level

For: London Hydro Inc.

| # | Initiative Number | Initiative Name | Program Na | Program Year | Results Status | # | Measure Name | Unit Savings Assumptions | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Gross Summer Peak Demand Savings (kW) | Gross Annual Energy Savings (kWh) | Gross Lifetime Energy Savings (kWh) | Net Summer Peak Demand Savings (kW) | Net Annual Energy Savings (kWh) | Net Lifetime Energy Savings (kWh) | Aggregate Net-to-Gross Adjustment (%) | Effective Useful Life (EUL) |
| 1605 | 53 | Great Refrigerator Roundup | Consumer | 2010 | Final | 1 | Dehumidifier | 0.38 | 371.00 | 1113.00 | 0.14 | 133.56 | 400.68 | 0.36 | 3.00 |
| 1606 | 53 | Great Refrigerator Roundup | Consumer | 2010 | Final | 2 | Freezer | 0.15 | 1045.00 | 4180.00 | 0.08 | 543.40 | 2173.60 | 0.52 | 4.00 |
| 1607 | 53 | Great Refrigerator Roundup | Consumer | 2010 | Final | 3 | Refrigerator | 0.16 | 1126.00 | 5630.00 | 0.08 | 608.04 | 3040.20 | 0.54 | 5.00 |
| 1608 | 53 | Great Refrigerator Roundup | Consumer | 2010 | Final | 4 | Window Air Conditioner | 0.98 | 964.00 | 3856.00 | 0.35 | 347.04 | 1388.16 | 0.36 | 4.00 |
| | | | | | | | | 1.65 | 3506.00 | 14779.00 | 0.65 | 1632.04 | 7002.64 | 1.78 | 16.00 |
| | | | | | | | | | | | | | | | |
| 1609 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 1 | Energy Star® 14.5 SEER (Tier 1) Central Air Conditioner (CAC) | 1.64 | 2772.00 | 52668.00 | 0.67 | 1137.26 | 21607.86 | 0.41 | 19.00 |
| 1610 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 2 | Energy Star® 14.5 SEER (Tier 1) Central Air Conditioner (CAC) with change | 0.18 | 324.00 | 6156.00 | 0.07 | 132.93 | 2525.59 | 0.41 | 19.00 |
| 1611 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 3 | Energy Star® 15.0 SEER (Tier 2) Central Air Conditioner (CAC) | 1.78 | 3005.00 | 57095.00 | 0.73 | 1232.85 | 23424.11 | 0.41 | 19.00 |
| 1612 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 4 | Energy Star® 15.0 SEER (Tier 2) Central Air Conditioner (CAC) with change | 1.67 | 2821.00 | 53599.00 | 0.68 | 1157.36 | 21989.82 | 0.41 | 19.00 |
| 1613 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 5 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.21 | 373.00 | 7087.00 | 0.09 | 153.03 | 2907.55 | 0.41 | 19.00 |
| 1614 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 6 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 1.81 | 3054.00 | 58026.00 | 0.74 | 1252.95 | 23806.07 | 0.41 | 19.00 |
| 1615 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 7 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.83 | 1534.00 | 29146.00 | 0.34 | 629.35 | 11957.60 | 0.41 | 19.00 |
| 1616 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 8 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.17 | 324.00 | 6156.00 | 0.07 | 132.93 | 2525.59 | 0.41 | 19.00 |
| 1617 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 9 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.90 | 1666.00 | 31654.00 | 0.37 | 683.50 | 12986.54 | 0.41 | 19.00 |
| 1618 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 10 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 1.69 | 2865.00 | 54435.00 | 0.69 | 1175.41 | 22332.80 | 0.41 | 19.00 |
| 1619 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 11 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.12 | 207.00 | 3933.00 | 0.05 | 84.92 | 1613.57 | 0.41 | 19.00 |
| 1620 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 12 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 2.06 | 3485.00 | 66215.00 | 0.85 | 1429.78 | 27165.73 | 0.41 | 19.00 |
| 1621 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 13 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 1.73 | 2925.00 | 55575.00 | 0.71 | 1200.03 | 22800.51 | 0.41 | 19.00 |
| 1622 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 14 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.15 | 267.00 | 5073.00 | 0.06 | 109.54 | 2081.28 | 0.41 | 19.00 |
| 1623 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 15 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 2.10 | 3545.00 | 67355.00 | 0.86 | 1454.39 | 27633.43 | 0.41 | 19.00 |
| 1624 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 16 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.85 | 1569.00 | 29811.00 | 0.35 | 643.71 | 12230.43 | 0.41 | 19.00 |
| 1625 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 17 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.11 | 207.00 | 3933.00 | 0.05 | 84.92 | 1613.57 | 0.41 | 19.00 |
| 1626 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 18 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.92 | 1700.00 | 32300.00 | 0.38 | 697.45 | 13251.58 | 0.41 | 19.00 |
| 1627 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 19 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.12 | 112.60 | 2026.80 | 0.07 | 67.14 | 1208.54 | 0.60 | 18.00 |
| 1628 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 20 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.34 | 316.70 | 5700.60 | 0.20 | 188.84 | 3399.15 | 0.60 | 18.00 |
| 1629 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 21 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.19 | 176.70 | 3180.60 | 0.11 | 105.36 | 1896.53 | 0.60 | 18.00 |
| 1630 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 22 | Furnace with Electronically Commutated Motor (ECM), Home constructed | 0.40 | 366.10 | 6589.80 | 0.24 | 218.30 | 3929.37 | 0.60 | 18.00 |
| 1631 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 23 | Programmable Thermostat - Central Air Conditioning (CAC) & Gas heating | 0.03 | 30.00 | 450.00 | 0.01 | 12.15 | 182.29 | 0.41 | 15.00 |
| 1632 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 24 | Programmable Thermostat - Energy Star® Central Air Conditioning (CAC) & | 0.02 | 26.00 | 390.00 | 0.01 | 10.53 | 157.99 | 0.41 | 15.00 |
| 1633 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 25 | Programmable Thermostat - Gas Heating only | 0.01 | 9.00 | 135.00 | 0.00 | 3.65 | 54.69 | 0.41 | 15.00 |
| | | | | | | | | 20.00 | 33680.10 | 638689.80 | 8.40 | 13998.27 | 265282.21 | 10.99 | 459.00 |
| | | | | | | | | | | | | | | | |
| 1634 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 1 | ENERGY STAR Specialty CFLs-Spring Campaign (Rebated) | 0.00 | 18.22 | 109.31 | 0.00 | 7.67 | 46.03 | 0.42 | 6.00 |
| 1635 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 2 | ENERGY STAR Fixtures-Spring Campaign (Rebated) | 0.00 | 152.41 | 2438.61 | 0.00 | 60.00 | 960.00 | 0.39 | 16.00 |
| 1636 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 3 | ENERGY STAR Ceiling Fans-Spring Campaign (Rebated) | 0.00 | 51.58 | 515.80 | 0.00 | 19.30 | 193.04 | 0.37 | 10.00 |
| 1637 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 4 | Clotheslines-Spring Campaign (Rebated) | 0.01 | 88.53 | 885.33 | 0.00 | 21.34 | 213.36 | 0.24 | 10.00 |
| 1638 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 5 | Smart Power Bars-Spring Campaign (Rebated) | 0.00 | 21.42 | 428.40 | 0.00 | 7.68 | 153.51 | 0.36 | 20.00 |
| 1639 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 6 | Lighting Controls-Spring Campaign (Rebated) | 0.00 | 20.59 | 205.92 | 0.00 | 6.75 | 67.54 | 0.33 | 10.00 |
| 1640 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 7 | Energy Star Qualified Window Air Conditioner-Spring Campaign (Promote | 0.14 | 140.70 | 1266.30 | 0.07 | 71.33 | 642.01 | 0.51 | 9.00 |
| 1641 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 8 | Energy Star Qualified Dehumidifiers-Spring Campaign (Promoted) | 0.02 | 284.00 | 3408.00 | 0.01 | 113.04 | 1356.45 | 0.40 | 12.00 |
| 1642 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 9 | Programmable Thermostat-Spring Campaign (Promoted) | 0.06 | 121.36 | 1820.46 | 0.02 | 36.41 | 546.14 | 0.30 | 15.00 |
| 1643 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 10 | Solar Power Products-Spring Campaign (Promoted) | 0.00 | 3.16 | 4.54 | 0.00 | 1.49 | 2.14 | 0.47 | 1.44 |
| 1644 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 11 | Window Blinds and Awnings-Spring Campaign (Promoted) | 0.04 | 40.61 | 406.05 | 0.01 | 12.10 | 120.96 | 0.30 | 10.00 |
| 1645 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 12 | Turned off / reduced use of lights-Spilllover Actions - Spring | 0.00 | 0.00 | 0.00 | 0.00 | 10.23 | 10.23 | 0.00 | 1.00 |
| 1646 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 13 | Turned off / reduced use of power to electronics-Spilllover Actions - Sprir | 0.00 | 0.00 | 0.00 | 0.00 | 1.42 | 1.42 | 0.00 | 1.00 |
| 1647 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 14 | Washed laundry with cold water-Spilllover Actions - Spring | 0.00 | 0.00 | 0.00 | 0.00 | 1.24 | 1.24 | 0.00 | 1.00 |
| 1648 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 15 | Turned down the thermostat setting on my furnace-Spilllover Actions - Sp | 0.00 | 0.00 | 0.00 | 0.00 | 9.29 | 9.29 | 0.00 | 1.00 |
| 1649 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 16 | Installed compact fluorescents that were not rebated-Spilllover Actions - | 0.00 | 0.00 | 0.00 | 0.00 | 5.75 | 46.00 | 0.00 | 8.00 |
| 1650 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 17 | Dried clothes inside on a rack-Spilllover Actions - Spring | 0.00 | 0.00 | 0.00 | 0.00 | 3.86 | 3.86 | 0.00 | 1.00 |
| 1651 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 18 | Unplugged devices usually plugged into outlet-Spilllover Actions - Spring | 0.00 | 0.00 | 0.00 | 0.00 | 6.79 | 6.79 | 0.00 | 1.00 |
| 1652 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 19 | Sealed around windows / doors-Spilllover Actions - Spring | 0.00 | 0.00 | 0.00 | 0.00 | 2.96 | 44.33 | 0.00 | 15.00 |
| 1653 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 20 | Installed a programmable thermostat-Spilllover Actions - Spring | 0.00 | 0.00 | 0.00 | 0.00 | 9.44 | 141.57 | 0.00 | 15.00 |
| 1654 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 21 | Installed LED lights-Spilllover Actions - Spring | 0.00 | 0.00 | 0.00 | 0.00 | 1.82 | 14.58 | 0.00 | 8.00 |
| 1655 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 22 | Energy Star Specialty CFLs-Fall Campaign (Rebated) | 0.00 | 21.33 | 127.97 | 0.00 | 13.02 | 78.15 | 0.61 | 6.00 |
| 1656 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 23 | Energy Star Fixtures-Fall Campaign (Rebated) | 0.00 | 140.60 | 2189.42 | 0.00 | 62.49 | 973.07 | 0.44 | 15.57 |
| 1657 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 24 | Weatherstripping - adhesive foam or V-strip-Fall Campaign (Rebated) | 0.00 | 9.25 | 138.75 | 0.00 | 3.44 | 51.58 | 0.37 | 15.00 |
| 1658 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 25 | Weatherstripping - door frame kits-Fall Campaign (Rebated) | 0.00 | 14.75 | 221.21 | 0.00 | 6.52 | 97.74 | 0.44 | 15.00 |
| 1659 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 26 | Baseboard Programmable Thermostat-Fall Campaign (Rebated) | 0.00 | 63.15 | 947.25 | 0.00 | 37.89 | 568.35 | 0.60 | 15.00 |
| 1660 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 27 | Pipe Wrap-Fall Campaign (Rebated) | 0.00 | 6.76 | 40.56 | 0.00 | 2.42 | 14.51 | 0.36 | 6.00 |
| 1661 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 28 | Water Blanket-Fall Campaign (Rebated) | 0.00 | 55.77 | 557.75 | 0.00 | 32.23 | 322.25 | 0.58 | 10.00 |
| 1662 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 29 | Lighting Controls-Fall Campaign (Rebated) | 0.00 | 25.98 | 259.83 | 0.00 | 15.20 | 152.00 | 0.59 | 10.00 |
| 1663 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 30 | Power Bar-Fall Campaign (Rebated) | 0.00 | 13.22 | 264.46 | 0.00 | 9.12 | 182.47 | 0.69 | 20.00 |
| 1664 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 31 | Programmable Thermostat-Fall Campaign (Promoted) | 0.06 | 118.90 | 1783.56 | 0.01 | 26.58 | 398.68 | 0.22 | 15.00 |
| 1665 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 32 | Solar Powered Products-Fall Campaign (Promoted) | 0.00 | 2.01 | 2.14 | 0.00 | 0.51 | 0.55 | 0.26 | 1.06 |
| 1666 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 33 | Window Sealing Kits-Fall Campaign (Promoted) | 0.00 | 3.03 | 30.29 | 0.00 | 0.55 | 5.51 | 0.18 | 10.00 |
| 1667 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 34 | Turned off / reduced use of lights-Spillover Actions - Fall | 0.00 | 0.00 | 0.00 | 0.00 | 20.75 | 20.75 | 0.00 | 1.00 |
| 1668 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 35 | Turned off / reduced use of power to electronics-Spillover Actions - Fall | 0.00 | 0.00 | 0.00 | 0.00 | 5.58 | 5.58 | 0.00 | 1.00 |
| 1669 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 36 | Washed laundry with cold water-Spillover Actions - Fall | 0.00 | 0.00 | 0.00 | 0.00 | 1.81 | 1.81 | 0.00 | 1.00 |
| 1670 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 37 | Turned down the thermostat setting on my furnace-Spillover Actions - Fal | 0.00 | 0.00 | 0.00 | 0.00 | 11.66 | 11.66 | 0.00 | 1.00 |
| 1671 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 38 | Sealed around windows / doors-Spillover Actions - Fall | 0.00 | 0.00 | 0.00 | 0.00 | 5.20 | 78.04 | 0.00 | 15.00 |
| 1672 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 39 | Unplugged devices usually plugged into outlet-Spillover Actions - Fall | 0.00 | 0.00 | 0.00 | 0.00 | 18.67 | 18.67 | 0.00 | 1.00 |
| 1673 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 40 | Installed compact fluorescent lights that were not those rebated by the P | 0.00 | 0.00 | 0.00 | 0.00 | 7.95 | 63.62 | 0.00 | 8.00 |
| 1674 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 41 | Dried clothes inside on a rack-Spillover Actions - Fall | 0.00 | 0.00 | 0.00 | 0.00 | 4.67 | 4.67 | 0.00 | 1.00 |
| 1675 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 42 | Energy Star Specialty CFLs-Non-Participant Campaign Products | 0.00 | 0.00 | 0.00 | 0.00 | 1.20 | 7.20 | 0.00 | 6.00 |
| 1676 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 43 | Energy Star Fixtures-Non-Participant Campaign Products | 0.00 | 0.00 | 0.00 | 0.00 | 10.52 | 163.79 | 0.00 | 15.57 |
| 1677 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 44 | Weatherstripping - adhesive foam or V-strip-Non-Participant Campaign P | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 4.43 | 0.00 | 15.00 |
| 1678 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 45 | Weatherstripping - door frame kits-Non-Participant Campaign Products | 0.00 | 0.00 | 0.00 | 0.00 | 0.24 | 3.56 | 0.00 | 15.00 |
| 1679 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 46 | Baseboard Programmable Thermostat-Non-Participant Campaign Product | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 15.00 |
| 1680 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 47 | Pipe Wrap-Non-Participant Campaign Products | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.13 | 0.00 | 6.00 |
| 1681 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 48 | Water Blanket-Non-Participant Campaign Products | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 |
| 1682 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 49 | Lighting Controls-Non-Participant Campaign Products | 0.00 | 0.00 | 0.00 | 0.00 | 0.85 | 8.45 | 0.00 | 10.00 |
| 1683 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 50 | Power Bar-Non-Participant Campaign Products | 0.00 | 0.00 | 0.00 | 0.00 | 0.52 | 10.47 | 0.00 | 20.00 |
| 1684 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 51 | Programmable Thermostat-Fall Campaign (Non-Participant Promoted) | 0.00 | 0.00 | 0.00 | 0.01 | 20.03 | 300.40 | 0.00 | 15.00 |
| 1685 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 52 | Solar Powered Products-Fall Campaign (Non-Participant Promoted) | 0.00 | 0.00 | 0.00 | 0.00 | 0.29 | 0.31 | 0.00 | 1.06 |
| 1686 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 53 | Window Sealing Kits-Fall Campaign (Non-Participant Promoted) | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | [illegible] | [illegible] | 10.00 |
| 1687 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 54 | Energy Star 4.0 & 5.0 Television Program | 0.00 | 166.58 | 832.91 | 0.00 | 56.43 | 282.17 | 0.34 | 5.00 |
| 1688 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 55 | Energy Star 4.0 & 5.0 Television Program - Spillover Actions | 0.00 | 0.00 | 0.00 | 0.00 | 13.11 | 19.15 | 0.00 | 1.46 |
| | | | | | | | | 0.36 | 1583.93 | 18884.82 | 0.16 | 799.78 | 8431.43 | 9.77 | 484.17 |

# OPA Conservation & Demand Management Programs

## Measure Results at End-User Level

For: London Hydro Inc.

| # | Initiative Number | Initiative Name | Program Name | Program Year | Results Status | # | Measure Name | | Activity Results (#) | Gross Summer Peak Demand Savings (kW) | Gross Annual Energy Savings (kWh) | Gross Lifetime Energy Savings (kWh) | Net Summer Peak Demand Savings (kW) | Net Annual Energy Savings (kWh) | Net Lifetime Energy Savings (kWh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | LDC Specific Results | | | | | | |
| 1605 | 53 | Great Refrigerator Roundup | Consumer | 2010 | Final | 1 | Dehumidifier | 0 | 41.30 | 15.51 | 15321.44 | 45964.31 | 5.58 | 5515.72 | 16547.15 |
| 1606 | 53 | Great Refrigerator Roundup | Consumer | 2010 | Final | 2 | Freezer | 0 | 520.57 | 75.73 | 543999.12 | 2175996.50 | 39.38 | 282879.54 | 1131518.18 |
| 1607 | 53 | Great Refrigerator Roundup | Consumer | 2010 | Final | 3 | Refrigerator | | 1660.37 | 260.57 | 1869581.75 | 9347908.74 | 140.71 | 1009574.14 | 5047870.72 |
| 1608 | 53 | Great Refrigerator Roundup | Consumer | 2010 | Final | 4 | Window Air Conditioner | | 43.81 | 42.75 | 42235.82 | 168943.29 | 15.39 | 15204.90 | 60819.58 |
| | | | | | | | | | 2266.06 | 394.57 | 2471138.13 | 11738812.83 | 201.06 | 1313174.30 | 6256755.63 |
| 1609 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 1 | Energy Star® 14.5 SEER (Tier 1) Central Air Conditioner (CAC) | | 395.50 | 48.14 | 44533.69 | 801606.47 | 28.70 | 26554.56 | 477982.00 |
| 1610 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 2 | Energy Star® 14.5 SEER (Tier 1) Central Air Conditioner (CAC) with change in | | 81.29 | 27.83 | 25745.80 | 463424.38 | 16.59 | 15351.71 | 276330.75 |
| 1611 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 3 | Energy Star® 15.0 SEER (Tier 2) Central Air Conditioner (CAC) | | 941.12 | 179.75 | 166296.36 | 2993334.51 | 107.18 | 99159.21 | 1784865.86 |
| 1612 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 4 | Energy Star® 15.0 SEER (Tier 2) Central Air Conditioner (CAC) with change in | | 193.44 | 76.55 | 70819.67 | 1274754.12 | 45.65 | 42228.36 | 760110.54 |
| 1613 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 5 | Furnace with Electronically Commutated Motor (ECM), Home constructed b | | 118.45 | 194.07 | 328329.90 | 6238268.12 | 79.62 | 134702.44 | 2559346.34 |
| 1614 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 6 | Furnace with Electronically Commutated Motor (ECM), Home constructed b | | 311.69 | 56.33 | 100988.50 | 1918781.59 | 23.11 | 41432.10 | 787209.93 |
| 1615 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 7 | Furnace with Electronically Commutated Motor (ECM), Home constructed b | | 25.42 | 45.15 | 76387.54 | 1451363.30 | 18.52 | 31339.18 | 595444.33 |
| 1616 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 8 | Furnace with Electronically Commutated Motor (ECM), Home constructed b | | 129.14 | 215.32 | 364293.90 | 6921584.14 | 88.34 | 149457.23 | 2839687.35 |
| 1617 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 9 | Furnace with Electronically Commutated Motor (ECM), Home constructed b | | 339.83 | 70.70 | 126755.66 | 2408357.59 | 29.01 | 52003.48 | 988066.09 |
| 1618 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 10 | Furnace with Electronically Commutated Motor (ECM), Home constructed b | | 27.71 | 50.03 | 84640.59 | 1608171.27 | 20.53 | 34725.12 | 659777.23 |
| 1619 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 11 | Furnace with Electronically Commutated Motor (ECM), Home constructed b | | 32.28 | 26.69 | 49523.83 | 940952.68 | 10.95 | 20317.92 | 386040.45 |
| 1620 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 12 | Furnace with Electronically Commutated Motor (ECM), Home constructed b | | 84.96 | 14.84 | 27526.03 | 522994.54 | 6.09 | 11292.98 | 214566.63 |
| 1621 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 13 | Furnace with Electronically Commutated Motor (ECM), Home constructed b | | 6.93 | 6.22 | 11543.16 | 219320.02 | 2.55 | 4735.76 | 89979.44 |
| 1622 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 14 | Furnace with Electronically Commutated Motor (ECM), Home constructed a | | 139.04 | 235.46 | 398361.87 | 7568875.56 | 96.60 | 163434.14 | 3105248.70 |
| 1623 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 15 | Furnace with Electronically Commutated Motor (ECM), Home constructed a | | 365.90 | 42.25 | 75741.38 | 1439086.19 | 17.33 | 31074.08 | 590407.45 |
| 1624 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 16 | Furnace with Electronically Commutated Motor (ECM), Home constructed a | | 29.84 | 61.47 | 103996.03 | 1975924.62 | 25.22 | 42665.99 | 810653.75 |
| 1625 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 17 | Furnace with Electronically Commutated Motor (ECM), Home constructed a | | 151.59 | 262.09 | 443415.24 | 8424889.53 | 107.53 | 181917.99 | 3456441.72 |
| 1626 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 18 | Furnace with Electronically Commutated Motor (ECM), Home constructed a | | 398.93 | 59.41 | 106513.76 | 2023761.49 | 24.37 | 43698.92 | 830279.57 |
| 1627 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 19 | Furnace with Electronically Commutated Motor (ECM), Home constructed a | | 32.53 | 68.17 | 115335.19 | 2191368.60 | 27.97 | 47318.05 | 899042.99 |
| 1628 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 20 | Furnace with Electronically Commutated Motor (ECM), Home constructed a | | 37.90 | 32.05 | 59463.12 | 1129799.29 | 13.15 | 24395.67 | 463517.70 |
| 1629 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 21 | Furnace with Electronically Commutated Motor (ECM), Home constructed a | | 99.73 | 11.13 | 20644.52 | 392245.91 | 4.57 | 8469.74 | 160924.97 |
| 1630 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 22 | Furnace with Electronically Commutated Motor (ECM), Home constructed a | | 8.13 | 7.45 | 13827.21 | 262716.97 | 3.06 | 5672.83 | 107783.72 |
| 1631 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 23 | Programmable Thermostat - Central Air Conditioning (CAC) & Gas heating | | 623.59 | 16.01 | 18707.70 | 280615.43 | 6.49 | 7578.46 | 113676.88 |
| 1632 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 24 | Programmable Thermostat - Energy Star® Central Air Conditioning (CAC) & G | | 790.35 | 17.59 | 20549.04 | 308235.62 | 7.13 | 8324.38 | 124865.77 |
| 1633 | 54 | Cool Savings Rebate | Consumer | 2010 | Final | 25 | Programmable Thermostat - Gas Heating only | | 155.90 | 1.20 | 1403.08 | 21046.16 | 0.49 | 568.38 | 8525.77 |
| | | | | | | | | # | 5521.21 | 1825.91 | 2855342.78 | 53781478.11 | 810.74 | 1228418.67 | 23090775.90 |
| 1634 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 1 | ENERGY STAR Specialty CFLs-Spring Campaign (Rebated) | | 1979.39 | 1.12 | 36060.73 | 216364.40 | 0.47 | 15185.68 | 91114.05 |
| 1635 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 2 | ENERGY STAR Fixtures-Spring Campaign (Rebated) | | 871.05 | 4.12 | 132759.05 | 2124144.80 | 1.62 | 52262.81 | 836205.00 |
| 1636 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 3 | ENERGY STAR Ceiling Fans-Spring Campaign (Rebated) | | 169.60 | 0.27 | 8748.24 | 87482.45 | 0.10 | 3274.10 | 32740.96 |
| 1637 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 4 | Clotheslines-Spring Campaign (Rebated) | | 226.79 | 2.24 | 20078.59 | 200785.91 | 0.54 | 4838.94 | 48389.40 |
| 1638 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 5 | Smart Power Bars-Spring Campaign (Rebated) | | 38.43 | 0.02 | 823.19 | 16463.84 | 0.01 | 294.98 | 5899.54 |
| 1639 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 6 | Lighting Controls-Spring Campaign (Rebated) | | 939.66 | 0.60 | 19349.97 | 193499.71 | 0.20 | 6346.79 | 63467.90 |
| 1640 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 7 | Energy Star Qualified Window Air Conditioner-Spring Campaign (Promoted) | | 145.44 | 20.72 | 20463.40 | 184170.57 | 10.50 | 10374.94 | 93374.48 |
| 1641 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 8 | Energy Star Qualified Dehumidifiers-Spring Campaign (Promoted) | | 131.10 | 3.23 | 37232.62 | 446791.42 | 1.28 | 14819.32 | 177831.83 |
| 1642 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 9 | Programmable Thermostat-Spring Campaign (Promoted) | | 208.94 | 12.33 | 25358.08 | 380371.27 | 3.70 | 7607.43 | 114111.38 |
| 1643 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 10 | Solar Power Products-Spring Campaign (Promoted) | | 1191.17 | 0.00 | 3760.17 | 5411.69 | 0.00 | 1771.04 | 2548.91 |
| 1644 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 11 | Window Blinds and Awnings-Spring Campaign (Promoted) | | 875.71 | 38.63 | 35558.48 | 355584.76 | 11.51 | 10592.68 | 105926.83 |
| 1645 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 12 | Turned off / reduced use of lights-Spilllover Actions - Spring | | n/a | 0.00 | 0.00 | 0.00 | 0.14 | 4651.19 | 4651.19 |
| 1646 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 13 | Turned off / reduced use of power to electronics-Spilllover Actions - Spring | | n/a | 0.00 | 0.00 | 0.00 | 0.04 | 504.73 | 504.73 |
| 1647 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 14 | Washed laundry with cold water-Spilllover Actions - Spring | | n/a | 0.00 | 0.00 | 0.00 | 0.03 | 412.61 | 412.61 |
| 1648 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 15 | Turned down the thermostat setting on my furnace-Spilllover Actions - Spri | | n/a | 0.00 | 0.00 | 0.00 | 0.00 | 2416.23 | 2416.23 |
| 1649 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 16 | Installed compact fluorescents that were not rebated-Spilllover Actions - Sp | | n/a | 0.00 | 0.00 | 0.00 | 0.04 | 1389.92 | 11119.40 |
| 1650 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 17 | Dried clothes inside on a rack-Spilllover Actions - Spring | | n/a | 0.00 | 0.00 | 0.00 | 0.09 | 789.96 | 789.96 |
| 1651 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 18 | Unplugged devices usually plugged into outlet-Spilllover Actions - Spring | | n/a | 0.00 | 0.00 | 0.00 | 0.12 | 1355.48 | 1355.48 |
| 1652 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 19 | Sealed around windows / doors-Spilllover Actions - Spring | | n/a | 0.00 | 0.00 | 0.00 | 0.00 | 481.30 | 7219.56 |
| 1653 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 20 | Installed a programmable thermostat-Spilllover Actions - Spring | | n/a | 0.00 | 0.00 | 0.00 | 0.08 | 1169.70 | 17545.56 |
| 1654 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 21 | Installed LED lights-Spilllover Actions - Spring | | n/a | 0.00 | 0.00 | 0.00 | 0.01 | 211.00 | 1687.98 |
| 1655 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 22 | Energy Star Specialty CFLs-Fall Campaign (Rebated) | | 2671.75 | 1.77 | 56983.57 | 341901.44 | 1.08 | 34797.97 | 208787.82 |
| 1656 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 23 | Energy Star Fixtures-Fall Campaign (Rebated) | | 176.33 | 0.77 | 24792.60 | 386056.27 | 0.34 | 11018.94 | 171580.57 |
| 1657 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 24 | Weatherstripping - adhesive foam or V-strip-Fall Campaign (Rebated) | | 612.69 | 0.36 | 5667.47 | 85012.03 | 0.14 | 2106.82 | 31602.30 |
| 1658 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 25 | Weatherstripping - door frame kits-Fall Campaign (Rebated) | | 400.52 | 0.38 | 5906.64 | 88599.67 | 0.17 | 2609.66 | 39144.95 |
| 1659 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 26 | Baseboard Programmable Thermostat-Fall Campaign (Rebated) | | 131.09 | 0.00 | 8278.33 | 124174.94 | 0.00 | 4967.00 | 74504.96 |
| 1660 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 27 | Pipe Wrap-Fall Campaign (Rebated) | | 302.62 | 0.16 | 2045.70 | 12274.19 | 0.06 | 731.91 | 4391.43 |
| 1661 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 28 | Water Blanket-Fall Campaign (Rebated) | | 50.71 | 0.22 | 2828.34 | 28283.41 | 0.13 | 1634.15 | 16341.52 |
| 1662 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 29 | Lighting Controls-Fall Campaign (Rebated) | | 665.10 | 0.54 | 17281.04 | 172810.41 | 0.31 | 10109.41 | 101094.09 |
| 1663 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 30 | Power Bar-Fall Campaign (Rebated) | | 86.36 | 0.02 | 1141.91 | 22838.15 | 0.02 | 787.92 | 15758.32 |
| 1664 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 31 | Programmable Thermostat-Fall Campaign (Promoted) | | 330.72 | 20.12 | 39323.40 | 589851.00 | 4.50 | 8789.94 | 131849.05 |
| 1665 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 32 | Solar Powered Products-Fall Campaign (Promoted) | | 541.55 | 0.06 | 1088.41 | 1157.59 | 0.01 | 278.15 | 295.83 |
| 1666 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 33 | Window Sealing Kits-Fall Campaign (Promoted) | | 607.69 | 0.00 | 1840.80 | 18408.04 | 0.00 | 334.69 | 3346.92 |
| 1667 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 34 | Turned off / reduced use of lights-Spillover Actions - Fall | | n/a | 0.00 | 0.00 | 0.00 | 0.53 | 16985.91 | 16985.91 |
| 1668 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 35 | Turned off / reduced use of power to electronics-Spillover Actions - Fall | | n/a | 0.00 | 0.00 | 0.00 | 0.30 | 3485.54 | 3485.54 |
| 1669 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 36 | Washed laundry with cold water-Spillover Actions - Fall | | n/a | 0.00 | 0.00 | 0.00 | 0.08 | 1078.18 | 1078.18 |
| 1670 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 37 | Turned down the thermostat setting on my furnace-Spillover Actions - Fall | | n/a | 0.00 | 0.00 | 0.00 | 0.00 | 6266.12 | 6266.12 |
| 1671 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 38 | Sealed around windows / doors-Spillover Actions - Fall | | n/a | 0.00 | 0.00 | 0.00 | 0.00 | 2193.64 | 32904.62 |
| 1672 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 39 | Unplugged devices usually plugged into outlet-Spillover Actions - Fall | | n/a | 0.00 | 0.00 | 0.00 | 0.63 | 7254.00 | 7254.00 |
| 1673 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 40 | Installed compact fluorescent lights that were not those rebated by the Pov | | n/a | 0.00 | 0.00 | 0.00 | 0.09 | 2991.57 | 23932.58 |
| 1674 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 41 | Dried clothes inside on a rack-Spillover Actions - Fall | | n/a | 0.00 | 0.00 | 0.00 | 0.19 | 1719.34 | 1719.34 |
| 1675 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 42 | Energy Star Specialty CFLs-Non-Participant Campaign Products | | n/a | 0.00 | 0.00 | 0.00 | 0.16 | 5042.80 | 30256.82 |
| 1676 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 43 | Energy Star Fixtures-Non-Participant Campaign Products | | n/a | 0.00 | 0.00 | 0.00 | 0.25 | 6590.10 | 102617.27 |
| 1677 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 44 | Weatherstripping - adhesive foam or V-strip-Non-Participant Campaign Pro | | n/a | 0.00 | 0.00 | 0.00 | 0.03 | 525.62 | 7884.33 |
| 1678 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 45 | Weatherstripping - door frame kits-Non-Participant Campaign Products | | n/a | 0.00 | 0.00 | 0.00 | 0.02 | 309.07 | 4636.03 |
| 1679 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 46 | Baseboard Programmable Thermostat-Non-Participant Campaign Products | | n/a | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1680 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 47 | Pipe Wrap-Non-Participant Campaign Products | | n/a | 0.00 | 0.00 | 0.00 | 0.00 | 27.80 | 166.82 |
| 1681 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 48 | Water Blanket-Non-Participant Campaign Products | | n/a | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1682 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 49 | Lighting Controls-Non-Participant Campaign Products | | n/a | 0.00 | 0.00 | 0.00 | 0.03 | 826.17 | 8261.66 |
| 1683 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 50 | Power Bar-Non-Participant Campaign Products | | n/a | 0.00 | 0.00 | 0.00 | 0.01 | 476.64 | 9532.84 |
| 1684 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 51 | Programmable Thermostat-Fall Campaign (Non-Participant Promoted) | | n/a | 0.00 | 0.00 | 0.00 | 5.68 | 10037.42 | 150561.31 |
| 1685 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 52 | Solar Powered Products-Fall Campaign (Non-Participant Promoted) | | n/a | 0.00 | 0.00 | 0.00 | 0.03 | 412.54 | 438.76 |
| 1686 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 53 | Window Sealing Kits-Fall Campaign (Non-Participant Promoted) | | n/a | 0.00 | 0.00 | 0.00 | 0.00 | 157.37 | 1573.66 |
| 1687 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 54 | Energy Star 4.0 & 5.0 Television Program | | 3941.33 | 4.30 | 656553.28 | 3282766.40 | 1.46 | 222424.17 | 1112120.86 |
| 1688 | 55 | Every Kilowatt Counts Power S | Consumer | 2010 | Final | 55 | Energy Star 4.0 & 5.0 Television Program - Spillover Actions | | n/a | 0.00 | 0.00 | 0.00 | 1.05 | 30898.66 | 45143.49 |
| | | | | | | | | | 17295.74 | 111.97 | 1163924.03 | 9365304.35 | 47.78 | 538620.05 | 3984830.88 |

*EP #42*

*Ref: London Hydro _Copy_2006-2010 Final OPA CDM 20130204.xls &*
*London Hydro _IRR _BoardStaff_20b_2013_Load_Forecast 20130204.xls*

*a) Please reconcile the OPA 2013 Total summer peak savings of 20.26 Mw and 93,429Mwh (Reference 1) to the CDM savings shown at Reference 2 Table 3-7 (Tab 1) and Tab CDM Activity.*

*b) If necessary, please amend the Load Forecast to reflect the OPA results.*

RESPONSE EP #42

a) In Reference 2, Table 3-7 (Tab 1) and Tab CDM Activity the value used for 2013 from the 2006-2010 Final OPA Results (Reference 1) is 56,959 MWh. This value is a net value and the equivalent gross value is 93,429 MWh. Table 3-7 outlines the values used to develop the CDM Activity variable and since the CDM Activity variable is at the net level, the net value was used. The summer peak savings amount is not used to develop the CDM Activity variable or in any other area related to the load forecast.

b) Not applicable.

*EP #43*

*Ref: Board Staff IRR #39 and Appendix C*

*Preamble: London Hydro is applying both for recoveries for 2011 lost distribution revenues due to 2011 CDM programs funded by the OPA, and recoveries for 2012 lost London Hydro Inc. Lost Revenue Adjustment Mechanism Recoveries Rate Application (2011 OPA CDM Programs) distribution revenues due to persistent 2011 CDM programs funded by the OPA. The amount that the Applicant seeks to recover through volumetric rate riders totals a LRAM amount of $176,092, including carrying costs.*

a) *Please provide a copy of the full OPA Spreadsheet with Final 2006-2011 results*

b) *Please provide a reconciliation of the Total OPA-Contracted Province-Wide Programs savings of 4020Kw and 84,0317,117Kwh in Table 5 and also to the answer to EP IR # 41(a)*

RESPONSE EP #43

a) For easier reviewing of the OPA Reports, they have been filed as documents onto the OEB web site for London Hydro 2013 Cost of Service.

Please find a copy of the 2006-2011 OPA report file as Excel document and identified as:

"London_IRR BS_ Copy of 2011_Final_Annual_Report_Data_CDM_OPAPrograms_xlsx_20130108"

Please find a copy of the 2006-2010 OPA report file as Excel document and identified as:

LondonHydro_Copy_ 2006-2010_Final_OPA_CDM_xls_20130204

b) Before replying to this interrogatory question, London Hydro requested further information from Energy Probe in order to better prepare our reply.

London Hydro has compared the information as indicated in 2011 Final Annual Report Data CDM OPA Programs (Table 5) and the London Hydro LRAM Filing Table for 2011 OPA Program Load Results (as filed London Hydro Responses to Interrogatories, Exhibit 9, OEB Q # 47). Copies of these Tables are found below.

Reflected in the 2011 Final Annual Report Data CDM OPA Programs (the "OPA Report") is the Total OPA-Contracted Province-Wide CDM Program savings, showing both the Program-to-Date: Net Annual Peak Demand Savings (kW) in 2014 of 4,020 kWs, and the Program-to-Date: 2011- 2014 Net Cumulative Energy Savings (kWhs) totaling 84,037,117 kWhs. The question requests London Hydro to reconcile this data to that reflected in the London Hydro LRAM Filing Table for 2011 OPA Program Load Results ("London Hydro LRAM Filing"). The specific data for reconciliation is the Gross Total Load Impacts from OPA Programs figures, a total gross savings amount of 14,368 kWs and 68,596,686 kWhs.

In order to proceed to reconcile the amounts reflected in the OPA Report, which are Net amounts, with the figures in the London Hydro LRAM Filing, which are Gross amounts, London Hydro would need to obtain the OPA methodologies for CDM Programs. The OPA Report does mention the methodologies, contained in the tab Methodologies, but does not provide the calculations or details as to the free-ridership factors to sufficiently determine how OPA arrived at its results. Without sufficient details as to methodologies utilized by the OPA, London Hydro is inhibited in properly reconciling the balances.

With respect to the Net Annual Peak Demand Savings in OPA Report, the OPA reflects a Peak Demand savings for only the year of 2014. London Hydro's LRAM figures only seek savings for both 2011 and 2012. As these are different periods of time, London Hydro does not have access to the appropriate data to provide the requested reconciliation. This same challenge is also associated with the OPA

Report where the data is for the Program-to-Date: 2011- 2014 Net Cumulative Energy Savings (kWh). Again, London Hydro's LRAM figures are applicable to years 2011 and 2012 only.

With respect to Question EP IR #41 a) it appears impractical to incorporate any factors associated with this Question as this Questions appears to not have relevancy to London Hydro's recoveries from OPA CDM programs. Please see EP IR Response Question # 41 a).

# 2011 Final Annual Report Data CDM OPA Programs (Table 5)

**Table 5: Summarized Program Results**

| Program | Gross Savings: Incremental Peak Demand Savings (kW) | Gross Savings: Incremental Energy Savings (kWh) | | Net Savings: Incremental Peak Demand Savings (kW) | Net Savings: Incremental Energy Savings (kWh) | Contribution to Targets: Program-to-Date: Net Annual Peak Demand Savings (kW) in 2014 | Contribution to Targets: Program-to-Date: 2011-2014 Net Cumulative Energy Savings (kWh) |
|---|---|---|---|---|---|---|---|
| Consumer Program Total | 2,182 | 6,371,383 | | 1,309 | 4,235,553 | 1,288 | 16,924,158 |
| Business Program Total | 2,103 | 7,211,326 | | 1,575 | 5,425,294 | 1,076 | 21,596,043 |
| Industrial Program Total | 2,708 | 1,112,311 | | 2,265 | 881,628 | 127 | 3,147,173 |
| Home Assistance Program Total | 0 | 0 | | 0 | 0 | 0 | 0 |
| Pre-2011 Programs completed in 2011 Total | 2,625 | 17,939,328 | | 1,528 | 10,592,436 | 1,528 | 42,369,743 |
| **Total OPA Contracted Province-Wide CDM Programs** | **9,618** | **32,634,347** | | **6,677** | **21,134,911** | **4,020** | **84,037,117** |

| # | Initiative | Realization Rate: Peak Demand Savings | Realization Rate: Energy Savings | Gross Savings: Incremental Peak Demand Savings (kW) | Gross Savings: Incremental Energy Savings (kWh) | Net-to-Gross Ratio: Peak Demand Savings | Net-to-Gross Ratio: Energy Savings | Net Savings: Incremental Peak Demand Savings (kW) | Net Savings: Incremental Energy Savings (kWh) | Contribution to Targets: Program-to-Date: Net Annual Peak Demand Savings (kW) in 2014 | Contribution to Targets: Program-to-Date: 2011-2014 Net Cumulative Energy Savings (kWh) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Consumer Program** | | | | | | | | | | | |
| 1 | Appliance Retirement | 100% | 100% | 350 | 1,967,720 | 49% | 52% | 167 | 1,002,610 | 153 | 3,998,531 |
| 2 | Appliance Exchange | 100% | 100% | 24 | 30,871 | 52% | 52% | 12 | 15,910 | 5 | 57,495 |
| 3 | HVAC Incentives | 100% | 100% | 1,739 | 3,173,112 | 61% | 60% | 1,052 | 1,901,868 | 1,052 | 7,607,473 |
| 4 | Conservation Instant Coupon Booklet | 100% | 100% | 28 | 465,107 | 114% | 111% | 32 | 512,644 | 32 | 2,050,576 |
| 5 | Bi-Annual Retailer Event | 100% | 100% | 41 | 734,572 | 113% | 110% | 46 | 802,521 | 46 | 3,210,084 |
| 6 | Retailer Co-op | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 7 | Residential Demand Response | 0% | 0% | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 8 | Residential New Construction | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| **Business Program** | | | | | | | | | | | |
| 9 | Efficiency: Equipment Replacement | 92% | 123% | 1,408 | 7,035,154 | 73% | 75% | 1,034 | 5,260,353 | 1,024 | 21,005,761 |
| 10 | Direct Install Lighting | 108% | 90% | 52 | 157,160 | 93% | 93% | 56 | 145,929 | 52 | 571,271 |
| 11 | Existing Building Commissioning Incentive | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 12 | New Construction and Major Renovation Incentive | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 13 | Energy Audit | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 14 | Commercial Demand Response (part of the Residential program schedule) | 0% | 0% | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 15 | Demand Response 3 (part of the Industrial program schedule) | 76% | 100% | 642 | 19,012 | n/a | n/a | 485 | 19,012 | 0 | 19,012 |
| **Industrial Program** | | | | | | | | | | | |
| 16 | Process & System Upgrades | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 17 | Monitoring & Targeting | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 18 | Energy Manager | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 19 | Efficiency: Equipment Replacement Incentive (part of the C&I program schedule) | 92% | 131% | 172 | 986,857 | 74% | 77% | 128 | 756,174 | 127 | 3,021,719 |
| 20 | Demand Response 3 | 84% | 100% | 2,536 | 125,454 | n/a | n/a | 2,137 | 125,454 | 0 | 125,454 |
| **Home Assistance Program** | | | | | | | | | | | |
| 21 | Home Assistance Program | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| **Pre-2011 Programs completed in 2011** | | | | | | | | | | | |
| 22 | Electricity Retrofit Incentive Program | 94% | 95% | 2,288 | 16,207,519 | 60% | 60% | 1,359 | 9,726,531 | 1,359 | 38,906,125 |
| 23 | High Performance New Construction | 100% | 100% | 337 | 1,731,809 | 50% | 50% | 169 | 865,905 | 169 | 3,463,618 |
| 24 | Toronto Comprehensive | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 25 | Multifamily Energy Efficiency Rebates | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 26 | Data Centre Incentive Program | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| 27 | EnWin Green Suites | - | - | 0 | 0 | - | - | 0 | 0 | 0 | 0 |
| | *Assumes demand response resources have a persistence of 1 year* | | | | | | | | | | |

# London Hydro LRAM Filing Table for 2011 OPA Program Load Results

**London Hydro Inc.**
**OPA CDM Program Load Impacts (2011)**

**2011 Data from OPA Verfied Results**
**see Tab 1- OPA CDM Savings**

***London Hydro is not requesting LRAM /SSM for Programs in 2006, 2007, and 2008. Programs in 2009 were also not included**

| Class/ Program | Year Program Implimented | 2011 NET kWh | 2011 NET Kw | 2011 GROSS kWh | 2011 GROSS Kw | 2012 NET kWh | 2012 NET Kw | 2012 GROSS kWh | 2012 GROSS Kw | TOTAL NET kWh | TOTAL NET Kw | TOTAL GROSS kWh | TOTAL GROSS Kw |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | | | | | | | | | |
| Appliance Retirement | 2011 | 1,002,610 | 167.0 | 1,967,720 | 350.0 | 1,002,610 | 167.0 | 2,471,000 | 395.0 | 2,005,220 | 334.0 | 4,438,720 | 745.0 |
| Appliance Exchange | 2011 | 15,910 | 12.0 | 30,871 | 24.0 | 15,910 | 12.0 | 2,855,000 | 1,826.0 | 31,820 | 24.0 | 2,885,871 | 1,850.0 |
| HVAC Incentives | 2011 | 1,901,868 | 1,052.0 | 3,173,112 | 1,739.0 | 1,901,868 | 1,052.0 | 1,159,000 | 112.0 | 3,803,736 | 2,104.0 | 4,332,112 | 1,851.0 |
| Conservative Instant Coupon Booklet | 2011 | 512,644 | 32.0 | 465,107 | 28.0 | 512,644 | 32.0 | 1,159,000 | 112.0 | 1,025,288 | 64.0 | 1,624,107 | 140.0 |
| Bi-Annual Retailer Event | 2011 | 802,521 | 46.0 | 734,572 | 41.0 | 802,521 | 46.0 | 1,159,000 | 112.0 | 1,605,042 | 92.0 | 1,893,572 | 153.0 |
| **Residential Total** | | **4,235,553** | **1,309.0** | **6,371,382** | **2,182.0** | **4,235,553** | **1,309.0** | **8,803,000** | **2,557.0** | **8,471,106** | **2,618.0** | **15,174,382** | **4,739.0** |
| **General Service < 50 kW** | | | | | | | | | | | | | |
| OPA Energy Retrofit Incentive Program (ERIP) | 2010 | 797,576 | 111.4 | 1,329,017 | 187.6 | 797,576 | 111.4 | 1,329,017 | 187.6 | 1,595,151 | 222.9 | 2,658,033 | 375.2 |
| High Performance New Construction* | 2010 | 865,905 | 169.0 | 1,731,809 | 337.0 | 865,905 | 169.0 | 1,731,809 | 337.0 | 1,731,810 | 338.0 | 3,463,618 | 674.0 |
| Efficiency Equipment Replacement | 2011 | 493,355 | 95 | 657,805 | 130 | 493,355 | 95 | 657,805 | 129.6 | 986,710 | 190.6 | 1,315,610 | 259.1 |
| Direct Install Lighting | 2011 | 145,929 | 56.0 | 157,160 | 52.0 | 145,929 | 368.0 | 1,198,000 | 525.0 | 291,858 | 424.0 | 1,355,160 | 577.0 |
| Demand Response 3 | 2011 | 19,012 | 485.0 | 19,012 | 642.0 | 0 | 0.0 | 0 | 0.0 | 19,012 | 485.0 | 19,012 | 642.0 |
| **Total General Service < 50 kW** | | **2,321,777** | **917** | **3,894,802** | **1,348** | **2,302,765** | **744** | **4,916,630** | **1,179.2** | **4,624,542** | **1,660.4** | **8,811,433** | **2,527.4** |
| **General Service 50 kW to 4,999 kW** | | | | | | | | | | | | | |
| OPA Energy Retrofit Incentive Program (ERIP) | 2010 | 8,928,955 | 1,247.6 | 14,878,502 | 2,100.4 | 8,928,955 | 1,247.6 | 14,878,502 | 2,100.4 | 17,857,911 | 2,495.1 | 29,757,005 | 4,200.8 |
| Efficiency Equipment Replacement | 2011 | 5,523,172 | 1,066.7 | 7,364,206 | 1,450.4 | 5,523,172 | 1,066.7 | 7,364,206 | 1,450.4 | 11,046,344 | 2,133.4 | 14,728,412 | 2,900.9 |
| Demand Response 3 | 2011 | 125,454 | 2,137.0 | 125,454 | 2,536.0 | 0 | 0.0 | 0 | 0.0 | 125,454 | 0.0 | 125,454 | 0.0 |
| **Total General Service 50 to 4,999 kW** | | **14,577,581** | **4,451.3** | **22,368,163** | **6,087** | **14,452,127** | **2,314** | **22,242,709** | **3,550.8** | **29,029,708** | **4,628.6** | **44,610,871** | **7,101.6** |
| **Total Load Impacts from OPA programs** | | **21,134,911** | **6,677** | **32,634,347** | **9,617** | **20,990,445** | **4,367** | **35,962,339** | **7,287** | **42,125,356** | **8,907** | **68,596,686** | **14,368** |

**LPMA #22**

Table 4-8 Summary of Total Distribution Expense (before PILs)

| SUMMARY OF OM&A COSTS BY MAJOR COST CATEGORY | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Major Cost Category | 2009 TEST as Submitted | OEB Decision Adjustments Required | 2009 OEB Approved | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 ACTUAL MIFRS | 2013 BRIDGE CGAAP | 2013 TEST MIFRS |
| LABOUR & BENEFITS: | $19,393,700 | $ (225,000) | $19,168,700 | $18,936,138 | $20,399,946 | $20,868,220 | $22,339,051 | $22,852,300 | $22,852,300 |
| NON LABOUR COST ELEMENTS: | | | | | | | | | |
| Purchased Services | 4,342,000 | | 4,342,000 | 4,072,391 | 5,142,670 | 5,014,988 | 4,036,832 | 4,775,600 | 4,775,600 |
| Materials & Supplies | 1,074,500 | | 1,074,500 | 1,002,008 | 1,019,451 | 1,005,394 | 1,048,780 | 1,175,963 | 1,175,963 |
| Bad Debts | 535,000 | | 535,000 | 825,000 | 1,120,000 | 800,000 | 325,000 | 1,000,000 | 1,000,000 |
| Property Taxes and Insurance | 1,222,000 | | 1,222,000 | 1,136,041 | 1,122,764 | 1,116,903 | 1,081,432 | 1,148,500 | 1,148,500 |
| Facilities Maintenance and Repair | 1,531,800 | | 1,531,800 | 1,468,387 | 1,681,819 | 1,616,108 | 1,390,877 | 1,738,000 | 1,738,000 |
| Office Equipment Services and Maintenance | 1,324,000 | | 1,324,000 | 1,342,531 | 1,427,800 | 1,748,632 | 1,624,631 | 1,792,600 | 1,792,600 |
| Postage | 975,000 | | 975,000 | 874,451 | 963,197 | 1,044,174 | 1,119,539 | 1,070,000 | 1,070,000 |
| Fleet Operations and Maintenance | 1,079,800 | 481,900 | 1,561,700 | 1,414,617 | 1,333,134 | 1,659,625 | 1,413,788 | 2,086,000 | 1,685,000 |
| Corporate Training & Employee Expenses | 932,900 | (125,000) | 807,900 | 761,043 | 734,884 | 1,030,685 | 951,147 | 1,025,800 | 1,025,800 |
| Rental Regulatory & Other expenses | 1,023,400 | (17,637) | 1,005,763 | 1,113,329 | 897,563 | 1,085,981 | 1,087,333 | 1,129,800 | 1,129,800 |
| Studies and Special Projects | 109,000 | | 109,000 | 66,996 | 62,178 | 59,964 | 278,367 | 165,000 | 165,000 |
| TOTAL NON-LABOUR COST ELEMENTS: | 14,149,400 | 339,263 | 14,488,663 | 14,076,794 | 15,505,460 | 16,182,453 | 14,357,725 | 17,107,263 | 16,706,263 |
| ALLOCATIONS: Stores and Fleet | (1,715,700) | | (1,715,700) | (1,658,543) | (1,890,069) | (2,136,291) | (1,587,585) | (2,547,700) | (1,810,700) |
| COST RECOVERIES: | (3,658,000) | (42,000) | (3,700,000) | (3,610,172) | (3,815,955) | (4,137,801) | (4,153,637) | (4,678,200) | (4,678,200) |
| SMART METER COSTS: Table 4-5 | | | | | | | | | |
| Labour | | | | | | | 320,929 | 232,000 | 232,000 |
| Non-Labour | | | | | | | 140,459 | 442,900 | 442,900 |
| | **$28,169,400** | **$ 72,263** | **$28,241,663** | **$27,744,217** | **$30,199,382** | **$30,776,581** | **$31,416,942** | **$33,408,563** | **$33,744,563** |

**LPMA #23** Table 4-13 Summary of Cost Drivers: Labour

| *Note: Costs are presented in CGAAP, no MIFRS impacts, unless otherwise indicated. Allocations to capital, billable and other activities is shown under "Deployment of Resources"* | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 Actual MIFRS | 2013 TEST |
|---|---|---|---|---|---|
| **TOTAL Labour in OM&A - 2009 ACTUALS to 2013 TEST** | **$18,936,138** | **$20,399,946** | **$20,868,220** | **$22,659,981** | **$23,084,300** |
| Year over Year Change ($) | | $ 1,463,809 | $ 468,274 | $ 1,791,761 | $ 424,319 |
| Cumulative Change ($) | | | | | $ 4,148,162 |
| Year over Year Change (%) | | 7.7% | 2.3% | 8.6% | 1.9% |
| Cumulative Change (%) | | | | | 21.9% |

| | | Year on Year Change | | | | Total Change |
|---|---|---|---|---|---|---|
| **Cost Drivers: Labour** | **Description** | **2009 Actual to 2010 Actual** | **2010 Actual to 2011 Actual** | **2011 Actual to 2012 Actual** | **2012 Actual to 2013 TEST** | **2009 Actual to 2013 TEST** |
| | | **$** | **$** | **$** | **$** | **$** |
| Wage Settlements | The cumulative increase in wage settlements is 10.92% over the 2009 - 2013 period. The current contract with the Power Workers' Union expires Dec 31, 2012. | 381,341 | 486,209 | 598,037 | 615,978 | **2,081,566** |
| Change in Employee Complement | Total headcount, both full time and part-time have increased in order to: address changing technology, support new OPA programs, customer demand, succession planning, regulatory compliance, time of use and bill complexity, and a change in resourcing mix to reduce external contractors and increase internal labour. See full discussion related to Base Labour in this Exhibit, Page 39 | 667,407 | 482,445 | 1,041,129 | 1,356,926 | **3,547,907** |
| Benefit Cost | Benefit Costs, particularly pension cost (OMERS) is increasing significantly. See Table 4-23, Page 52 | 577,398 | 317,779 | 875,696 | 338,103 | **2,108,976** |
| Deployment of Resources | Changing the mix of internal labour and external contractors. This results in increases to the complement, however is partially offset with higher allocations to capital, billable and other activities. All labour and benefit costs related to CDM are allocated out of OM&A | (166,903) | (1,018,431) | (570,482) | (1,800,854) | **(3,556,670)** |
| Overtime | Although wages have increase 10.92% since 2009, actual hours of overtime have declined. See Table 4-25, and Table 4-26, Pages 54 and 55 | 4,566 | 200,271 | (152,620) | (85,834) | **(33,616)** |
| **TOTAL ANNUAL CHANGE - LABOUR IN OM&A** | | **1,463,809** | **468,274** | **1,791,761** | **424,319** | **4,148,162** |

**LPMA #23** Table 4-13 Summary of Cost Drivers: Non-Labour

| *Note: Costs are presented in CGAAP, unless otherwise indicated, and are prior to allocations to capital, billable, and other activities. Non-Labour Smart Meter Costs are included.* | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 Actual MIFRS | 2013 TEST |
|---|---|---|---|---|---|
| **TOTAL Non-Labour Costs in OM&A - 2009 ACTUALS to 2013 TEST** | **$14,076,794** | **$15,505,460** | **$16,182,453** | **$14,498,184** | **$17,550,163** |
| Year over Year Change (%) | | $ 1,428,666 | $ 676,993 | -$ 1,684,269 | $ 3,051,979 |
| Cumulative Change ($) | | | | | $ 3,473,369 |
| Year over Year Change ($) | | 10.1% | 4.4% | -10.4% | 21.1% |
| Cumulative Change (%) | | | | | 24.7% |

| | | Annual Change | | | | Total Change |
|---|---|---|---|---|---|---|
| **Cost Drivers: Non Labour** | **Description** | **2009 Actual to 2010 Actual** | **2010 Actual to 2011 Actual** | **2011 Actual to 2012 Actual** | **2012 Actual to 2013 TEST** | **2009 Actual to 2013 TEST** |
| | | **$** | **$** | **$** | **$** | **$** |
| <u>NEW PROGRAMS - TECHNOLOGY - REGULATORY</u> | | | | | | |
| Smart Meter - Ongoing Non Labour OM&A | See detailed tab of new recurring smart meter spending Table 4-5, Page 11. These costs are partially offset with reductions in meter reading cost | - | - | 321,471 | 121,429 | 442,900 |
| Billing System (TOU) - Software and Hardware Mtce and License Fees | To prepare for the introduction of TOU rates, added bill complexity and to provide flexibility to adopt regulatory changes , London Hydro implemented a new billing system in 2009. This and other new technology results in changes to hardware and software maintenance costs. | 69,137 | 402,594 | (96,015) | 132,879 | 508,595 |
| Billing System (TOU) - System Support | SAP system support utilizes both internal labour and external contracted maintenance support services. This required external support peaked in 2011 at $1,751,000 and with business reengineering is declining to an ongoing maintenance level in 2013 Test Year | 881,916 | 61,519 | (639,518) | 146,872 | 450,788 |
| Studies and Special Projects | Studies may vary from year to year, however, continual need for studies to take advantage of new technology, and assess new programs and identify new opportunities | 2,074 | (6,823) | (12,124) | 63,493 | 46,620 |

**LPMA #23** Table 4-13 Summary of Cost Drivers: Non-Labour, cont'd

| | | | | | | |
|---|---|---|---|---|---|---|
| Community Relations - Information Programs | New expanded programs to inform and educate customer related to TOU billing, regulatory, new programs, etc. | 6,815 | (46,735) | (47,606) | 149,179 | 61,653 |
| OEB Hearing Expense | Timing of actual expense related to the 2009 Cost of Service Application results in year over year comparability issues. The 2013 Test Year includes only 1/4 of the total rate application cost to be recovered 2013 - 2017 | (161,345) | (30,000) | 128,356 | (7,856) | (70,845) |
| **Year over Year and Total Change - 2009 to 2013** | | **798,597** | **380,556** | **(345,437)** | **605,996** | **1,439,712** |
| CHANGE IN PROGRAM SCOPE/PROGRAM ENDS | | | | | | |
| PCB Removal Program | London Hydro's program to become 100% PCB free has been accomplished and future budgets include only an on-going maintenance function | (22,684) | 5,328 | (1,607) | 1,279 | (17,684) |
| Wholesale Metering | London Hydro has taken full responsibility of these metering points and will no longer incur one-time exit fees or legacy meter service provider fees from Hydro One related to transition | (24,716) | 20,151 | (69,008) | 46,701 | (26,872) |
| Smart Meter Start-up Cost | Non - labour Start up costs will be recovered through SMIRR | | | 148,989 | (148,989) | - |
| | Adjustment to reflect incremental costs for recovery | | | (330,000) | 330,000 | - |
| Epost | Program ended in 2011 as not cost effective, new on-line services offered on London Hydro Website to meet customer demand | 2,975 | (14,090) | (32,033) | - | (43,149) |
| **Year over Year and Total Change - 2009 to 2013** | | **(44,425)** | **11,389** | **(283,660)** | **228,991** | **(87,705)** |
| TECHNOLOGY CHANGE | | | | | | |
| Contracted Meter Reading | With the introduction of TOU and new technology for wireless meter readings the traditional meter reading is replaced. Remaining meter reading cost is mainly related to the water readings and are recovered through the Service Level Agreement with the City of London. See Exhibit 4, Shared Service and Corporate Cost Allocation, Page 99. | (63,828) | (185,627) | (135,833) | 88,264 | (297,024) |
| **Year over Year and Total Change - 2009 to 2013** | | **(63,828)** | **(185,627)** | **(135,833)** | **88,264** | **(297,024)** |

**LPMA #23** Table 4-13 Summary of Cost Drivers: Non-Labour, cont'd

| | | | | | | |
|---|---|---|---|---|---|---|
| ECONOMIC - REGULATORY COMPLIANCE | | | | | | |
| Contracted Collection Services | Consumers continue to have difficulty paying bills due to the combined impact of the economy, regulated price increases, and TOU billing. London Hydro negotiated new pricing in 2011. | 96,752 | 9,166 | 8,019 | 2,291 | 116,228 |
| Bad Debt Expense | Despite London Hydro's best collection efforts, bad debt expenses continue to rise. The economy, price increases, TOU, as well as regulations impacting collection practices are continuing to increase bad debts. | 295,000 | (320,000) | (475,000) | 675,000 | 175,000 |
| **Year over Year and Total Change - 2009 to 2013** | | **391,752** | **(310,834)** | **(466,981)** | **677,291** | **291,228** |
| SUCCESSION PLANNING, SKILL UPGRADE AND SUSTAINMENT | | | | | | |
| Employee Training and Development | The Strategic plan outlines the importance of skilled resources, and training programs must respond to changes in technology, and new skill development. The aging workforce will result in continued high turn-over in future years. | (26,844) | 216,658 | (84,965) | 53,416 | 158,265 |
| **Year over Year and Total Change - 2009 to 2013** | | **(26,844)** | **216,658** | **(84,965)** | **53,416** | **158,265** |
| WEATHER AND ENVIRONMENTAL ISSUES | | | | | | |
| Snow Removal | Year to year fluctuations impact comparability of prior year actuals to future year forecasts. Test year forecast based on historical averages, although fluctuates from 2009 Actual | 67,335 | (29,401) | (49,690) | 44,921 | 33,166 |
| Operating & Maintenance Materials and Supplies | Materials related to storm damage and cycle maintenance programs impact total cost year on year. | 69,231 | (59,929) | 37,910 | 133,791 | 181,004 |
| Environmental Assessments and Remediation | Deferrals in programs from prior years are no longer possible. New ongoing assessments and remediation is required | (6,892) | 4,609 | 230,527 | (176,860) | 51,383 |
| **Year over Year and Total Change - 2009 to 2013** | | **129,673** | **(84,721)** | **218,747** | **1,853** | **265,553** |

**LPMA #23** Table 4-13 Summary of Cost Drivers: Non-Labour, cont'd

| | | | | | | |
|---|---|---|---|---|---|---|
| OUTSOURCING OPPORTUNITIES / CUSTOMER DEMAND | | | | | | |
| Plant Locates | Positioning London Hydro to take advantage of amalgamation of plant locate services and future efficiencies. The internal labour plan reflects reduced headcount requirement for this activity. Locates completed by the service provider continue to increase from the 2009 level. | 132,017 | 28,440 | 23,406 | 20,000 | 203,863 |
| **Year over Year and Total Change - 2009 to 2013** | | **132,017** | **28,440** | **47,929** | **(4,523)** | **203,863** |
| CAPITAL INVESTMENT - IMPACT TO OM&A | | | | | | |
| Depreciation (part of Fleet overhead) | Since 2009 London Hydro has invested in the fleet in order to reduce maintenance cost, down time, provide efficient, safe and reliable equipment. Approximately 40% of fleet costs remain in OM&A | 95,157 | 224,299 | (225,538) | 575,808 | 669,726 |
| Standby Generator | New investment to provide on-going power supply for emergency situations. Also a safety cost driver | 11,272 | 8,453 | (11,228) | 10,420 | 18,916 |
| HVAC Expense | Costs for maintaining the HVAC system were increasing significantly. Replacement of the systems in 2010 and 2011 have resulted in lower on-going cost in 2012. | 76,165 | 5,284 | (47,914) | (24,972) | 8,563 |
| Lease Cost / Vehicle Parts & Auto Body Repair | No longer leasing and contracted auto body repair has declined | (190,020) | 58,578 | (57,527) | 93,850 | (95,119) |
| **Year over Year and Total Change - 2009 to 2013** | | **(7,426)** | **296,613** | **(342,208)** | **655,106** | **602,086** |

**LPMA #23** Table 4-13 Summary of Cost Drivers: Non-Labour, cont'd

| | | | | | | |
|---|---|---|---|---|---|---|
| CONTRACT COST / RENEGOTIATIONS / ALTERNATE SERVICE PROVIDERS | | | | | | |
| Photocopier Expense | Competition in market results in negotiations with a new service provider. | (2,909) | (19,013) | 3,747 | (76) | (18,251) |
| Telephone Expense | Competition in market results in negotiations with a new service provider. | (8,142) | (39,047) | 19,442 | 1,121 | (26,626) |
| Insurance Claims Expense | By changing insurance coverage and deductibles, eliminated this cost while maintaining insurance premiums within normal inflationary increases | (35,266) | (1,680) | (511) | 1,405 | (36,052) |
| Facility Maintenance Contracts and Expense | Contracts such as janitorial, landscape, security, has been renegotiated since 2009 | 68,057 | 121,586 | (266,400) | 321,754 | 244,998 |
| Software Mtce - Financial Systems | Issued an RFP for Financial systems support (JDEdwards), resulting in awarding contract at lower price | (584) | (13,662) | (15,157) | 1,100 | (28,303) |
| Payment Processing Fees | Faced with 110% increases from service provider this previously outsourced activity was brought in-house. As volumes of lockbox mail continue to decline London Hydro will be able to reduce hours and maintain lower unit processing costs | (3,945) | (6,182) | (42,640) | 6,872 | (45,895) |
| Fuel | Price increases of 33.6% experienced over the 2009 - 2013 period. | 13,072 | 54,341 | 32,291 | (14,136) | 85,567 |
| Postage | Price increases of 17.5% experienced over the 2009 Actual - 2013 Test period. This price is non-controllable | 88,746 | 80,977 | 75,365 | (49,539) | 195,549 |
| **Year over Year and Total Change - 2009 to 2013** | | **119,029** | **177,320** | **(193,862)** | **268,501** | **370,987** |
| OTHER COST VARIANCES | | | | | | |
| **Year over Year and Total Change - 2009 to 2013** | | **121** | **147,199** | **(53,154)** | **432,238** | **526,404** |
| **TOTAL ANNUAL CHANGE: NON LABOUR:** | | 1,428,666 | 676,993 | (1,639,423) | 3,007,133 | 3,473,369 |

**VECC #22 –** Table 4-27

| SUMMARY OF PURCHASED SERVICES - SIGNIFICANT COST VARIANCES | 2009 OEB Submission | 2009 OEB Approved | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 ACTUAL | 2013 TEST | 2013 TEST |
|---|---|---|---|---|---|---|---|---|
| | CGAAP | CGAAP | CGAAP | CGAAP | CGAAP | MIFRS | CGAAP | MIFRS |
| | | | $ | $ | $ | $ | $ | $ |
| **Significant Expense & Cost Variances:** | | | | | | | | |
| **Operations and Maintenance:** | | | | | | | | |
| Contractor Services | 401,500 | 401,500 | 418,683 | 447,890 | 421,945 | 349,663 | 484,700 | 484,700 |
| Plant Locate Services | 292,200 | 292,200 | 256,137 | 388,154 | 416,594 | 464,523 | 460,000 | 460,000 |
| PCB Elimination Services | 5,200 | 5,200 | 22,684 | - | 5,328 | 3,721 | 5,000 | 5,000 |
| Wholesale Metering Services | 123,900 | 123,900 | 140,772 | 116,056 | 136,208 | 67,199 | 113,900 | 113,900 |
| **General and Administrative:** | | | | | | | | |
| Advertising Expense | 158,400 | 158,400 | 155,747 | 162,562 | 115,828 | 68,221 | 217,400 | 217,400 |
| Legal Fees | 147,100 | 147,100 | 90,853 | 89,643 | 105,349 | 114,376 | 170,600 | 170,600 |
| Collection Agency Fees | 90,000 | 90,000 | 54,529 | 65,960 | 74,900 | 71,605 | 80,000 | 80,000 |
| Disaster Recovery Expense | 51,500 | 51,500 | 58,884 | 52,640 | 50,828 | 53,368 | 54,000 | 54,000 |
| Contractor / Consulting Services | 796,700 | 796,700 | 807,312 | 1,689,228 | 1,750,746 | 1,111,228 | 1,258,100 | 1,258,100 |
| Bill Printing Services | 59,700 | 59,700 | 71,360 | 94,283 | 88,231 | 88,287 | 100,000 | 100,000 |
| Epost Contracted Services | 38,600 | 38,600 | 43,149 | 46,124 | 32,033 | - | - | - |
| Payment Processor Fees | 92,700 | 92,700 | 109,095 | 105,150 | 98,968 | 56,328 | 63,200 | 63,200 |
| Contract Collection Services | 250,000 | 250,000 | 159,243 | 244,564 | 244,790 | 256,104 | 250,000 | 250,000 |
| Contract Meter Reading Service | 1,060,900 | 1,060,900 | 997,024 | 933,196 | 747,569 | 611,736 | 700,000 | 700,000 |
| | 3,568,400 | 3,568,400 | 3,385,472 | 4,435,450 | 4,289,317 | 3,316,361 | 3,956,900 | 3,956,900 |
| **Other Expense & Cost Variances:** | | | | | | | | |
| **Operations and Maintenance:** | 82,600 | 82,600 | 68,801 | 94,320 | 55,123 | 49,631 | 100,000 | 100,000 |
| **General and Administrative:** | 691,000 | 691,000 | 618,118 | 612,900 | 670,548 | 670,840 | 718,700 | 718,700 |
| **Smart Meter Costs** *(Note 1)* | | | | | | 286,328 | 238,900 | 238,900 |
| | 773,600 | 773,600 | 686,919 | 707,220 | 725,671 | 1,006,799 | 1,057,600 | 1,057,600 |
| **TOTAL EXPENSE & COST VARIANCE:** | **4,342,000** | **4,342,000** | **4,072,391** | **5,142,670** | **5,014,988** | **4,323,160** | **5,014,500** | **5,014,500** |

*Note 1 - see detailed schedule of smart meter expense - Table 4-5*

**VECC #22 –** Table 4-28

| SUMMARY OF MATERIALS & SUPPLIES - SIGNIFICANT COST VARIANCES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2009 OEB Submission | 2009 OEB Approved | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 ACTUAL | 2013 TEST | 2013 TEST |
| | CGAAP | CGAAP | CGAAP | CGAAP | CGAAP | MIFRS | CGAAP | MIFRS |
| | | | $ | $ | $ | $ | $ | $ |
| **Significant Expense & Cost Variances:** | | | | | | | | |
| **Operations and Maintenance:** | | | | | | | | |
| Conductors | 30,600 | 30,600 | 34,326 | 53,241 | 45,658 | 51,940 | 51,800 | 51,800 |
| Hardware, Attachs & Terms | 360,500 | 360,500 | 330,385 | 355,430 | 384,085 | 363,142 | 422,900 | 422,900 |
| General Maintenance Supplies | 102,100 | 102,100 | 113,615 | 122,535 | 85,045 | 151,531 | 142,863 | 142,863 |
| Small Tool & Shop Supplies | 218,600 | 218,600 | 180,931 | 189,538 | 167,895 | 149,821 | 219,100 | 219,100 |
| Poles | 25,800 | 25,800 | 36,403 | 44,146 | 22,278 | 26,437 | 40,000 | 40,000 |
| **General and Administrative:** | | | | | | | | |
| Office Supplies | 84,800 | 84,800 | 93,171 | 90,344 | 86,438 | 93,634 | 100,800 | 100,800 |
| Forms, Prints & Stationery | 131,700 | 131,700 | 127,111 | 76,015 | 115,038 | 124,167 | 92,400 | 92,400 |
| | 954,100 | 954,100 | 915,941 | 931,249 | 906,438 | 960,672 | 1,069,863 | 1,069,863 |
| **Other Expense & Cost Variances:** | 120,400 | 120,400 | 86,067 | 88,202 | 98,956 | 88,108 | 106,100 | 106,100 |
| **TOTAL EXPENSE & COST VARIANCE:** | **1,074,500** | **1,074,500** | **1,002,008** | **1,019,451** | **1,005,394** | **1,048,780** | **1,175,963** | **1,175,963** |

**VECC #22 –** Table 4-29

| SUMMARY OF FACILITIES MAINTENANCE & REPAIR - SIGNIFICANT COST VARIANCES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2009 OEB Submission<br>CGAAP<br>$ | 2009 OEB Approved<br>CGAAP<br>$ | 2009 ACTUAL<br>CGAAP<br>$ | 2010 ACTUAL<br>CGAAP<br>$ | 2011 ACTUAL<br>CGAAP<br>$ | 2012 ACTUAL<br>MIFRS<br>$ | 2013 TEST<br>CGAAP<br>$ | 2013 TEST<br>MIFRS<br>$ |
| **Significant Expense & Cost Variances:** | | | | | | | | |
| Contractor Services | 218,000 | 218,000 | 210,912 | 169,266 | 220,546 | 186,408 | 267,000 | 267,000 |
| HVAC Expense | 100,000 | 100,000 | 156,437 | 232,602 | 237,886 | 189,972 | 165,000 | 165,000 |
| Utilities | 386,300 | 386,300 | 361,249 | 367,270 | 360,980 | 359,761 | 390,000 | 390,000 |
| Electrical | 80,000 | 80,000 | 120,305 | 168,924 | 120,327 | 97,605 | 120,000 | 120,000 |
| Painting | 40,000 | 40,000 | 40,311 | 35,913 | 25,590 | 24,620 | 40,000 | 40,000 |
| Janitorial Services | 246,500 | 246,500 | 221,145 | 201,801 | 199,634 | 210,761 | 223,500 | 223,500 |
| Landscape Expense | 75,000 | 75,000 | 55,847 | 32,264 | 52,350 | 47,188 | 55,000 | 55,000 |
| Snow Removal | 90,000 | 90,000 | 56,834 | 124,169 | 94,768 | 45,079 | 90,000 | 90,000 |
| Plumbing/Sewer | 60,000 | 60,000 | 30,817 | 63,178 | 32,570 | 34,341 | 50,000 | 50,000 |
| Furniture Mntce & Expense | 30,000 | 30,000 | 57,467 | 79,370 | 61,898 | 39,184 | 73,500 | 73,500 |
| Door Maintenance | 20,000 | 20,000 | 12,585 | 26,843 | 25,192 | 21,039 | 25,000 | 25,000 |
| Fencing & Gates | 25,000 | 25,000 | 5,644 | 11,319 | 2,026 | 2,114 | 15,000 | 15,000 |
| Fire Protection | 30,000 | 30,000 | 22,601 | 27,521 | 38,060 | 29,045 | 43,000 | 43,000 |
| Paving | 15,000 | 15,000 | 15,062 | 27,355 | 24,350 | - | 25,000 | 25,000 |
| Standby Generator Maintenance | 22,000 | 22,000 | 29,084 | 40,356 | 48,809 | 37,580 | 48,000 | 48,000 |
| | 1,437,800 | 1,437,800 | 1,396,299 | 1,608,150 | 1,544,987 | 1,324,697 | 1,630,000 | 1,630,000 |
| **Other Expense & Cost Variances:** | 94,000 | 94,000 | 72,088 | 73,669 | 71,121 | 66,180 | 108,000 | 108,000 |
| **TOTAL EXPENSE & COST VARIANCE:** | **1,531,800** | **1,531,800** | **1,468,387** | **1,681,819** | **1,616,108** | **1,390,877** | **1,738,000** | **1,738,000** |

**VECC #22 –** Table 4-30

| SUMMARY OF OFFICE EQUIPMENT SERVICES & MAINTENANCE - SIGNIFICANT COST VARIANCES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2009 OEB Submission CGAAP $ | 2009 OEB Approved CGAAP $ | 2009 ACTUAL CGAAP $ | 2010 ACTUAL CGAAP $ | 2011 ACTUAL CGAAP $ | 2012 ACTUAL MIFRS $ | 2013 TEST CGAAP $ | 2013 TEST MIFRS $ |
| **Significant Expense & Cost Variances:** | | | | | | | | |
| Photocopier Equipment Lease | 116,400 | 116,400 | 125,451 | 122,542 | 103,529 | 107,276 | 107,200 | 107,200 |
| Telephone Equipment / Lines | 198,100 | 198,100 | 268,726 | 260,584 | 221,537 | 240,979 | 242,100 | 242,100 |
| Software Expense | 770,600 | 770,600 | 680,439 | 756,180 | 1,023,665 | 942,099 | 1,043,700 | 1,043,700 |
| Hardware Maintenance Expense | 93,900 | 93,900 | 117,968 | 110,780 | 232,228 | 202,623 | 235,000 | 235,000 |
| | 1,179,000 | 1,179,000 | 1,192,584 | 1,250,086 | 1,580,959 | 1,492,976 | 1,628,000 | 1,628,000 |
| **Other Expense & Cost Variances:** | 145,000 | 145,000 | 149,946 | 177,713 | 167,673 | 131,655 | 164,600 | 164,600 |
| **Smart Meter Expenses** *(Note 1)* | | | | | | 107,053 | 126,600 | 126,600 |
| **TOTAL EXPENSE & COST VARIANCE:** | **1,324,000** | **1,324,000** | **1,342,531** | **1,427,800** | **1,748,632** | **1,731,684** | **1,919,200** | **1,919,200** |

*Note 1 - see detailed schedule of smart meter expense - Table 4-5*

**VECC #22 –** Table 4-31

| SUMMARY OF SOFTWARE AND HARDWARE EXPENSE | | | | | | |
|---|---|---|---|---|---|---|
| | 2009 ACTUAL CGAAP $ | 2010 ACTUAL CGAAP $ | 2011 ACTUAL CGAAP $ | 2012 ACTUAL MIFRS $ | 2013 TEST CGAAP $ | 2013 TEST MIFRS $ |
| **Software** | | | | | | |
| Applications | 529,842 | 642,628 | 883,507 | 838,811 | 910,000 | 910,000 |
| Infrastructure | 59,476 | 43,684 | 52,735 | 46,430 | 39,000 | 39,000 |
| Network Security | 31,778 | 11,905 | 19,669 | 17,738 | 29,300 | 29,300 |
| Network & Telecom | 55,316 | 52,986 | 65,835 | 26,171 | 64,600 | 64,600 |
| End User Computing | 4,028 | 4,977 | 1,921 | 12,950 | 800 | 800 |
| **TOTAL SOFTWARE** | **680,439** | **756,180** | **1,023,667** | **942,099** | **1,043,700** | **1,043,700** |
| **Hardware** | | | | | | |
| Servers & Storage | 51,162 | 63,699 | 182,639 | 151,729 | 179,900 | 179,900 |
| Network Security | 9,234 | 10,394 | 4,141 | 8,249 | 13,800 | 13,800 |
| Network & Telecom | 32,700 | 27,541 | 22,317 | 27,922 | 24,800 | 24,800 |
| End User Computing | 24,181 | 9,147 | 23,129 | 14,724 | 10,500 | 10,500 |
| Peripherals | 692 | - | - | - | 6,000 | 6,000 |
| **TOTAL HARDWARE** | **117,968** | **110,781** | **232,226** | **202,623** | **235,000** | **235,000** |
| **Smart Meter Costs** | | | | | | |
| Software | - | - | - | 96,580 | 120,600 | 120,600 |
| Hardware | - | - | - | 5,680 | 6,000 | 6,000 |
| **TOTAL SMART METER COSTS** | **-** | **-** | **-** | **102,260** | **126,600** | **126,600** |
| **TOTAL** | **798,408** | **866,961** | **1,255,893** | **1,246,983** | **1,405,300** | **1,405,300** |

**VECC #22 –** Table 4-33

| SUMMARY OF FLEET OPERATIONS & MAINTENANCE - SIGNIFICANT COST VARIANCES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2009 OEB Submission | 2009 OEB Approved | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 ACTUAL | 2013 TEST | 2013 TEST |
| | CGAAP $ | CGAAP $ | CGAAP $ | CGAAP $ | CGAAP $ | MIFRS $ | CGAAP $ | MIFRS $ |
| **Significant Expense & Cost Variances:** | | | | | | | | |
| Lease Expense | 72,000 | 72,000 | 62,184 | 20,466 | 13,778 | 10,059 | 10,000 | 10,000 |
| Fuel Expense | 388,200 | 388,200 | 254,433 | 267,505 | 321,846 | 354,136 | 340,000 | 340,000 |
| Vehicle Parts / Auto Body Repair | 472,100 | 472,100 | 477,936 | 329,633 | 394,899 | 341,090 | 435,000 | 435,000 |
| V&E Depreciation | 481,900 | 481,900 | 458,274 | 553,431 | 777,730 | 552,192 | 1,128,000 | 727,000 |
| | 1,414,200 | 1,414,200 | 1,252,826 | 1,171,035 | 1,508,252 | 1,257,478 | 1,913,000 | 1,512,000 |
| **Other Expense & Cost Variances:** | 147,500 | 147,500 | 161,790 | 162,100 | 151,372 | 156,310 | 173,000 | 173,000 |
| **TOTAL EXPENSE & COST VARIANCE:** | **1,561,700** | **1,561,700** | **1,414,617** | **1,333,134** | **1,659,625** | **1,413,788** | **2,086,000** | **1,685,000** |

**VECC #22 –** Table 4-35

| SUMMARY OF CORPORATE TRAINING AND EMPLOYEE EXPENSES - SIGNIFICANT COST VARIANCES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2009 OEB Submission | 2009 OEB Approved | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 ACTUAL | 2013 TEST | 2013 TEST |
| | CGAAP $ | CGAAP $ | CGAAP $ | CGAAP $ | CGAAP $ | MIFRS $ | CGAAP $ | MIFRS $ |
| **Significant Expense & Cost Variances:** | | | | | | | | |
| O/T Meal Allowance | 32,100 | 32,100 | 26,840 | 31,943 | 32,567 | 33,194 | 34,700 | 34,700 |
| Corporate Clothing | 70,600 | 70,600 | 72,023 | 47,960 | 77,449 | 66,296 | 71,600 | 71,600 |
| Boot and Tool Allowance | 42,100 | 42,100 | 39,100 | 35,280 | 37,666 | 46,491 | 45,600 | 45,600 |
| Membership Dues | 20,900 | 20,900 | 16,894 | 20,943 | 21,519 | 26,372 | 26,200 | 26,200 |
| Department Safety Supplies | 99,500 | 99,500 | 107,743 | 94,145 | 119,346 | 115,124 | 105,300 | 105,300 |
| Relocation / Recruitment Exp | 30,600 | 30,600 | 20,457 | 34,159 | 19,478 | 14,207 | 30,000 | 30,000 |
| Corporate Medical Expenses | 16,000 | 16,000 | 11,338 | 8,202 | 15,466 | 18,150 | 24,700 | 24,700 |
| LEAC / Employee Wellness | 25,500 | 25,500 | 31,019 | 43,096 | 51,032 | 51,198 | 57,900 | 57,900 |
| Recognition Gifts | 33,700 | 33,700 | 20,454 | 23,242 | 30,830 | 28,505 | 26,500 | 26,500 |
| Employee Development / Training | 510,100 | 385,100 | 368,735 | 341,891 | 558,549 | 473,584 | 527,000 | 527,000 |
| | 881,100 | 756,100 | 714,601 | 680,861 | 963,902 | 873,120 | 949,500 | 949,500 |
| **Other Expenses & Cost Variances:** | 51,800 | 51,800 | 46,442 | 54,023 | 66,783 | 78,026 | 76,300 | 76,300 |
| **Smart Meter Expenses** *(Note 1)* | | | | | | 11,967 | 4,000 | 4,000 |
| **TOTAL EXPENSE & COST VARIANCE:** | **932,900** | **807,900** | **761,043** | **734,884** | **1,030,685** | **963,114** | **1,029,800** | **1,029,800** |

*Note 1 - see detailed schedule of smart meter expense - Table 5*

**VECC #22 –** Table 4-36

| SUMMARY OF RENTAL REGULATORY & OTHER EXPENSES - SIGNIFICANT COST VARIANCES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2009 OEB Submission | 2009 OEB Approved | 2009 ACTUAL | 2010 ACTUAL | 2011 ACTUAL | 2012 ACTUAL | 2013 TEST | 2013 TEST |
| | CGAAP $ | CGAAP $ | CGAAP $ | CGAAP $ | CGAAP $ | MIFRS $ | CGAAP $ | MIFRS $ |
| **Significant Expense & Cost Variances:** | | | | | | | | |
| Non-recoverable Claims Exp | 40,800 | 40,800 | 37,552 | 2,285 | 606 | 95 | 1,500 | 1,500 |
| School Safety Program | 12,200 | 12,200 | 11,407 | 13,402 | 13,212 | 17,414 | 15,000 | 15,000 |
| Corporate Membership Fees | 134,800 | 134,800 | 138,932 | 144,202 | 149,273 | 156,404 | 154,200 | 154,200 |
| Property Lease | 189,000 | 189,000 | 190,619 | 190,656 | 188,423 | 186,153 | 189,200 | 189,200 |
| OEB Regulatory Expense | 367,200 | 367,200 | 384,242 | 377,039 | 393,158 | 413,479 | 417,200 | 417,200 |
| OEB Hearing Expense | 72,800 | 72,800 | 161,345 | - | (30,000) | 98,356 | 90,500 | 90,500 |
| IMO Prudential Fees | 28,600 | 28,600 | 26,335 | 31,780 | 26,336 | 26,408 | 30,000 | 30,000 |
| | 845,400 | 845,400 | 950,432 | 759,365 | 741,008 | 898,308 | 897,600 | 897,600 |
| **Other Expense & Cost Variances:** | 178,000 | 160,363 | 162,898 | 138,198 | 344,973 | 189,025 | 232,200 | 232,200 |
| **Total Before Smart Meters** | **1,023,400** | **1,005,763** | **1,113,329** | **897,563** | **1,085,981** | **1,087,334** | **1,129,800** | **1,129,800** |
| **Incremental Smart Meter Expenses** *(Note 1)* | | | | | | 65,110 | 73,400 | 73,400 |
| **Incremental Smart Meter Cost Adjustment** | | | | | | (330,000) | | |
| **TOTAL EXPENSE & COST VARIANCE:** | **1,023,400** | **1,005,763** | **1,113,329** | **897,563** | **1,085,981** | **822,444** | **1,203,200** | **1,203,200** |

*Note 1 - see detailed schedule of smart meter expense - Table 4-5*

**VECC #30; VECC #56** - Table 4-42 Detailed, Account by Account, OM&A Expense Table

| Acct | Description | Last Rebasing Year (2009 Actuals) | 2010 Actual | 2011 Actual | 2012 Actual | 2013 TEST Year | CGAAP to MIFRS Adjustments | 2013 TEST Year Original | 2013 Adjustments | 2013 TEST Year Adjusted |
|---|---|---|---|---|---|---|---|---|---|---|
| *Reporting Basis* | | CGAAP | CGAAP | CGAAP | MIFRS | CGAAP | | MIFRS | MIFRS | MIFRS |
| *Operations* | | | | | | | | | | |
| 5005 | Operation Supervision and Engineering | $ 1,258,994 | $ 1,395,778 | $ 1,636,095 | $ 1,759,993 | $ 1,879,668 | $ 45,267 | $ 1,924,935 | $ - | $ 1,924,935 |
| 5010 | Load Dispatching | 1,296,420 | 1,220,584 | 1,297,969 | $ 1,433,677 | 1,580,153 | - | 1,580,153 | - | 1,580,153 |
| 5012 | Station Buildings and Fixtures Expense | 221,313 | 219,793 | 195,112 | $ 214,454 | 226,631 | - | 226,631 | - | 226,631 |
| 5014 | Transformer Station Equipment - Operation Labour | - | - | - | $ - | - | - | - | - | - |
| 5015 | Transformer Station Equipment - Operation Supplies and Exp | - | - | - | $ - | - | - | - | - | - |
| 5016 | Distribution Station Equipment - Operation Labour | 152,951 | 119,253 | 165,190 | $ 173,349 | 162,547 | - | 162,547 | - | 162,547 |
| 5017 | Distribution Station Equipment - Operation Supplies and Exp | 458,250 | 303,181 | 363,340 | $ 364,125 | 346,028 | 108,902 | 454,931 | - | 454,931 |
| 5020 | Overhead Distribution Lines and Feeders - Operation Labour | 27,132 | 24,787 | 60,204 | $ 50,814 | 37,151 | - | 37,151 | - | 37,151 |
| 5025 | Overhead Distribution Lines and Feeders-Operation Supplies & Exp | 438,331 | 304,447 | 308,813 | $ 415,561 | 300,932 | 107,019 | 407,951 | - | 407,951 |
| 5030 | Overhead Sub-transmission Feeders - Operation | - | - | - | $ - | - | - | - | - | - |
| 5035 | Overhead Distribution Transformers - Operation | 41,026 | 3,130 | 19,553 | $ 17,887 | 19,559 | 3,567 | 23,125 | - | 23,125 |
| 5040 | Underground Distribution Lines and Feeders - Operation Labour | 85,665 | 61,852 | 51,197 | $ 50,925 | 72,210 | - | 72,210 | - | 72,210 |
| 5045 | Underground Distribution Lines and Feeders - Operation Supplies & Exp | 76,915 | 52,243 | 49,603 | $ 59,058 | 52,824 | 14,811 | 67,635 | - | 67,635 |
| 5050 | Underground Sub-transmission Feeders - Operation | - | - | - | $ - | - | - | - | - | - |
| 5055 | Underground Distribution Transformers - Operation | 493,020 | 283,265 | 400,125 | $ 578,004 | 339,496 | 101,701 | 441,196 | - | 441,196 |
| 5060 | Street Lighting and Signal System Expense | - | - | - | $ - | - | - | - | - | - |
| 5065 | Meter Expense | 643,483 | 747,504 | 846,336 | $ 953,922 | 762,099 | - | 762,099 | - | 762,099 |
| 5070 | Customer Premises - Operation Labour | - | - | - | $ - | - | - | - | - | - |
| 5075 | Customer Premises - Operation Materials and Expenses | - | - | - | $ - | - | - | - | - | - |
| 5085 | Miscellaneous Distribution Expenses | 1,964,358 | 2,420,493 | 2,400,326 | $ 2,291,337 | 2,556,988 | - | 2,556,988 | - | 2,556,988 |
| 5090 | Underground Distribution Lines and Feeders - Rental Paid | - | - | - | $ - | - | - | - | - | - |
| 5095 | Overhead Distribution Lines and Feeders - Rental Paid | 81,886 | 82,090 | 80,223 | $ 69,511 | 94,496 | - | 94,496 | - | 94,496 |
| 5096 | Other Rent | - | - | - | $ - | - | - | - | - | - |
| **Total - Operations** | | $ 7,239,743 | $ 7,238,401 | $ 7,874,084 | $ 8,432,617 | $ 8,430,782 | $ 381,267 | $ 8,812,049 | $ - | $ 8,812,049 |

**VECC #30; VECC #56** - Table 4-42 Detailed, Account by Account, OM&A Expense Table, cont'd

| Acct | Description | Last Rebasing Year (2009 Actuals) | 2010 Actual | 2011 Actual | 2012 Actual | 2013 TEST Year | CGAAP to MIFRS Adjustments | 2013 TEST Year Original | 2013 Adjustments | 2013 TEST Year Adjusted |
|---|---|---|---|---|---|---|---|---|---|---|
| *Reporting Basis* | | CGAAP | CGAAP | CGAAP | MIFRS | CGAAP | | MIFRS | MIFRS | MIFRS |
| *Maintenance* | | | | | | | | | | |
| 5105 | Maintenance Supervision and Engineering | $ 1,050,377 | $ 1,242,742 | $ 1,420,801 | $ 1,525,703 | $ 1,747,339 | -$ 45,267 | $ 1,702,072 | $ - | $ 1,702,072 |
| 5110 | Maintenance of Buildings and Fixtures - Distribution Stations | 45,280 | 44,335 | 92,967 | 80,044 | 67,009 | - | 67,009 | - | 67,009 |
| 5112 | Maintenance of Transformer Station Equipment | - | - | - | - | - | - | - | - | - |
| 5114 | Maintenance of Distribution Station Equipment | 140,079 | 217,687 | 296,775 | 388,040 | 253,783 | - | 253,783 | - | 253,783 |
| 5120 | Maintenance of Poles, Tow ers and Fixtures | 715,826 | 696,114 | 494,639 | 445,916 | 725,065 | - | 725,065 | - | 725,065 |
| 5125 | Maintenance of Overhead Conductors and Devices | 1,028,495 | 1,065,656 | 1,366,596 | 1,458,107 | 1,421,976 | - | 1,421,976 | - | 1,421,976 |
| 5130 | Maintenance of Overhead Services | 146,430 | 177,095 | 207,094 | 179,043 | 197,365 | - | 197,365 | - | 197,365 |
| 5135 | Overhead Distribution Lines and Feeders - Right of Way | 581,897 | 647,810 | 785,017 | 794,373 | 920,100 | - | 920,100 | - | 920,100 |
| 5145 | Maintenance of Underground Conduit | 263,195 | 362,082 | 126,356 | 307,503 | 317,588 | - | 317,588 | - | 317,588 |
| 5150 | Maintenance of Underground Conductors and Devices | 805,664 | 880,178 | 1,125,571 | 965,821 | 950,176 | - | 950,176 | - | 950,176 |
| 5155 | Maintenance of Underground Services | 442,246 | 485,985 | 521,033 | 495,852 | 512,908 | - | 512,908 | - | 512,908 |
| 5160 | Maintenance of Line Transformers | 413,936 | 502,903 | 316,721 | 326,298 | 448,239 | - | 448,239 | - | 448,239 |
| 5165 | Maintenance of Street Lighting and Signal Systems | - | - | - | - | - | - | - | - | - |
| 5170 | Sentinel Lights - Labour | - | - | - | - | - | - | - | - | - |
| 5172 | Sentinel Lights - Materials and Expenses | - | - | 162 | - | 47 | - | 47 | - | 47 |
| 5175 | Maintenance of Meters | 9,792 | 66,007 | 28,453 | 314,272 | 275,364 | - | 275,364 | - | 275,364 |
| 5178 | Customer Installations Expenses - Leased Property | - | - | - | - | - | - | - | - | - |
| 5195 | Maintenance of Other Installations on Customer Premises | - | - | - | - | - | - | - | - | - |
| **Total - Maintenance** | | $ 5,643,217 | $ 6,388,593 | $ 6,782,183 | $ 7,280,971 | $ 7,836,959 | -$ 45,267 | $ 7,791,693 | $ - | $ 7,791,693 |

**VECC #30; VECC #56** - Table 4-42 Detailed, Account by Account, OM&A Expense Table, cont'd

| Acct | Description | Last Rebasing Year (2009 Actuals) | 2010 Actual | 2011 Actual | 2012 Actual | 2013 TEST Year | CGAAP to MIFRS Adjustments | 2013 TEST Year Original | 2013 Adjustments | 2013 TEST Year Adjusted |
|---|---|---|---|---|---|---|---|---|---|---|
| *Reporting Basis* | | CGAAP | CGAAP | CGAAP | MIFRS | CGAAP | | MIFRS | MIFRS | MIFRS |
| ***Billing and Collecting*** | | | | | | | | | | |
| 5305 | Supervision | $ 88,553 | $ 87,365 | $ 85,214 | $ 85,628 | $ 80,443 | $ - | $ 80,443 | $ 3,573 | $ 84,016 |
| 5310 | Meter Reading Expense | 1,524,579 | 1,367,829 | 1,409,092 | 1,206,726 | 1,248,848 | - | 1,248,848 | 55,468 | 1,304,316 |
| 5315 | Customer Billing | 2,175,953 | 2,011,563 | 2,033,959 | 2,026,069 | 1,789,354 | - | 1,789,354 | 70,148 | 1,859,502 |
| 5320 | Collecting | 1,272,225 | 1,306,745 | 1,369,719 | 1,252,800 | 1,197,519 | - | 1,197,519 | 46,811 | 1,244,331 |
| 5325 | Collecting - Cash Over and Short | - | - | - | - | - | - | - | - | - |
| 5330 | Collection Charges | (493,985) | (661,368) | (672,100) | (746,325) | (667,000) | - | (667,000) | - | (667,000) |
| 5335 | Bad Debt Expense | 825,000 | 1,120,000 | 800,000 | 325,000 | 1,000,000 | - | 1,000,000 | - | 1,000,000 |
| 5340 | Miscellaneous Customer Accounts Expenses | - | - | - | - | - | - | - | - | - |
| **Total - Billing and Collecting** | | $ 5,392,324 | $ 5,232,134 | $ 5,025,884 | $ 4,149,897 | $ 4,649,165 | $ - | $ 4,649,165 | $ 176,000 | $ 4,825,165 |

| Acct | Description | Last Rebasing Year (2009 Actuals) | 2010 Actual | 2011 Actual | 2012 Actual | 2013 TEST Year | CGAAP to MIFRS Adjustments | 2013 TEST Year Original | 2013 Adjustments | 2013 TEST Year Adjusted |
|---|---|---|---|---|---|---|---|---|---|---|
| ***Community Relations*** | | | | | | | | | | |
| 5405 | Supervision | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| 5410 | Community Relations - Sundry | 38,844 | 70,506 | 39,250 | 33,347 | 92,340 | - | 92,340 | - | 92,340 |
| 5415 | Energy Conservation | 219,195 | 90,165 | 34,025 | (0) | - | - | - | - | - |
| 5420 | Community Safety Program | 94,113 | 90,504 | 105,456 | 110,140 | 112,997 | - | 112,997 | - | 112,997 |
| 5425 | Miscellaneous Customer Service and Informational Expenses | - | - | - | - | - | - | - | - | - |
| 5505 | Supervision | - | - | - | - | - | - | - | - | - |
| 5510 | Demonstrating and Selling Expense | - | - | - | - | - | - | - | - | - |
| 5515 | Advertising Expenses | - | - | - | - | - | - | - | - | - |
| 5520 | Miscellaneous Sales Expense | - | - | - | - | - | - | - | - | - |
| **Total - Community Relations** | | $ 352,152 | $ 251,175 | $ 178,731 | $ 143,487 | $ 205,337 | $ - | $ 205,337 | $ - | $ 205,337 |

**VECC #30; VECC #56** - Table 4-42 Detailed, Account by Account, OM&A Expense Table, cont'd

| Acct | Description | Last Rebasing Year (2009 Actuals) | 2010 Actual | 2011 Actual | 2012 Actual | 2013 TEST Year | CGAAP to MIFRS Adjustments | 2013 TEST Year Original | 2013 Adjustments | 2013 TEST Year Adjusted |
|---|---|---|---|---|---|---|---|---|---|---|
| *Reporting Basis* | | CGAAP | CGAAP | CGAAP | MIFRS | CGAAP | | MIFRS | MIFRS | MIFRS |
| ***Administrative and General Expenses*** | | | | | | | | | | |
| 5605 | Executive Salaries and Expenses | $ 1,047,992 | $ 984,165 | $ 1,066,582 | $ 180,438 | $ 1,140,925 | $ - | $ 1,140,925 | $ - | $ 1,140,925 |
| 5610 | Management Salaries and Expenses | 842,539 | 1,291,293 | 1,256,619 | 1,181,592 | 1,378,848 | - | 1,378,848 | 5,930 | 1,384,778 |
| 5615 | General Administrative Salaries and Expenses | 1,988,455 | 2,656,469 | 2,577,862 | 4,064,248 | 3,042,152 | - | 3,042,152 | 10,650 | 3,052,803 |
| 5620 | Office Supplies and Expenses | 1,039,106 | 1,114,368 | 1,222,633 | 1,228,048 | 1,225,718 | - | 1,225,718 | 1,281 | 1,226,999 |
| 5625 | Administrative Expense Transferred - Credit | - | - | - | - | - | - | - | - | - |
| 5630 | Outside Services Employed | 472,272 | 1,516,867 | 1,184,623 | 1,053,666 | 1,168,753 | - | 1,168,753 | 6,139 | 1,174,893 |
| 5635 | Property Insurance | 420,500 | 394,895 | 411,307 | 403,635 | 427,860 | - | 427,860 | - | 427,860 |
| 5640 | Injuries and Damages | 297,775 | 215,132 | 248,767 | 222,978 | 277,054 | - | 277,054 | - | 277,054 |
| 5645 | OMERS Pensions and Benefits | 133,685 | 182,541 | 223,313 | 220,815 | 249,208 | - | 249,208 | - | 249,208 |
| 5646 | Employee Pensions and OPEB | - | - | - | - | - | - | - | - | - |
| 5647 | Employee Sick Leave | - | - | - | - | - | - | - | - | - |
| 5650 | Franchise Requirements | - | - | - | - | - | - | - | - | - |
| 5655 | Regulatory Expenses | 571,922 | 408,819 | 389,494 | 538,243 | 537,700 | - | 537,700 | - | 537,700 |
| 5660 | General Advertising Expenses | 404,405 | 417,810 | 406,027 | 463,729 | 586,260 | - | 586,260 | - | 586,260 |
| 5665 | Miscellaneous General Expenses | 1,286,805 | 1,365,210 | 1,395,733 | 1,317,352 | 1,662,265 | - | 1,662,265 | - | 1,662,265 |
| 5670 | Rent | - | - | - | - | - | - | - | - | - |
| 5672 | Lease Payment Charge | - | - | - | - | - | - | - | - | - |
| 5675 | Maintenance of General Plant | 611,324 | 541,510 | 532,739 | 535,225 | 589,576 | - | 589,576 | - | 589,576 |
| 5680 | Electrical Safety Authority Fees | - | - | - | - | - | - | - | - | - |
| 5681 | Special Purpose Charge Expense | - | - | - | - | - | - | - | - | - |
| 5685 | Independent Electricity System Operator Fees and Penalties | - | - | - | - | - | - | - | - | - |
| 5695 | OM&A Contra Account | - | - | - | - | - | - | - | - | - |
| 6205 | Donations | 3,291 | 7,252 | 5,742 | 33,217 | - | - | - | - | - |
| 6205 | Donations, Sub-account LEAP Funding | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | - | 100,000 | - | 100,000 |
| **Total - Administrative and General Expenses** | | $ 9,220,072 | $11,196,330 | $11,021,441 | $11,543,185 | $12,386,320 | $ - | $12,386,320 | $ 24,000 | $12,410,320 |
| **Total OM&A and Donations** | | $27,847,508 | $30,306,634 | $30,882,323 | $31,550,159 | $33,508,563 | $ 336,000 | $33,844,563 | $ 200,000 | $34,044,563 |
| **Adjustments for non-recoverable items** | | | | | | | | | | |
| 5681 | Special Purpose Charge Expense | $ - | $ - | $ - | | $ - | | $ - | | $ - |
| 6205 | Donations | 3,291 | 7,252 | 5,742 | 33,217 | - | | - | | - |
| | | | | | | | | | | |
| **Total Recoverable OM&A, and Donations** | | **$27,844,217** | **$30,299,382** | **$30,876,581** | **$31,516,942** | **$33,508,563** | **$ 336,000** | **$33,844,563** | **$ 200,000** | **$34,044,563** |

## LPMA #55

| Item | Actual | Actual | Actual | Actual (MIFRS) | Test Year (MIFRS) | Increase 2009-2013F | % Increase 2009-2013F | Avg Increase 2009-2013 |
|---|---|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 | | | |
| **Number of Employees (FTEs including Part-Time)** | | | | | | | | |
| Executive | 13.8 | 14.8 | 16.1 | 17.0 | 16.0 | 2.2 | 16.0% | 4.0% |
| Management | 34.1 | 30.7 | 32.3 | 31.7 | 36.0 | 1.9 | 5.6% | 1.4% |
| Non-Union | 32.7 | 38.2 | 37.7 | 39.1 | 48.0 | 15.3 | 46.7% | 11.7% |
| Union | 168.4 | 165.1 | 177.0 | 181.5 | 188.0 | 19.6 | 11.7% | 2.9% |
| Non-Permanent | 24.0 | 33.3 | 27.7 | 30.0 | 31.5 | 7.5 | 31.3% | 7.8% |
| **Total** | **273.0** | **282.1** | **290.8** | **299.3** | **319.5** | **46.5** | **17.0%** | **4.3%** |
| ***Year on Year % increase*** | | **3.4%** | **3.1%** | **2.9%** | **6.7%** | | | |
| **Number of Part-Time Employees (FTEs)** | | | | | | | | |
| Executive | | | | | | | | |
| Management | | | | | | | | |
| Non-Union | 5.2 | 7.5 | 9.0 | 13.0 | 15.6 | 10.4 | 201.2% | 50.3% |
| Union | 18.8 | 25.8 | 18.7 | 17.0 | 15.9 | (2.9) | -15.4% | -3.8% |
| **Total** | **24.0** | **33.3** | **27.7** | **30.0** | **31.5** | **7.5** | **31.3%** | **7.8%** |
| ***Year on Year % increase*** | | **38.8%** | **-16.8%** | **8.4%** | **4.8%** | | | |
| **Total Salary and Wages** | | | | | | | | |
| Executive | 1,683,320 | 1,912,524 | 2,143,976 | 2,387,851 | 2,239,266 | 555,945.3 | 33.0% | 8.3% |
| Management | 2,969,782 | 2,836,137 | 2,946,297 | 2,913,412 | 3,446,939 | 477,157.0 | 16.1% | 4.0% |
| Non-Union | 2,521,953 | 3,036,176 | 2,938,402 | 3,174,002 | 4,014,067 | 1,492,114.4 | 59.2% | 14.8% |
| Union | 10,531,648 | 10,644,915 | 11,450,503 | 12,377,690 | 12,933,468 | 2,401,819.2 | 22.8% | 5.7% |
| Non-Permanent | 1,019,399 | 1,387,354 | 1,277,383 | 1,593,516 | 1,627,761 | 608,361.9 | 59.7% | 14.9% |
| **Total** | **18,726,102** | **19,817,107** | **20,756,561** | **22,446,471** | **24,261,500** | **5,535,397.8** | **29.6%** | **7.4%** |
| ***Year on Year % increase*** | | **5.8%** | **4.7%** | **8.1%** | **8.1%** | | | |
| **Current Benefits** | | | | | | | | |
| Executive | 350,685 | 406,728 | 444,048 | 543,494 | 519,035 | 168,349.9 | 48.0% | 12.0% |
| Management | 664,315 | 706,034 | 663,884 | 751,562 | 849,951 | 185,636.2 | 27.9% | 7.0% |
| Non-Union | 599,250 | 702,020 | 727,731 | 833,771 | 1,019,011 | 419,760.9 | 70.0% | 17.5% |
| Union | 2,860,912 | 3,136,026 | 3,071,139 | 3,678,816 | 3,810,251 | 949,338.9 | 33.2% | 8.3% |
| Non-Permanent | 83,868 | 122,328 | 166,483 | 153,286 | 214,752 | 130,884.0 | 156.1% | 39.0% |
| **Total** | **4,559,030** | **5,073,136** | **5,073,285** | **5,960,929** | **6,413,000** | **1,853,969.9** | **40.7%** | **10.2%** |
| ***Year on Year % increase*** | | **11.3%** | **0.0%** | **17.5%** | **7.6%** | | | |
| **Accrued Pension and Post-Retirement Benefits** | | | | | | | | |
| Executive | 88,871 | 101,865 | 146,271 | 147,787 | 116,407 | 27,535.7 | 31.0% | 7.7% |
| Management | 135,956 | 134,397 | 180,519 | 164,363 | 162,487 | 26,530.3 | 19.5% | 4.9% |
| Non-Union | 115,246 | 143,513 | 178,439 | 178,928 | 188,379 | 73,133.1 | 63.5% | 15.9% |
| Union | 476,522 | 500,112 | 692,287 | 694,487 | 604,328 | 127,806.5 | 26.8% | 6.7% |
| Non-Permanent | - | - | - | - | - | - | | |
| **Total** | **816,594** | **879,886** | **1,197,516** | **1,185,566** | **1,071,600** | **255,005.6** | **31.2%** | **7.8%** |
| ***Year on Year % increase*** | | **7.8%** | **36.1%** | **-1.0%** | **-9.6%** | | | |
| **Total Benefits (Current + Accrued)** | | | | | | | | |
| Executive | 439,556 | 508,593 | 590,320 | 691,281 | 635,441 | 195,885.6 | 44.6% | 11.1% |
| Management | 800,271 | 840,430 | 844,403 | 915,925 | 1,012,438 | 212,166.5 | 26.5% | 6.6% |
| Non-Union | 714,496 | 845,533 | 906,170 | 1,012,699 | 1,207,390 | 492,894.0 | 69.0% | 17.2% |
| Union | 3,337,434 | 3,636,139 | 3,763,426 | 4,373,303 | 4,414,579 | 1,077,145.4 | 32.3% | 8.1% |
| Non-Permanent | 83,868 | 122,328 | 166,483 | 153,286 | 214,752 | 130,884.0 | 156.1% | 39.0% |
| **Total** | **5,375,625** | **5,953,022** | **6,270,801** | **7,146,495** | **7,484,600** | **2,108,975.5** | **39.2%** | **9.8%** |
| ***Year on Year % increase*** | | **10.7%** | **5.3%** | **14.0%** | **4.7%** | | | |
| **Total Compensation (Salary, Wages, & Benefits)** | | | | | | | | |
| Executive | 2,122,876 | 2,421,117 | 2,734,296 | 3,079,132 | 2,874,707 | 751,831.0 | 35.4% | 8.9% |
| Management | 3,770,053 | 3,676,567 | 3,790,700 | 3,829,338 | 4,459,376 | 689,323.5 | 18.3% | 4.6% |
| Non-Union | 3,236,448 | 3,881,709 | 3,844,572 | 4,186,701 | 5,221,457 | 1,985,008.3 | 61.3% | 15.3% |
| Union | 13,869,082 | 14,281,054 | 15,213,929 | 16,750,993 | 17,348,047 | 3,478,964.6 | 25.1% | 6.3% |
| Non-Permanent | 1,103,267 | 1,509,682 | 1,443,866 | 1,746,802 | 1,842,513 | 739,245.9 | 67.0% | 16.8% |
| **Total** | **24,101,727** | **25,770,129** | **27,027,363** | **29,592,966** | **31,746,100** | **7,644,373.3** | **31.7%** | **7.9%** |
| ***Year on Year % increase*** | | **6.9%** | **4.9%** | **9.5%** | **7.3%** | | | |

## LPMA #55, continued

| Item | Actual | Actual | Actual | Actual | Test Year | $ Increase 2009-2013F | % Increase 2009-2013F | Avg Increase 2009-2013 |
|---|---|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 | | | |
| **Overtime by Group** | | | | | | | | |
| Executive | - | - | - | - | - | | | |
| Management | 91,677 | 90,233 | 184,519 | 158,931 | 110,242 | 18,565 | 20.3% | 5.1% |
| Non-Union | 19,978 | 10,950 | 32,538 | 24,476 | 19,073 | (905) | -4.5% | -1.1% |
| Union | 1,125,621 | 1,131,885 | 1,217,239 | 1,093,723 | 1,069,545 | (56,076) | -5.0% | -1.2% |
| Non-Permanent | 2,841 | 11,615 | 10,658 | 15,205 | 7,641 | 4,800 | 168.9% | 42.2% |
| **Total** | **1,240,116** | **1,244,682** | **1,444,954** | **1,292,334** | **1,206,500** | **(33,616)** | **-2.7%** | **-0.7%** |
| ***Year on Year % increase*** | | **0.4%** | **16.1%** | **-10.6%** | **-6.6%** | | | |
| **Incentive Pay by Group** | | | | | | | | |
| Executive | 280,825 | 255,668 | 275,368 | 246,126 | 252,000 | (28,825) | -10.3% | -2.6% |
| Management | 35,000 | 24,500 | 39,500 | 16,000 | 30,500 | (4,500) | -12.9% | -3.2% |
| Non-Union | 25,100 | 18,500 | 13,000 | 15,000 | 17,500 | (7,600) | -30.3% | -7.6% |
| Union | - | - | - | - | - | | | |
| Non-Permanent | - | - | - | - | - | | | |
| **Total** | **340,925** | **298,668** | **327,868** | **277,126** | **300,000** | **(40,925)** | **-12.0%** | **-3.0%** |
| ***Year on Year % increase*** | | **-12.4%** | **9.8%** | **-15.5%** | **8.3%** | | | |
| **Compensation - Average Yearly Base Wages** | | | | | | | | |
| Executive | 122,041 | 128,884 | 133,166 | 140,462 | 139,954 | 17,913 | 14.7% | 3.7% |
| Management | 87,075 | 92,310 | 91,217 | 91,906 | 95,748 | 8,674 | 10.0% | 2.5% |
| Non-Union | 77,067 | 79,426 | 77,942 | 81,177 | 83,626 | 6,559 | 8.5% | 2.1% |
| Union | 62,551 | 64,492 | 64,692 | 68,197 | 68,795 | 6,244 | 10.0% | 2.5% |
| Non-Permanent | 42,495 | 41,675 | 46,115 | 53,117 | 51,695 | 9,200 | 21.6% | 5.4% |
| **Total** | **391,229** | **406,787** | **413,132** | **434,858** | **439,819** | **48,590** | **12.4%** | **3.1%** |
| ***Year on Year % increase*** | | **4.0%** | **1.6%** | **5.3%** | **1.1%** | | | |
| **Compensation - Average Yearly Overtime** | | | | | | | | |
| Executive | - | - | - | - | - | | | |
| Management | 2,688 | 2,937 | 5,713 | 5,014 | 3,062 | 374 | 13.9% | 3.5% |
| Non-Union | 610 | 286 | 863 | 626 | 397 | (213) | -34.9% | -8.7% |
| Union | 6,685 | 6,858 | 6,877 | 6,026 | 5,689 | (996) | -14.9% | -3.7% |
| Non-Permanent | 118 | 349 | 385 | 507 | 243 | 124 | 104.9% | 26.2% |
| **Total** | **10,102** | **10,430** | **13,838** | **12,172** | **9,391** | **(711)** | **-7.0%** | **-1.8%** |
| ***Year on Year % increase*** | | **3.2%** | **32.7%** | **-12.0%** | **-22.8%** | | | |
| **Compensation - Average Yearly Incentive Pay** | | | | | | | | |
| Executive | 20,360 | 17,229 | 17,104 | 14,478 | 15,750 | (4,610) | -22.6% | -5.7% |
| Management | 1,026 | 797 | 1,223 | 505 | 847 | (179) | -17.4% | -4.4% |
| Non-Union | 767 | 484 | 345 | 384 | 365 | (402) | -52.5% | -13.1% |
| Union | - | - | - | - | - | | | |
| Non-Permanent | - | - | - | - | - | | | |
| **Total** | **22,153** | **18,511** | **18,671** | **15,366** | **16,962** | **(5,191)** | **-23.4%** | **-5.9%** |
| ***Year on Year % increase*** | | **-16.4%** | **0.9%** | **-17.7%** | **10.4%** | | | |
| **Compensation - Average Yearly Benefits** | | | | | | | | |
| Executive | 31,868 | 34,274 | 36,666 | 40,664 | 39,715 | 7,847 | 24.6% | 6.2% |
| Management | 23,464 | 27,354 | 26,143 | 28,894 | 28,123 | 4,659 | 19.9% | 5.0% |
| Non-Union | 21,834 | 22,119 | 24,036 | 25,900 | 25,154 | 3,320 | 15.2% | 3.8% |
| Union | 19,822 | 22,030 | 21,262 | 24,095 | 23,482 | 3,660 | 18.5% | 4.6% |
| Non-Permanent | 3,496 | 3,675 | 6,010 | 5,110 | 6,820 | 3,324 | 95.1% | 23.8% |
| **Total** | **100,484** | **109,451** | **114,117** | **124,662** | **123,294** | **22,810** | **22.7%** | **5.7%** |
| ***Year on Year % increase*** | | **8.9%** | **4.3%** | **9.2%** | **-1.1%** | | | |
| **Total Compensation** | $25,682,768 | $27,313,479 | $28,800,184 | $31,162,426 | $33,252,600 | $ 7,569,832 | 29.5% | 7.4% |
| ***Year on Year % increase*** | | **6.3%** | **5.4%** | **8.2%** | **6.7%** | | | |
| **Total Compensation Capitalized (CGAAP)** | $ 6,746,630 | $ 6,913,533 | $ 7,931,964 | $ 8,502,446 | | | | |
| **Total Compensation Charged to OM&A (CGAAP)** | $18,936,138 | $20,399,946 | $20,868,220 | $22,659,980 | | | | |
| | | | | | | | | |
| **Total Compensation Capitalized (MIFRS)** | | | | | $10,166,700 | | | |
| **Total Compensation Charged to OM&A (MIFRS)** | | | $28,800,184 | $31,162,426 | $23,085,900 | | | |

# London Hydro Inc.

## 2013 Cost of Service Rate Application (EB-2012-0146/ EB- 2012-0380) Response to Supplementary Interrogatories

## Cost of Capital and Rate of Return (Exhibit 5)

### London Property Management Association Supplementary Interrogatories

*LPMA #56*

*Ref: LPMA #35*

*Please assume that London Hydro were to borrow $65 million at the beginning of 2013 at an interest rate of 4.0% for a long term loan.*

a. *Please confirm that this $65 million on top of the existing long term debt would bring the actual long term debt close to the deemed amount forecast of 2013.*

b. *What is the impact on the revenue requirement of this additional $65 million in long term debt at a rate of 4%? Please show all calculations.*

RESPONSE LPMA #56

a. London Hydro confirms that if London Hydro borrowed an additional $65 million as of January 1st, that would provide approximately (within $3 million) the same amount of forecasted debt as deemed debt.

b. The impact of borrowing an additional $65 million dollars (excluding any other impacts such as reinvesting in capital infrastructure) would be to reduce the revenue requirement by $1,046,750 from the following:

As originally submitted weighted average cost of long-term debt:

| Row | Description | Lender | Affiliated or Third-Party Debt? | Fixed or Variable-Rate? | Start Date | Term (yrs) | Principal ($) | Rate (%) | Interest ($) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Promissory Note | City of London | Affiliated | Fixed Rate | 30-Sep-09 | 6 | $70,000,000 | 6% | $ 4,200,000.00 |
| 2 | Smart Meter Loan | Royal Bank | Third-Party | Fixed Rate | 21-Jun-12 | 7.5 | $13,042,000 | 3.33% | $ 434,298.60 |
| | | | | | | | | | |
| Total | | | | | | | $83,042,000 | 5.58% | $ 4,634,298.60 |

As originally submitted Return on Rate Base.

| | 2009 Board Approved | | 2013 Test Year | |
|---|---|---|---|---|
| | Amount | % | Amount | % |
| Total Rate Base | 225,325,979 | | 269,590,258 | |
| Long term debt | 126,182,548 | 56% | 150,970,544 | 56% |
| Short term debt | 9,013,039 | 4% | 10,783,610 | 4% |
| Common equity | 90,130,392 | 40% | 107,836,103 | 40% |
| | 225,325,979 | | 269,590,258 | |
| Interest on long term debt | 7,570,953 | 6.00% | 8,424,156 | 5.58% |
| Interest on short term debt | 119,873 | 1.33% | 224,299 | 2.08% |
| Return on common equity | 7,219,444 | 8.01% | 9,834,653 | 9.12% |
| Return on Rate Base | 14,910,271 | 6.62% | 18,483,108 | 6.86% |

Revised weighted average cost of long-term debt:

**Year** 2013 Test Year

| Row | Description | Lender | Affiliated or Third-Party Debt? | Fixed or Variable-Rate? | Start Date | Term (yrs) | Principal ($) | Rate (%) | Interest ($) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Promissory Note | City of London | Affiliated | Fixed Rate | 30-Sep-09 | 6 | $70,000,000 | 6% | $4,200,000.00 |
| 2 | Smart Meter Loan | Royal Bank | Third-Party | Fixed Rate | 21-Jun-12 | 7.5 | $13,042,000 | 3.33% | $434,298.60 |
| 3 | LPMA Loan | | | Fixed Rate | | | $65,000,000 | 4% | $2,600,000.00 |
| | | | | | | | | | |
| Total | | | | | | | $ 148,042,000 | 4.89% | $ 7,234,298.60 |

Revised Return on Rate Base.

| | 2013 Test Year Amount | % |
|---|---|---|
| Total Rate Base | 269,590,258 | |
| | | |
| Long term debt | 150,970,544 | 56% |
| Short term debt | 10,783,610 | 4% |
| Common equity | 107,836,103 | 40% |
| | 269,590,258 | |
| | | |
| Interest on long term debt | 7,377,406 | 4.89% |
| Interest on short term debt | 224,299 | 2.08% |
| Return on common equity | 9,834,653 | 9.12% |
| | | |
| Return on Rate Base | 17,436,358 | 6.47% |

The interest on the long-term debt calculation is simply taking the revised weighted average cost of debt (4.89%) times the deemed long term debt balance ($150,970,544) which provides a total deemed interest calculation of $7,377,406.

| | |
|---|---|
| Interest on long-term debt as originally filed: | $8,424,156 |
| Interest on long-term debt as adjusted per LPMA: | $7,377,406 |
| Difference in revenue requirement | $1,046,750 |

*LPMA #57*

*Ref: VECC #34*

*Please explain why ratepayers should be expected to pay for long term debt that is partly impacted by a 6.0% on affiliate debt, when the interrogatory response indicates that the applicable external rate available was 5.43% based on the financial performance at the time the affiliate debt was renewed.*

RESPONSE LPMA #57

As indicated in the initial response to the question referenced, there are a number of additional terms and conditions available in the shareholder agreement which are not available from other third party providers.

As indicated in response to VECC #34

"As an example, this note has certain terms and conditions that would not be available from a third party lender and as such, are looked upon favorably from a credit agency rating perspective, and provide cashflow relief from a utility operating perspective. From a credit rating agency perspective, this note is more in the nature of preferred shares than it is a debt instrument.

Features such as no principal payment requirements, ability to postpone interest payments under certain conditions and conversion of the debt to paid up capital upon default, are all features that would not be available through a third party lender. These terms and conditions give rise to slightly higher rates than would be available through the external market.

In addition to comparing the external and internal rates, the favorable terms and conditions, the other external factor is the impact that having the shareholder loan classified as short term on our books. If the decision was made that London Hydro would rather seek external funding rather than renew the agreement with the City, the 2009 financial statements would have recorded the entire $70M debt as a current liability, which would have resulted in a very unfavourable liquidity ratio. That ratio may have resulted in a poor credit rating with S&P which would have resulted in higher borrowing costs and potentially a higher interest rate.

As discussed above, the terms and conditions associated with the shareholder loan may give rise to slightly higher interest rates. London Hydro has previously reduced the debt levels by utilizing the terms in the agreement to convert $25M of debt to equity. London Hydro also values the no principal repayment aspect of the loan. Both of these items have allowed for reduced actual cash expenditures which were therefore reinvested into capital infrastructure providing increased reliability and performance levels without being required to obtain excess debt levels.

*LPMA #58*

*Ref: Board Letter dated February 14, 2013 – Cost of Capital Parameter Updates for 2013 Cost of Service Applications for Rates Effective May 1, 2013 & OEB #2.*

a. *Please update the cost of capital to reflect the figures in the Board's letter noted above. Please also provide an updated RRWF (including the live Excel version) that incorporates these changes, along with the changes adopted in the response to OEB #2 along with any other changes that may be made by London Hydro as a result of the supplemental interrogatories. Please include in the changes the reflection of the actual capital expenditures closed to rate base at the end of 2012 (as identified in the interrogatory responses) in the calculation of the 2013 rate base, including the MIFRS related changes applied to 2012 (capitalization and depreciation rate changes).*

## RESPONSE LPMA #58

As requested, London Hydro has provided an updated cost of capital calculation based on the Board letter dated February 14, 2013. London Hydro determined the impacts of adjusting the rate base for the 2012 actual expenditures will have an immaterial impact on the revenue requirement and has therefore not been adjusted. The impact of adjusting the useful lives (and the change in burden rates) were already recorded in the expected Test Year rate base and therefore no adjustments are required to comply with that request.

The revised return on rate base chart is provided below and also carried over to the RRFW.

| | 2009 Board Approved | | 2013 Test Year | |
|---|---|---|---|---|
| | Amount | % | Amount | % |
| Total Rate Base | 225,325,979 | | 269,590,258 | |
| Long term debt | 126,182,548 | 56% | 150,970,544 | 56% |
| Short term debt | 9,013,039 | 4% | 10,783,610 | 4% |
| Common equity | 90,130,392 | 40% | 107,836,103 | 40% |
| | 225,325,979 | | 269,590,258 | |
| Interest on long term debt | 7,570,953 | 6.00% | 8,424,156 | 5.58% |
| Interest on short term debt | 119,873 | 1.33% | 223,221 | 2.07% |
| Return on common equity | 7,219,444 | 8.01% | 9,683,682 | 8.98% |
| Return on Rate Base | 14,910,271 | 6.62% | 18,331,059 | 6.80% |

## VECC Supplementary Interrogatories

*VECC #57*

*Reference: VECC 34/ Exhibit 5, page 1 / page 11*

a. *At page 1 of the promissory note (Exhibit 5, page 11) paragraph 1, states that a sum of \$95,000,000 (also shown on the top left margin). VECC is unable to locate the agreement which would appear to be adjusted this note to the current \$70 million as shown in Exhibit 5, page 150. If the originally promissory note was not for \$95 million in December 2000 then please explain the figure in this document. If the note was re-negotiated prior to 2009 please file this document*

RESPONSE VECC #57

a. The original note was for \$95 million dollars in 2000 as the agreement indicated. In 2001, London Hydro requested one of the terms and conditions in the shareholder note be utilized to convert \$25,000,000 of the debt into contributed Capital. This request was approved by City Council on August 8, 2001.

   A copy of the Council resolution has been provided as **Appendix 5A**

300 Dufferin Avenue
P.O. Box 5035
London, ON
N6A 4L9

London
CANADA

1 cc J.S AUG 1 0 2001
2 KW (see item #2)
3 MY FILE.

August 8, 2001

R. A. Blackwell
Commissioner of Legal Services
& City Solicitor
Room 1014

I hereby certify that the Municipal Council, at its session held on August 7, 2001 resolved:

10. That, on the recommendation of the Commissioner of Legal Services & City Solicitor and at the request of London Hydro Inc., the principal amount of the November 1, 2000 promissory note issued to the City and held by the Public Utility Commission as assignee **BE REDUCED** from $95 million to $70 million in order to accommodate the Company's proposed revolving line of credit for operating purposes within the debt/equity ratio on a consolidated basis of 60:40 specified for the Company by part 4 of clause 11 of the 14th Report of Board of Control, as amended and adopted by Council on May 15, 2000; and the contributed capital by the City as the sole shareholder to the Company **BE INCREASED** by $25 million, with all other terms and conditions of the note remaining the same. (61.14.1.) (10/20/BC)

G.W. Hallman
for Jeff Malpass
Deputy City Manager
/crg

c. B. T. Watts, London Hydro Inc., 111 Horton Street
Chair and Members, Public Utility Commission
L. H. Reed, Suite 1105
N. G. Bellchamber, Room 406
L. R. Rowe, Room 1105

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# London Hydro Inc.

## 2013 Cost of Service Rate Application (EB-2012-0146/ EB- 2012-0380) Response to Supplementary Interrogatories

## Cost Allocation (Exhibit 7)

### VECC Supplementary Interrogatories

*VECC #58*

*Reference: LPMA #40 a) and b)*

a. *Part a) of the LPMA 40 asked about changes relative to the previous cost of service application (i.e., the 2009 EDR). Please respond to the question as posed.*

b. *Part b) of LPMA 40 asked about the percentage of the total revenue requirement associated with the accounts where the weighting factors were updated. Please provide a response to the question as posed.*

RESPONSE VECC #58

a. London Hydro's last cost allocation model filing was the filing of the Cost Allocation Model version 1.2, under OEB filing EB-2007-0002. The model was utilized in London Hydro's last cost of service rate application (EB-2008-0235).

   Other than changes related to data inputs, such as trail balance data, distribution asset break outs, customer data, and changes as reflected in the Application, Table7-2 through Table 7-5, London Hydro has not made any further improvements to the cost allocation model.

b. London Hydro has included in its calculation of base revenue requirement accounts for Services (Account 1855), Billing and Collection (Account 5315 to 5340, except 5335), Meter Capital, and Meter Reading Costs. The total percentage of the total base revenue requirement that has been impacted by the changes in the noted accounts above is approximately 16% change.

The major factor for this percent change is associated with the significant expenditures towards smart meters (impacting both rate base and amortization factors towards revenue requirement).

# London Hydro Inc.

## 2013 Cost of Service Rate Application (EB-2012-0146/ EB- 2012-0380) Response to Supplementary Interrogatories

## Rate Design (Exhibit 8)

### VECC Supplementary Interrogatories

*VECC #59*

*59.0 Reference: VECC #40 c)*

a. *Please explain more fully why/how the result of the 2013 (2012?) cost allocation “disrupted” London`s intention to maintain the existing fixed/variable split for the Residential class.*

RESPONSE VECC #59

a. More correctly, London Hydro continues to propose the use of the same existing fixed / variable splits that was approved in London Hydro’s 2009 Cost of Service Decision. The tables below reflect the same fixed / variable splits for both proposed volumetric and proposed fixed charge split for 2013 as that approved in London Hydro’s 2009 Cost of Service (EB-2008-0235).

**Fixed Charge Analysis**

2013 Test Year (Proposed)

| Customer Class | Current Volumetric Split | Current Fixed Charge Spilt | Proposed Volumetric Split | Proposed Fixed Charge Spilt |
|---|---|---|---|---|
| Residential | 42% | 58% | 44% | 56% |
| GS <50 kW | 45% | 55% | 47% | 53% |
| GS 50 to 4,999 kW | 52% | 48% | 54% | 46% |
| GS 50 to 4,999 kW (Co-Generation) | 70% | 30% | 68% | 32% |
| Standby Power | 100% | 0% | 100% | 0% |
| Large Use >5MW | 54% | 46% | 54% | 46% |
| Street Light | 44% | 56% | 45% | 55% |
| Sentinel | 45% | 55% | 46% | 54% |
| Unmetered Scattered Load | 69% | 31% | 70% | 30% |

**Fixed Charge Analysis**

2009 Board Approved (EB-2008-0235)

| Customer Class | Current Volumetric Split | Current Fixed Charge Spilt | Proposed Volumetric Split | Proposed Fixed Charge Spilt |
|---|---|---|---|---|
| Residential | 43% | 57% | 44% | 56% |
| GS <50 kW | 47% | 53% | 47% | 53% |
| GS 50 to 4,999 kW | 54% | 46% | 54% | 46% |
| GS 50 to 4,999 kW (Co-Generation) | 65% | 35% | 68% | 32% |
| Standby Power | 100% | 0% | 100% | 0% |
| Large Use >5MW | 53% | 47% | 54% | 46% |
| Street Light | 45% | 55% | 45% | 55% |
| Sentinel | 46% | 54% | 46% | 54% |
| Unmetered Scattered Load | 85% | 15% | 70% | 30% |

Table 8-7 of the Application does reflect the percentage fixed / variable splits that London Hydro proposes to use in its determination of rates (rates design) for 2013. The Residential percentage fixed / variable splits approved in 2009 are 44% / 56%, which the same is proposed for rate design in the 2013 Cost of Service.

In response to the percentage fixed / variable splits reflected in Table 8-5 and Table 8-7 (Current Fixed Charge Column 2012) in which identifies the current percentage fixed / variable splits as 42%/ 58%, the differences are likely from the impacts during the IRM rate years. For instance, although the price cap index adjustment might be at approved OEB rate, it impacts the fixed and volumetric rate results differently. In the case of the 2012 IRM rate application, the price cap index adjustment was 0.88 percent. However, applying this percentage to the approved 2012 distribution rates resulted in only 0.872

percent change for Fixed and 0.704% change for Volumetric. Please refer to below table for price cap index adjustment differences.

Over the four years of IRM rate application being approved, the different increases or results for fixed/ volumetric (variable) impact the current percentage fixed / variable splits, which are included in Table 8-5.

| Distribution Rate Change Analysis | Fixed | Volumetric |
|---|---|---|
| 2011 Approve Rates | $ 12.61 | $ 0.0142 |
| Price Cap Index Adjustment (%) | 0.88 | 0.88 |
| Actual Resulting Rate | $ 12.7209680 | $ 0.0143250 |
| 2012 Approved Rates | $ 12.72 | $ 0.0143 |
| Difference Actual Result to Approved Rate | $ 0.000968 | $ 0.000025 |
| Actual Percentage Adjustment (2011 Approved to 2012 Approved) | 0.872% | 0.704% |

# London Hydro Inc.

## 2013 Cost of Service Rate Application (EB-2012-0146/ EB- 2012-0380) Response to Supplementary Interrogatories

## Deferral and Variance Accounts (Exhibit 9)

### Board Staff Supplementary Interrogatories:

*OEB - # 68*

*RSVA 1588, Global Adjustment Sub-Account*

*References:*

- *Exh 9 – BdStaff #51(b)*
- *Board Decision EB 2011-0181*
- *Deferral/Variance Account Work Form for COS 2013 Filers*
- *Exh 9 - BdStaff #54(a), 'Table 9-3'*

*In Board Decision EB- 2011-0181, London Hydro obtained Board approval for the disposition of the December 31, 2010 principal and interest balances in Account 1588 RSVA, Power and Account 1588, Sub Account Global Adjustment.*

*In London Hydro's response to BdStaff #51 and in the table labeled as "1588 RSVA Power Sub Account Global Adjustment Recalculated with Eliminating the Amount for Fixed Price Credit Accrued in Error After the Accrual Method is Implemented", London Hydro provided the debit adjustment of $4,262,161 for the year 2010 (made up of debit balance of $459,200, credit balance of $1,998,139 and debit balance of $5,801,100).*

*Requests:*

a. *When was the $4,262,161 debit adjustment recorded by London Hydro in its books? Please provide the journal entries and General Leger postings and supporting documentation.*

b. *Please confirm if the debit adjustment of $4,262,161 is a prior year adjustment that was made by London Hydro in 2010.*

c. *Please confirm if the $4,262,161 debit adjustment was included in the amount requested for disposition in EB- 2011-0181.*

d. *If the $4,262,161 debit adjustment was recorded in 2010, please explain why did London Hydro record a prior year adjustment in 2011 and bring it to the Board for disposition, given the fact that the rates for 2010 were approved on a final basis.*

e. *Based on the table in the response to BdStaff # 54, London Hydro made the adjustment for the $5,801,100 in the year 2010. This is different from the year this adjustment was reflected in the Deferral/Variance Account Work form for 2013 Filers which is 2011 and from the year this adjustment was shown in Table 9-3 which is 2013. Please explain why the entry $5,801,100 is shown in different years.*

RESPONSE OEB - #68

## Actual Journal Entries for Fixed Price Credits Accruals and Reversals

| Date | Fixed Price Credit Accrual Reversals from prior month (recorded on the first day of the month) | Fixed Price Credit Accruals (accrued on the last day of the month) |
|---|---|---|
| **Dec-2008** | | |
| Jan-2009 | | |
| Feb-2009 | | |
| Mar-2009 | | |
| Apr-2009 | | |
| May-2009 | | |
| Jun-2009 | | |
| Jul-2009 | | |
| Aug-2009 | | |
| Sep-2009 | | (3,908,500) |
| Oct-2009 | 3,908,500 | (3,247,785) |
| Nov-2009 | 3,247,785 | (3,807,116) |
| **Dec-2009** | **3,807,116** | **(4,262,161)** |
| Jan-2010 | 4,262,161 | (4,622,900) |
| Feb-2010 | 4,622,900 | (3,554,800) |
| Mar-2010 | 3,554,800 | (5,335,500) |
| Apr-2010 | 5,335,500 | (3,367,400) |
| May-2010 | 3,367,400 | (2,501,500) |
| Jun-2010 | 2,501,500 | (2,743,000) |
| Jul-2010 | 2,743,000 | (1,078,900) |
| Aug-2010 | 1,078,900 | (1,663,300) |
| Sep-2010 | 1,663,300 | (2,832,200) |
| Oct-2010 | 2,832,200 | (3,486,021) |
| Nov-2010 | 3,486,021 | (3,083,063) |
| **Dec-2010** | **3,083,063** | **(3,802,961)** |
| Jan-2011 | 3,802,961 | (4,950,500) |
| Feb-2011 | 4,950,500 | (4,210,400) |
| Mar-2011 | 4,210,400 | (4,258,400) |
| Apr-2011 | 4,258,400 | (4,446,800) |
| May-2011 | 4,446,800 | (5,273,900) |
| Jun-2011 | 5,273,900 | (5,899,100) |
| Jul-2011 | 5,899,100 | (3,858,200) |
| Aug-2011 | 3,858,200 | (4,969,600) |
| Sep-2011 | 4,969,600 | (4,106,700) |
| Oct-2011 | 4,106,700 | (4,182,826) |
| Nov-2011 | 4,182,826 | (3,445,200) |
| **Dec-2011** | **3,445,200** | **(5,801,100)** |
| Jan-2012 | 5,801,100 | - |
| Feb-2012 | - | - |
| Mar-2012 | - | - |
| Apr-2012 | - | - |
| May-2012 | - | - |
| Jun-2012 | - | - |
| Jul-2012 | - | - |
| Aug-2012 | - | - |
| Sep-2012 | - | - |
| Oct-2012 | - | - |
| Nov-2012 | - | - |
| **Dec-2012** | **-** | **-** |

a. The $4,262,161 debit is the reversal of December 31, 2009 fixed price credit accrual for the RPP portion of Global Adjustment claim on the unbilled energy at December 31, 2009 booked via reversing journal entry. The reversal of this accrual was recorded on January 1, 2010 as a debit. Please refer to Table - Actual Journal Entries for Fixed Price Credits Accruals and Reversals showing the actual entries for each month.

Journal entry on January 1, 2010 reversing the accrual made on December 31, 2009:

| | |
|---|---|
| dr 4707 Charges – Global Adjustment | $4,262,161 |
| cr 2205 Accounts Payable | ($4,262,161) |
| *Reversal of GA credit on unbilled amounts* | |
| | |
| dr 1588 RSVA Power Sub-account Global Adjustment | $4,262,161 |
| cr 4707 Charges – Global Adjustment | ($4,262,161) |
| *Reversal of accrual closing off to RSVA - GA credit on unbilled amounts* | |

b. The $4,262,161 debit, on January 1, 2010, is the reversal of the fixed price credit accrued at December 31, 2009.

c. The $4,262,161 debit (prior year reversal) was recorded in year 2010, and therefore it is included in the balance requested for disposition in EB-2011-0181.

d. The $4,262,161 debit is a reversal of the prior year accrual which accounted for the fixed price credit for the month of December 2009. The actual invoice for December is received and posted to the general ledger in the month of January 2010. The reversal of prior year accrual offsets the January posting of the actual invoice. This is the method to book December related transactions in the proper period when the actual invoice is received in the following month.

e. Table 9-3 – Deferral and Variance Accounts Submitted for Recovery with this Application Updated reflects the last reversal of the fixed price credits in the column titled "Recoveries/Adjustments to April 30, 2013", interpreting this as an adjustment made after December 31, 2011 to the ending balance and belongs to the disposition is being requested. In other words, the $5,801,100 debit adjustment in the table removes the accrual included in the December 31, 2011 balance in error. Please refer to Table - Actual Journal Entries for Fixed Price Credits Accruals and Reversals showing the accruals and the corresponding reversals.

*OEB #69*

*CGAAP and IFRS*

*References:*

- *Exh 9 – BdStaff #49 (b) & (c)*
- *Exh 10 – BdStaff #58(a)*
- *AcSB IFRS Changeover Adoption Date Pronouncement, dated February 14, 2013*

*London Hydro stated, in part, in its responses to BdStaff #49(b) and (c):*

> *"Since the transitional P&OPEB adjustment is a material amount ($1,844,800), London Hydro is requesting that a deferral account be opened for use when the Company does in fact move to IFRS."*
>
> *"This transitional adjustment is an adjustment to the opening balance sheet on transition to IFRS rather than a charge to OM&A for a given year."*

*In its response to BdStaff # 58 (a) London Hydro stated:*

> *"London Hydro confirms that it is asking for a deferral and variance account as per the Addendum to EB 2008-0408 dated June 13, 2011, pp. 23-24 which states that "Individual utilities that can demonstrate the likelihood of large variances can seek an individual variance account from the Board."*
>
> *As mentioned in the COS rate application and above, although London Hydro has not yet transitioned to IFRS, this deferral account is being requested as a place holder for its forthcoming transitional P&OPEB adjustment which will be made when transition to IFRS is in fact complete."*

*In its response to BdStaff # 58 (b) London Hydro stated:*

> *"The Company has chosen to defer IFRS implementation to the new mandated transition date of January 1, 2014. In view of the foregoing, London Hydro has not yet developed a proposed accounting treatment associated with the P&OPEB adjustment for rate-setting purposes.*

*Once London Hydro has transitioned to IFRS and has made this P&OPEB adjustment to the opening balance sheet, it will provide a proposed accounting treatment that is consistent with that used by LDC's as the industry standard at that time."*

*On February 14, 2013, the Accounting Standards Board (AcSB) has extended the existing deferral of the mandatory IFRS changeover date for entities with qualifying rate-regulated activities by an additional year to January 1, 2015.*

*Requests:*

a. *Please confirm that the unamortized actuarial loss referred to in the response to BdStaff # 49 s related to employee benefits (P&OEB).*

b. *Please confirm that London Hydro is adopting IFRS on January 1, 2014 or January 1, 2015 per AcSB.*

c. *Please confirm that London Hydro is not making a one- time adjustment of $1,844,800 in this application, given that LONDON HYDRO is adopting IFRS in 2014 or in 2015.*

d. *Please confirm that the one-time adjustment of $1,844,800 will be changed when London Hydro adopts IFRS in 2014 or in 2015. If so, please provide an estimate of the adjustment amount when LONDON HYDRO will transition to IFRS, as well as the actuarial valuation.*

e. *Why is London Hydro requesting for a deferral account for P&OPEB when it has chosen to defer IFRS implementation to the new mandated transition date of January 1, 2014 or January 1, 2015?*

RESPONSE OEB #69

a. London Hydro confirms that the unamortized actuarial losses referred to in response to BdStaff #49 s are in connection with employee benefits (P&OPEB).

b. London Hydro confirms that it will defer the implementation of IFRS to the new mandatory changeover date of January 1, 2015.

c. London Hydro confirms that it has not made any transitional adjustment for the P&OPEB liability since it is deferring the implementation of IFRS to January 1, 2015 (previously January 1, 2014). As mentioned above, the deferral account that was being requested was a place holder only for the forthcoming transitional P&OPEB adjustment which will be required on transition to IFRS.

d. The one-time adjustment of $1,844,800 noted above represents unamortized actuarial losses at January 1, 2012. London Hydro confirms that the one-time adjustment will be changed so that it represents unamortized actuarial losses at January 1, 2014 corresponding to the new IFRS implementation date of January 1, 2015.

   London Hydro is unable to provide a further estimate of the adjustment amount at January 1, 2014 or any supporting actuarial valuation at this time other than the current amount of $1,844,800. This actual amount will be determined through the services of an actuarial analyst sometime during 2014.

e. The deferral account is being requested as a place holder only for the forthcoming transitional P&OPEB adjustment which will be required on transition to IFRS, and based on the assumption that the required adjustment will be a material amount.

*OEB #70*

*Account 1592, sub account HST/OVAT/ITC*

*References:*

- *Accounting Procedures Handbook ("APH") Q & A, December 2010*
- *Exh 9 - BdStaff # 60*
- *Exh 9 - BdStaff # 54(a) & (b), Table 9-3*
- *Exhibit 9 –Table 4*
- *Application: Excel spreadsheet 'Appendix 2-T'*

*The December 2010 Q & A #5 states as follows:*

*Q.5*

"The 2010 Decisions and Orders provided the reasons the Board concluded that fifty percent (50%) of the confirmed balances recorded in "Subaccount HST / OVAT Input Tax Credits (ITCs)" shall be returnable to the ratepayers. The reasons include the following: "The Board's view is whether a distributor's cost reductions arising from the implementation of the HST should be returned to the ratepayers. In that regard, the Board notes that to do so would be consistent with what the Board has done with tax changes in second and third generation IRMs. In second generation IRM, the Board treated 100 % of the tax changes as a Z factor. In the third generation IRM, the Board determined that tax changes would be shared equally between ratepayers and the shareholder. The 50% was considered appropriate as the changes in input prices will flow through the GDP-IPI over time to some degree. The same rationale applies in the case of the HST.

*Can a distributor record only the 50 percent portion of the HST savings attributable to ratepayers in the sub-account?"*

*A.5*

*"No. The Board would first want to review the quantum of savings associated with the ITCs recorded in the sub-account to confirm, among other things, the reasonableness of the amount and consider any adjustments, as appropriate."*

*Appendix 2-T shows the amount $185,548 plus carrying charges requested for disposition for account 1592, sub account HST/OVAT/ITC. Board staff notes that the principal balance shown in Table 9-3 of $185,548 is the same balance as is shown in Appendix 2-T. The APH guideline requires that HST savings attributable to ratepayers in the 1592 sub-account HST / OVAT Input Tax Credits (ITCs) be recorded at 100% and not 50%. The 50% of the HST savings attributable to ratepayers in the 1592 sub-account HST / OVAT Input Tax Credits (ITCs) is the amount returnable to the ratepayers.*

a. *What is the balance recorded in London Hydro's books as of December 31, 2011 for Account 1592, sub account HST/OVAT/ITC? Please confirm if the amount in part 1 represents 100% of the total HST savings in the sub-account. If not, what is the amount representing 100%.*

b. *Please confirm if the balance of $185,548 in Appendix 2-T represents 100% and the balance in Table 9-3 for Account 1592, sub account HST/OVAT/ITC represents 50% of the HST savings attributable to ratepayers in the sub-account? If not, what should be the principal total representing the 50% in Table 9-3?*

c. *Please make any adjustments that are necessary to ensure that Appendix 2-T reflects the 100% total HST/ OVAT/ITCs and that Table 9-3 reflects the 50% balance returnable to the ratepayers.*

RESPONSE OEB #70

a. The balance recorded in London Hydro's books as at December 31, 2011 for Account 1592, sub account HST/OVAT/ITC is $185,546 representing 50% of the total HST savings. The total 100% of the HST savings to December 31, 2011 is $371,092, as summarized below:

| HST Savings Liability for July 2010 to December 2011 | | | |
|---|---|---|---|
| | 2010 July-Dec | 2011 Jan-Dec | **Total** |
| OM&A | 113,537 | 227,073 | 340,610 |
| Depreciation | 2,027 | 28,455 | 30,482 |
| | 115,564 | 255,528 | **371,092** |
| Portion repayable at 50% | | | 185,546 |
| Carrying charges to April 30, 2013 | | | 5,476 |
| | | | **191,022** |

b. London Hydro confirms that both Appendix 2-T and Table 9-3 represent 50% of the total HST savings.

c. As requested Appendix 2-T has been revised to report 100% of the HST savings ($371,092) rather than 50% of the HST savings ($185,546) as originally reported and is being resubmitted herewith.

## VECC Supplementary Interrogatories:

*VECC - # 60*

*Ref: VECC #42 / Exhibit 9, pg. 22, pg. 59*

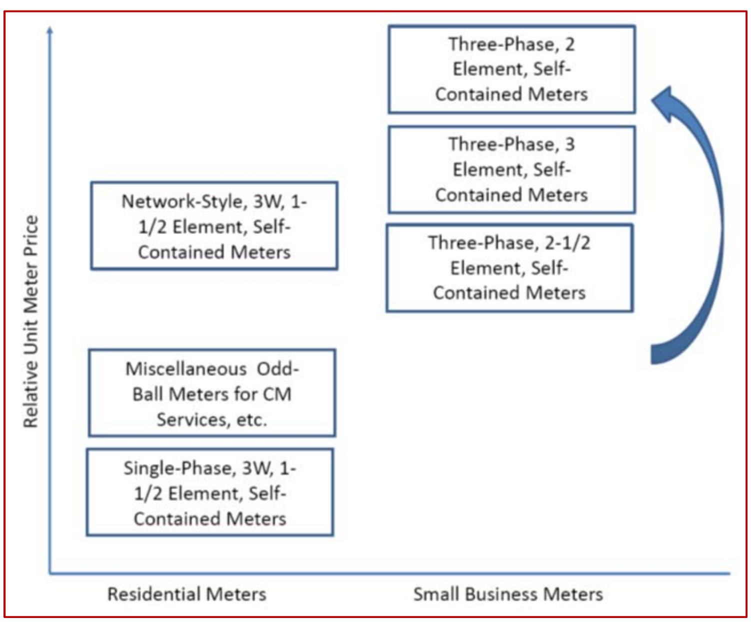
a. *The response to part (b) of the interrogatory shows no difference in recorded costs as between installed meters in the residential and GS<50 class. Is it London's position that installed mechanical meters for the two classes are identical. If so were identical meters used for both classes?*

b. *Please provide the average installed cost for smart meters for both the GS<50 and residential classes.*

RESPONSE VECC - #60

a. One of the challenges associated with the stranding of revenue meter assets (prior to their end-of-life replacement due to the provincial Smart-meter program) is that although the Smart meter program covers two (2) distinct tariff classifications (i.e. "residential" and "general service < 50 kW"), the types of revenue meters (and their associated price tag) within each tariff classification is not homogeneous.

   The following diagram is intended to illustrate this reality.



Within the population of residential customers, there were close to 120,000 of the single-phase, 3-wire, 1-1/2 element, self-contained, revenue meters (i.e. the kind that normally found on detached dwelling units). But in London Hydro's service territory and within that same residential customer class, one would find:

- On the order of 11,000 network-style revenue meters that are generally installed in metered load centres within apartment buildings. Such network-style revenue meters are generally about 3-times the price of a single-phase residential meter;
- A sprinkling of special-type revenue meters (e.g. 2-wire meters) for such things as so-called "central metering" farm services. The unit price for such odd-ball meters is generally more that for the common single-phase residential meters but will depend on features and market conditions.

Within the population of small business customers (i.e. those with the tariff classification "general service < 50 kW"), there were almost 6,300 three-phase, self-contained, revenue meters that were replaced. Such meters would have fallen into three (3) broad classifications (with respect to internal electrical arrangement and unit price), namely:

- Three-phase, 2-1/2 element, self-contained, revenue meters;
- Three-phase, 3 element, self-contained, revenue meters; and
- Three-phase, 2 element, self-contained, revenue meters that are used exclusively on so-called 600 V delta services.

The unit prices of the three-phase, 2-1/2 element and 3 element revenue meters would be slightly more expensive than the network-style meters used in apartment buildings.

Since today, there is only one remaining manufacturer of 600 V rated 2-element revenue meters (approved by Measurement Canada for a 600 V delta application), and a small residual market demand, the unit pricing on this style of meter has skyrocketed in recent years. As such, the unit price will be very dependent upon when this meter was originally purchased, and the level of competition in the marketplace at that time.

Revenue meters are a pooled asset and London Hydro employed the following cost allocation methodology: The total value of the pooled asset was determined by the total meter purchase price plus installation costs in each year. The number of each meter types, 1 Phase and 3 Phase, was determined by the number of meters in service or in stock. The total installed meter costs was reflected over the number of meters for both meter types.

The accumulated amortization was determined based on the age of the asset and life span. Given the limitations of the available historical information, London Hydro holds the opinion that the methodology for cost allocation that has been used is the best that can be done with the available data.

The allocation of “stranded” costs to “residential” and “general service < 50 kW” tariff classifications are based on the number of meters by type removed from the services of each customer classes, with the average pooled residual value applied.

The number of mechanical meters removed and replaced with smart meters by billing class:

| | Residential | | | GS < 50 | | | Total |
|---|---|---|---|---|---|---|---|
| Year | 1 Phase | 3 Phase | Total | 1 Phase | 3 Phase | Total | Replaced meters |
| 2009 | 6,035 | - | 6,035 | 348 | - | 348 | 6,383 |
| 2010 | 113,340 | 6,759 | 120,099 | 3,762 | 274 | 4,036 | 124,135 |
| 2011 | 399 | 4,289 | 4,688 | 348 | 5,957 | 6,305 | 10,993 |
| 2012 | 33 | 8 | 41 | 29 | 45 | 74 | 115 |
| **Total** | **119,807** | **11,056** | **130,863** | **4,487** | **6,276** | **10,763** | **141,626** |

b. The average cost per smart meters installed on Residential and GS<50 kW services is $100.86 and $250.86 respectively. The value of the individual meters is similar, yet the number of meters of a certain meter type is different depending on the type of service it is installed on within the two customer classes.

| | Residential | | | GS<50 | | |
|---|---|---|---|---|---|---|
| | Total Qty Installed | Average cost per installed meter | Total meter cost | Total Qty Installed | Average cost per installed meter | Total meter cost |
| iSA2 - Form 2S - single phase | 122,927 | 92.28 | 11,343,914.99 | 4,650 | 92.28 | 429,110.00 |
| iNA2 - Form 12S - network | 11,624 | 189.23 | 2,199,664.92 | 480 | 189.23 | 90,832.69 |
| Form A3RL - 16S - 3 phase self-contained | 104 | 355.68 | 36,990.27 | 5,652 | 355.68 | 2,010,279.04 |
| Form A3RL - F9S, F36S, F35S - 3phase transformer rated | 3 | 425.96 | 1,277.87 | 997 | 425.96 | 424,680.16 |
| | **134,658** | | **$ 13,581,848** | **11,779** | | **$ 2,954,902** |
| **Average cost per billing class** | | | **100.86** | | | **250.86** |

# London Hydro Inc.

**2013 Cost of Service Rate Application (EB-2012-0146/ EB- 2012-0380)**
**Response to Supplementary Interrogatories**

## TRANSITION TO MIFRS (Exhibit 10)

### *Question LPMA #59*

**Ref: LPMA #43**

a) *Where has the amended Appendix 2-EB noted in the response to part (c) been provided?*

b) *Please update Appendix 2-EB to reflect the actual capital expenditures closed to rate base at the end of 2012 in the calculation of the 2013 rate base (as identified in the interrogatory responses), including the MIFRS related changes applied to 2012 (capitalization and depreciation rate changes). Please also provide the corresponding continuity schedules for 2012, one based on CGAAP and the other based on CGAAP with the addition of the capitalization and depreciation rate changes.*

### Response LPMA #59

a) The amended Appendix 2-EB has been provided with this submission. Due to oversight it was not submitted with the original response to part (c). London Hydro apologizes for any inconvenience.

b) The Appendix 2-EB noted above is based on projected amounts and represents the forecasted difference in the net book value of fixed assets calculated under CGAAP in comparison to MIFRS at December 31, 2012. Without the availability of two ledger types (one for CGAAP under old life spans and burdens and one for MIFRS under new life spans and burdens), this Appendix cannot be updated with actual results for 2012.

   In order to accommodate transition to IFRS, London Hydro was initially accounting under dual ledger types up until September 2012. However, the second ledger (MIFRS ledger) was abandoned when the AcSB decided to extend the existing deferral of the mandatory IFRS changeover date for entities with qualifying rate-regulated activities for an additional year to January 1, 2014, for maintaining a second ledger under MIFRS is a large and costly administrative burden.

## ***Question OEB #71***

**Reference:** Exh 10 - BdStaff #58( b)

*London Hydro stated in the referenced response:*

> *"The Company has chosen to defer IFRS implementation to the new mandated transition date of January 1, 2014."*

Please confirm that for its 2013 COS rate application London Hydro is still on a MIFRS basis.

## **Response OEB #71**

London Hydro confirms that its 2013 COS rate application has been filed on a MIFRS basis pursuant to section 2.3.4 of the Ontario Energy Board Filing Requirements for Electricity Transmission and Distribution Applications last revised on June 28, 2012.

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**All Respectfully Submitted**