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Measurement Canada to Further Standardize Electricity Measurement in Canada

Background

In the fall of 2006, two separate Measurement Canada(MC) and electricity industry workgroups were launched to review and discuss the issues associated with the establishment of legal units of measurement (LUM) for time-related demand outside an approved meter (LUM Joint Working Group), as well as the establishment of methodologies pertaining to the determination of volt-ampere demand and volt ampere-hour energy (VA Joint Working Group).

The mandate of the VA joint working group was to identify and study the factors which can contribute to measurement inequities with regard to electricity sold on the basis of volt-amperes. The group was also tasked with addressing the potential for this occurrence, through the development of a recommendation which would standardize the different VA calculation methods being utilized by the electricity industry. Marketplace measurement standardization would be established through amendments to the *Electricity and Gas Inspection Regulations* which would include the prescription of specific algorithms to be used by electricity utilities for the demand units of measurement known as watt, var, and volt-ampere (VA).

The mandate of the other joint working group (LUM) was to evaluate existing methodologies and practices where legal units of measure (KW, VA, Var) were being established outside of an approved electricity meter (i.e. within utility billing computers). The group was requested to make recommendations with regard to the potential for recognizing certain methodologies and recording keeping criteria which could, from a legal metrology perspective, be considered as acceptable for the purposes of supporting some of the current electricity billing practices. As the *Electricity and Gas Inspection Regulations* do not currently recognize the potential for electricity units of measurement or electricity quantities to be established outside of a Measurement Canada approved meter, further regulatory amendments would be necessitated.

With regard to joint working group membership, both the VA and LUM groups were established on the basis of a balanced representation of technical experts from electricity utilities, meter manufacturers and Measurement Canada. Public consultation on the recommendations developed by the joint working groups, was performed and input was received from some provincial electricity regulators or system operators.

Issues

When identifying the underlying issue to be resolved with regard to the definition of the volt-ampere as a unit of measure for the measurement and sale of electricity, it should be first recognized that the establishment of the VA unit in a direct current environment, is simply the amount of voltage across a load multiplied by the amount of current through the load. In terms of measurement equity, there is no other acceptable definition that could lead to differing values of VA under the same direct current load conditions. However, what is the definition of VA in an alternating current polyphase environment which includes harmonic distortions and reactive power (both leading and lagging)? This is a complex question for electricity regulators who are responsible for either electricity measurement or electricity rate setting, as, to date, a standardized definition of VA has not existed within the Canadian electricity market. In addition, because there are multiple methods in place for responding to varying load conditions (demand response characteristics), greater disparity can be further created with regard to the values of the legal unit of measurement referred to as VA demand.

With respect to the determination of legal units of measure outside of an approved meter, the issue is again one of consistency, standardization, and formal prescription. Measurement Canada is aware that microprocessor based technologies (that are not approved electricity meters) are being used to determine legal units of measure (time related electricity demand) for electricity consumption and invoicing purposes. However, as the legislation does not currently recognize or control such methods or technologies, the potential exists for inconsistencies in measurement conclusions and data integrity.

Outcomes

The joint working group recommendations will result in a defined unit of VA (VA-h) for trade measurement purposes that is consistent across the country regardless of where the transaction takes place, who the electricity seller is, or which type of meter is utilized. Additionally, the formal recognition of the potential for establishing legal units of measurement for time-related electricity demand outside an approved meter, should benefit both consumers and industry stakeholders. Appropriate prescription will ensure that electricity demand determined in this manner, will meet the accuracy and integrity standards currently applied to the establishment of these same units in approved electricity meters. Implementation of the recommendations from both joint working groups will serve to improve the accuracy of electricity measurement in Canada and ensure that the legal metrology fundamentals utilized in the electricity sector, align with those found in other fields of trade measurement such as natural gas, liquid volume and mass.

Impact on Electricity Utilities and Provincial Rate Regulators

The majority of concerns identified during consultations on the recommendations, pertained not to technical recommendations but to implementation issues. MC will mitigate many of these concerns through the implementation of transition periods as well as grand fathering clauses for existing meters in service. One of the other common concerns expressed during consultations, related to the potential impact on utility revenue. The establishment of a standardized definition for a unit of measurement may have an impact on some utilities, should they currently be using a methodology which differs from the proposed standard definition. This could lead to changes relative to historical electricity consumption levels and in turn, revenue increases or decreases if utilities do not modify their tariff and rate structures.

Many utilities raised concerns against the further standardization of legal units of measure on the basis of the perceived difficulty they have in achieving adjustments to their established rates and tariff structures. From a legal metrology perspective, Measurement Canada cannot support a position which appears to suggest that the standard of measurement should be adjusted to reflect a rate of charge or revenue. The Agency's position is that the rate of charge should be adjusted to achieve a certain revenue from a specific standard of measurement. Recognizing that it is the standardization of the measurement unit and what it represents, which ultimately provides for national uniformity and fairness in trade measurement.

Some consultation feedback with regard to the implementation of the joint working group recommendations, suggested that implementation should be trade level specific with greater implementation flexibility being provided to the wholesale level of trade. The rationale provided being that the wholesale trade level typically involves parties with more knowledge of the trade measurement transaction and the units being used to establish the basis of a charge for the electricity supplied.

Although, the JWG did not have the mandate nor the expertise to pursue customer class definition parameters for the purposes of statutory exemption, Measurement Canada is willing to give further consideration to this suggestion. In this regard, future consultations with applicable provincial and territorial regulatory authorities are anticipated to further explore the feasibility of the suggested approach.

For additional information regarding this information bulletin, please contact:

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