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RE: Board File No. EB-2012-0383

Kirsten,

The board issued a request for comments through its letter dated March 20, 2014 surrounding the changes to the distribution system code (DSC), and the City of Hamilton thanks the Board for this opportunity to have input into this file.

The City of Hamilton has approximately 44,000 street lights in two LDC areas. The history of street lighting in Hamilton is that for a significant period of time, the systems were run and maintained by the LDC on behalf of the City of Hamilton. As you're aware of the changes in ownership requirements that took place over the last 10 years, the system is now run by the City of Hamilton. The equipment installed is a large variety of manufacturers and ages. The maintenance and installation records are not always complete and understanding all of the parameters associated with the system can be challenging.

The majority of systems were installed when energy costs were less of a concern and the lighting system was for a public service benefit.

Hamilton engaged in the original study for ED-2012-0383 and sent a letter outlining some of the elements we wished were clarified through the process. That letter was dated January 16, 2013.

Overriding our comments below are the following concerns; the Street Light rate class in Hamilton has experienced increases in Service Delivery costs over the last 5 years in excess of $1 million dollars annually from the 2008 base, representing increase in the magnitude of 400% or greater.

The board asked for comments with respect to four items on Attachment 'A', and we outline our comments as follows:

1. **Rights and Obligations**

    - Hamilton seeks clear definition of the following terms:
        - Connection
        - Equipment
        - Demarcation Point

    These definitions will help drive rights and obligations as it pertains to the distribution network and field related activity.

    There has been significant discussion about the use of "daisy chained" connections, cost allocation processes and weighting factors in regards to this rate class. It appears to Hamilton that the use of the "connection" as a driver in the CA model is not well understood.

    Hamilton's preference is that the rights and obligations drive a true cost of service review and that the reliance on modelling out cost allocations is directly related to the requirements of the DSC.

2. Process to Update Unmetered Load Data

The validation of un-metered street lighting data is critical to both LCDs and load customers as it ensures electricity billing determinants are reflective of actual usage. Historically, the methodology for validating usage data has been un-defined or non-existent as lower energy costs did not necessarily warrant detailed review. Recent excessive energy cost escalation for flat-rate street lighting has resulted in increased attention from load customers in an effort to rationalize and mitigate further cost increases. The rapid development and on-going adoption of next generation street lighting technology, such as LED luminaires and adaptive controls, has also placed further pressure to define or revise outdated data validation practices.

It is of paramount importance that the process for the validation of flat-rate street lighting data is formally identified, reasonable and flexible. The validation process needs to comprehensively address the billing determinants which are electricity load consumption, duration (on-time) of use and quantity of devices.

Electricity Consumption

Existing (historical) Street Lighting Loads:

Existing street lighting equipment mainly consists of high intensity discharge [HID] street lighting such as high pressure sodium [HPS] and metal halide [MH]. HID street lighting has been utilized in excess of 40 years and the in-service age of equipment ranges from 40 years to current.

A variety of types of in-service HID equipment, from a specification perspective, exist which results in differing load consumption from street light to street light. In addition to this, load consumption is impacted by age which adds further complexity to determining mean load consumption values.

The mass majority of existing HID equipment was installed by LDCs on behalf of municipalities. Equipment specifications, date of installations and maintenance history is typically unavailable or non-existent. Coupled with age related operating characteristics, load consumption values used by LDCs for existing equipment is assumed and not validated. Study undertaken by the City of Hamilton and other municipalities in Ontario suggests that current billing load consumption values are inaccurate and resulting in possible over-billing.

Validation of existing street lighting loads is difficult as many variables impact energy consumption. In order to identify with certainty actual in-service energy consumption, in-field measurements of a statistically significant quantity of street lights is necessary. Measurement project can be very onerous as they are time-consuming and expensive.

In consideration that LDCs were responsible for the installation of the majority of HID equipment, they should be required to assist municipalities to conduct and fund measurement studies. Further, where similar studies have already been completed (by other LDC or municipalities for example), these studies should accepted to avoid unnecessarily repeating similar study.

New and Next Generation Street Lighting Loads:

When compared to existing in-service street lighting equipment, the validation of new and next generation equipment load consumption values should be considered as being much simpler. Unlike in-service equipment, new and next generation equipment specifications are known and can be verified prior to installation.

Next generation street lighting equipment specifications, performance, adoption and standardization has progressed at a rapid pace. Industry testing is far more intensive and thorough when compared to HID. The accuracy of energy consumption load values is easily identified and validated through the manufacturing testing data. LED, for example, is tested and certified to various standards such as:

IESNA LM-80-08 – Measuring Lumen Maintenance of LED Light Sources
IESNA LM-79-08 – Electrical and Photometric Measurements of Solid-State Lighting Products

IESNA TM-21-11 – Projecting Long Term Maintenance of LED Light Sources
CAN/CSA-C22.2 No.250.13-12 – Light Emitting Diode (LED) Equipment for Lighting Applications

Further to the above, equipment must be tested and certified to satisfy the requirements of the Canadian Electrical Code and Ontario Electrical Safety Authority. Equipment which fails these tests or lacks certification is prohibited to be sold in Ontario. Testing and certification of these products is inclusive of consumption load verification.

Consumption load data supplied from equipment manufacturers should be accepted by LDCs and load customers to be utilized for billing determinants without the necessity for further testing and verification. Consumption load data is typically published by manufacturers on product specification data sheets. Additional testing/testing requirements undertaken by either LDCs/load or customers would be far less comprehensive than testing already required and undertaken by the industry and therefore should be deemed as unnecessary.

Due to the nature of next generation equipment, particularly LED, undertaking or duplicating equipment testing would be onerous, time-consuming and expensive. Any requirement to conduct additional testing could potentially prohibit the adoption of next generation equipment which would cause difficulty in meeting Federal, Provincial and Municipal energy conservation targets and objectives.

Duration of Use

Traditional (historical) Street Lighting On-Off Controls:

The duration of which street lights are operating is determined by control equipment such as photocells. For the purposes of billing, flat-rate street light operating time is typically based upon pre-determined on-off load shapes rather than in-field measurement. These load shapes have historically been selected by LDCs and, in most instances, follow published sunrise/sunset times which is not validated.

Due to the operating characteristics of photocells many factors determine actual on-off times as on-off threshold specifications, weather and equipment age impact operating time. Study undertaken by the City of Hamilton and other municipalities in Ontario suggests that current sunset/sunrise load shapes are inaccurate and resulting in possible over-billing.
The use of static on-off load shapes for billing is problematic as the on-off times are difficult to validate and make it prohibitive for load customers to utilize different control equipment which operate differently than the on-off load shape (such as passive and active adaptive controls, inclusive of dimming capability).

Rather than using static on-off values, actual on-off times should be recorded on a daily basis. This could be achieve by selecting a number of geographically separate street light locations and measuring (through utility metering equipment) the average on-off operating times which then could be applied holistically as a billing determinant. This methodology would remove the necessity for any more complicated validation studies and ensure that actual day-to-day duration of use is accurate.

To ensure that duration of use billing determinant values are reflective of actual duration of use, the utilization of static pre-determined load-shapes should no-longer be prohibited and be replaced with the on-going measurement of select in-service equipment.

Next Generation Street Lighting On-Off Controls:

Next generation street lighting on-off controls provide further evidence which demonstrates that the utilization of static pre-determined load-shapes should not be considered. Advancements in street lighting control systems enable, when installed, load customers to actively and/or passively control on-off times as well as light output (dimming).

The current billing practice of using static pre-determined load-shapes does not provide LDCs or load customers with flexibility to take advantage of the control options. Load-shapes need to be easily adaptable to reflect actual duration of use.

Networked adaptive control systems report back on duration of use values to a high degree of accuracy. While not Measurement Canada Certified, the accuracy of the data typically meets or exceeds the Measurement Canada specifications. Where these types of systems are being utilized, output reporting for on-off duration should be accepted by LDCs for billing determinants.

Identical to street lighting luminaire equipment, the development of control equipment has progressed at a rapid pace. Control equipment must be tested and certified to satisfy many various industry standards and ultimately required to adhere to the Canadian Electrical Code and Ontario Electrical Safety Authority. As such, manufacturers conduct and complete many tests which validate the accuracy of the function of control equipment.

Due to the nature of next generation on-off control equipment undertaking or duplicating equipment testing would be onerous, time-consuming and expensive. Any requirement to conduct additional testing could potentially prohibit the adoption of next generation equipment which would cause difficulty in meeting Federal, Provincial and Municipal energy conservation targets and objectives.

Formally capturing methodologies for validating and accepting data as it relates to billing determinants is crucial as it ensures that electricity costs are accurate and the LDCs and load customers have confidence them. Determining methodologies should not be unilaterally set by the LDCs as it should be the mutual responsibility of the LDC and their associated load customers. Further to this, when possible, holistic rules should be set by the OEB to ensure that the rules are applied consistently across the Province from LDC to LDC. Allowing for wide variations in validation rules is very problematic as it reduces the ability of LDCs and load customers from sharing data and/or conducting validation studies. Lastly, overly onerous validation rules may be detrimental or prohibitive to load customer efforts for cost mitigation and energy conservation.

3. Process to Update Unmetered Load Billing

The process by which an un-metered street lighting account load summary is maintained differs drastically from metered accounts. Metered accounts reflect real and live time of use with no account maintenance requirements beyond ensuring accurate meter reads. Flat rate accounts will continue to bill as originally set up unless continuously updated and reviewed.
It is essential for both LDC's and customers that the process to update flat rate accounts be defined such that minimal effort is required by the LDC to maintain the account load profile allowing the customer to manage their loads with full confidence that the bill accurately reflects the present conditions especially as it pertains to investments in load reduction. The process for updating the flat rate bills needs to address Maintained Load Profile, Load Reporting, and Effective Implementation of Load Changes.

Maintained Load Profile

Where the customer maintains a system profile and has accurate load data available the customer should send a monthly output of the total load to the LDC for the purposes of billing, highlighting where any load changes have occurred. The LDC should accept the load output as long as the loads contained within have been through the validation process.

Where the customer is not maintaining a system profile the customer should send load updates to the LDC whenever a change in load has occurred. The load update form should identify the asset, the previous/existing load, and the new load. The LDC should update the billing for the next billing cycle upon receiving the update.

Load Reporting

Where a customer has adopted an adaptive control system, or new street lighting technology such as LED, accurate load reporting may be available. Where load reporting is available the customer should present the information to the LDC on a monthly basis as supplementary information to the total load profile. The LDC should use the information to implement any adjustments to the total billed consumption for the billing period to which the information pertains.

In the case of a static adaptive load, such as a street light set to an operating parameter of less time on, or less light output, the mean demand should be determined and added to the load profile as a static load. i.e. a 50W LED street light device set to operate at 50% light output should be added to the load profile as a 25W street light. The customer should update the LDC of changing the operating parameters of any such static adaptive device. The LDC should update the billing for the next billing cycle upon receiving the update.

Effective Implementation of Load Changes

The LDC should implement any load change accurate to the date indicated by the customer that the load was changed by calculating the consumption accordingly and applying a retroactive charge or refund.

4. Process the Distributor Will Use to Communicate and Engage Customers

Hamilton notes that the rate filing processes have taken place between the LDC and the OEB in the past with very little communication to this rate class. Currently it appears that the only method of understanding rate impacts and IRM impacts is through maintaining vigilance on the OEB website.

This rate class has only 1 or 2 client groups for most LDC's and is significant with respect to load and billing. The communication process should be revised to include full disclosure of upcoming cost impacts and applications prior to submission to the board.

Hamilton suggests the process may need to be determined locally to accommodate specific factors between street lighting and the LDC; however cost impacts should be well understood prior to submissions to the board.

Factors that don't appear to be considered during the development of a CA model are as below:

Critically of supply to the Street Light systems. There is a mandated response timeline of 5 days under the Municipal Act for the repair of street lights once the provider is aware of the outage. How this is weighted into an LDC's model is undetermined as this rate class does not need to support 24 hour trouble trucks and repair crews.

Locates, repairs, call tracking and system maintenance are all done by the City. These factors need to be weighted into the models as often the call for repairs does not go to the LDC, rather to the street light provider.

Asset depreciation, Outside Supervision, Outside Services, Miscellaneous Distribution Expenses, Office Supplies and Customer Premises account in the USoA have increased over $550,000 in a 5 year period without a defined study or data supporting the increase in charges.

As a part of the engagement process a full understanding of each charge in the model is recommended and supporting data to confirm the charges.

Respectfully Submitted,

Original Signed

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