



Monitoring  
Analytics

# Total Cost of Wholesale Power Calculation Documentation

The Independent Market Monitor for PJM  
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## Table of Contents

Introduction.....	1
Energy .....	2
Day Ahead Energy .....	2
Balancing Energy.....	2
ARR Credits .....	2
Self Scheduled FTR Credits.....	2
Balancing Congestion .....	2
Emergency Energy .....	3
Inadvertent Energy .....	3
Load Response - Energy .....	3
Emergency Load Response .....	3
Energy Uplift (Operating Reserves) .....	4
Marginal Loss Surplus Allocation.....	4
Market to Market Payments (M2M) .....	4
Capacity .....	5
Capacity Market and FRR.....	5
Capacity Market .....	5
Fixed Resource Requirement (FRR).....	5
Capacity Part V (Reliability Must Run or RMR).....	6
Load Response - Capacity .....	6
Transmission.....	6
Transmission Service Charges.....	6
Transmission Enhancement Cost Recovery.....	7
Transmission Owner (Schedule 1A).....	7
Transmission Seams Elimination Cost Assignment (SECA).....	8
Transmission Facility Charges.....	8
Ancillary .....	8
Reactive.....	8
Regulation.....	9

Black Start .....	9
Synchronized Reserves .....	9
Secondary Reserves .....	9
Nonsynchronized Reserves .....	10
Day Ahead Scheduling Reserve (DASR).....	10
Administration .....	10
PJM Administrative Fees.....	10
NERC/RFC.....	11
RTO Startup and Expansion .....	12
Other.....	12

## Introduction

The total cost of wholesale power is the total cost per MWh of wholesale electricity in PJM markets.<sup>1</sup> The total cost is an average cost. The costs of each component and subcomponent may vary by location and time period. The total costs are the sum of the total charges for the individual billing line items in each category divided by real-time load, even when a specific category is not charged on that basis.<sup>2 3</sup> The charges for the individual billing line items includes after the fact adjustments. Adjustments are included in the month for which they apply, not the month they are charged. For example, if July's bill includes a \$100,000 adjustment to May's bill for BLI 1100, the \$100,000 will be added to BLI 1100 total for May, not for July. The prior total cost of wholesale power calculation used the load-weighted real-time LMP as the energy component of the overall cost. The updated calculation of the energy component includes the day-ahead market, balancing market, ARRs, self scheduled FTRs, balancing congestion, emergency energy, inadvertent energy, load response, emergency load response, energy uplift, marginal loss surplus allocations, and market to market payments. The prior total cost of wholesale power calculation did not include FRR costs. The updated calculation of the capacity component includes an estimate of the cost of FRR capacity based on capacity market prices. Overall, the updated calculation is a more complete metric of the total cost of wholesale electricity in PJM markets.

The totals presented in the total cost of wholesale power figures and tables include after the fact billing adjustments. When PJM makes market settlement adjustments to previous months, the total cost calculation is updated. As a result, historical totals may not match totals presented in past reports.

The total cost of wholesale power and the components of that cost are presented for informational purposes and should not be used to calculate the costs of any specific market activity in PJM. The total cost includes the cost of energy, capacity, transmission

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<sup>1</sup> A detailed description of the individual components included in the total cost of wholesale power can be found in the State of the Market report for PJM. See Monitoring Analytics. Reports. "PJM State of the Market," <[https://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2024.shtml](https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2024.shtml)>.

<sup>2</sup> Billing line items (BLI) are lines on the bills to customers prepared by PJM Settlements.

<sup>3</sup> Accounting load is used in the calculation of total cost because accounting load is the load customers pay for in PJM settlements. The use of accounting load with losses before June 1, 2007 and without losses after June 1, 2007, is consistent with PJM's calculation of LMP. Before June 1, 2007, transmission losses were included in accounting load. After June 1, 2007, transmission losses were excluded from accounting load and losses were addressed through the inclusion of marginal loss pricing in LMP.

service, ancillary services and administrative fees billed to customers through PJM systems.

## **Energy**

The energy component of the total cost of wholesale power is the sum of the costs of day-ahead energy, balancing energy, ARR credits, Self Scheduled FTR Credits, Balancing Congestion, Emergency Energy, Inadvertent Energy, Load Response charges for economic demand response, Emergency Load Response, Energy Uplift (Operating Reserves), Marginal Loss Surplus Allocations and Market to Market Payments, divided by real time load.

### **Day-Ahead Energy**

The day-ahead energy subcomponent is the product of the day-ahead load-weighted LMP and the day-ahead load (fixed and price sensitive demand) divided by real-time load.<sup>4</sup>

### **Balancing Energy**

The balancing energy subcomponent is the balancing load charge divided by real-time load. The balancing load charge is the difference between the real-time load and the day-ahead load (fixed and price sensitive demand) multiplied by real-time LMP.

### **ARR Credits**

The ARR Credit subcomponent is the sum of ARR Credits plus end of planning period Excess ARR Credits to ARR holders, divided by real time load. ARR credits are paid to ARR holders. Any ARR surplus after the end of the planning period payout to FTRs is paid to ARR holders as Excess ARR credits.

### **Self Scheduled FTR Credits**

The Self Scheduled FTR Credit subcomponent is the sum of the self scheduled FTR revenues and revenues from the sale of self scheduled FTRs, divided by real-time load.

### **Balancing Congestion**

The balancing congestion subcomponent is total balancing congestion, which must be paid by load and exports per FERC order, divided by real-time load. Total balancing congestion equals the sum of explicit and implicit balancing congestion charges and credits. Load and exports are assigned balancing congestion on the basis of their proportion of total real-time MW. The balancing congestion included here includes only the balancing congestion allocated on a load ratio share to load.

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<sup>4</sup> Day-ahead load does not include DECs or UTCs.

## Emergency Energy

The emergency energy subcomponent is the sum of the total charges for the individual billing line items identified in Table 1, divided by real-time load.<sup>5</sup>

**Table 1 Billing line items: Emergency energy charges**

BLI	BLI Name
1260	Emergency Energy

## Inadvertent Energy

The inadvertent energy subcomponent is the sum of the total charges for the individual billing line items identified in Table 2, divided by real-time load.<sup>6</sup>

**Table 2 Billing line items: Inadvertent energy charges**

BLI	BLI Name
1230	Inadvertent Interchange
1430	Load Reconciliation for Inadvertent Interchange

## Load Response - Energy

The load response energy subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 3 divided by real-time load.<sup>7</sup>

**Table 3 Billing line items: Energy load response charges**

BLI	BLI Name
1240	Day-ahead Economic Load Response Program
1241	Real-time Economic Load Response Program
1242	Day-Ahead Load Response Charge Allocation
1243	Real-Time Load Response Charge Allocation
1246	Load Response Test Reduction

## Emergency Load Response

The emergency load response subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 4 divided by real-time load.<sup>8</sup>

**Table 4 Billing line items: Emergency load response charges**

BLI	BLI Name
1245	Pre-Emergency and Emergency Load Response

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<sup>5</sup> OA Schedule 1 § 3.2.6.

<sup>6</sup> OA Schedule 1 § 3.7.

<sup>7</sup> OA Schedule 1 § 3.6.

<sup>8</sup> OATT PJM Emergency Load Response Program.

## Energy Uplift (Operating Reserves)

The energy uplift (operating reserve) subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 5, divided by real-time load.<sup>9</sup>

**Table 5 Billing line items: Energy uplift (Operating Reserve) charges**

BLI	BLI Name
1370	Day-ahead Operating Reserve
1371	Day-ahead Operating Reserve for Load Response
1375	Balancing Operating Reserve
1376	Balancing Operating Reserve for Load Response
1377	Synchronous Condensing
1478	Load Reconciliation for Balancing Operating Reserve
1480	Load Reconciliation for Synchronous Condensing

## Marginal Loss Surplus Allocation

The marginal loss surplus subcomponent is the total marginal loss surplus assigned to load, divided by real-time load. Marginal loss surplus exists because load pays more for energy, due to marginal losses, than generators receive. The difference between what load pays for energy due to marginal losses and generation receives due to marginal losses is the marginal loss surplus. Marginal loss surplus is collected in both the day-ahead and real-time market. The marginal loss surplus is assigned to real-time load plus exports that pay for transmission service, with nonfirm exports receiving a reduced percentage of their allocation. Only the part of the marginal loss surplus credited to real-time load is included in the total cost calculation.

## Market to Market Payments (M2M)

The M2M subcomponent is the sum of market to market charges. The market to market charges are all charges resulting from the PJM/MISO and PJM/NYISO joint operating agreements, divided by real time load. The market to market charges can be a charge or credit to PJM load depending on the operating conditions for the period.

The M2M coordination process is real-time market coordination to manage transmission limits that occur on M2M flowgates. Market to market operations may require one or both RTOs to redispatch units to control congestion on M2M flowgates. This coordination may result in the exchange of payments for the redispatch. Coordination between NYISO and PJM also includes coordinated operation of the PARs that are located at the PJM/NYIS border and associated charges.

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<sup>9</sup> OA Schedules 1 §§ 3.2.3 & 3.3.3.



Market to market payments are assigned to real-time load plus exports. Only the part of the market to market payments credited to real-time load is included in the total cost calculation.

## **Capacity**

The capacity component of the total cost of wholesale power is the sum of the capacity charges, charges under Part V of the PJM OATT, commonly referred to as reliability must run (RMR) charges, and load response charges assigned to capacity, divided by real-time load.

### **Capacity Market and FRR**

The capacity subcomponent of the total cost of wholesale power is the sum of capacity market charges including the FRR capacity resource deficiency charge (BLI 1681) and FRR administration costs used only during the ATSI integration (BLIs 1682-1688) and estimated FRR capacity charges, divided by real-time load.

### **Capacity Market**

The capacity market subcomponent charges are the sum of the total charges for the individual billing line items in Table 6, divided by real-time load. The cost of Energy Efficiency (EE) is included in BLI 1610 and is not billed separately. Capacity transfer rights are credits to load to account for the fact that load in separated LDAs pays more for capacity than generation receives.

**Table 6 Billing line items: Capacity market charges**

BLI_ID	BLI_NAME
1610	Locational Reliability
1611	CP Transitional Locational Reliability
1681	FRR LSE Capacity Resource Deficiency
1682	FRR LSE Generation Resource Rating Test Failure
1686	FRR LSE Load Management Test Failure
1687	FRR LSE Schedule 9-5
1688	FRR LSE Schedule 9-6
2630	Capacity Transfer Rights

### **Fixed Resource Requirement (FRR)**

The estimated FRR capacity subcomponent charges are the estimated load payments for capacity in FRR entities. The estimated FRR capacity charges are calculated by multiplying the obligation MW (each FRR entity’s obligation to provide capacity) by the final zonal net load price (which is the net price that load pays for capacity in each zone, based on the RPM auctions).

The FRR option for utilities with regulated revenues based on cost of service rates, including both privately and publicly owned utilities, provides the ability to opt out of the capacity market and provide their own capacity at rates defined by a local regulatory

process and collected outside the PJM settlement process.<sup>10</sup> FRR payments for capacity are part of the total cost of capacity to load. The FRR capacity costs must be estimated because the actual FRR capacity payments are not included in PJM Market Settlements.

## Capacity Part V (Reliability Must Run or RMR)

Capacity reliability OATT Part V (RMR) subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 7, divided by real-time load.<sup>11</sup>

**Table 7 Billing line items: Capacity Reliability Must Run (RMR) charges**

BLI	BLI Name
1930	Generation Deactivation
1932	Generation Deactivation Refund

## Load Response - Capacity

The load response capacity subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 8 divided by real-time load.<sup>12</sup> Payments to capacity units for providing demand response are included in the locational reliability BLI 1610 as part of capacity charges. Test failure charges for RPM committed Demand Response are included in BLI 1666. RPM deficiency penalties for Price Responsive Demand are included in BLI 1669.

**Table 8 Billing line items: Capacity load response charges**

BLI	BLI Name
1666	Load Management Test Failure
1669	PRD Commitment Compliance Penalty

## Transmission

The transmission component of the total cost of wholesale power is the sum of the transmission service charges, transmission enhancement cost recovery, transmission owner (Schedule 1A), transmission seams elimination cost assignment (SECA) and transmission facility charges, divided by real-time load.

## Transmission Service Charges

The transmission service subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 9, divided by real-time load.<sup>13</sup> Supplemental project costs are recovered as part of network integration transmission

<sup>10</sup> RAA Schedule 8.1.

<sup>11</sup> OATT Part V.

<sup>12</sup> OA Schedule 1 § 3.6.

<sup>13</sup> OATT §§ 13.7, 14.5, 27A & 34.

service charges (BLI 1100). State agreement approach (SAA) charges are recovered through transmission cost of service rates and are included in the network integration transmission service charges (BLI 1100).

**Table 9 Billing line items: Transmission service charges**

BLI	BLI Name
1100	Network Integration Transmission Service
1101	Network Integration Transmission Service (ATSI Low Voltage)
1102	Network Integration Transmission Service (exempt)
1103	Underground Transmission Service
1104	Network Integration Transmission Service Offset
1110	Direct Assignment Facilities
1120	Other Supporting Facilities
1130	Firm Point-to-Point Transmission Service
1133	Firm Point-to-Point Transmission Service Resale
1140	Non-Firm Point-to-Point Transmission Service
1143	Non-Firm Point-to-Point Transmission Service Resale
1900	Unscheduled Transmission Service

## Transmission Enhancement Cost Recovery

The transmission enhancement cost recovery subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 10, divided by real-time load.<sup>14</sup> Transmission enhancement cost recovery charges are costs associated with required baseline reliability upgrades identified through the RTEP planning process that have not yet been included in BLI 1100 (Network Integration Transmission Service).

**Table 10 Billing line items: Transmission enhancement cost recovery charges**

BLI_ID	BLI_NAME
1108	Transmission Enhancement
1109	MTEP Project Cost Recovery
1115	Transmission Enhancement Settlement (EL05-121-009)

## Transmission Owner (Schedule 1A)

The transmission owner (Schedule 1A) subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 11, divided by real-time load.<sup>15</sup>

**Table 11 Billing line Items: Transmission owner (Schedule 1A) charges**

BLI_ID	BLI_NAME
1320	Transmission Owner Scheduling, System Control and Dispatch Service

<sup>14</sup> OATT Schedule 12.

<sup>15</sup> OATT Schedule 1A.

## Transmission Seams Elimination Cost Assignment (SECA)

The transmission seams elimination cost assignment (SECA) subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 12, divided by real-time load.

**Table 12 Billing line items: Transmission seams elimination cost assignment (SECA) charges**

BLI	BLI Name
1710	PJM/MISO Seams Elimination Cost Assignment
1712	Intra-PJM Seams Elimination Cost Assignment

## Transmission Facility Charges

The transmission facility subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 13, divided by real-time load.<sup>16</sup>

**Table 13 Billing line items: Transmission facility charges**

BLI	BLI Name
1910	Ramapo Phase Angle Regulators
1911	Michigan - Ontario Interface Phase Angle Regulators

## Ancillary

The ancillary services component of the total cost of wholesale power is the sum of the reactive, regulation, black start, synchronized reserves, secondary reserves, non synchronized reserves and day-ahead scheduling reserve charges, divided by real-time load.

## Reactive

The reactive subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 14, divided by real-time load.<sup>17</sup>

**Table 14 Billing line items: Reactive charges**

BLI	BLI Name
1330	Reactive Supply and Voltage Control from Generation and Other Sources Service
1378	Reactive Services
1490	Load Reconciliation for Reactive Services

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<sup>16</sup> OA Schedule 1 § 5.3b.

<sup>17</sup> OATT Schedule 2 and OA Schedule 1 § 3.2.3B. The line item in Table 14 includes all reactive services charges.

## Regulation

The regulation subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 15, divided by real-time load.<sup>18</sup>

**Table 15 Billing line items: Regulation charges**

BLI	BLI Name
1340	Regulation and Frequency Response Service
1460	Load Reconciliation for Regulation and Frequency Response Service

## Black Start

The black start subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 16, divided by real-time load.<sup>19</sup>

**Table 16 Billing line items: Black start charges**

BLI	BLI Name
1380	Black Start Service

## Synchronized Reserves

The synchronized reserve subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 17 divided by real-time load.<sup>20</sup>

**Table 17 Billing line items: Synchronized reserves**

BLI	BLI Name
1360	Synchronized Reserve
1470	Load Reconciliation for Synchronized Reserve

## Secondary Reserves

The secondary reserve subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 18 divided by real-time load.<sup>21</sup>

**Table 18 Billing line items: Secondary reserves charges**

BLI	BLI Name
1361	Secondary Reserve
1471	Load Reconciliation for Secondary Reserve

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<sup>18</sup> OA Schedules 1 §§ 3.2.2, 3.2.2A, 3.3.2, & 3.3.2A; OATT Schedule 3.

<sup>19</sup> OATT Schedule 6A. The line item in Table 16 includes all Energy Uplift (Operating Reserves) charges for Black Start.

<sup>20</sup> OA Schedule 1 § 3.2.3A.01; PJM OATT Schedule 6.

<sup>21</sup> OA Schedules 1 §§ 3.2.3A 001.

## Nonsynchronized Reserves

The nonsynchronized reserve subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 19 divided by real-time load.<sup>22</sup>

**Table 19 Billing line items: Nonsynchronized reserves charges**

BLI	BLI Name
1362	Nonsynchronized Reserve
1472	Load Reconciliation for Nonsynchronized Reserve

## Day-Ahead Scheduling Reserve (DASR)

The day-ahead scheduling reserve (DASR) subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 20 divided by real-time load.<sup>23</sup>

**Table 20 Billing line items: Day-ahead scheduling reserve (DASR) charges**

BLI	BLI Name
1365	Day-ahead Scheduling Reserve
1475	Load Reconciliation for Day-ahead Scheduling Reserve

## Administration

The administration services component of the total cost of wholesale power is the sum of the PJM administrative fees, NERC/RFC and RTO Startup and Expansion charges, and other various charges, divided by real-time load.

## PJM Administrative Fees

The PJM administrative fees subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 21 divided by real-time load.

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<sup>22</sup> OA Schedule 1 § 3.2.3A.001.

<sup>23</sup> OA Schedules 1 §§ 3.2.3A.01 & OATT Schedule 6.

**Table 21 Billing line items: PJM administrative fees**

BLI	BLI Name
1301	PJM Scheduling, System Control and Dispatch Service - Control Area Administration
1302	PJM Scheduling, System Control and Dispatch Service - FTR Administration
1303	PJM Scheduling, System Control and Dispatch Service - Market Support
1304	PJM Scheduling, System Control and Dispatch Service - Regulation Market Administration
1305	PJM Scheduling, System Control and Dispatch Service - Capacity Resource/Obligation Mgmt.
1306	PJM Scheduling, System Control and Dispatch Service - Advanced Second Control Center
1307	PJM Scheduling, System Control and Dispatch Service - Market Support Offset
1308	PJM Scheduling, System Control and Dispatch Service Refund - Control Area Administration
1309	PJM Scheduling, System Control and Dispatch Service Refund - FTR Administration
1310	PJM Scheduling, System Control and Dispatch Service Refund - Market Support
1311	PJM Scheduling, System Control and Dispatch Service Refund - Regulation Market Administration
1312	PJM Scheduling, System Control and Dispatch Service Refund - Capacity Resource/Obligation Mgmt.
1313	PJM Settlement, Inc.
1314	Market Monitoring Unit (MMU) Funding
1315	FERC Annual Recovery
1316	Organization of PJM States, Inc. (OPSI) Funding
1319	Consumer Advocates of PJM States, Inc. (CAPS)
1440	Load Reconciliation for PJM Scheduling, System Control and Dispatch Service
1441	Load Reconciliation for PJM Scheduling, System Control and Dispatch Service Refund
1442	Load Reconciliation for Schedule 9-6 - Advanced Second Control Center
1443	Load Reconciliation for PJM Settlement, Inc.
1444	Load Reconciliation for Market Monitoring Unit (MMU) Funding
1446	Load Reconciliation for Organization of PJM States, Inc. (OPSI) Funding
1449	Load Reconciliation for Consumer Advocates of PJM States, Inc. (CAPS) Funding
1450	Load Reconciliation for Transmission Owner Scheduling, System Control and Dispatch Service
1995	PJM Annual Membership Fee
1999	PJM Customer Payment Default

## NERC/RFC

The NERC/RFC subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 22 divided by real-time load.<sup>24</sup>

**Table 22 Billing line items: NERC/RFC fees**

BLI	BLI Name
1317	North American Electric Reliability Corporation (NERC)
1318	Reliability First Corporation (RFC)
1445	Load Reconciliation for FERC Annual Recovery
1447	Load Reconciliation for North American Electric Reliability Corporation (NERC)
1448	Load Reconciliation for Reliability First Corporation (RFC)

<sup>24</sup> OATT Schedule 10-NERC and OATT Schedule 10-RFC.

## RTO Startup and Expansion

The RTO startup and expansion subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 23 divided by real-time load.<sup>25</sup>

**Table 23 Billing line items: RTO startup and expansion charges**

BLI	BLI Name
1720	RTO Start-up Cost Recovery
1730	Expansion Cost Recovery

## Other

The other charges subcomponent charges are the sum of the total charges for the individual billing line items identified in Table 24, divided by real-time load.

**Table 24 Billing line items: Other charges**

BLI	BLI Name
1000	Amount Due for Interest on Past Due Charges
1250	Meter Error Correction
1950	Virginia Retail Administrative Fee
1952	Deferred Tax Adjustment
1955	Deferral Recovery
1956	Dominion Settlement
1957	Schedule 11A PJM Net

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<sup>25</sup> OATT Attachments H-13, H-14 and H-15 and Schedule 13.