Pepco Holdings, Inc

October 15, 2010

Supplier Operating Manual

Procedures for Determining Peak Load Contribution For Capacity and Transmission Service And Hourly Energy Obligations

TABLE OF CONTENTS

I INTRODUCTION

This Manual describes the procedures that Pepco Holdings, Inc. (PHI), which is represented by the individual brands of Pepco, Atlantic City Electric and Delmarva Power (collectively, "The Company") will use to derive certain load and energy accounting information associated with implementing retail access. Its purpose is to facilitate understanding of data coordination requirements established by PJM Interconnection, L.L.C. (PJM) to account for electricity transactions in a competitive market environment.

The three key information items addressed include *Supplier Capacity Peak Load Contribution (Supplier Capacity PLC), Supplier Network Service Peak Load Contribution (Supplier Transmission PLC),* and *Supplier Hourly Energy Obligation (Supplier HEO).* The first two items, Supplier Capacity Peak Load Contribution and Supplier Network Service Peak Load Contribution, are necessary for allocating capacity and network service obligations for entities serving load within the PJM Control Area. The last item, Supplier Hourly Energy Obligation, is the basis for transaction accounting as part of the PJM Interchange Energy Market settlement system; specifically, to conduct hourly energy-interchange billing and subsequent billing reconciliation.

The Company will use Lodestar's Profiling and Settlement System (LPSS)©, to calculate the Capacity PLC, Transmission PLC, and Supplier HEO, as well as all associated data management functions. Data will be submitted electronically to PJM. Factors used for their derivation will be made available to the Suppliers via the specific brand web site (www.atlanticcityelectric.com, www.delmarva.com, www.pepco.com).

This manual consists of three major sections, each outlining the methods used for calculating Supplier Capacity PLC, Supplier Network Service PLC, and Supplier HEO, respectively. These methods, as implemented by the LPSS©, reflect the reporting responsibilities outlined in the following documents:

- ACE/DPL/Pepco *Third Party Supplier Agreements*

- *PJM Reliability Assurance Agreement*
  This agreement is intended to ensure the adequacy of electric capacity resources to meet peak load and emergency response requirements in the PJM Control Area.

- *PJM Open Access Transmission Tariff* (OATT)
  The OATT provides rates, terms and conditions for transmission services provided through transmission facilities in the PJM Control Area.

- *PJM Manuals.*
  The PJM manuals are a set of instructions and guidelines for "the operation, planning, and accounting requirements of the PJM Control Area and the PJM Interchange Energy Market."

Each section presents sample calculations showing the step-by-step derivation of the processes using sample data. For the *Supplier Capacity PLC* and *Supplier Transmission PLC* sections, the sample calculations are based on a zone for a Supplier with three customers. For the *Supplier HEO*, the sample calculations are based on an energy settlement for two Suppliers that each serve three customers (Suppliers A and B).

Appendix 1 describes how the load profiles are developed, as well as the specific load profiling method used by the Company to support capacity and energy settlement processes. Appendix 2 documents the development of Customer Coincident Factors. Appendix 3 is a glossary of PJM and LPSS® terms.

Note that the information provided in this Manual reflects the Company's understanding of PJM's prevailing procedures, and may be revised occasionally to reflect changes to Company operations, PJM committee actions, and regulatory mandates. See any of the brand-specific web sites (www.atlanticcityelectric.com, www.delmarva.com, www.pepco.com) for updates to this Manual.

II SUPPLIER CAPACITY PEAK LOAD CONTRIBUTION

1 Introduction

As required by the PJM Reliability Assurance Agreement (RAA), the PJM Office of the Interconnection (PJM OI) calculates the PJM zonal capacity obligation. The zonal capacity obligation serves as the baseline level of installed capacity resources sufficient to meet the forecasted load and reserve margin, accounting for unit unavailability due to outages (forced and maintenance) and load deviations. The PJM installed capacity obligation is assessed to suppliers based on their peak load contribution (Capacity Peak Load Contribution or Capacity PLC). The PJM IO assigns each Local Distribution Company (LDC) a share of the overall PJM peak load contribution. Each Local Distribution Company is responsible for calculating and reporting the Capacity PLC for each supplier serving load in their service territory. The sum of the customer's Capacity PLC will equal the LDC's share of the overall PJM Peak Load Contribution.

In accordance with the PJM RAA and PJM rules and procedures, the Company will calculate a Peak Load Contribution "ticket" for each customer on an annual basis. The PLC value for a customer represents their share of the LDC's peak load contribution. The customer's share is calculated based on the customer's average unrestricted load coincident with the five highest PJM unrestricted peak loads. The five PJM peak hours (occurring on separate days) are provided by PJM. The customer PLC will be updated in accordance with PJM rules and procedures, with supporting data posted on the Company's Web site. The Company will calculate and report to PJM the Supplier Capacity Peak Load Contribution (Supplier Capacity PLC), which is the sum of all customers PLC for each supplier.

This section describes the methods and calculations used to derive the customer and Supplier Capacity PLC. The sample calculations are presented.

2 Annual Customer Capacity Peak Load Contribution

The derivation of customer Capacity Peak Load Contributions (Capacity PLC or CPLC) consists of two procedures:

- Determining the preliminary customer peak loads.
- Reconciling customer peak loads to the Company zonal peak load.

2.1 Determining Preliminary Customer Peak Loads

For this procedure, the company will determine hourly peak loads for each customer according to the customers metering type and profile class. Since the sum of the customers' estimated peak loads, can deviate from the company's allocated peak load share within the PJM control area, they are referred to as *preliminary capacity peak loads.*

The method used to determine a customer's preliminary peak load depends on the type of metering equipment installed at the customer's location that is used for billing. Customer billing data are classified in one of three ways:

- interval-metered customers who have hourly metered usage data,
- non-interval metered customers who only have monthly energy readings, and
- non-interval metered customers who have maximum demand readings and monthly energy readings.

For the interval-metered customers, actual demand readings coincident with the PJM peak hours are used to determine the customer's preliminary peak load. For the non-interval-metered customers with monthly energy readings only, profile estimates by customer classes are developed using load research samples for which hourly data are available. For the customers who have demand data, coincidence factors are calculated for the corresponding hours of the PJM peaks.

The determination of the customer peak load depends on the customer's assigned profile class. A profile class is a grouping of customers with a similar energy usage pattern. Note that an interval-meter customer is not grouped with other customers because of the availability of actual hourly data. Profile classes for non-interval-meter customers are established according to the Company's tariff rate classes, billing data, and available load research data.

The derivation of the preliminary customer peak loads occurs in several steps. These steps are as follows:

1. For each customer, retrieve five hourly loads for the hours corresponding to the five highest peak demands for the PJM control area. (For interval-meter customers, the loads are the customer's hourly-metered loads; for non-interval meter customers with no demand data, the loads are estimated using the customer's actual consumption and hourly profile class loads; and for non-interval meter customer with demand data, the loads are estimated using the customer maximum demand for the summer billing cycles and the coincident factors for the five PJM peaks.)

2. Apply the appropriate loss factor to each demand. Sum the customers' coincident demands. This is the total un-reconciled load.

3. After adding back any load reductions stemming from Active Load Management initiatives, reconcile the sum of the customers' loads to the unrestricted, metered zonal load for each of the five PJM peak times. The difference between each unrestricted, metered zonal peak and the sum of the estimated customers' demands coincident with the zonal peak is called unaccounted for energy (UFE). UFE is assigned to customers based on the zone and whether or not the customer is interval metered.[1]

[1] For ACE and DPL, interval metered accounts are not assigned any UFE. For Pepco, interval metered customers are assigned five percent of the UFE based on a load weighted share.

4. Calculate the average of the reconciled demands for each customer.

5. Calculate the reconciliation factor (RF). The RF is the target peak, provided by PJM, divided by the sum the average of the reconciled demands.

6. Calculate the Final Capacity Peak Load for each customer by multiplying the customer's average of the reconciled demands by the reconciliation factor.

The framework of calculation steps is presented below.

Hourly Metered Customers – Calculation of the Preliminary Demands

Data requirements

1. Hourly demands for each customer coincident with the highest five PJM peak hours (KW_i).
2. Loss adjustment factors by rate class (loss_factor).
3. Reduction values for any customer participating in an Active Load Management Program (ALM_i).

Processes

1. Obtain the five hourly customer metered loads coincident with the five PJM peaks for each hourly-metered customer.[2]
2. Add any hourly load reduction amounts (ALM) that correspond to the five PJM peaks for each applicable hourly-metered customer.
3. Apply the loss adjustment factors by rate level.[3]

$$CPLC_{\mathrm{Pr}elim_i} n = \left(KW_i\right) \times \left(loss\_factor\right)$$

Where n = corresponds to the five PJM peak hours and *i* is the customer.

Example Calculation for an Hourly Metered Customer, loss factor = 1.02

Rank	Day/hour	KW	Prel KW with Losses - $CPLC_{Prelim}$
1	6/09 17:00	124	126.48
2	6/10 17:00	131	133.62
3	7/17 17:00	90	91.80
4	7/18 17:00	125	127.50
5	7/21 17:00	126	128.52

[2] If a customer is missing data for the highest five PJM peak hours, proxy data are substituted for the customer. If proxy data are not available, the PLC will be based on the PJM peak hours where data are available.

[3] Loss adjustment factors are available on the Company websites.

Profile Customers with No Demand Data – Calculation of the Preliminary Demands

Data requirements

1. Hourly demands (KWP_i) for each profile class coincident with the five PJM peak hours.
2. Loss adjustment factors ($loss\_factor^P$) by profile class.
3. Billing energy for the customer (SUM_KWH_i) that covers the five PJM peak days and corresponding usage for class profile (SUM_KWH^P).

Processes

1. Obtain the customer's billing energy that includes the five PJM peak dates.
2. Obtain the five loads coincident with the five PJM peak for each profile class.
3. Calculate the profile class energy for the same time period as the customer's billing energy. (This is done for every customer.)
4. Apply the ratio of the customer's billing energy to the profile usage to the profile coincident peaks.
5. Apply the loss factors by profile class.

$$CPLC_{\mathrm{Pr}e\lim i}n = \left(KWP_i\right)\times\left(\frac{SUM\_KWH_i}{SUM\_KWH^P}\right)\times loss\_factor^{\,p}$$

Where i = customer, p = profile class, and n = five PJM peak hours.

Example Calculation for a Profile Customer

Hourly Demands for the Profile Class

Rank	*Day*	*KWP*
1	6/09 17:00	2.48
2	6/10 17:00	2.43
3	7/17 17:00	1.90
4	7/18 17:00	2.27
5	7/21 17:00	2.34
Loss factor = 1.02		

Start Meter Read Date	Stop Meter Read Date	Customer's Summer Energy	Profile Class Energy for the Same Time Period
05/16/2008 – 00:00	6/11/2008 – 24:00	1060	627.9
06/12/2008 – 00:00	07/13/2008 – 24:00	1746	881.4
07/14/2008 – 00:00	08/11/2008 – 24:00	2104	897.6

Un-reconciled peaks for Profile Customer, with No Demand Data:

$CPLC_{1Prelim} = 2.48 * 1060 * 1.02 / 627.9 = 4.27$

$CPLC_{2Prelim} = 2.43 * 1060 * 1.02 / 627.9 = 4.18$

$CPLC_{3Prelim} = 1.90 * 2104 * 1.02 / 897.6 = 4.54$

$CPLC_{4Prelim} = 2.27 * 2104 * 1.02 / 897.6 = 5.43$

$CPLC_{5Prelim} = 2.34 * 2104 * 1.02 / 897.6 = 5.59$

Profile Customer with Demand Meters – Calculation of the Preliminary Demands

Data requirements

1. The maximum billing demand(s) (Billing_KW$_i$) for the billing period(s) that cover the PJM peak dates.
2. Corresponding billing energy for the customer (SUM_KWH$_i$) and the number of days during the billing month(s) for the customer (DAYS^i) that cover the PJM peaks.
3. Loss adjustment factors by profile class (loss_factor^P).

Process

1. Obtain for each customer, the maximum billing demand (Billing_KW$_i$), the billing energy (KWH^i), and the number of days (DAYS^i) for the billing months that cover the PJM peak dates.
2. Calculate the customers load factor based on the maximum billing demand for the customer and the billing energy covering the PJM peaks. This may include more than one billing period.

$$Load\_Factor_i = (\mathrm{KWH_i} / DAY_i) / (Billing\_KW_i \times 24)$$

3. Calculate the coincident factor using the customer's load factor based on their billing demand, where:[4]

$$Coinc\_factor_i = \left[1 - \exp^{\alpha * Load\_factor_i}\right]$$

4. Calculate the preliminary coincident demands using the coincident factor that corresponds to the PJM peak and the customer's summer monthly billing demand that covers the respective PJM peak.
5. Apply the loss adjustment factors.

$$CPLC_{\mathrm{Pr}e\lim n} \equiv (Billing\_KW_i \times Coinc\_factor_i) \times (loss\_factor^{\mathrm{P}})$$

Where n = five PJM peaks, i = customer and p is the profile class.

Example Calculation for Profile Customers with Demand Meters

Bill Period 1: 06/03 – 07/02; Max_KW = 55.1; SUM_KWH = 16,000; DAYS = 30
Bill Period 2:: 07/03 – 08/01; Max_KW = 63.4; SUM_KWH = 14,610; DAYS = 30

Example Calculations for Bill Period 1 – Peak 1

$$Load\_Fac_{\mathrm{i}} = (16{,}000 / 55.1) / (30x24) = 0.4033$$

[4] Refer to Appendix 2 for the development of coincidence factors.

$$Coinc\_factor_i = \left[1 - \exp^{-2.85605 \times 0.4033}\right] = 0.6840$$

$$CPLC_{Prelim_i} = (55.1 \times 0.6840) \times 1.073 = 40.44$$

Example Calculations for Bill Period 2 – Peak 3

$$Load\_Fac_i = (14{,}610 / 63.4) / (30x24) = 0.320$$

$$Coinc\_factor_i = \left[1 - \exp^{-2.70931X\,0.320}\right] = 0.5800$$

$$CPLC_{Prelim_i} = (55.1 \times 0.6650) \times 1.073 = 39.44$$

Rank	*Day/Hour*	*Alpha Value*	*Coinc_factor*	*$CPLC_{prelimi}$*
1	6/09 17:00	-2.85605	0.684	40.44
2	6/10 17:00	-3.02065	0.704	41.63
3	7/17 17:00	-2.70931	0.580	39.44
4	7/18 17:00	-2.81494	0.594	40.40
5	7/21 17:00	-2.71696	0.581	39.52

Loss Factor = 1.073

$CPLC_{1Prelim}$ = *0.684*55.1*1.073= 40.44*
$CPLC_{2Prelim}$ = *0.704*55.1* 1.073= 41.63*
$CPLC_{3relim}$ = *0.580*63.4*1.073= 39.44*
$CPLC_{4relim}$ = *0.594*63.4*1.073= 40.40*
$CPLC_{5relim}$ = *0.581*63.4*1.073= 39.52*

2.2 Reconciling Preliminary Peak Loads to the Company Zonal Peak and to the Company Zonal Capacity Peak Allocation

This section describes the process of scaling each customer's preliminary peak loads, derived in the previous section, to the Company zonal peak and then to the Company zonal capacity peak allocation which was set by PJM. The result is a *final Capacity Peak Load Contribution* for each customer in the zone. The process consists of steps described below.

Data requirements

1 The Company's total, unrestricted zonal load for the five PJM peak hours.

2 The Company's zonal share of the PJM peak allocation ($CPLC_{PHI\ zone}$). This value will be provided by PJM. Assume $CPLC_{PHI\ zone}$ = 179.10 for this example.

3 Preliminary unrestricted hourly loads $CPLCi_{Prelim}$ for each customer from the steps above.

Process

1. Determine the sum of all customers' preliminary hourly loads (SUM_CPLCi_{Prelim}) for each of the five PJM peaks (includes any ALM to be added back; for this example, assume that the interval customer has 40 kw of ALM on the 7/17-17:00 peak. The adjusted hourly load with ALM would be 91.80 + 40 = 131.80).
2. Calculate the unaccounted for energy (UFE). This is the zonal demand minus the sum of the customers' preliminary peaks.

3. Allocate the UFE to each of the customers' $CPLC_{prelim}$ to determine the reconciled customer load ($CPLC_{reconi}$) for each of the five PJM peaks.

Steps 1 through 3 are illustrated below.

Type of Customer	*6/09 - 17:00*	*6/10 – 17:00*	*7/17 – 17:00*	*7/18 – 17:00*	*7/21 – 17:00*
Interval	126.48	133.62	91.80 + 40	127.50	128.52
Profile-no demand	4.27	4.18	4.54	5.43	5.59
Profile-with demand	40.44	41.63	39.44	40.40	39.52
Sum of preliminary demands (SUM_CPLCi_{Prelim})	171.19	179.43	175.78	173.33	173.63
Zonal Load:	**173.60**	**177.9**	**177.2**	**171.1**	**175.2**
UFE	2.41	-1.53	1.42	-2.23	1.57
Allocation of UFE & Final Reconciled Demands-($CPLC_{recon}$)					
Interval	126.48	133.62	131.8	127.50	128.52
Profile-no demand	4.50	4.04	4.69	5.17	5.78
Profile-with demand	42.62	40.24	40.71	38.43	40.9
Sum of Reconciled Demands:	**173.60**	**177.9**	**177.2**	**171.1**	**175.2**

4. Calculate the average the customers' reconciled loads.

Type of Customer	*6/09 - 17:00*	*6/10 – 17:00*	*7/17 – 17:00*	*7/18 – 17:00*	*7/21 – 17:00*	*Average of Five Demands*
Interval	126.48	133.62	131.80	127.50	128.52	129.58
Profile-no demand	4.50	4.03	4.69	5.17	5.78	4.84
Profile-with demand	42.62	40.24	40.71	38.43	40.90	40.58
Sum of the Average of the Five demands						**174.99**

5. Calculate the reconciliation factor (RF) by dividing the Company's zonal share of the PJM peak allocation by the sum of the average customers' reconciled peaks.

RF = 179.10 / 174.99 = 1.023

6. Multiply the reconciliation factor by each customer's preliminary CPLC to determine each customer's final share of the total PJM zonal obligation $CPLC_{Final}$.

$$CPLC_{Final_i} = RF \times CPLC_{\Pr elim_i}$$

Where i = customer.

Example Showing Customers Share of the PJM Peak Allocation

Customer Class	$PLC_{1Prelim}$	*Reconciliation Factor*	PLC_{Final}
Interval Metered	129.58	1.023487	132.62
Profile – no Demand	4.84	1.023487	4.95
Profile with Demand	40.58	1.023487	41.53
Total:	**174.99**		**179.10**

2.3 **New Customers** (New Service Point) or Service Point without Peak Period Usage (Service Point Inactive)

A default value using class average data will be assigned until actual summer peak usage information for the customer becomes available and an actual CPLC is calculated for the following year. The profile class default values are updated annually and posted on the Supplier Support website.

2.4 **New Customers** (Existing Service Point)

Since the actual CPLC is calculated based on the energy consumed at a given Service Point during the previous peak period, the CPLC is inherited by the new customer. The CPLC value may be smaller or larger than the expected future calculated value but remains with the Service Point until actual summer peak usage information for the customer becomes available and an actual CPLC is calculated for the following year.

3 Suppliers' Capacity Peak Load Contribution

The daily Supplier Capacity Peak Load Contribution (Supplier Capacity PLC) is the sum of the all customers' Final Capacity PLCs served by each Supplier. For example, assume that Supplier A serves the first two customers in the example above. Then Supplier A's Capacity PLC would be 137.57 KW (sum of Final Capacity PLC of 132.62 KW and 4.95 KW).

The reporting of Supplier Capacity PLC must occur no later than 36 hours in advance of the operating day, or as specified by PJM guidelines. The Company will submit the Supplier Capacity PLCs to PJM in accordance with PJM's published submission guidelines. In the event that the Company is unable to submit Capacity PLC data according to the allowable PJM

guidelines for a given day, the Company assumes that PJM will use the most recent values available (those previously submitted by the Company).

4 Information Coordination Responsibilities

4.1 Supplier

The Supplier will schedule capacity resources with PJM in accordance with PJM requirements.

4.2 PHI

The Company will compute and report to PJM the Supplier's Capacity Peak Load Contribution on a timetable defined by PJM.

The Company will cooperate with reasonable audit requests by Suppliers. The Supplier shall bear the cost of 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. The Company will address audit requests on a first come, first served basis.

The supplier or scheduling coordinator shall be subject to Capacity Peak Load Contribution adjustments for any errors in arithmetic, computation, or other errors. .Any adjustments to a supplier's Capacity Peak Load responsibilities will be done as supported by PJM and in accordance with PJM guidelines. Disputes shall be resolved through the PJM Dispute Resolution process.

III SUPPLIER NETWORK SERVICE PEAK LOAD CONTRIBUTION

1 Introduction

A Network Service Peak Load Contribution (Transmission PLC) is calculated for each customer in the Company zone. Under the Open Access Transmission Tariff (OATT) submitted to FERC on September 24, 1998, the Transmission PLC is based on the demand at the time of the Company's metered zone peak load during the twelve months ended October 31 of the prior calendar year.

In accordance with the PJM rules and procedures, the Company will calculate a Transmission PLC "ticket" for each customer on an annual basis. The Transmission PLC value for a customer represents the customer's average load ratio share of the Zone's metered peak loads. The Transmission PLC value is determined from (1) the customer's load coincident with the five highest metered peak loads of the Zone, and (2) the metered peak load of the Zone. The customer Transmission PLC will be updated in accordance with PJM rules and procedures, with supporting data posted on the Company's web site. The Company will also calculate and report to PJM the Supplier Network Service Peak Load Contribution (Supplier Transmission PLC), which is the sum of customers' Transmission PLCs for each supplier.

This section describes the methods and calculations used to derive the customer and Supplier Network PLCs. The sample calculations are presented.

2 Annual Customer Network Service Peak Load Contribution

The derivation of customer Network Service Peak Load Contributions (Transmission PLC or TPLC) consists of two procedures:

- Determining the preliminary customer transmission peak loads.
- Reconciling customer transmission peak loads to the Company zonal peak loads and to the Company's Network Service Peak as determined by PJM.

2.1 Determining Preliminary Customer Network Service Peak Loads

For this procedure, the Company will derive hourly estimated transmission peak loads for each customer according to the customers metering type and profile class. Since the sum of the customers' estimated transmission peak loads can deviate from the Company's network zonal peak load, they are referred to as *preliminary transmission peak loads.*

The method used to estimate a customer's preliminary transmission peak load depends on the type of metering equipment used in collecting customer billing data. Customer billing data can be classified in one of three ways:

- interval-metered customers who have hourly metered usage data,
- non-interval metered customers who only have monthly energy readings, and
- non-interval metered customers who have maximum demand readings and monthly energy readings.

For the interval-metered customers, actual demand readings coincident with the zonal (ACE, DPL or Pepco) peak hours are used to determine the customer's preliminary peak load. For the non-interval-metered customers with monthly energy readings only, profile estimates by customer classes are developed using load research samples for which hourly data are available. For the customers who have demand data, coincidence factors are calculated for the corresponding hours of the zonal peaks.

The determination of the customer peak load depends on the customer's assigned profile class. A profile class is a grouping of customers with a similar energy usage pattern. Note that an interval-meter customer is not grouped with other customers because of the availability of actual hourly data. Profile classes for non-interval-meter customers are established according to the Company's tariff rate classes, billing data, and available load research data.

The derivation of the preliminary customer peak loads occurs in several steps. These steps are as follows:

1 For each customer, retrieve five hourly loads for the hours corresponding to the five highest peak demands for the zone – ACE, DPL or Pepco. (For interval-meter customers, the loads are the customer's hourly-metered loads; for non-interval meter customers with no demand data, the loads are estimated using the hourly profile class loads; and for non-interval meter customer with demand data, the loads are estimated using the customer maximum demand for the summer billing cycles and the coincident factors for the five zonal peaks.)

2 Apply the appropriate loss factor to each demand. Sum the customers' coincident demands. This is the total un-reconciled load.

3 Reconcile the sum of the customers' loads to the metered zonal load for each of the five zonal peak times. The difference between the metered zonal peak and the sum of the estimated customers' demands coincident with the zonal peak is called unaccounted for energy (UFE). UFE is assigned to customers based on the zone and whether or not the customer is interval metered.[5]

4 Calculate the average of the reconciled demands for each customer except wholesale customers. For the wholesale customers, the transmission peak load contribution is the single reconciled demand corresponding to the zonal peak.

[5] For ACE and DPL, interval metered accounts are not assigned any UFE. For Pepco, interval metered customers are assigned five percent of the UFE based on a load weighted share.

5 Calculate the reconciliation factor (RF). The RF is the zonal peak, less the wholesale load divided by the sum the average of the reconciled demands, less wholesale load. The zonal peak is verified by PJM.

6 Calculate the Final Transmission Peak Load for each customer by multiplying the customer's average of the reconciled demands by the reconciliation factor.

The framework of calculation steps is presented below.

Hourly Metered Customers – Calculation of the Preliminary Demands

Data requirements

1 Hourly demands for each customer coincident with the highest five zonal peak hours (KW_i).
2 Loss adjustment factors by rate class (loss_factor).

Processes

1 Obtain the five hourly customer metered loads coincident with the highest five zonal metered peak loads for each hourly-metered customer.[6]
2 Apply the loss adjustment factors by rate level.[7]

$$TPLC_{\Pr elim\,i} = (KW_i) \times (loss\_factor)$$

Where n = five highest zonal peak hours (on separate days).

Example Calculation for an Hourly Metered Customer, loss factor = 1.02

Rank	Day/hour	KW	Prel KW with Losses - $TPLC_{Prelim}$
1	6/09 17:00	124	126.48
2	6/10 17:00	131	133.62
3	7/17 17:00	90	91.80
4	7/18 17:00	125	127.50
5	7/21 17:00	126	128.52

Profile Customers with No Demand Data – Calculation of the Preliminary Demands

Data requirements

1. Hourly demands (KWP_i) for each profile class coincident with the five zonal peak hours.

[6] If a customer is missing data for the highest five peak hours, proxy data are substituted for the customer. If proxy data are not available, the TPLC will be based on the zonal peak hours where data are available.

[7] Loss adjustment factors are available on the Company websites.

2. Loss adjustment factors (loss_factor^{P}) by profile class.
3. Billing energy for the customer (SUM_KWH^{i}) that covers the five zonal peak days and corresponding usage for class profile (SUM_KWH^{P}).

Processes

1. Obtain the customer's billing energy that includes the five zonal peaks.
2. Obtain the five loads coincident with the five zonal peak loads for each profile class.
3. Calculate the profile class energy for the same time period as the customer's billing energy. This is done for every customer.
4. Apply the ratio of the customer's billing energy to the profile usage to the profile coincident peaks.
5. Apply the loss factors by profile class.

$$TPLC_{i\,\mathrm{Prelim}}n = (KWP_i) \times \left(\frac{SUM\_KWH^{i}}{SUM\_KWH^{P}} \right) \times loss\_factor^{p}$$

Where i = customer, p = profile class, and n = five zonal peaks.

Example Calculation for a Profile Customer

Hourly Demands for the Profile Class

Rank	*Day*	*KWP*
1	6/09 17:00	2.48
2	6/10 17:00	2.43
3	7/17 17:00	1.90
4	7/18 17:00	2.27
5	7/21 17:00	2.34
Loss factor 1.02		

Start Meter Read Date	Stop Meter Read Date	Customer's Summer Energy	Profile Class Energy for the Same Time Period
05/16/2008 – 00:00	6/11/2008 – 24:00	1060	627.9
06/12/2008 – 00:00	07/13/2008 – 24:00	1746	881.4
07/14/2008 – 00:00	08/11/2008 – 24:00	2104	897.6

Un-reconciled peaks for Profile Customer, with No Demand Data:

$$TPLC_{1Prelim} = 2.48 * 1060 * 1.02 / 627.9 = 4.27$$
$$TPLC_{2Prelim} = 2.43 * 1060 * 1.02 / 627.9 = 4.18$$
$$TPLC_{3Prelim} = 1.90 * 2104 * 1.02 / 897.6 = 4.54$$
$$TPLC_{4Prelim} = 2.27 * 2104 * 1.02 / 897.6 = 5.43$$
$$TPLC_{5Prelim} = 2.34 * 2104 * 1.02 / 897.6 = 5.59$$

Profile Customer with Demand Meters – Calculation of the Preliminary Demands

Data requirements

1. Customer maximum billing demand(s) (Billing_KW$_i$) for the billing period(s) that cover the zonal peak dates.
2. Corresponding billing energy for the customer (SUM_KWH$_i$) and the number of days during the billing month(s) for the customer ($DAYS^i$) that covers the zonal peaks.
3. Loss adjustment factors by profile class ($loss\_factor^P$).

Process

1. Obtain the maximum billing demand for each customer, the billing energy (KWH^C), and the number of days ($DAYS^i$) for the billing months that include the PJM peak dates.
2. Calculate the customers load factor based on the maximum billing demand for the customer and the billing energy covering the PJM peaks. This may include more than one billing period.

$$Load\_Factor_i = (\mathrm{KWH_i} / DAY^i) / \left(Billing\_KW_i \times 24\right)$$

3. Calculate the coincident factor for the individual customer using the customer's load factor based on their billing demand, where:[8]

$$Coinc\_factor_i = \left[1 - \exp^{\alpha * Load\_factor_i}\right]$$

4. Calculate the coincident demand using the coincident factor that corresponds to the zonal peak and the customer's summer monthly billing demand that covers the respective zonal peak.
5. Apply the loss adjustment factors.

$$TPLC_{\mathrm{Pr}elim^n} \equiv \left(Billing\_KW_i \times Coinc\_factor_i\right) \times \left(loss\_factor^{\mathrm{P}}\right)$$

Where n = five highest zonal peak hours (on separate days) and *i* = customer.

Example Calculation for Profile Customers with Demand Meters

Bill Period 1: 06/03 – 07/02; Max_KW = 55.1; SUM_KWH = 16,000; DAYS = 30
Bill Period 2:: 07/03 – 08/01; Max_KW = 63.4; SUM_KWH = 14,610; DAYS = 30

[8] Refer to Appendix 2 for the development of coincidence factors.

Example Calculations for Bill Period 1 – Peak 1

$$Load\_Fac = (16{,}000/55.1)/(30x24) = 0.4033$$

$$Coinc\_factor_i = \left[1 - \exp^{-2.85605 \times 0.4033}\right] = 0.6840$$

$$TPLC_{Prelim} = (55.1 \times 0.6840) \times 1.073 = 40.44$$

Example Calculations for Bill Period 2 – Peak 3

$$Load\_Fac = (14{,}610/63.4)/(30x24) = 0.320$$

$$Coinc\_factor_i = \left[1 - \exp^{-2.70931X\,0.320}\right] = 0.5800$$

$$TPLC_{Prelim} = (63.4 \times 0.58) \times 1.073 = 39.44$$

Rank	*Day/Hour*	*Alpha Value*	*Coinc_factor*	*$TPLC_{prelimi}$*
1	6/09 17:00	-2.85605	0.684	40.44
2	6/10 17:00	-3.02065	0.704	41.63
3	7/17 17:00	-2.70931	0.580	39.44
4	7/18 17:00	-2.81494	0.594	40.40
5	7/21 17:00	-2.71696	0.581	39.52

Loss Factor = 1.073

$TPLC_{1Prelim}$ = *0.684*55.1*1.073= 40.44*
$TPLC_{2Prelim}$ = *0.704*55.1* 1.073= 41.63*
$TPLC_{3relim}$ = *0.580*63.4*1.073= 39.44*
$TPLC_{4relim}$ = *0.594*63.4*1.073= 40.40*
$TPLC_{5relim}$ = *0.581*63.4*1.073= 39.52*

2.2 Reconciling Preliminary Peak Loads to the Company Zonal Peak and to the Company Zonal Capacity Peak Allocation

This section describes the process of scaling each customer's preliminary peak loads, derived in the previous section, to the Company zonal peak and then to the Company zonal capacity peak allocation which was set by PJM. The result is a *final Peak Load Contribution* for each customer in the zone. The process consists of steps described below.

Data requirements

1. The Company total zonal load for the five peak days.
2. Preliminary hourly loads $TPLCi_{Prelim}$ for each customer from the steps above.

Process

1. Determine the sum of all customers' preliminary hourly loads (SUM_TPLCi_{Prelim}) for each of the five zonal peaks.
2. Calculate the unaccounted for energy (UFE). This is the zonal demand minus the sum of the customers' preliminary peaks.

3. Allocate the UFE to each of the customers' $TPLC_{prelim}$ to determine the reconciled customer load ($TPLC_{irecon}$) for each of the five zonal peaks.

Steps 1 through 3 are illustrated below.

Type of Customer	*6/09 - 17:00*	*6/10 – 17:00*	*7/17 – 17:00*	*7/18 – 17:00*	*7/21 – 17:00*
Interval	126.48	133.62	91.80	127.50	128.52
Profile-no demand	4.27	4.18	4.54	5.43	5.59
Profile-with demand	40.44	41.63	39.44	40.40	39.52
Sum of preliminary demands (SUM_TPLCi_{Prelim})	171.19	179.43	135.78	173.33	173.63
Zonal Load:	**173.60**	**177.9**	**137.2**	**171.1**	**175.2**
UFE	2.41	-1.53	1.42	-2.23	1.57
Allocation of UFE & Final Reconciled Demands-($TPLC_{recon}$)					
Interval	126.48	133.62	91.80	127.50	128.52
Profile-no demand	4.50	4.04	4.69	5.17	5.78
Profile-with demand	42.62	40.24	41.71	38.43	40.90
Sum of Reconciled Demands:	**173.60**	**177.9**	**137.2**	**171.1**	**175.2**

4. Calculate the average the customers' reconciled loads.

Type of Customer	*6/09 - 17:00*	*6/10 – 17:00*	*7/17 – 17:00*	*7/18 – 17:00*	*7/21 – 17:00*	*Average of Five Demands*
Interval	126.48	133.62	91.80	127.50	128.52	121.58
Profile-no demand	4.50	4.04	4.69	5.17	5.78	4.84
Profile-with demand	42.62	40.24	40.71	38.43	40.90	40.58
Sum of the Average of the Five demands						**166.99**

5. Calculate the reconciliation factor (RF) by dividing the Company's zonal peak, as verified by PJM, less wholesale divided by the sum of the average customers' reconciled peaks, less wholesale load.

$$RF = 179.1 / 166.99 = 1.0725$$

6. Multiply the reconciliation factor by each customer's preliminary TPLC to determine each customer's final share of the zonal transmission peak $TPLC_{Final}$.

$$TPLC_{Final_i} = RF \times TPLC_{\Pr elim_i}$$

Where i = customer.

Example Showing Customers Share of the Transmission Zonal Capacity Obligation

Customer Class	$TPLC_{1Prelim}$	*Scaling Factor*	$TPLC_{Final}$
Interval Metered	121.58	1.0725	130.39
Profile – no Demand	4.84	1.0725	5.19
Profile with Demand	40.58	1.0725	43.52
Total:	**166.99**		**179.10**

2.3 **New Customers** (New Service Point) or Service Point without Peak Period Usage (Service Point Inactive)

A default value using class average data will be assigned until actual summer peak usage information for the customer becomes available and an actual TPLC is calculated for the following year. The profile class default values are updated annually and posted on the Company's websites.

2.4 **New Customers** (Existing Service Point)

Since the actual TPLC is calculated based on the energy consumed at a given Service Point during the previous peak period, the TPLC is inherited by the new customer. The TPLC value may be smaller or larger than the expected future calculated value but remains with the Service Point until actual summer peak usage information for the customer becomes available and an actual TPLC is calculated for the following year.

3 Suppliers' Network Service Peak Load Contribution

The Supplier Network Service Peak Load Contribution (Supplier Transmission PLC) is the sum of the Customer TPLCs for that Supplier. For example, given the customers' TPLCs of 130.39 and 5.19 calculated above, the TPLC for the Supplier is 135.58.

Supplier Transmission PLCs will be reported as specified in PJM guidelines. The Company will submit the Supplier Transmission PLCs to PJM 36 hours in advance of the settlement day in accordance with PJM's published submission guidelines. In the event that the Company is unable to submit Supplier Transmission PLC data according to the allowable PJM guidelines for a given day, the Company assumes that PJM will use the most recent values available (those previously submitted by the Company).

4 Information Coordination Responsibilities

4.1 Supplier

The Company will compute and make available the supplier's transmission peak load contribution in accordance with PJM requirements.

4.2 PHI

The Company will compute and report to PJM the Supplier's daily Transmission Peak Load Contribution on a timetable defined by PJM.

The Company will cooperate with reasonable audit requests by Suppliers. The Supplier shall bear the cost of 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. The Company will address audit requests on a first come, first served basis.

The supplier or scheduling coordinator shall be subject to Transmission Peak Load Contribution adjustments for any errors in arithmetic, computation, or other errors. Any adjustments to a supplier's Transmission Peak Load responsibilities will be done as supported by PJM and in accordance with PJM guidelines. Disputes shall be resolved through the PJM Dispute Resolution process.

IV SUPPLIER HOURLY ENERGY OBLIGATION

1 Introduction

PJM determines the price of energy in two separate markets, called the Two-Settlement market. The Two-Settlement market consists of the following two markets:

- Day-ahead Energy Market – The day-ahead energy market is a forward market in which hourly clearing prices are calculated for each hour of the next operating day based on generation offers, demand bids and bilateral transaction schedules submitted into the day-ahead market. The day-ahead market allows participants to purchase and sell energy at binding day-ahead prices.
- Real-time Market or Real-time Balancing Market – The balancing market is the real-time energy market in which hourly clearing prices are determined by the actual system operations security-constrained economic dispatch. Suppliers will pay balancing prices (at the real time price) for any demand that exceeds their day-ahead scheduled quantities and will receive revenues (at the real time price) for demand deviations below their scheduled quantities.

Participation by suppliers in the Day-ahead Energy Market is voluntary and the supplier is responsible for submitting the day-ahead demand forecast for their customers to PJM. Participation in the Real-time market is mandatory and the Company is responsible for calculating each supplier's real-time hourly load responsibility on a day-after basis and reporting the information to PJM.

The Company will also calculate a subsequent supplier's real-time hourly load responsibility or final settlement for the Real-time Market to account for actual usage data obtained following the close of the meter-reading cycles. The difference between the day-after and final settlement, the supplier hourly load adjustment, will be reported to PJM within two months after the month subject to adjustment, or as required by PJM guidelines.

2 Day-ahead Energy Market

As part of PJM's Day-ahead Energy Market, the supplier is responsible for forecasting its customer's Hourly Energy Obligation (HEO) and submitting the data to PJM in accordance with PJM's guidelines, generally by noon on the day before the actual operating day.

3 Real Time Balancing Market

3.1 Day-after Estimates

As part of PJM's hourly energy interchange settlement process, the Company will submit to PJM the hourly energy usage values for each supplier on a "day-after" basis. Each of the hourly usage values is the aggregate usage for the supplier's customers estimated for the previous day using information available to the Company the "day-after." The information used includes actual and historical customer interval meter readings, historical load profile data, actual weather conditions, and the Company Zone Load for the previous day. The aggregate usage for all the suppliers' customers is referred to as the Supplier Hourly Energy Obligation (Supplier HEO), and represents the Supplier's hourly load responsibility for PJM accounting purposes.

PJM will use the Supplier HEO quantities to perform an initial balancing settlement or day-after settlement for the Real-time Market. The Day-after Settlement entails computing the difference between the Supplier HEO results of the Day-ahead Energy Market (submitted by the supplier) and the day-after results (submitted by the Company). PJM determines supplier charges or credits based on the hourly usage differences and hourly Real-time Prices. These charges or credits will be aggregated into a monthly supplier energy-interchange bill.

The derivation of the Suppliers HEO consists of two processes.

- Determine the preliminary Supplier HEO for each hour.
- Reconcile Supplier HEO to the Company Zone Load.

The sample calculations presented in this section are based on a settlement for two suppliers that each serve three customers. The hours ending 1:00 through 5:00 are presented for the settlement day.

3.1.1 Determining Day-After Hourly Energy Obligation for Real-time Market

This section describes the methods and calculations used to derive the Day-after Suppliers Hourly Energy Obligation (HEO) or hourly energy load for the Real-time Energy Market.

The Company will estimate hourly energy obligations for each customer according to the customer's metering type. For the Pepco zone, a proxy-day is selected for the class average profile data. The proxy day process is used for interval metered customers that do not have data for the settlement day. For the ACE and DPL zones, a regression model of hourly load as a function of weather variables is used to develop the hourly loads for the profiled customers. Refer to Appendix 1: Load Profiling Methodology for more information.

The derivation of the estimated hourly energy load occurs in several steps. The steps are as follows:

1. The preliminary hourly Company Zone Load[9] and actual weather data for the previous day and day types are inputs to a proxy day process that selects a historical day from which to retrieve hourly data to use for monthly-read interval-metered customers.

2. Using the weather data for the previous day, calculated the hourly loads for the profiled classes for the ACE and DPL zones. For the Pepco zone, the hourly loads for the profiled classes from the proxy day selected in step one are used for the profiled classes.

3. Historical customer load data are retrieved for the proxy day selected in step one for all monthly-read interval-metered customers. Available actual load data for the day of interest are retrieved for customers with daily-read meters. If data are not available for the day of interest, historical information is used for the daily-read customers.

4. For each profile customer, adjust the class profile load assigned to the customer by the ratio of the customer's usage prior to or covering the settlement period to the profile class usage over the same period.

5. Adjust customer loads by the appropriate loss factor.

6. Adjust the customer loads to ensure that they sum to the hourly Company Zone Load. The adjustment is based on the type of metering equipment used for billing at the customer's location. This adjustment is assigned on a zone-specific basis according to the arrangements agreed-upon by the Company and the suppliers.

7. Sum individual customer loads for each supplier.

8. Obtain the final Company zone load data from PJM.

9. Adjust the preliminary supplier HEO such that the sum of the supplier HEO equals the final zone load published by PJM. The adjustment is based on the supplier's pro rata share of the preliminary zone load total.

Data Requirements

1. Preliminary Hourly Company Zone Load for day of interest.
2. Actual weather data for day of interest.
3. Historical Company zone load and weather data for potential proxy days.
4. Historical interval-metered and profile customer load data.
5. Actual interval-metered data for daily-read interval metered customers.
6. Final Company zone loads from PJM.

Procedures for Hourly Metered Accounts

[9] The preliminary Company zones loads do not include marginal losses assigned by PJM. Preliminary supplier HEOs are trued-up to the zone load total, including marginal losses prior to submission to PJM.

1. Retrieve historical customer load data for monthly-read interval-metered accounts (Customer 2) for the proxy day that was selected in the proxy day analysis.
2. Retrieve actual customer load data for daily-read interval-metered accounts (Customer 1) for the day of interest.

Interval Customer Load (Hours 1:00-5:00)

Customer	*KW_1*	*KW_2*	*KW_3*	*KW_4*	*KW_5*
1	39.15	39.42	38.88	37.53	38.07
2	692.55	658.8	638.1	623.25	613.80
Sum_	731.70	698.22	676.98	660.78	651.87

Loss adjustment factor 1.093 for customer 1 and 1.085 for customer 2.

3. Apply appropriate loss adjustment factor to each customer's load data.

$$HEO_h^{Interval} = KW_h \times (loss\_factor)$$

Where h represents hours one through twenty-four.

Estimated Load for Interval Metered Customers (Hours 1:00-5:00)

Customer	*KW_1*	*KW_2*	*KW_3*	*KW_4*	*KW_5*
1	42.79	43.09	42.50	41.02	41.61
2	751.42	714.80	692.34	676.23	665.97
Sum	794.21	757.89	734.84	717.25	707.58

If a monthly-metered customer's historic interval data are not available for the proxy day, the customer's load for the day of interest is zero for each hour. If a daily-metered customer's actual interval data are not available for the day of interest, the proxy day data are used. If the proxy data are also not available for the customer, the customer's load for the day of interest is zero for each hour. All zero values are updated in the 60-day settlement where the actual meter readings are available.

Procedures for Profile Customers

1. Retrieve class profile data for the settlement period.

Class Profile Load for Settlement Day (Hours 1:00-5:00)

Profile	*KW_1*	*KW_2*	*KW_3*	*KW_4*	*KW_5*
1	1.53	1.89	2.05	2.28	2.43
2	15.87	19.48	21.9	22	21.84
3	1.85	1.94	2.03	1.96	2.06
Loss adjustment factor is 1.093 for all profile classes.					

2. Calculate the Customer's Usage Factor:

   The customer's usage factor ($Usage^C$) is used to scale the profile class load which results in an hourly load curve for each customer. The customer usage factor is calculated by dividing the customer's billing data (KWH^C) for the period by the energy from the class profile class data (KWH^P) for the same period. The customer usage factor is estimated as follows:

   1. Retrieve the customer's energy consumption (KWH^C) for the reading period that includes or precedes the day of interest.
   2. Retrieve profile class data (KW^P) for the same period as the customers reading period and calculate the energy (KWH^P) for the same period as the customer's billing energy.
   3. Create the customer usage factor ($Usage^C$) by dividing the customer's energy consumption by the profile KWH^P for the same period. The energy for the class average profile is generated after aligning the profile data period with the customer reading period.

$$Usage^{C} = \sum_{Bill\_Start}^{Bill\_Stop} \frac{KWH^{C}}{KWH^{P}}$$

Where Bill_Start is the customer bill history record bill start date, Bill_Stop is the customer bill history record bill stop date.

3. Calculate the preliminary HEO for the profile class.

$$HEO_h^P = (KW_h) \times Usage^C \times (loss\_factor)$$

Where h represents hours one through twenty-four, C represents customer, and P represents profile. The resulting customer hourly energy obligations are shown below.

Estimated Load for Profile Customers (Hours 1:00-5:00)

Customer	*Profile*	*$Usage^C$*	*KW_1*	*KW_2*	*KW_3*	*KW_4*	*KW_5*
3	1	0.216	0.36	0.45	0.48	0.54	0.57
4	2	1.835	31.83	39.07	43.92	44.12	43.80
5	3	0.685	1.39	1.45	1.52	1.47	1.54
6	3	0.856	1.73	1.82	1.90	1.83	1.93

The usage values are calculated for each customer using historic billing data and class profiles.

IV. Aggregation of Loads by Supplier and Metering Type

The customer energy load results of the previous section will be aggregated by supplier and metering type (interval and profile) and overall to determine the Preliminary HEO for the Real-time Energy Market. Assume that customers one, three, and four are associated with Supplier A and customers two, five and six are associated with Supplier B. The resulting preliminary hourly energy obligations are shown below by supplier and metering type.

Preliminary HEO by Suppliers and Metering Type (Hours 1:00-5:00)

Supplier	*Meter Type*	KW_1	KW_2	KW_3	KW_4	KW_5
A	Interval	42.79	43.09	42.50	41.02	41.61
B	Interval	751.42	714.80	692.34	676.23	665.97
	Total Interval	794.21	757.89	734.84	717.25	707.58
A	Profile	43.2	42.8	43.2	42.9	41.7
B	Profile	3.5	3.7	4.0	4.2	4.9
	Total Profile	46.7	46.5	47.2	47.1	46.6
	$Total\_HEO_{Prelim}$	840.91	804.35	782.03	764.33	754.18

3.1.2 Scaling Hourly Energy Loads to the Preliminary Company Zonal Energy Load

This section describes the process of scaling each supplier's preliminary estimate of hourly energy to the preliminary Company Zonal Energy Load. The Total Unaccounted for Energy (UFE) for each hour is determined by calculating the difference between the Company Zone Load and the Preliminary HEO. The Unaccounted for Energy can be either positive or negative and is a result of sampling error, metering error and missing data. This adjustment is assigned on a zone-specific basis according to the arrangements agreed-upon by the Company and the suppliers. In the PEPCO zone, the Company applies 95% of the UFE to the customers whose loads are estimated using profile data and 5% of the total UFE to the customers whose loads are estimated using interval data. In the ACE and DPL zones, the Company applies 100% of the UFE to the customers whose loads are estimated using profile data. The scaling process for the PEPCO zone consists of the steps described below.

1. Calculate the Total UFE, the Total UFE for interval customers (Total_Interval_UFE) and the Total UFE for profile customers (Total_Profile_UFE). The Total UFE is the difference between the Preliminary PEPCO Zonal Energy Load ($Prel\_HEO_{Pepco}$) and the sum of all the suppliers preliminary HEO ($Total\_HEO_{Prelim}$). The Total UFE for interval customers is the Total UFE times 0.05 and the Total UFE for profile customers is the Total UFE times 0.95.

$$Total\_UFE = \left(\Pr el\_HEO_{Pepco} - Total\_HEO_{\Pr elim}\right)$$
$$Total\_Interval\_UFE = Total\_UFE \times 0.05$$
$$Total\_\Pr ofile\_UFE = Total\_UFE \times 0.95$$

Preliminary Zone Load and Total Unaccounted for Energy (Hours 1:00-5:00*)*

	KW₁	*KW₂*	*KW₃*	*KW₄*	*KW₅*
Prel_HEO$_{Pepco}$	829.89	815.59	801.18	786.04	775.26
Total_UFE	-11.02	11.24	19.15	21.71	21.08
Total_Interval_UFE	-0.55	0.56	0.96	1.09	1.05
Total_Profile_UFE	-10.47	10.68	18.19	20.62	20.03

2. Calculate each supplier's share of the interval UFE by multiplying the total interval UFE by the ratio of customers interval load (Interval_HEO$_i$) to the total interval load for all customers (Total_Interval_HEO). Calculate each supplier's share of the profile UFE by multiplying the total profile UFE by the ratio of customers profile load (Profile_HEO$_i$) to the total profile load for all customers (Total_Profile_HEO).

$$Interval\_UFE_i = \left(\frac{Interval\_HEO_i}{Total\_Interval\_HEO}\right) \times Total\_Interval\_UFE$$
$$\Pr ofile\_UFE_i = \left(\frac{\Pr ofile\_HEO_i}{Total\_\Pr ofile\_HEO}\right) \times Total\_\Pr ofile\_UFE$$

Where i = supplier.

Suppliers share of UFE by Metering Type (Hours 1:00-5:00*)*

Supplier	*Meter Type*	*KW₁*	*KW₂*	*KW₃*	*KW₄*	*KW₅*
A	Interval	-0.03	0.03	0.06	0.06	0.06
A	Profile	-9.68	9.83	16.65	18.79	17.92
Total Supplier A		-9.71	9.87	16.71	18.85	17.98
B	Interval	-0.52	0.53	0.90	1.02	0.99
B	Profile	-0.77	0.85	1.55	1.84	2.11
Total Supplier B		-1.29	1.38	2.45	2.86	3.10

3. Calculate each supplier hourly energy obligation (HEO$_{Final}$) as the sum of the supplier's interval hourly energy obligation, interval UFE, profile hourly energy obligation and profile UFE.

$$HEO_{Final_i} = Interval\_UFE_i + Interval\_HEO_i + Profile\_UFE_i + Profile\_HEO_i$$

Preliminary Estimate of HEO by Suppliers (Hours 1:00-5:00*)*

	KW1	*KW2*	*KW3*	*KW4*	*KW5*
Supplier A	76.28	95.76	102.41	102.77	101.29
Supplier B	753.63	719.88	698.79	683.29	673.97

3.1.2 True-up to the Final Company Zone Load as Determined by PJM

On a daily basis, the final Company zone load is available from PJM. This information is available at approximately 3:15 PM on Mondays and the first business day after a PJM holiday and at 12:15 PM on Tuesday through Friday. This is the final Company zone load as determined by PJM. Due to PJM deadlines and the amount of processing time involved to estimate suppliers' preliminary HEO as described above, an adjustment will be made to ensure that the sum of the suppliers' HEO equals the final Company zone load. This final adjustment is made to the preliminary supplier HEO on a pro rata basis prior to submitting the loads to PJM. This process is described below.

1 Obtain the final Company Zone loads from PJM ($Final\_HEO_{pepco}$) and compare to the preliminary Company Zone load total. Calculate an hourly adjustment factor by dividing the $Final\_HEO_{Pepco}$ by the $Prel\_HEO_{Pepco}$:

	KW1	*KW2*	*KW3*	*KW4*	*KW5*
$Final\_HEO_{Pepco}$	830.21	816.59	803.11	787.01	776.13
$Prel\_HEO_{Pepco}$	829.91	815.64	801.2	786.06	775.26
Adjust_Factor	1.00036	1.00117	1.00238	1.00121	1.00112

2 Adjust each supplier's preliminary HEO by the hourly adjustment factor. Compare the sum of the adjusted supplier's HEO with the $Final\_HEO_{Pepco}$:

First Adjustment	*KW1*	*KW2*	*KW3*	*KW4*	*KW5*
Supplier A	76.31	95.87	102.654	102.894	101.404
Supplier B	753.9	720.72	700.456	684.116	674.726
Total	830.21	816.59	803.11	787.01	776.13
Difference	0	0	0	0	0

3 In allocating the EDC's default supplier load by percentages based on the Public Utility Commission's auction process, there can be very minor rounding

differences. Any rounding differences are added back to a predesignated default supplier[10].

Final Estimated HEO by Suppliers (Hours 1:00-5:00*)*

Final	*KW_1*	*KW_2*	*KW_3*	*KW_4*	*KW_5*
Supplier A	76.31	95.88	102.66	102.90	101.40
Supplier B	753.90	720.71	700.45	684.11	674.73
Total	830.21	816.59	803.11	787.01	776.13

3.2 Market Adjustments

The second phase of the PJM energy interchange Real-time Settlement process occurs after all actual monthly energy usage data has been processed for the day in question. The Company will estimate the hourly energy obligations for each supplier using available actual customer billing data for the day of interest. The Company will then calculate the hourly differences between the original Supplier HEO (estimated day-after) and the updated Supplier HEO for all of the suppliers. These hourly kilowatt-hour differences will be reported to PJM within a period of time sufficient to meet PJM bill adjustment accounting requirements. PJM will use the adjusted Supplier HEO quantities to perform a final balancing settlement for the Real-time Market. The updated Supplier HEO will employ the same processing steps used to derive the original Supplier HEO, but will use all available data collected subsequent to the original calculation.

The derivation of the Final Suppliers HEO consists of two processes.

- Determine the preliminary Supplier HEO for each hour.
- Reconcile Supplier HEO to the Final Company Zone Load.

The sample calculations presented are based on a settlement for two suppliers that each serve three customers. The hours ending 1:00 through 5:00 are presented for the settlement day.

3.2.1 Determining Final Hourly Energy Obligation for Real-time Market

This section describes the methods and calculations used to derive the final adjustment to the Suppliers Hourly Energy Obligation (HEO) for the Real-time Energy Market after actual data are obtained at the end of the full meter-reading cycle. The final HEO for an entire month is calculated two months after the end of the month of interest.

The Company will estimate hourly energy obligations for each customer according to the customer's metering type. For interval-metered accounts the actual customer load data are used

[10] This adjustment is usually made to the largest SOS/BGS supplier load for the zone.

for the month of interest. For the profile customers the profile class loads are adjusted by the customer's actual usage for the month of interest.

The derivation of the estimated hourly energy load occurs in several steps. The steps are as follows:

1. Retrieve actual customer load data and profile class data for the month of interest.
2. For each profile customer, adjust the assigned profile class load for the customer by the customer's usage factor. The customer's usage factor is defined as the ratio of the customer's actual usage to the profile class usage for the same period.
3. Adjust customer loads by the appropriate loss adjustment factor.
4. Sum individual customer loads for each supplier.
5. Adjust the supplier's loads proportionally to ensure that they sum to the final Company zone hourly load.

Data Requirements

1. Final Company Zone Load for the month of interest.
2. Actual interval-metered data for interval metered customers for the month of interest.
3. Actual usage data for profile customers.
4. Profile class hourly data for the month of interest and for a period of about forty-five days after the month of interest.[11]

Procedures for Hourly Metered Accounts

1. Retrieve actual customer load data for the month of interest.
2. Apply appropriate loss adjustment factor to each customer's load data.

Interval Customer Load for Day of Interest (Hours 1:00-5:00)

Customer	*KW1*	*KW2*	*KW3*	*KW4*	*KW5*
1	39.15	39.42	38.88	37.53	38.07
2	792.95	783.05	788.00	792.06	797.90

Assume a loss adjustment factor 1.093 for customer 1 and 1.085 for customer 2.

The Hourly Energy Obligation (HEO_h^I) for an interval customer is shown in the equation below:

$$HEO_h^I = KW_h \times (loss\_factor)$$

where h represents hours one through twenty-four and I represents interval customer.

[11] Refer to Appendix 1: Load Profiling Methodology

Load for Interval Metered Customers (Hours 1:00-5:00)

Customer	*KW_1*	*KW_2*	*KW_3*	*KW_4*	*KW_5*
1	42.79	43.09	42.50	41.02	41.61
2	860.35	849.61	854.98	859.38	865.72

If the customer's interval metered data is not available for any period during the month of interest, the customer's load data will be estimated for the missing period.

Procedures for Profile Customers

1. Retrieve actual class profile data for the month of interest.

Profile Load for Day of Interest (Hours 1:00-5:00)

Profile	*KW_1*	*KW_2*	*KW_3*	*KW_4*	*KW_5*
1	1.53	1.89	2.05	2.28	2.43
2	15.87	19.48	21.90	22.00	21.84
3	1.85	1.94	2.03	1.96	2.06

Assume a loss adjustment factor of 1.093 for all profile classes

2. Calculate customer's usage factors:

The customer's usage factor ($Usage^C$) is used to scale the profile class load which results in an hourly load curve for each customer. The customer usage factor is calculated by dividing the customers billing data for the period by the energy from the class profile class data (KWH) for the same period. The customer usage factor is estimated as follows:

1 Retrieve all customers billing data (KWH^C) for all the billing month that overlap the calendar month of interest. Note that for most customers two billing records will overlap the calendar month of interest.

2 Retrieve profile class data (KW^P) for the same period as the customers billing period and calculate the energy (KWH^P) for the period. The profile class data are used for the period through the end of the month of interest. For the period after the month of interest where no profile class load data are yet available, an estimate of the profile class data is used. The proxy-day estimate of the profile class data from the day-after process is used for the period after the month of interest.

3 Create the customer usage factor ($Usage^C$) by dividing the customers billing data by the profile KWH for the same period. The energy for the class average profile is generated after aligning the profile data period with the customer billing data period. Note that the profile period can extend before or after the calendar month of interest and unless the billing period is the same period as the month of interest the customer will have two usage factors.

$$Usage^{C} = \sum_{Bill\_Start}^{Bill\_Stop} \frac{KWH^{C}}{KWH^{P}}$$

Where Bill_Start is the customer bill history record bill start date, Bill_Stop is the customer bill history record bill stop date.

3. Calculated the Hourly Energy Obligation (HEO_h^C) by multiplying the usage factor for the customer ($Usage^C$) by the class average profile (KW^P) for the days in the calendar month of interest that overlap the billing period to determine the energy for each customer. For example if the customers billing period spans from 01/15 through 2/17 and the next billing period spans from 2/18 through 3/15 and the calendar month is February the customer load would be calculated for the period 02/01 through 02/17 using the first usage factor and 02/18 through 02/28 using the second usage factor.

$$HEO_h^C = \left(KW_h^P\right) \times Usage^C \times \left(loss\_factor^P\right)$$

Where h represents hours one through twenty-four, C represents customer, P represents profile. The resulting customer hourly energy obligations are shown below.

Estimated Load for Profile Customers (Hours 1:00-5:00)

Customer	*Profile*	*$Usage^C$*	*KW_1*	*KW_2*	*KW_3*	*KW_4*	*KW_5*
3	1	0.216	0.36	0.45	0.48	0.54	0.57
4	2	1.835	31.83	39.07	43.92	44.12	43.80
5	3	0.685	1.39	1.45	1.52	1.47	1.54
6	3	0.856	1.73	1.82	1.90	1.83	1.93
Assume a loss adjustment factor of 1.093 for all profile classes							

Aggregation of Hourly Loads by Supplier

The customer energy load results of the previous section will be aggregated to determine the Supplier Preliminary HEO for the Real-time Energy Market. Assume that customers one, three, and four are associated with Supplier A and customers two, five and six are associated with Supplier B. The resulting preliminary hourly energy obligations are shown below.

Preliminary HEO by Suppliers (Hours 1:00-5:00)

Supplier	*Meter Type*	*KW1*	*KW2*	*KW3*	*KW4*	*KW5*
A	Interval	42.79	43.09	42.5	41.02	41.61
B	Interval	860.35	849.61	854.98	859.38	865.72
	Total Interval	903.14	892.7	897.48	900.4	907.33
A	Profile	32.19	39.52	44.41	44.66	44.38
B	Profile	3.12	3.27	3.42	3.30	3.47
	Total Profile	35.31	46.5	47.2	47.1	46.6
	$Total\_HEO_{Prelim}$	938.45	939.20	944.68	947.50	953.93

3.2.2 Scaling Hourly Energy Loads to the Company Final Zonal Energy Load

This section describes the process of scaling each supplier's preliminary estimate of hourly energy to the Company Zonal Energy Load. The Total Unaccounted for Energy (UFE) for each hour is determined by calculating the difference between the Company Zone Load and the Preliminary HEO. The Unaccounted for Energy can be either positive or negative and is a result of sampling error, metering error and missing data. This adjustment is assigned on a zone-specific basis according to the arrangements agreed-upon by the Company and the suppliers. In the PEPCO zone, the Company applies 95% of the UFE to the customers whose loads are estimated using profile data and 5% of the total UFE to the customers whose loads are estimated using interval data. In the ACE and DPL zones, the Company applies 100% of the UFE to the customers whose loads are estimated using profile data. The scaling process for the PEPCO zone consists of the steps described below.

1 Calculate the Total UFE, the Total UFE for interval customers (Total_Interval_UFE) and the Total UFE for profile customers (Total_Profile_UFE). The Total UFE is the difference between the PEPCO Zonal Energy Load (HEO_{Pepco}) and the sum of all the suppliers preliminary HEO ($Total\_HEO_{Prelim}$). The Total UFE for interval customers is the Total UFE times 0.05 and the Total UFE for profile customers is the Total UFE times 0.95.

$$Total\_UFE = \left(HEO_{Pepco} - Total\_HEO_{Prelim}\right)$$

$$Total\_Interval\_UFE = Total\_UFE \times 0.05$$

$$Total\_Profile\_UFE = Total\_UFE \times 0.95$$

Zone Load and Total Unaccounted for Energy (Hours 1:00-5:00*)*

	KW1	*KW2*	*KW3*	*KW4*	*KW5*
HEO_{Pepco}	929.89	935.59	941.18	946.04	955.26
Total_UFE	-8.56	-3.61	-3.50	-1.46	1.33
Total_Interval_UFE	-0.428	-0.181	-0.175	-0.073	0.066
Total_Profile_UFE	-8.129	-3.430	-3.325	-1.387	1.263

2. Calculate each supplier's share of the interval UFE by multiplying the total interval UFE by the ratio of customers interval load (Interval_HEO$_i$) to the total interval load for all customers (Total_Interval_HEO). Calculate each supplier's share of the profile UFE by multiplying the total profile UFE by the ratio of customers profile load (Profile_HEO$_i$) to the total profile load for all customers (Total_Profile_HEO).

$$Interval\_UFE_i = \left(\frac{Interval\_HEO_i}{Total\_Interval\_HEO} \right) \times Total\_Interval\_UFE$$

$$\Pr ofile\_UFE_i = \left(\frac{\Pr ofile\_HEO_i}{Total\_\Pr ofile\_HEO} \right) \times Total\_\Pr ofile\_UFE$$

Where i = supplier.

Suppliers share of UFE by Metering Type (Hours 1:00-5:00*)*

Supplier	*Meter Type*	*KW$_1$*	*KW$_2$*	*KW$_3$*	*KW$_4$*	*KW$_5$*
A	Interval	-0.020	-0.009	-0.008	-0.003	0.003
A	Profile	-7.412	-2.914	-3.128	-1.315	1.203
Total Supplier A		-7.432	-2.923	-3.137	-1.319	1.206
B	Interval	-0.408	-0.172	-0.167	-0.070	0.063
B	Profile	-0.717	-0.241	-0.241	-0.097	0.094
Total Supplier B		-1.125	-0.413	-0.408	-0.167	0.158

3. Calculate each supplier hourly energy obligation (HEO$_{Final}$) as the sum of the supplier's interval hourly energy obligation, interval UFE, profile hourly energy obligation and profile UFE.

$$HEO_{Final_i} = Interval\_UFE_i + Interval\_HEO_i + \Pr ofile\_UFE_i + \Pr ofile\_HEO_i$$

Final HEO by Suppliers (Hours 1:00-5:00*)*

	KW$_1$	*KW$_2$*	*KW$_3$*	*KW$_4$*	*KW$_5$*
Supplier A	67.55	79.68	83.77	84.36	87.19
Supplier B	862.34	852.46	857.99	862.51	869.35

3.2.3 Determination of the Final Adjustment to the Suppliers' Hourly Energy Obligation (HEO) [60-Day Reconciliation]

1. This final adjustment or reconciliation amount is the difference between the "Day After supplier HEO value (Settlement A)" and the "Final supplier HEO (Settlement B)".

$$HEO_{Adjustment_i} = Settlement\,A\_HEO_i - Settlement\,B\_HEO_i$$

Where i = supplier.

Estimated HEO by Supplier (Settlement A)

	KW_1	KW_2	KW_3	KW_4	KW_5
Supplier A	76.31	95.88	102.66	102.90	101.40
Supplier B	753.90	720.71	700.45	684.11	674.73

Final HEO by Supplier (Settlement B)

	KW_1	KW_2	KW_3	KW_4	KW_5
Supplier A	67.55	79.68	83.77	84.36	87.19
Supplier B	862.34	852.46	857.99	862.51	869.35

Final Adjustment or Reconciliation (A-B)

	KW_1	KW_2	KW_3	KW_4	KW_5
Supplier A	8.76	16.20	18.89	18.54	14.21
Supplier B	-108.44	-131.75	-157.54	-178.40	-194.62

4. Settlement Beyond "60 Days"

In addition to the adjustments mentioned above, PJM's monthly bills to the supplier or scheduling coordinator shall be subject to adjustment for errors in arithmetic, computation, meter readings or other errors. Any adjustments to a supplier's energy responsibilities will be done as supported by PJM and in accordance with PJM guidelines. Disputes shall be resolved through the PJM Dispute Resolution process.

Appendix 1: Load Profiling Methodology

The Company is using Lodestar® and MetrixIDR® to develop load profiles for its customers that do not have hourly interval data. The load profiles are used for the various capacity and energy settlement calculations as described in this Manual. The profiling method used depends on the zone and the type of settlement - daily or reconciliation.

Daily Settlement:

For the day-after determination of load responsibility, available actual hourly data are used in the daily settlement. These data include PHI hourly zone loads, actual weather data and available hourly load data from the daily-read interval-metered customers for the settlement day.

For the ACE and DPL zones, MetrixIDR® is used to develop the load profiles used in the daily settlement for the profiled customers. A mathematical specification of the relationship between actual load data and weather data for customers grouped into profile classes was developed. A representative load is produced for the "typical" customer within the profile class. The output of the profiling process is the load profile: a set of 24 hourly loads for the settlement day. On a daily basis, the class average load shapes are generated using actual weather data from the National Weather Service. The weather data from the following locations are used:

For the ACE zone - Atlantic City International Airport
For the DPL zone –
Delaware profiles - Wilmington, New Castle County Airport
Maryland profiles - Salisbury-Wicomico County Regional Airport
Virginia profiles – Salisbury-Wicomico County Regional Airport
For the Pepco zone – Washington, DC, Reagan National Airport

For the Pepco zone, a proxy day selection process is used for customers without interval data. The proxy day selection process selects a historical day (Proxy Day) whose load shape most accurately represents a supplied day's load shape. The zone load and dry bulb temperature in winter, or weighted temperature humidity index data in summer for the settlement day are used to select candidate proxy days. The zone daily energy and hourly shape are used to select the best fitting day among the candidate proxy days. The load profiles for this proxy day are then used to estimate the hourly loads for customers without interval data.

For hourly metered customers, if the interval data for the prior day is available, it is used in the daily settlement. (The meters are read daily.) If day-after data are not available, then the customer's historical data for the proxy day is used to estimate the customer's load for the settlement day. This process is used for interval metered customers in all three zones – ACE, DPL and Pepco.

Energy Reconciliation

For the ACE and DPL zones, the profiles created by MetrixIDR® are updated using updated weather information. (The weather data may not have changed, therefore the same load

profiles will be used in the energy reconciliation as those that were used in the daily settlement.) These updated load profiles are used for non-interval metered customers.

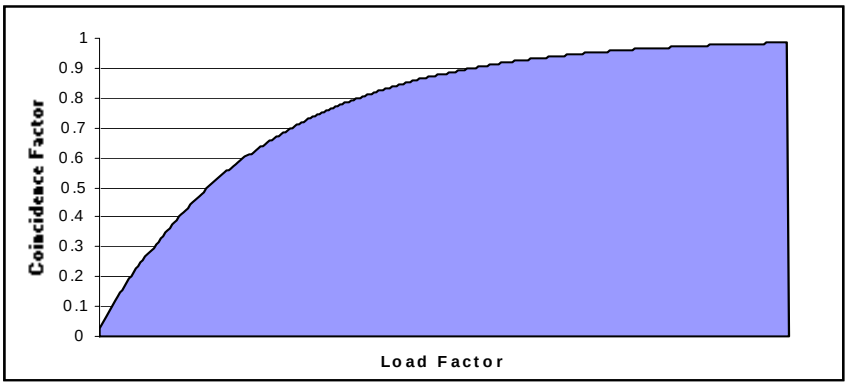
For the Pepco zone, hourly demand data from load research sample customers are collected on a monthly basis. After the data are collected, it is reviewed and analyzed on a monthly basis. The average profile class hourly loads for a month are available approximately two months after the end of the month. (For example, the profile loads for the month of January would be available the end of March.). These profile loads are used in the energy reconciliation process. In addition to the updated profile class loads, hourly loads are generated using MetrixIDR® for a period of two months after the end of the month. Both sets of profiles are used in the reconciliation process. (Refer to the Energy Reconciliation section for additional information.)

For interval metered customers, the settlement will be recalculated for a calendar month using actual data that was retrieved by PHI's meter reading resources. These will include actual hourly load data from customers who have an interval meter but are not remotely interrogated, customer billing energy, kWh, and updated average class hourly load profiles for the month that is being reconciled. Profiled customers will have their profiles adjusted for actual monthly-metered consumption and may be adjusted for available hourly load profiles.

Appendix 2: Development of Coincidence Factors

PHI uses a load factor/coincident factor analysis to calculate the coincident demands for the Capacity PLC and Transmission PLC for the profiled customers with billing demands. The relationship between the coincident factor and the load factor as shown below:

Relationship between load factor and coincidence factor



As shown in the figure, the load factor analysis will ensure that the coincident factor is less than or equal to one. The coincidence factors are calculated using the following estimated equation:

$$Coinc\_factor_i = \left[1 - \exp^{\alpha * Load\_factor}\right]$$

$$Load\_factor_i = \frac{SUM\_KWH\_DAY^C / 24}{Max\_KW}$$

Where α is a parameter resulting from the following regression:

$$Log\left(1 - Coin\_fact_i\right) = \alpha \times Load\_factor$$

The regressions are performed using load research data for the days and hours of the five PJM peaks and the days and times of the zonal peaks (ACE, DPL and Pepco). The regressions were performed using the coincident and load factors based on the monthly maximum billing demands. The analysis is updated annually and a summary of the parameter estimates are available on the supplier support websites.

Appendix 3: Glossary

Account, Customer Settlement

- See Service Point.

Active Load Management (ALM)

Active Load Management applies to interruptible customers whose load can be interrupted at the request of the PJM Office of the Interconnection (PJM OI) or for other reasons.

Capacity Resource

Net Capacity from owned (or contacted) generating resources, which are designated and committed by a Load Serving Entity to serve its obligation under the Reliability Assurance Agreement.

Control Area

An electric power system or combination of electric power systems bounded by interconnection metering and telemetry to which a common generation control scheme is applied in order to:

- match the power output of the generators within the electric power system(s) and energy purchased from entities outside the electric power system(s), with the load within the electric power system(s);
- maintain scheduled interchange with other Control Areas, within the limits of Good Utility Practice;
- maintain the frequency of the electric power system(s) within reasonable limits in accordance with Good Utility Practice and the criteria of the applicable regional reliability council of NERC;
- maintain power flows on Transmission Facilities within appropriate limits to preserve reliability; and
- provide sufficient generating Capacity to maintain Operating Reserves in accordance with Good Utility Practice.

Curtailment

A reduction in firm or non-firm transmission service in response to a transmission capacity shortage as a result of system reliability concerns.

Day-ahead Prices

Locational Marginal Prices resulting from the Day-ahead Energy Market.

ESuites – eSchedules, eRPM and Market User Interface

Computerized information systems, developed by PJM as Internet applications, that allow Load Aggregators and Local Distribution Companies (LDCs) to provide and obtain information needed to schedule transactions under PJM Member customer choice programs.

Forecast Pool Requirement

The forecast capacity required to meet the forecasted load and ensure a sufficient level of reserves to provide for the unavailability of capacity resources, load-forecasting uncertainty, and to permit planned and maintenance outages.

Good Utility Practice
Any of the practices, methods, and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision is made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method or act to the exclusion of all others, but rather is intended to include acceptable practices, methods, or acts generally accepted in the region.

Hourly Energy Obligation (HEO)
The estimated aggregate usage for all suppliers' customers using a "bottom-up" approach.

Interchange Energy Market, PJM
The regional competitive market administered by the PJM Office of the Interconnection for the purchase and sale of spot electric energy at wholesale in interstate commerce and related services established in the PJM Operating Agreement.

Interruption
A reduction in non-firm transmission service due to economic reasons.

Interval Customer
Customers with have an interval recorded that collects hourly load data daily or monthly from the customer's location.

Load Aggregator
A licensed entity that may provide (sell) energy to retail customers within the service territory of a Local Distribution Company (LDC). Also known as an Electric Generation Supplier (EGS).

Local Distribution Company (LDC)
A company in whose service territory Load Aggregators are providing energy to retail customers, and whose distribution system is being used to transport the energy. Also known as an Electric Distribution Company (EDC).

Load
Megawatts of load for firm energy delivered to load located electrically within the PJM Control Area, as well as firm energy delivered to the border of the PJM Control Area for receipt by others.

Load Serving Entity (LSE)
An entity, including a load aggregator or power marketer, serving end-users within the PJM Control Area, and that has been granted the authority or has an obligation pursuant to state or local law, regulation or franchise to sell electric energy to end-users located within the PJM Control Area or the duly designated Agent of such an entity.

Loss Adjustment Factor
The ratio or percentage of energy lost or unaccounted for in a specified time period to the net output of the system in the same period.

Locational Marginal Price (LMP)
The hourly integrated market clearing marginal price for energy at the location the energy is delivered or received.

Network Customer
An entity receiving Transmission Service pursuant to the terms of the Transmission Provider's Network Integration Transmission Service.

Network Integration Transmission Service
Allows a Transmission Customer to integrate, plan, economically dispatch and regulate its network resources to serve its network load in a manner comparable to that in which the transmission provider utilizes its Transmission System to serve its Native Load Customers. Network Integration Transmission Service also may be used by the Transmission Customer to deliver non-firm energy purchases to its network load without additional charge.

Network Load
Load that a network Customer designates for Network Integration Transmission Service. The Network Customer's Network Load includes all load served by the output of any network resources designated by the Network Customer. A Network Customer may elect to designate less than its total load as Network Load but may not designate only part of the load at a discrete Point of Delivery. Where an Eligible Customer has elected not to designate a particular load at discrete points of delivery as Network Load, the Eligible Customer is responsible for making separate arrangements from any Point-To-Point Transmission Service that may be necessary for such non-designated load.

Network Transmission Service
Transmission Service provided pursuant to the rates, terms and conditions set forth in the Tariff.

Node
A node represents a distribution of load buses constructed for settlement accounting purposes.

Load Factor
The ratio of a customer's maximum demand, either monthly or annual or on-peak, to the customer's average monthly usage for the same time period.

Office of the Interconnection (OI), PJM
Facilities, employees and agents of PJM Interconnection L.L.C. engaged in implementation of the PJM Operating Agreement, the Reliability Assurance Agreement and administration of the PJM Open Access Transmission Tariff for the PJM Control Area.

Operating Day
The daily 24-hour period that begins at midnight for which transactions on the PJM Interchange Energy Market are scheduled.

PJM
The acronym for PJM Interconnection, L.L.C., the entity that directs the use of the transmission system and ensures that energy can flow from one location to another. PJM also keeps track of ownership and movement of energy and provides billing information and services.

PJM Control Area
The electric Control Area operated by the PJM Office of the Interconnection and recognized by NERC.

PJM Manuals
The instructions, rules, procedures and guidelines established by the PJM Office of the Interconnection for the operation, planning, and accounting requirements of the PJM Control Area and PJM Interchange Energy Market.

PJM Member
Any entity that has completed an application and satisfies the requirements of PJM to conduct business with PJM Interconnection, L.L.C., including Transmission Owners, Generating Entities, Load Serving Entities, and Marketers.

Planning Period
The twelve months beginning June 1 and extending through May 31 of the following year.

Profile Class
A grouping of customers assigned to a particular load profile based on similar energy usage characteristics.

Proxy Day
An historic day from which to retrieve customer and profile data. The proxy day is used instead of actual data for the settlement day.

Reliability Assurance Agreement
Agreement amended from time to time, establishing obligations, standards and procedures for maintaining reliable operation of the PJM Control Area.

Retail Load Responsibility
The agreed-upon hourly load within the service territory of the Local Distribution Company for which the Load Aggregator must provide energy to customers.

Schedule
A set of Megawatt values consisting of one value for each hour of a single day.

Service Agreement
The initial agreement and any amendments or supplements entered into by the Transmission Customer and the Transmission Provider for service under the Tariff.

Service Point

Refers to the specific, physical service at a specific premise where energy is consumed regardless of the Account assigned. It is used for organizing customer information for capacity, transmission and energy settlement procedures. This is the lowest level of data granularity and represents the lowest level for which a supplier may be assigned. Multiple meters may be used at the Company's discretion to measure energy usage at a specific service point. It is defined by the following characteristics:

- a unique premise number.
- a unique service ID
- a supplier assignment with an "effective as of" date.
- a profile class assignment (profile class is a grouping of customers assigned to a particular load profile based on similar energy usage characteristics).
- metering type: interval or non-interval (demand or monthly).
- a loss class assignment that reflects the customer's rate code or voltage level.

Typically, the service point is a 9 or 10 digit numeric value which is the combination of premise ID and service ID. In certain instances where the service point is not represented in the Company's Billing System, it may be alpha-numeric. Within this document, the terms Customer and Service Point are, at times, used interchangeably with the understanding that the Service Point does not change while the Customer assigned to that Service Point may change.

Spot Market Energy

Energy bought or sold by Market Participants through the PJM Interchange Energy Market at Locational Marginal Prices.

Supplier

An entity that has been licensed by the state utility commission to sell Competitive Energy Supply to retail Customers within the state in accordance with the applicable legal authorities and has entered into a Master Supplier Agreement with the Company as a Party. A supplier under this Agreement must be a Load Serving Entity (LSE) and shall have the obligations of an LSE under the PJM Agreements. As used in the Master Supplier Agreement, references to the Supplier shall also apply to the Supplier's Scheduling Coordinator, if one has been duly designated, authorized and qualified to act on the Supplier's behalf. The term "supplier" also refers generically to any such licensed entity, as opposed to the specific signatory to this Agreement, where the context makes it appropriate to do so. The distinction can be derived from the context, but is also generally reflected in the use of lower case type ("supplier") to reflect the generic usage, and an initial capital ("Supplier") to reflect the specific Party to the Master Supplier Agreement.

Transmission Service

Point-to-Point Transmission Service provided on a firm and non-firm basis.

Type 1 Customer

Interval metered customer with monthly read meters.

Type 2 Customer
Interval metered customer with daily read meters.

Unaccounted For Energy (UFE)
The difference between the Company Zone Load and the sum of the suppliers preliminary HEO. UFE can be either negative or positive and is a result of sampling error, metering error and missing data.

Unforced Capacity
Installed capacity that is not experiencing a forced outage calculated on a rolling12-month average.

Usage Factor
The ratio of the metered customer kilowatt-hour usage for a billing cycle to the profiled kilowatt hour usage. The purpose of the Usage Factor in LPSS is to adjust a profiled load to an actual metered load for capacity and energy settlement accounting purposes.

Zone
An area within the PJM Control Area as set forth in the Tariff.