

**PROCEDURE MANUAL FOR THE POTOMAC  
EDISON COMPANY**

**Determination of Supplier  
Total Hourly Energy  
Obligation**

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## Introduction

This document is intended to provide a comprehensive explanation of the methodology and mechanics Potomac Edison (PE or Company) and Electric Generation Suppliers will apply to calculate and coordinate the information transfer needed to support retail open access associated with Suppliers' energy obligations at PJM. At PJM the counterparty nomenclature is Allegheny Power Systems.

As further explained below, the Company will report to PJM in a timeframe imposed by PJM the Supplier's Total Hourly Energy Obligation (THEO). The THEO will contain hourly interval metered usage for customers with Advanced Meters where available and profiled hourly-usage for customers without such meters. The hourly-usage estimate for non-interval metered customers will be the product of a Usage Factor (UF) and the hourly typical-class usage determined from daily Load Profile data provided by sampling meters on the day of usage. The UF will be calculated with billed usage data available from the immediately-prior billing cycle and the aggregate Load Profile for the corresponding period. This Usage Factor will be recalculated at the closing of each billing cycle. The THEO will include an allocation of Unaccounted for Energy (UFE). The UFE is the difference between the Company zonal load and the sum of the suppliers' daily loads.

PJM will utilize the hourly THEO values reported for each supplier to determine the hourly energy-interchange accounting and reconciliation under the terms of the PJM Operating Agreement, the PJM Open Access Transmission Tariff and PE's Supplier Tariff. The determination of the customer's usage for use in the THEO and the calculation of the THEO are the subject of this manual.

Please see Exhibit A for a simplified sample calculation of Energy Obligation for monthly non-interval metered customers. A discussion of the Company's load profiling methodology is posted on the Company's Supplier website.

## Determination of the Total Hourly Energy Obligation - For Initial Interchange Billing

The Supplier's Primary Total Hourly Energy Obligation (THEO) will be reported to PJM as 24 hourly numbers. Each hourly number will be the sum of the totals in each customer class for those customers served by the supplier. The Total Hourly Energy Obligation is comprised of the following components:

**Primary THEO<sub>daily</sub> = IM + NIM + NM + ZLA; Where**

**IM = Sum[(Interval metered)<sub>p</sub> \* (Loss Factor)<sub>p</sub>], and**

**NIM = Sum[(Non-interval metered)<sub>p</sub> \* (Loss Factor)<sub>p</sub>]**

**NM = Sum [(Non-metered)<sub>p</sub> \* (Loss Factor)<sub>p</sub>]**

**ZLA = Zonal Load Allocation of Unaccounted For Energy**

**p = Profile Group**

### **Interval Metered Data**

The interval metered data will be the sum of the products of the hourly usage recorded by each interval meter in a customer class and that class's loss factor. If, for any reason, an interval meter fails to report hourly data in a given time period, the missing data will be estimated using that customer's historic usage for a similar time period.

### **Non-interval Metered Data**

The non-interval meter data will be the sum of the product of the customer's load-profile usage (CLP) in a customer class for that hour and that class's loss factor.

The hourly CLP will be calculated as follows:

**CLP<sub>k</sub> = (UF)<sub>k</sub> \* (Class-Profile Hourly Usage)<sub>p</sub>**

Where UF = Usage Factor

Where k = customer

### **Usage Factor**

The UF used to estimate a customer's usage for a given hour will be determined as the ratio of the customer's electric use for the immediately-prior billing period to the aggregate hourly Load Profile for the same period.

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The estimated customer hourly usage will be this UF multiplied by the typical class use for that hour as reported by the Load Profile.

If a new customer has no historic or billed usage, an estimated hourly UF of one (1) will be imputed to that customer. All others will have a UF equal to the ratio of the customer's prior total billed consumption to the total typical usage in that class.

**Non- metered Data**

Unmetered service – typically street lighting and/or traffic lights. These customers electric usage is represented by Fixed Hourly Distribution (FHD) profiles. The same profile is used for each day in a given month.

**Zonal Load Allocation for Unaccounted For Energy**

Unaccounted for Energy (UFE) will be determined by comparing the aggregate load of all Certified Suppliers and the Company at the generation level including losses to the PE zone load less non retail load for each respective hour. The difference will then be allocated based on a ratio of each Certified Supplier's load to the total load of the Certified Suppliers and the Company on an hourly basis.

$ZLA_{\text{Hourly}}$  = Zonal Load Allocation calculated hourly

Where

$$UFE_{\text{Hourly}} = (\text{Final Daily Zonal Load}_{\text{Hourly}} - \text{Sum (Daily THEO}_{\text{Hourly}}))$$

$$ZLA_{\text{Hourly}} = UFE_{\text{Hourly}} * (\text{Supplier Daily THEO}_{\text{Hourly}} / \text{Sum (Daily THEOs}_{\text{Hourly}}))$$

## Responsibilities for Coordination

To ensure successful coordination the parties will be responsible as follows:

### **Supplier's Responsibilities**

- The Supplier will schedule its physical energy with PJM following PJM requirements.
- The Supplier, or any third parties acting as agents, contractors, or delegates of the Supplier and in possession of any relevant data, will cooperate with reasonable audit requests by the Company or professional auditing firms acting on the Company's behalf. Such audits are intended to provide the Company with a reasonable confidence in the validity and accuracy of any information that the Company obtains from the Supplier or the third party. The Company shall bear the cost of the audit as well as the Supplier's or third party's time and expense for cooperation with the audit. The scope of the audit and the terms of payment are to be agreed upon by the Company and the Supplier or the third party prior to commencement of the audit.

### **Company's Responsibilities**

- The Company will compute and report daily to PJM the Supplier's THEO in a day-after-the-fact basis. This THEO will constitute the initial estimate of the Supplier's hourly load for its customers served in the PE Zone for the purpose of hourly energy interchange accounting by PJM.
- The Company will report the Supplier's THEO to PJM as in accordance with PJM's Operating Agreements and OATT.
- The Company will not forecast the Supplier's THEO.
- The Company will cooperate with reasonable audit requests by Suppliers or professional auditing firms acting on their behalf. Audits are intended to provide the Supplier with reasonable confidence that the Company is calculating the Supplier's energy obligations in accordance with the user manual. The Supplier shall bear the cost of the audit as well as the Company's time and expense for cooperation with the audit. The scope of the audit and the terms of payment are to be agreed upon by the Company and the Supplier prior to commencement of the audit. Specific customer information (unless released by the customer) and proprietary

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information shall not be provided by the Company. The Company will address audit requests on a first come, first served basis.

- To facilitate the Supplier's calculation and understanding of the Company's reports, the Company will make available via its website (<http://www.firstenergycorp.com/supplierservices>), supporting information and sample calculations illustrating the Company's methodology applied in the determination of the Supplier's obligation.

## Energy Reconciliation and PJM Settlement

As mentioned above, the Primary THEO will be the basis for the initial hourly energy interchange accounting by PJM which shall result in a monthly market-energy interchange bill. Subsequently, the Company will calculate adjustments to the Primary THEO based upon additional, more accurate customer meter data that the Company typically obtains by the end of the full meter-reading cycle.

Additionally, these adjustments will account for errors including but not limited to, those due to failed meter data transmission, the inherent inaccuracies of using a one-month lagging UF for non-interval meters, and additional errors that may result from the timing differences between the actual reading of the meters and closing of the billing cycle. These errors may occur during the first and last few days of a Supplier contract with a customer, since the initial obligation is calculated upon the number of customers in a Supplier's list of customers as of the last billing date; while the Supplier's final obligation is calculated for the period between meter readings. The Company will endeavor to read meters on the estimated date offered to the Supplier and close the billing cycle as soon as practicable following the meter readings.

A Secondary THEO will be calculated similarly to the Primary THEO where estimated usage is now replaced with actual metered usage where available. The Company will determine the hourly differences between the Primary THEO and the Secondary THEO for each Supplier and report those hourly MWh values to PJM. These adjustments will be provided to PJM and the Supplier within two months following the month subject to adjustment. This will constitute a monthly energy reconciliation process.

For customers with non-interval meters the Secondary THEO will employ a usage factor based on the customer's current bill period. (Recall that the Primary THEO used the usage factor based on the customer's previous bill period.)

Secondary THEO calculation:

**Secondary THEO = IM+NIM+NM+ZLA;**

**Where**

**IM= Sum[(Interval metered)<sub>p</sub> \* (Loss Factor)<sub>p</sub>], and**

**NIM= Sum[(Non-interval metered)<sub>p</sub>\*(Loss Factor)<sub>p</sub>]**



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$$NM = \text{Sum} [(Non-metered)_p * (Loss Factor)_p]$$

**ZLA = Zonal Load Allocation of Unaccounted for Energy**

$$\text{Non-interval metered} = \text{Sum} [(UF)_p * (\text{Hourly Class Load Profile Usage})_p * LF_p]$$

Where UF = Usage Factor

Where LF = loss factor

$$UF_p = (\text{Hourly Class Load Profile Usage for Customer bill period})_p / (\text{Customer bill period Usage})_p$$

$ZLA_{\text{Hourly}}$  = Zonal Load Allocation calculated hourly

Where

$$UFE_{\text{Hourly}} = (\text{Final Monthly Zonal Load}_{\text{Hourly}} - \text{Sum} (\text{Secondary THEO}_{\text{Hourly}}))$$

$$ZLA_{\text{Hourly}} = UFE_{\text{Hourly}} * (\text{Supplier Secondary THEO}_{\text{Hourly}} / \text{Sum}(\text{Secondary THEO}_{\text{Hourly}}))$$

The Hourly Adjustment to the monthly bill is: Primary THEO – Secondary THEO.

### “Third-Tier” Reconciliation

In addition to the adjustments mentioned above, PJM’s monthly bills to the Company and Supplier or scheduling coordinator shall be subject to adjustment for any errors in arithmetic, computation, meter readings or other errors as agreed upon by the Company and the Supplier or Scheduling Coordinator. Third Tier Reconciliation shall be accomplished by PE calculating associated PJM line items using a Third Tier THEO in accordance with PJM Reconciliation Processes as provided for in the PJM Operating Agreement and PJM OATT. Disputes shall be resolved through the PJM Dispute Resolution process.

### Behind the Meter Generation

For those customers that have elected to install generation and net the output of that generation against their delivered load obligations, a bidirectional meter is installed to measure (1) the energy delivered or consumed by the customer and (2) the energy received or injected to the distribution system.

For these customers, only the register of the meter capturing the energy delivered to the customer is used in the calculations referenced in this manual. The meter register capturing received energy to the distribution system is not netted against these values.

Sample Calculation:

**Hourly Obligation Calculation:**

Determine the Total Hourly Energy Obligation to be reported to PJM for a Supplier serving three (3) customers in PE's RS No Heat Profile Group during the hour ending at 10 on March 15, 2012.

**Available data from Prior (February) Bill**

Customer	Bill Dates	Billed Usage	Class Usage	Days
#1	2/3~3/6	2477 kWh	1717 kWh	32
#2	2/4~3/5	1100 kWh	1620 kWh	30
#3	2/3~3/7	1429 kWh	1756 kWh	33

The Class Profile Usage for the 10<sup>th</sup> hour of March 15<sup>th</sup> was **2.3 kWh**.

**Usage Factor and Hourly Obligation:**

Customer	Usage Factor	Class Profile usage	Obligation
#1	1.44	2.3 kWh	3.312
#2	0.68	2.3 kWh	1.564
#3	0.81	2.3 kWh	1.863
Total	2.94		6.739 kWh

The Supplier's Total Hourly Energy Obligation reported to PJM for Class RS on the 16<sup>th</sup> for hour 10 on the 15<sup>th</sup> is:

$6.739 \text{ kWh} * 1.0718 = 7.223 \text{ kWh}$  Where 1.0718 = customer class loss factor

To illustrate the calculation of ZLA for the same hour, assume the following:

Zonal Load Hour 10 on March 15<sup>th</sup>: 2000 MWh

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Total Primary THEO Hour 10 on March 15<sup>th</sup>: 1998 MWh

$UFE_{3/15, HR10} = 2000MWh - 1980MWh = 20 \text{ MW or } 2000 \text{ kWh}$

$ZLA_{3/15, HR10} = 20000 \text{ kWh} * (7.223 \text{ kWh} / 1980 \text{ MWh}) = .00730 \text{ kWh}$

Final Primary THEO = 7.223 kWh + .00730 kWh = 7.296 kWh

Note: These calculations would be repeated for each class in which the Supplier serves customers.

**Hourly Total:**

The hourly total will be the sum of the hourly interval metered values upgraded for losses plus the hourly totals of the non-interval metered values upgraded for losses calculated following the methodology described above.

**Monthly Adjustments/Reconciliation:**

Following the completion of the monthly meter-read cycles applicable to that month, the Company will recalculate the Usage Factors for the period previously estimated.

Hence, based on metered usage corresponding to the month of March, the adjustment for hour 10 on March 15<sup>th</sup> will be calculated as follows:

**New/Actual data available for the Month of March**

Customer	Bill Dates	New Usage	Class Usage	Days
#1	3/7~4/7	2315 kWh	2021	32
#2	3/6~4/ 4	1200 kWh	1894	30
#3	3/8~4/9	1630 kWh	2084	33

The Class Profile Usage for the 10<sup>th</sup> hour of March 15<sup>th</sup> continues to be **2.3 kWh**.

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**Usage Factor and Hourly Obligation:**

Customer	Usage Factor	Class Profile usage	Obligation
#1	1.15	2.3 kWh	2.645
#2	0.63	2.3 kWh	1.449
#3	0.78	2.3 kWh	1.794
Total	2.56		5.888 kWh

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Total Hourly Energy Obligation for Class RS = 5.888 kWh\* 1.0718 = 6.311 kWh

where 1.0718 = customer class loss factor

To illustrate the calculation of ZLA for the same hour, assume the following:

Zonal Load Hour 10 on March 15<sup>th</sup>: 2000 MWh

Total Secondary THEO Hour 10 on March 15<sup>th</sup>: 1998 MWh

$UFE_{3/15, HR10} = 2000\text{MWh} - 1998\text{MWh} = 2 \text{ MW or } 2000 \text{ kWh}$

$ZLA_{3/15, HR10} = 2000 \text{ kWh} * (6.311 \text{ kWh} / 1998 \text{ MWh}) = .00635 \text{ kWh}$

Final Secondary THEO = 6.311 kWh + .00635 kWh = 6.317 kWh

The Company will submit to PJM a calendar-month adjustment file containing adjustment amounts for each hour on that calendar month. The adjustment amounts will be reported on kWh units. For this example the adjustment amount for hour 10<sup>th</sup> on March 15<sup>th</sup> will be (7.296 kWh - 6.317 kWh) = 0.979 kWh.