

# Operating Reserves Educational Session Part B

Energy Market Uplift  
Senior Task Force  
September 17, 2013

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Monitoring Analytics

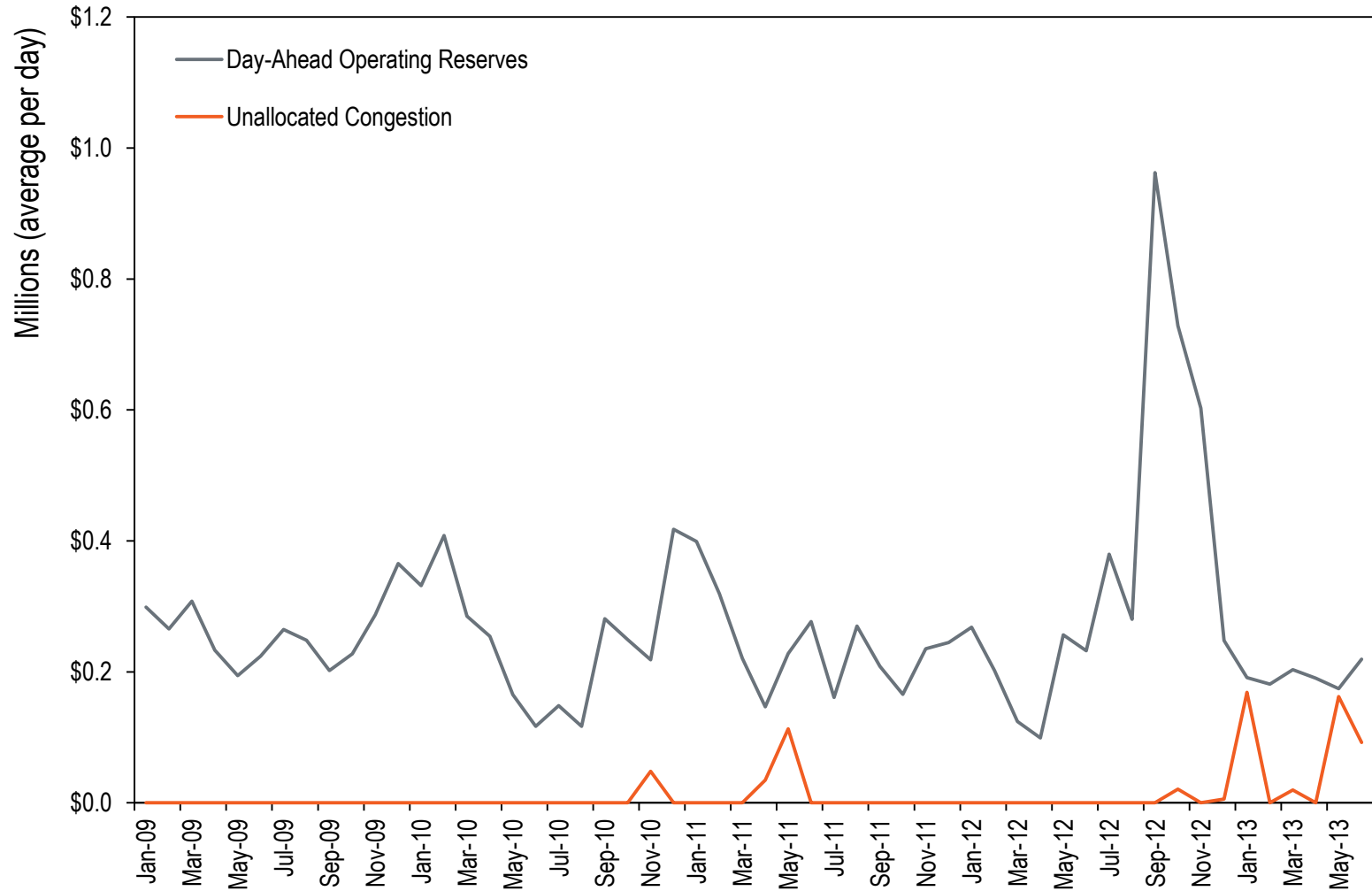
# Operating Reserves

Operating reserves can be grouped into five categories:

- **Day-Ahead**
- **Balancing**
- **Reactive Services**
- **Black Start Services**
- **Synchronous Condensing**



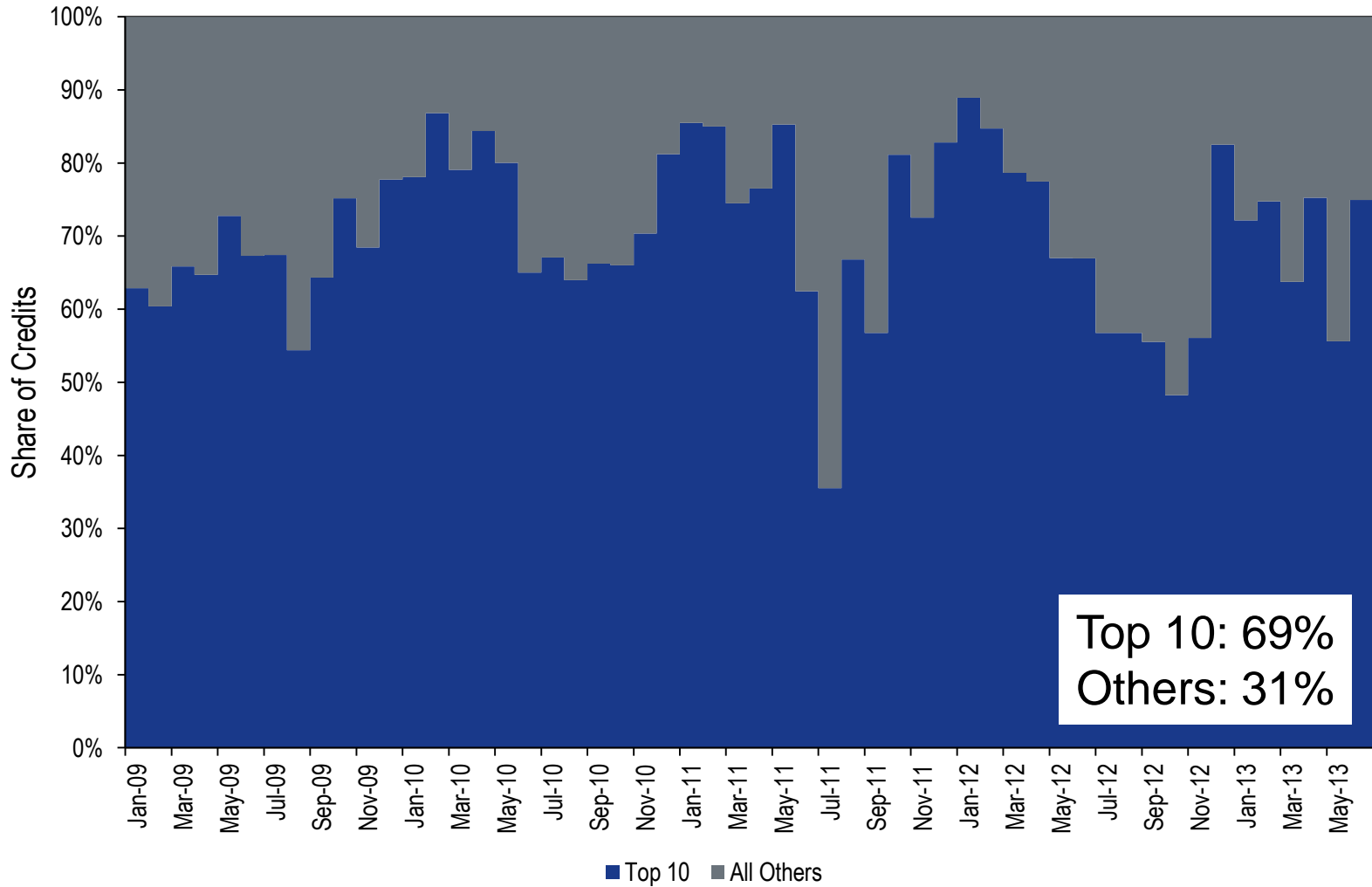
# Day-Ahead Charges



# Day-Ahead Charges

- **Total Day-Ahead Operating Reserve Charges from Jan 2009 – Jun 2013:**
  - **\$462 million**
- **From Day-Ahead Operating Reserve Credits (Not Black Start or Reactive):**
  - **\$442 million (96% of all DA OR Charges)**
- **From Unallocated Congestion:**
  - **\$20 million (4% of all DA OR Charges)**
    - **67% or \$14 million since Jan 2013.**

# Day-Ahead Credits Concentration

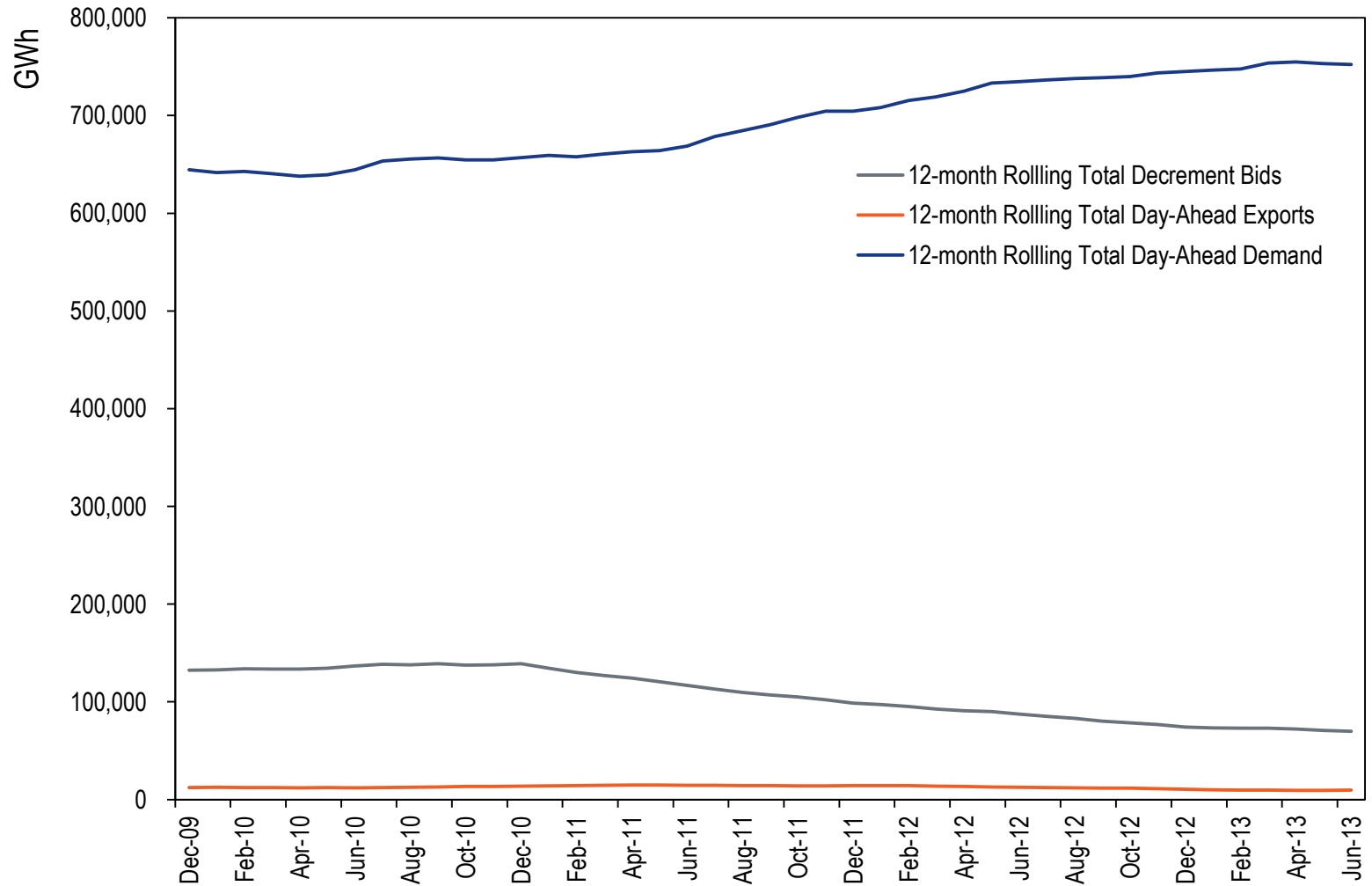


Top 10: 69%  
Others: 31%

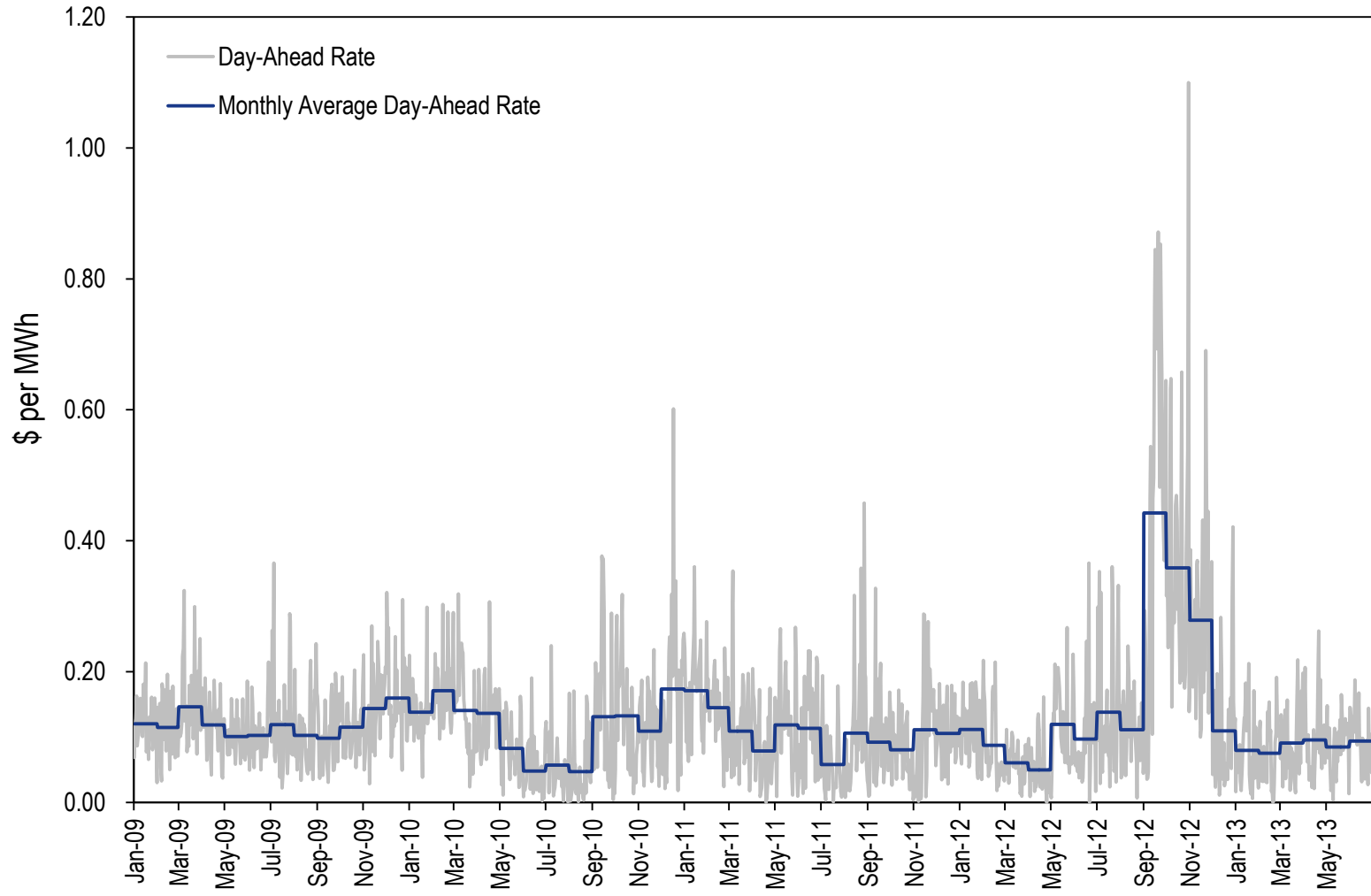
# Day-Ahead Allocation Recap

- **Charges are paid by:**
  - **Day-Ahead Demand Bids (Load)**
  - **Day-Ahead Exports**
  - **Day-Ahead Decrement Bids (DECs)**
- **Charges are allocated across the entire RTO. Each transaction pays the same rate per day across the entire system.**

# Basis for Day-Ahead Allocation

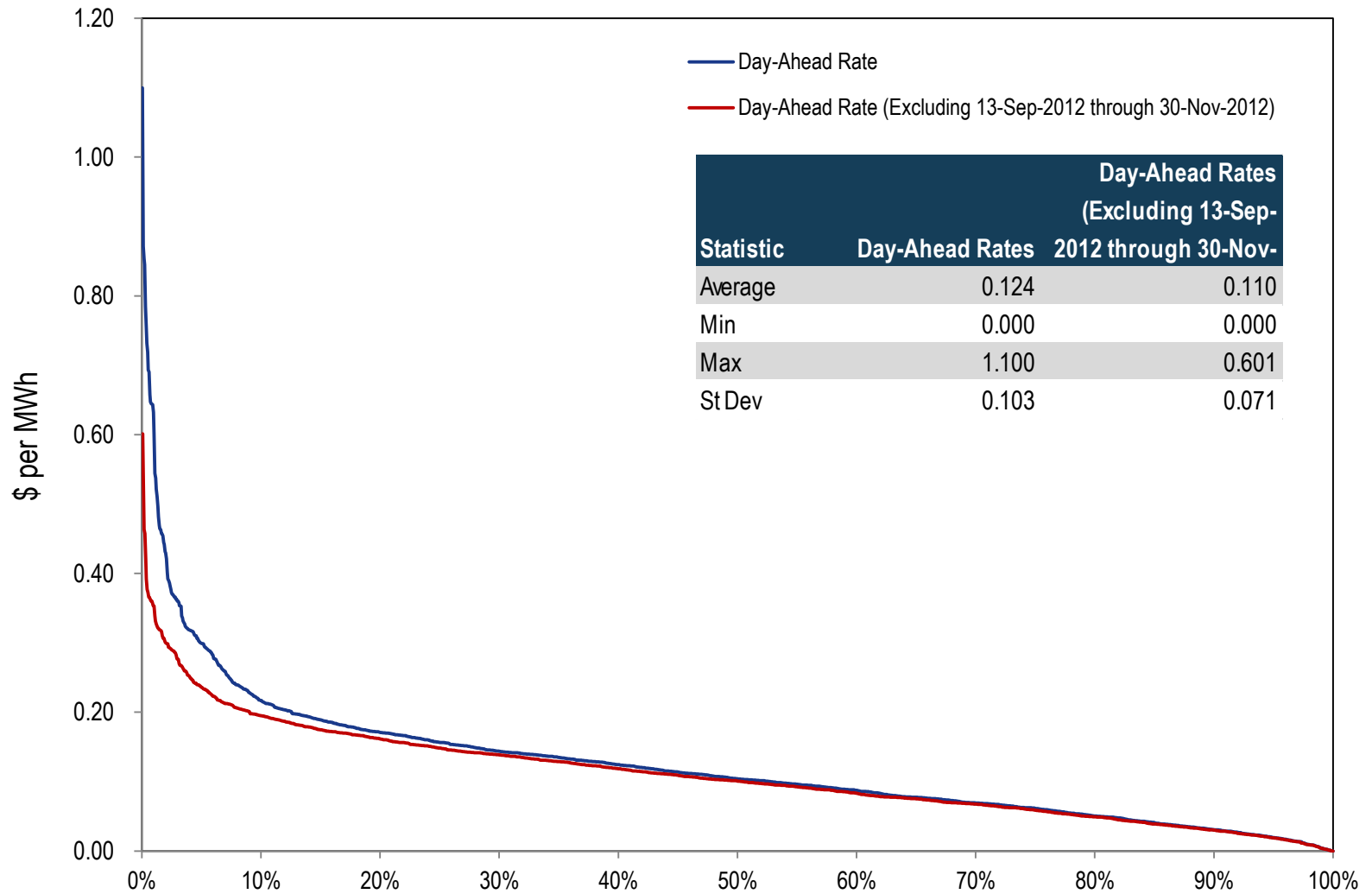


# Day-Ahead Rate





# Day-Ahead Rate



# Operating Reserves

Operating reserves can be grouped into five categories:

- Day-Ahead
- **Balancing**
- Reactive Services
- Black Start Services
- Synchronous Condensing



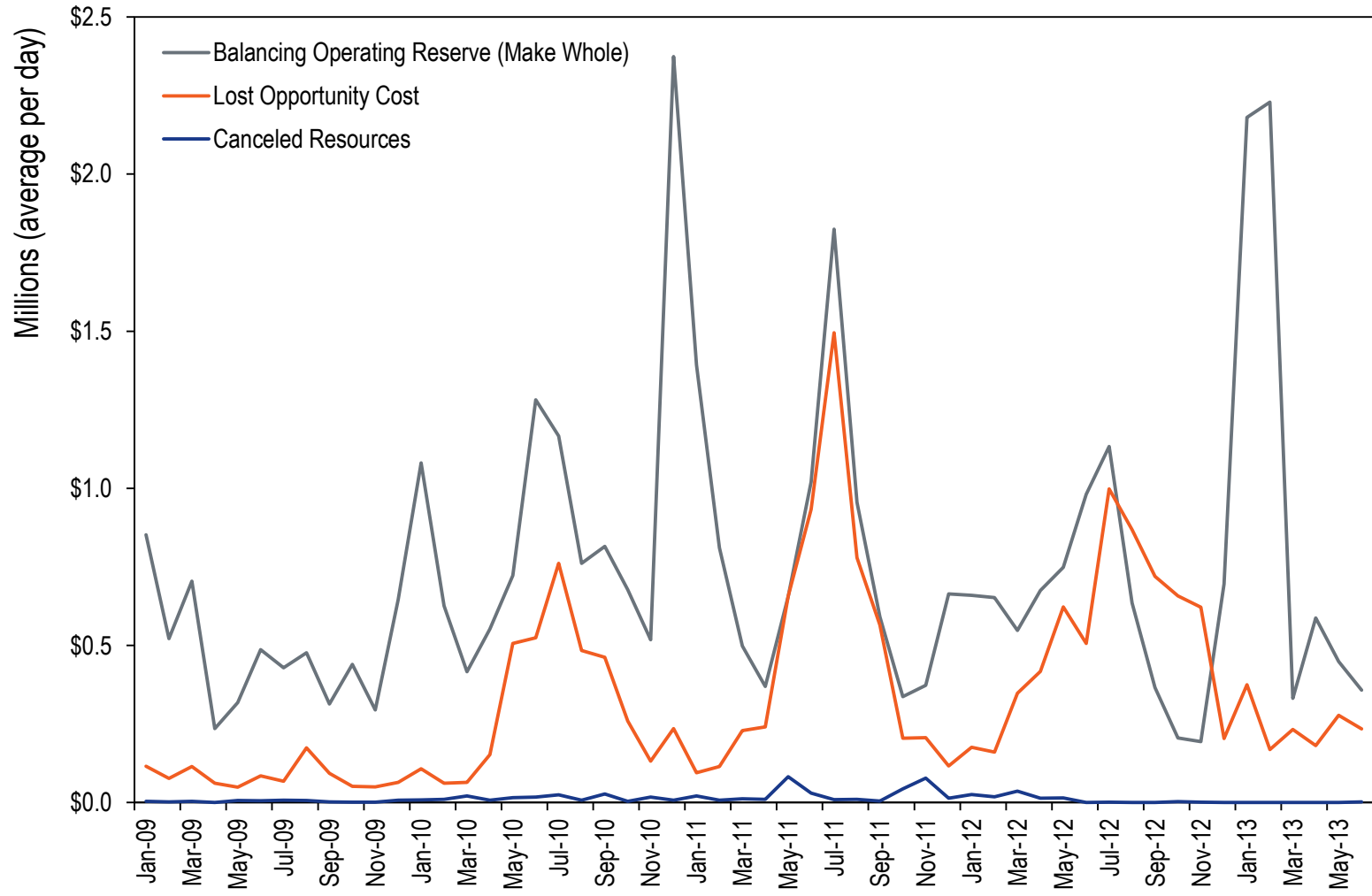
# Balancing Charges

## Balancing operating reserves:

- **Balancing (make whole)**
  - **Reliability**
    - RTO, East or West
  - **Deviations**
    - RTO, East or West
- **Lost Opportunity Cost (LOC)**
- **Canceled Resources**



# Balancing Charges

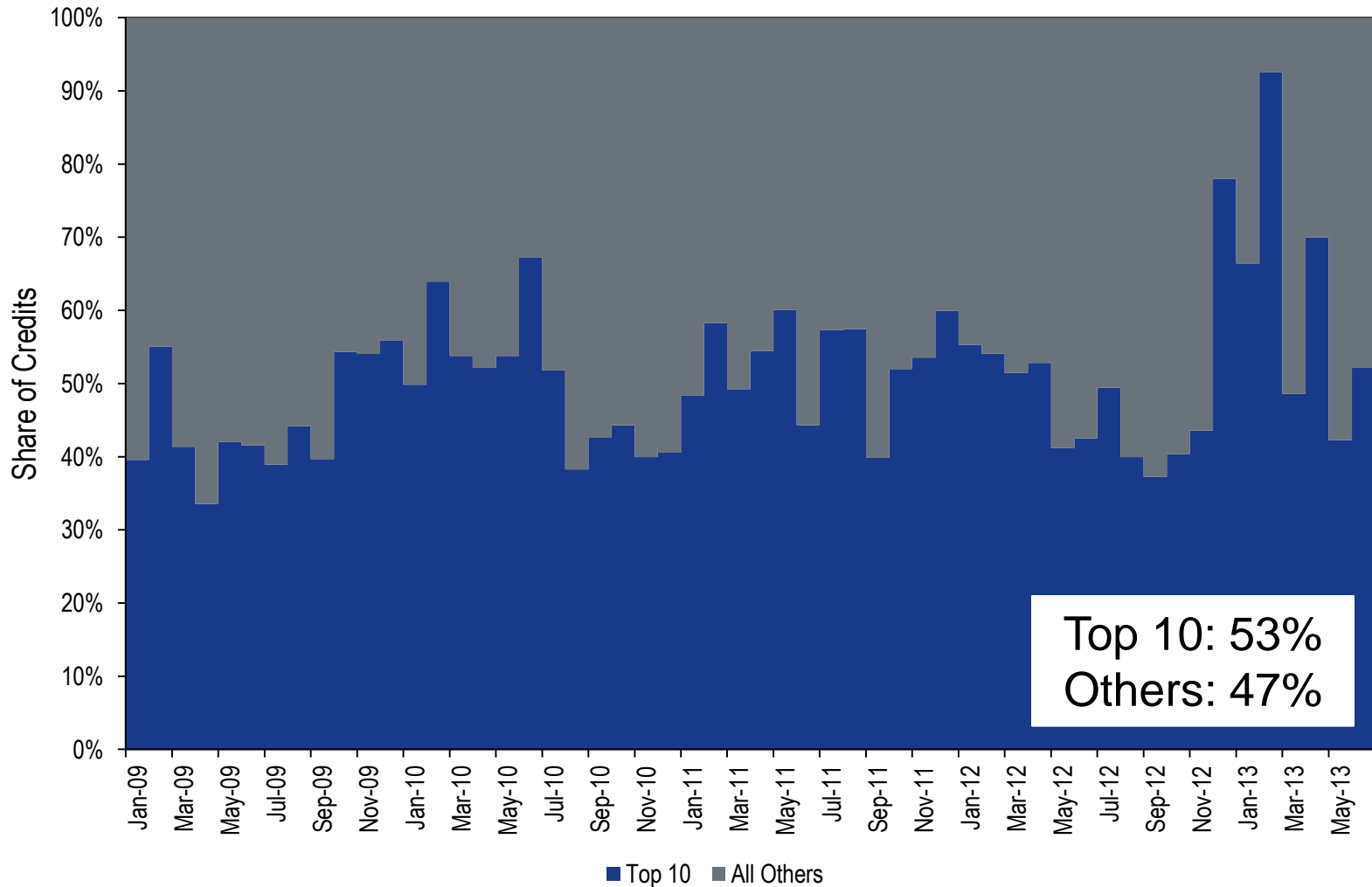


# Balancing (BOR) Charges

- **Total BOR Charges from Jan 2009 – Jun 2013:**
  - **\$1,786 million**
- **From BOR Credits (make whole):**
  - **\$1,211 million (68% of all BOR Charges)**
- **From LOC:**
  - **\$555 million (31% of all BOR Charges)**
- **From Canceled Resources:**
  - **\$20 million (1% of all BOR Charges)**
    - **\$0.3 million after Jun-2012 (wind LOC Rule): Before wind LOC rule, LOC paid to wind units was categorized as canceled resources.**

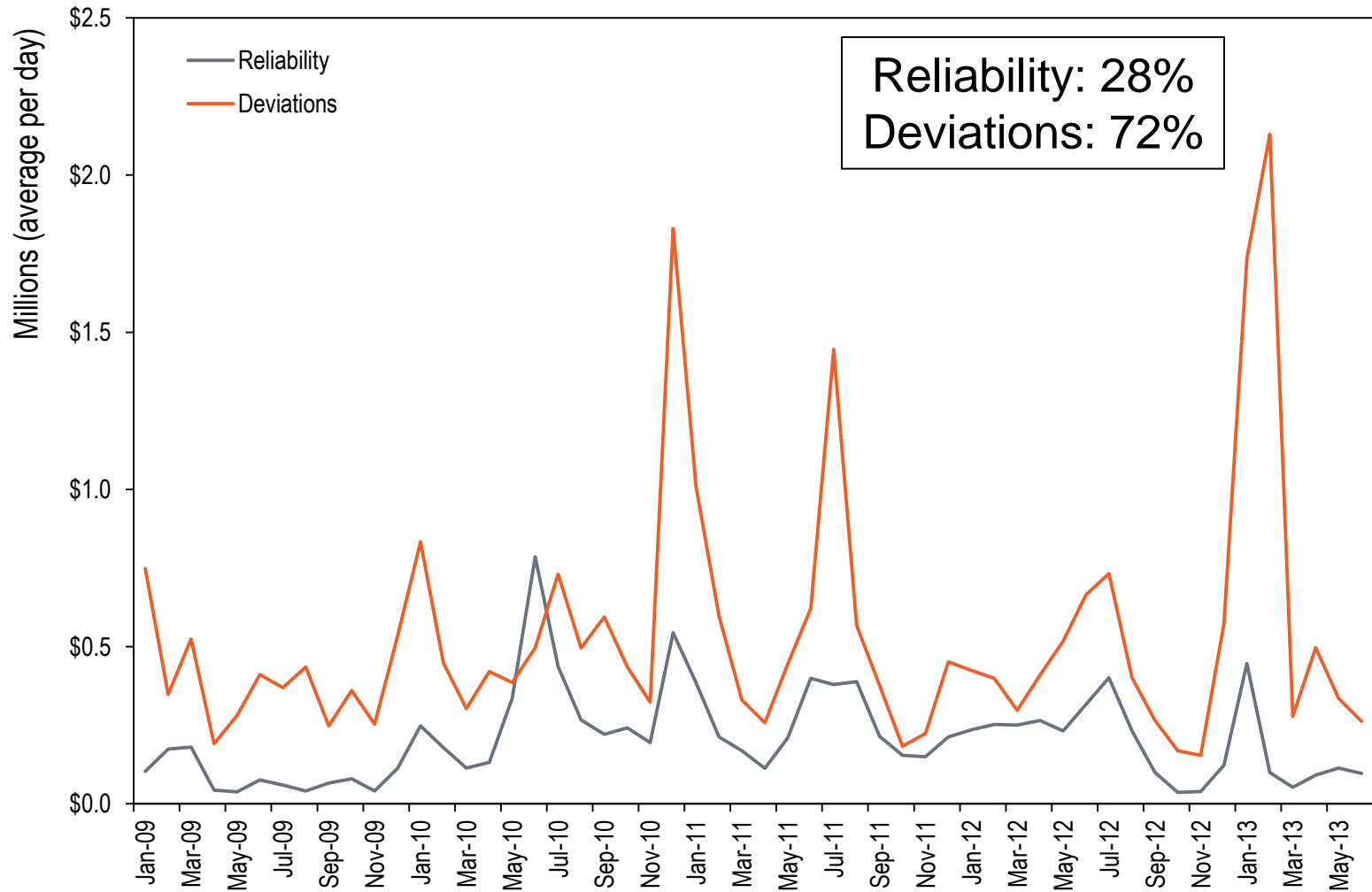


# Balancing (Make Whole) Credits Concentration

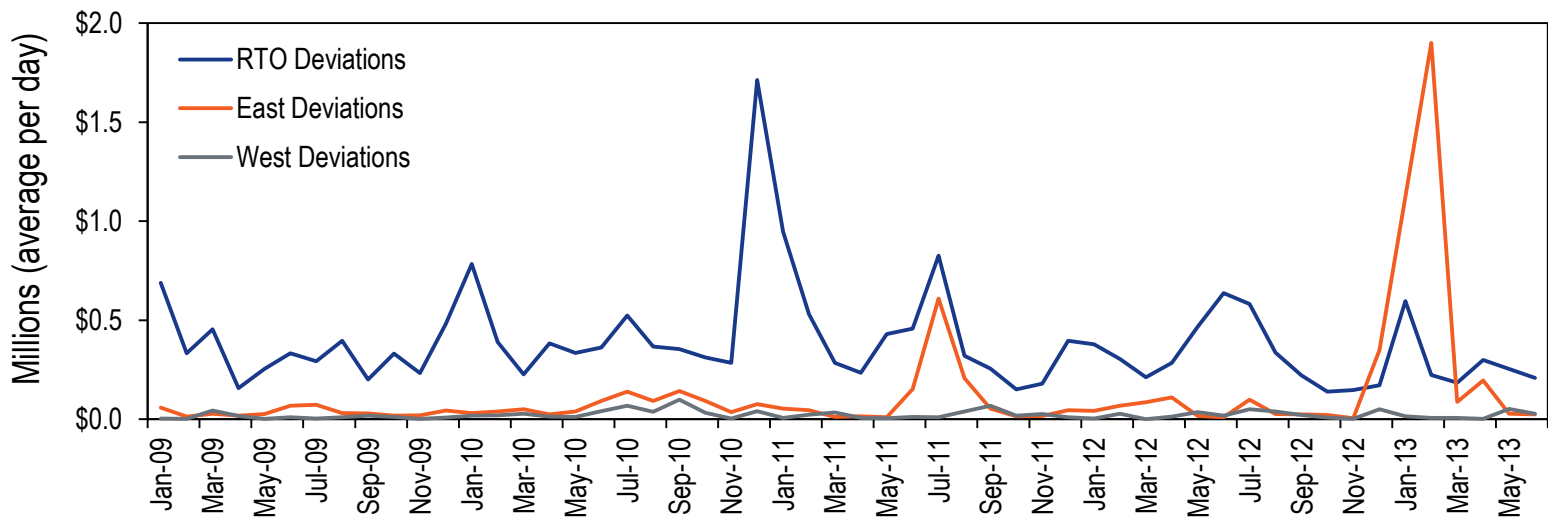
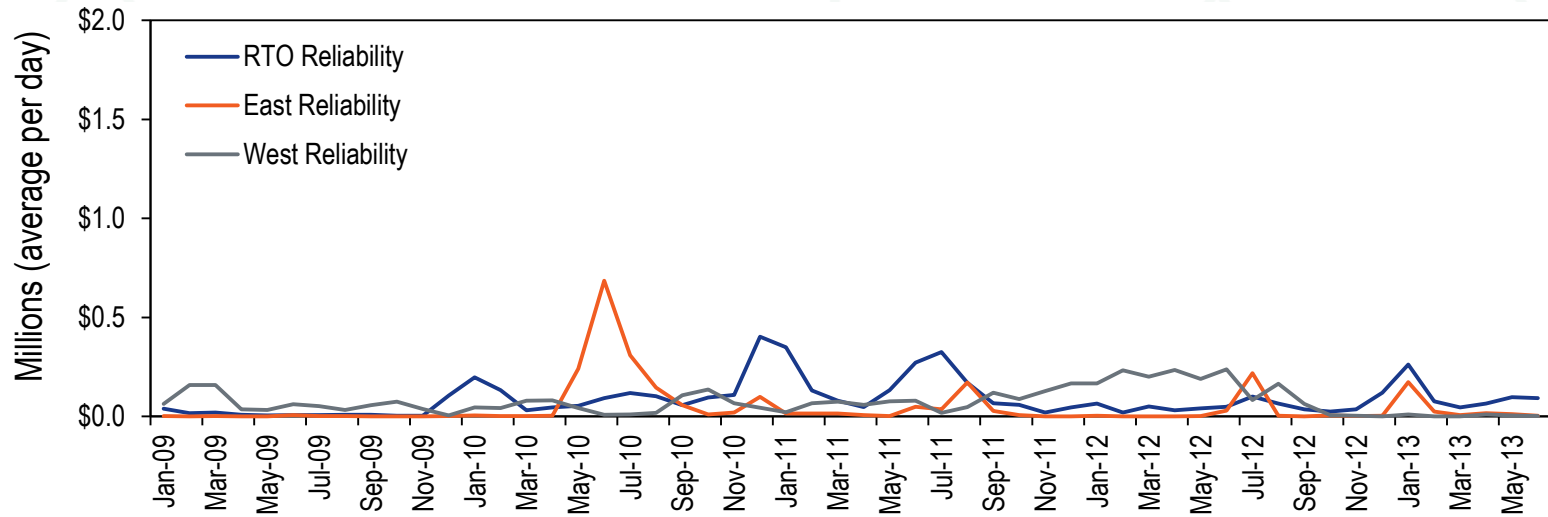


Top 10: 53%  
Others: 47%

# Balancing Charges



# Balancing Charges





# Balancing Charges Allocation

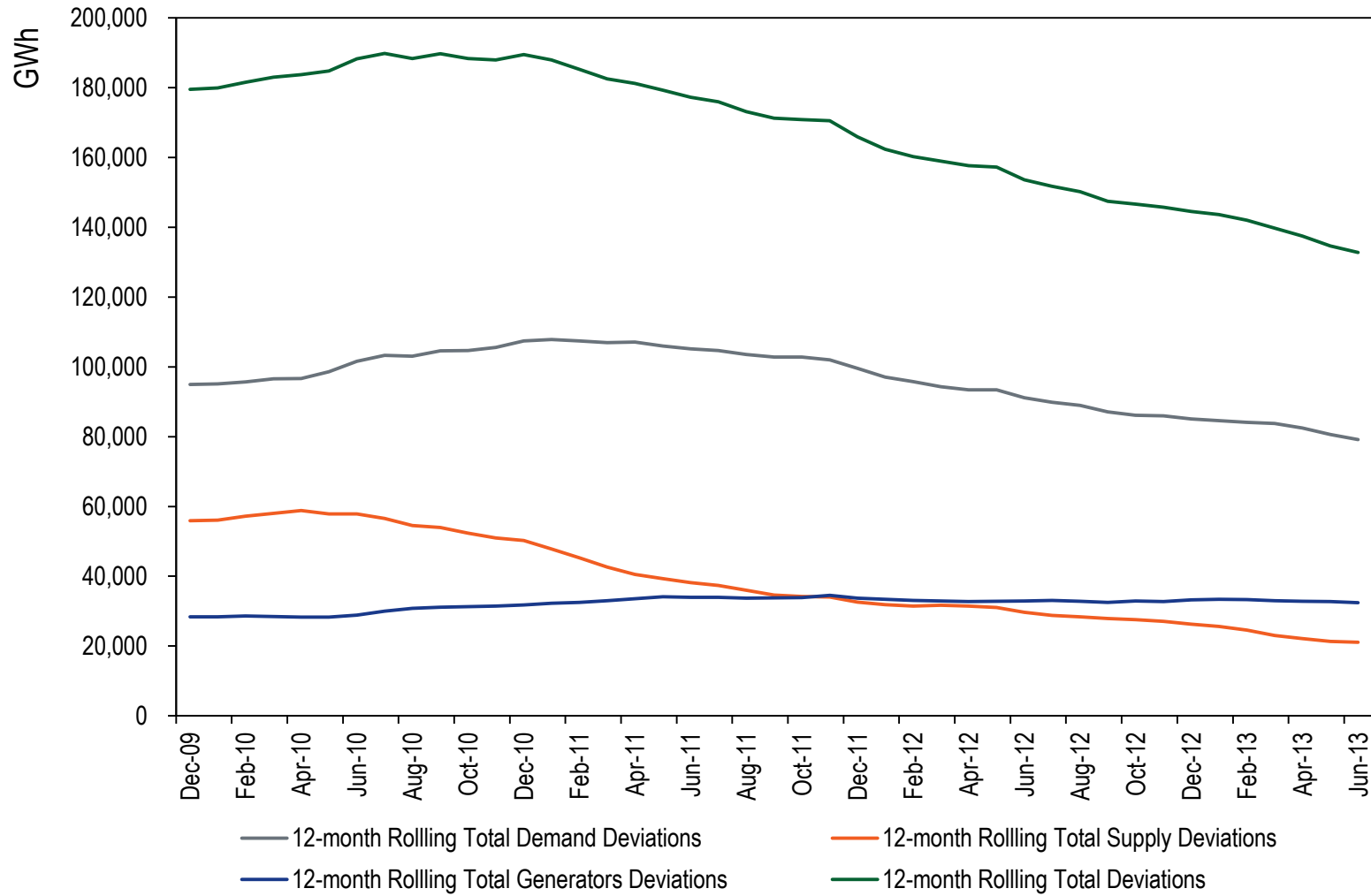
<b>Allocation</b>	<b>Jan 2009 - Nov 2012</b>	<b>Dec 2012 - Jun 2013</b>
<b>Reliability Charges</b>	<b>\$306</b>	<b>\$31</b>
RTO Share	39%	74%
East Share	22%	23%
West Share	39%	3%
<b>Deviation Charges</b>	<b>\$700</b>	<b>\$173</b>
RTO Share	82%	34%
East Share	13%	63%
West Share	4%	3%

# Balancing Allocation Recap

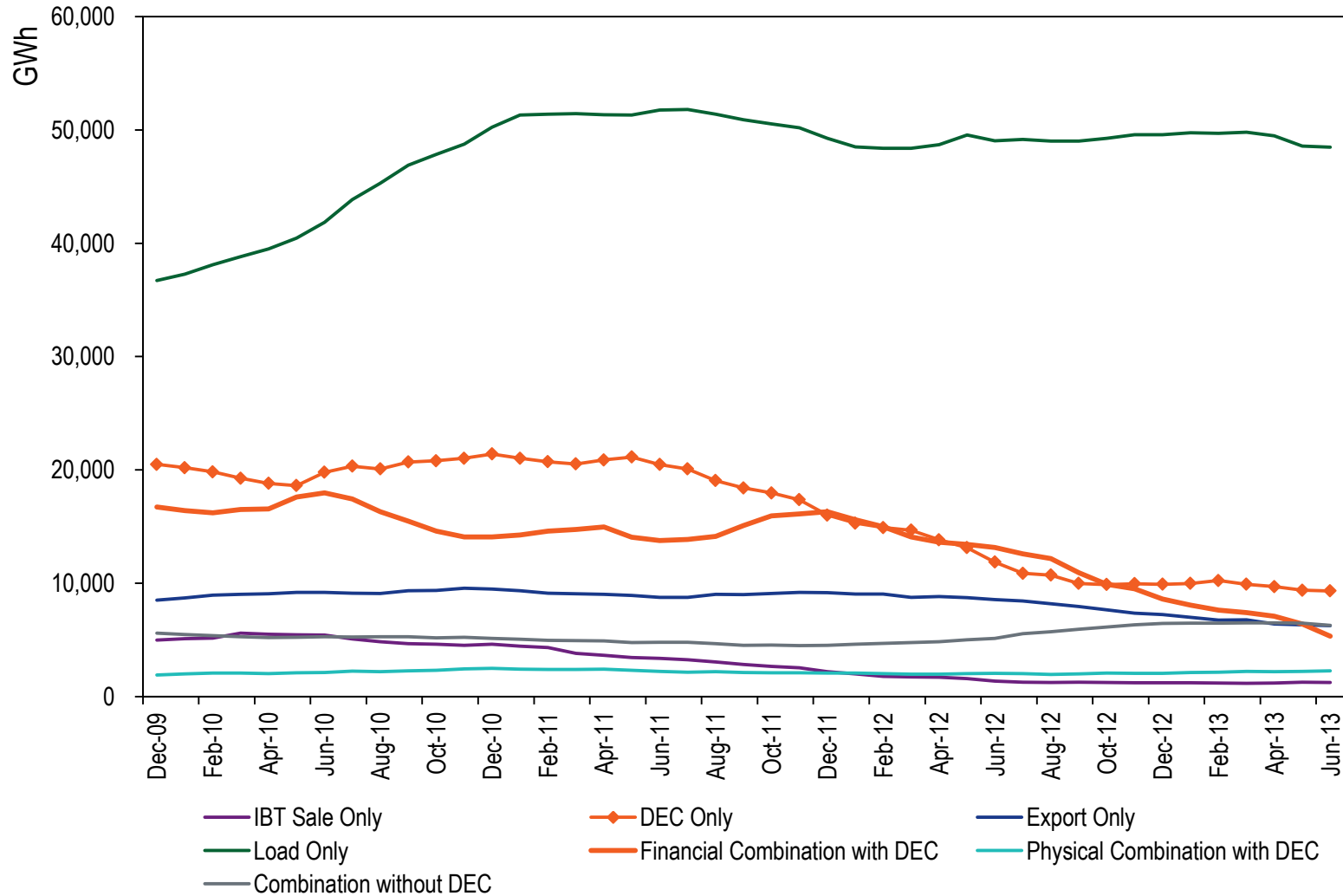
- **Reliability charges are paid by:**
  - Real-time Load
  - Real-time Exports
- **Reliability charges are allocated by region (RTO, East or West)**
- **Deviation charges are paid by:**
  - Real-time deviations from day-ahead position
  - Deviations from desired output (units and DR)
- **Deviation charges are allocated by region (RTO, East or West)**



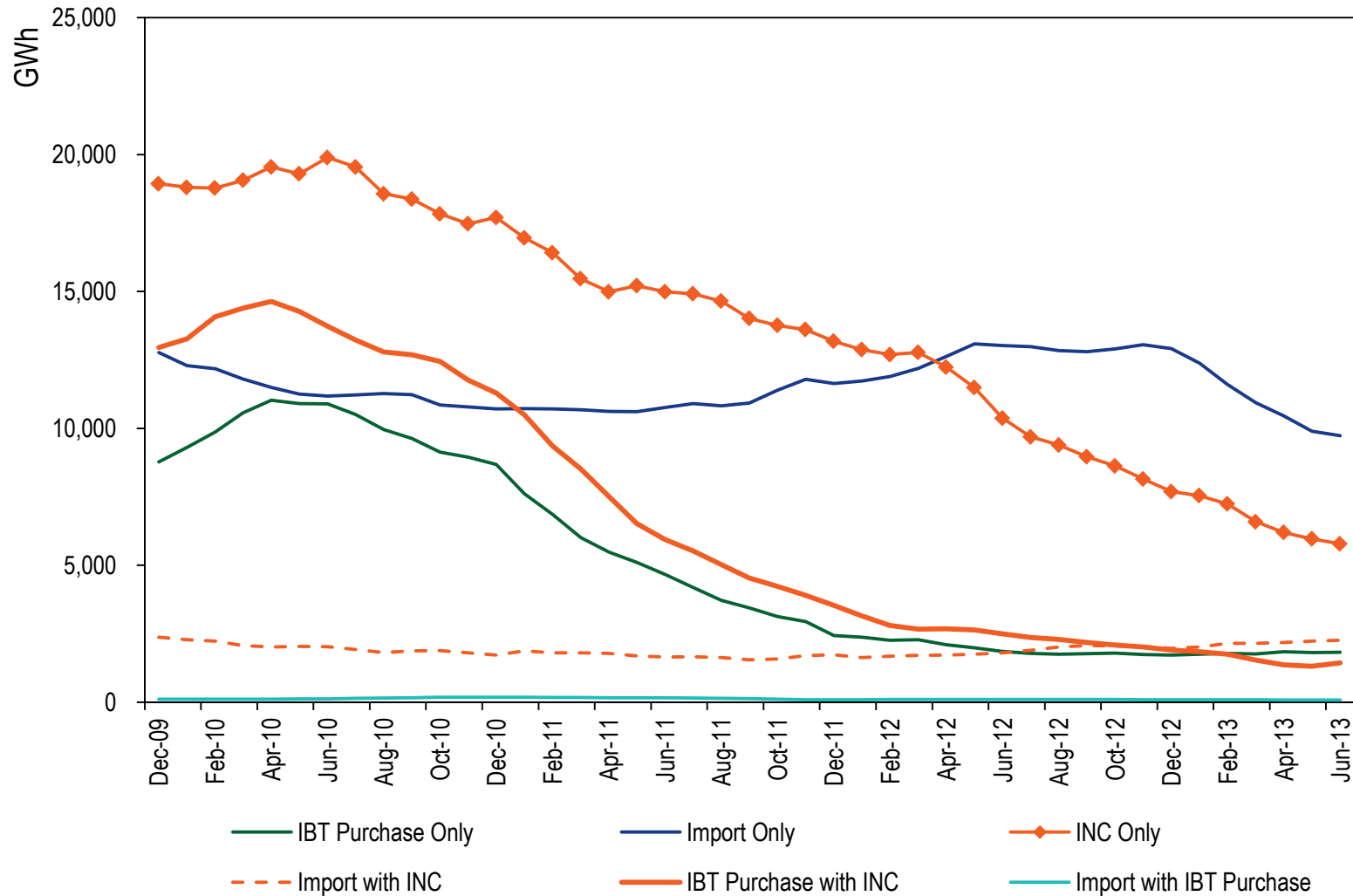
# RTO Deviations



# RTO Demand Deviations 12-month Rolling Totals



# RTO Supply Deviations 12-month Rolling Totals



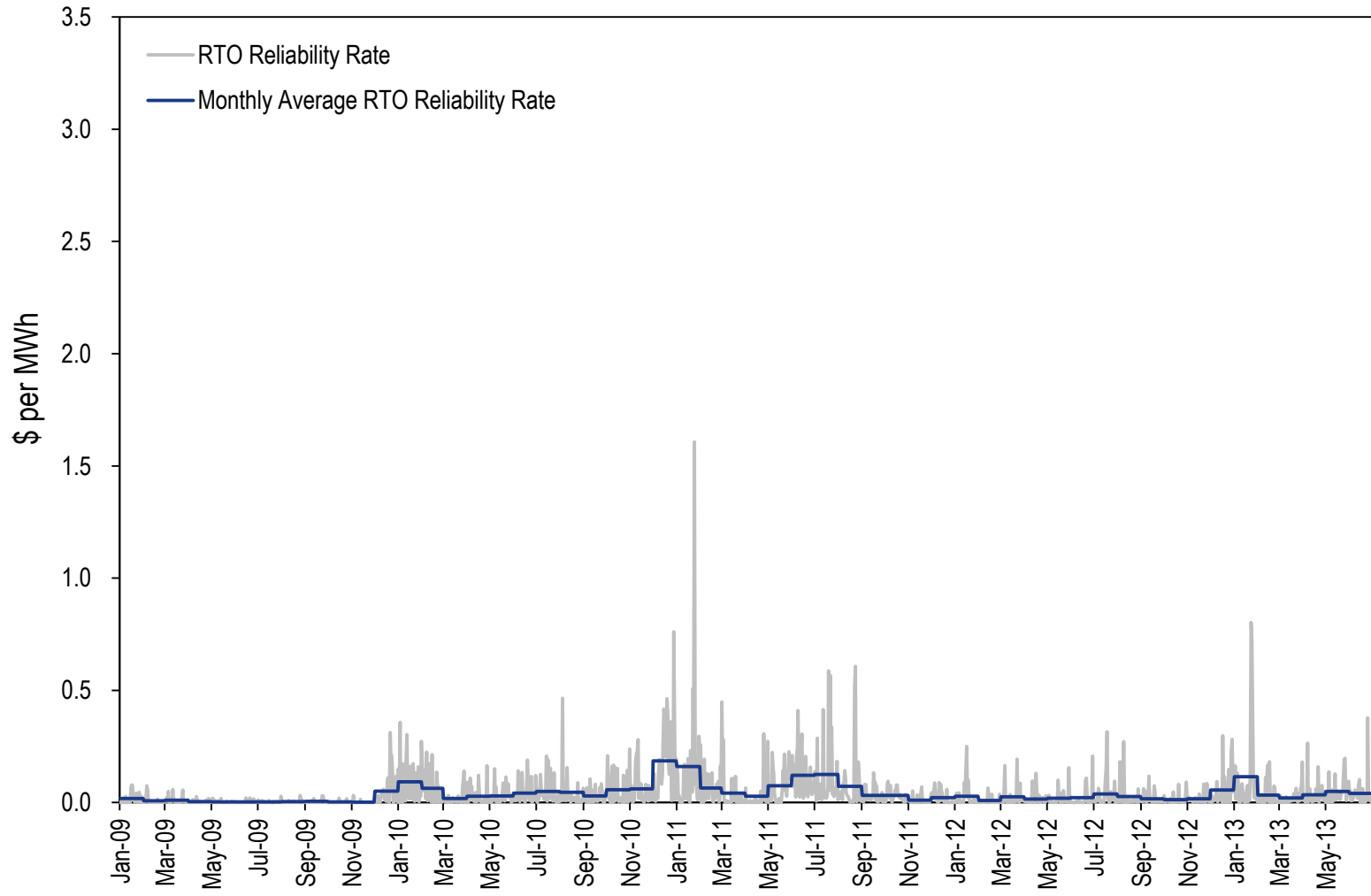
# Balancing Rates

Jan 2009 - Nov 2012	Reliability			Deviation		
	Statistics	RTO	East	West	RTO	East
Average	0.04	0.04	0.09	0.82	0.23	0.11
Minimum	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	1.61	3.08	1.03	13.37	5.18	3.78
Standard Deviation	0.08	0.17	0.10	0.90	0.56	0.28

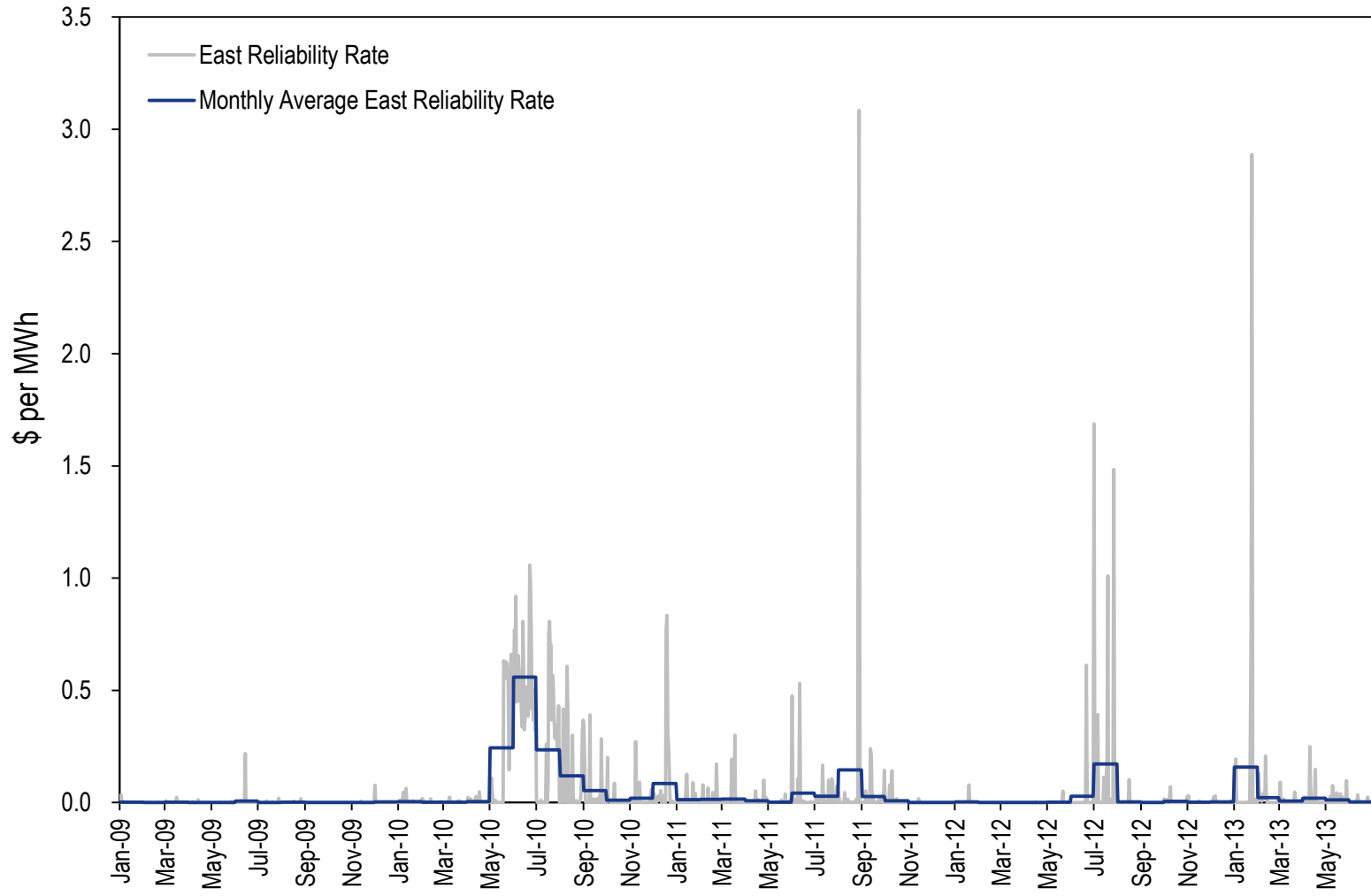
Dec 2012 - Jun 2013	Reliability			Deviation		
	Statistics	RTO	East	West	RTO	East
Average	0.05	0.03	0.00	0.77	2.77	0.13
Minimum	0.00	0.00	0.00	0.01	0.00	0.00
Maximum	0.80	2.89	0.13	10.23	32.88	2.10
Standard Deviation	0.09	0.21	0.02	1.16	5.75	0.37

Average Rates	Reliability			Deviation		
	RTO	East	West	RTO	East	West
Jan 2009 - Nov 2012	0.04	0.04	0.09	0.82	0.23	0.11
Dec 2012 - Jun 2013	0.05	0.03	0.00	0.77	2.77	0.13
Difference	0.01	(0.01)	(0.09)	(0.04)	2.54	0.02
Percentage	28%	(29%)	(96%)	(5%)	1,122%	22%

# RTO Reliability Rate

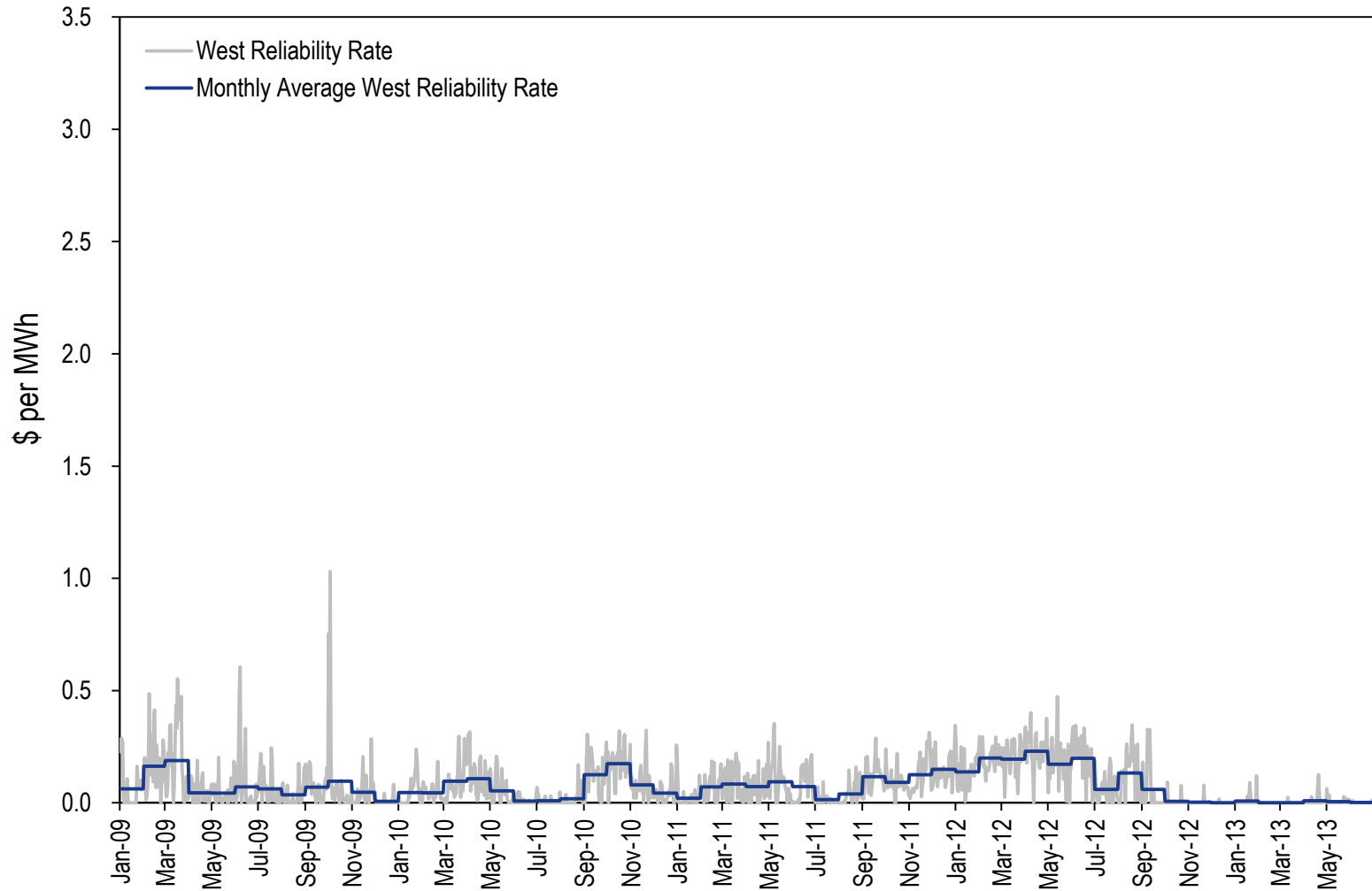


# East Reliability Rate

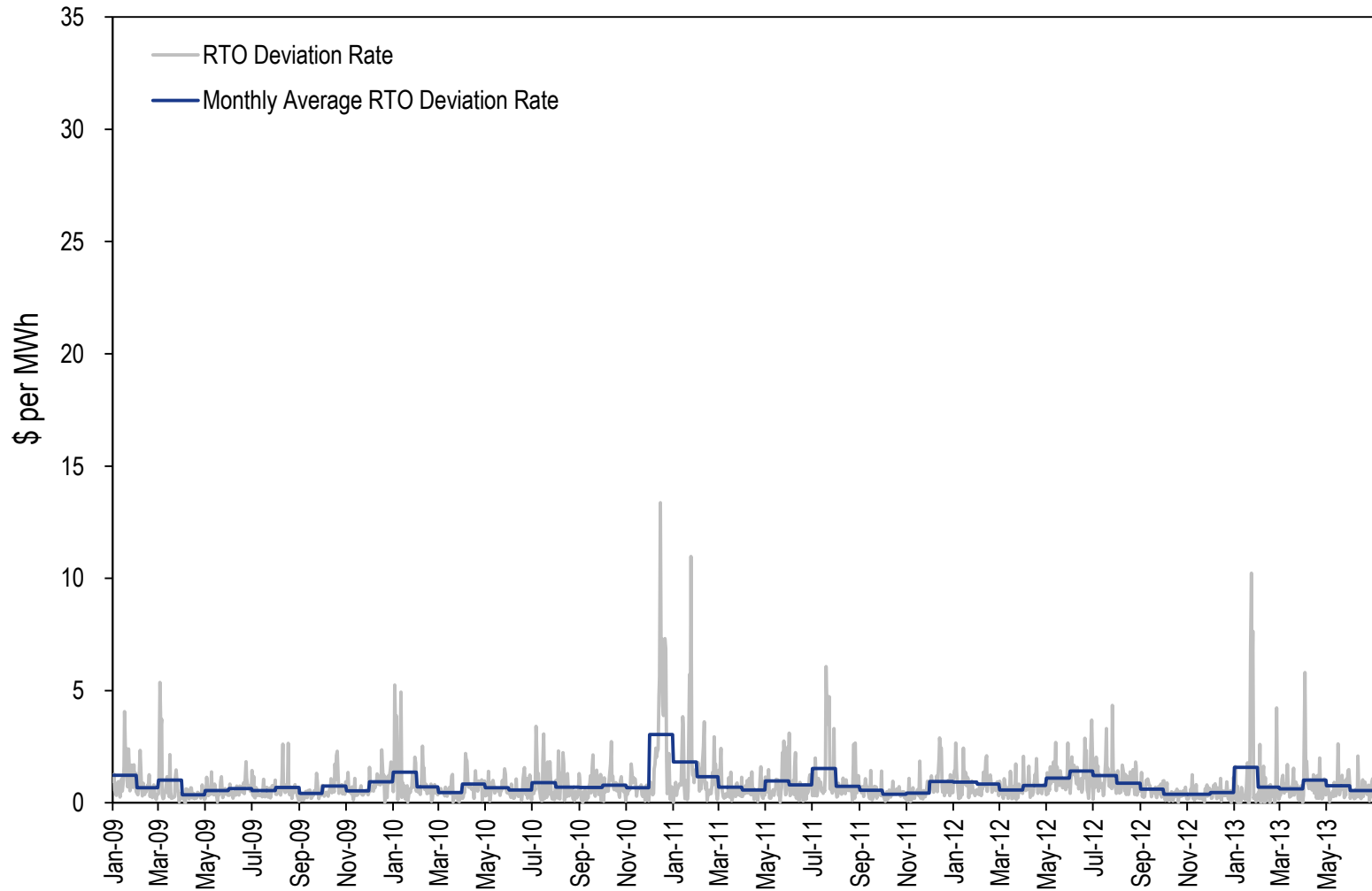




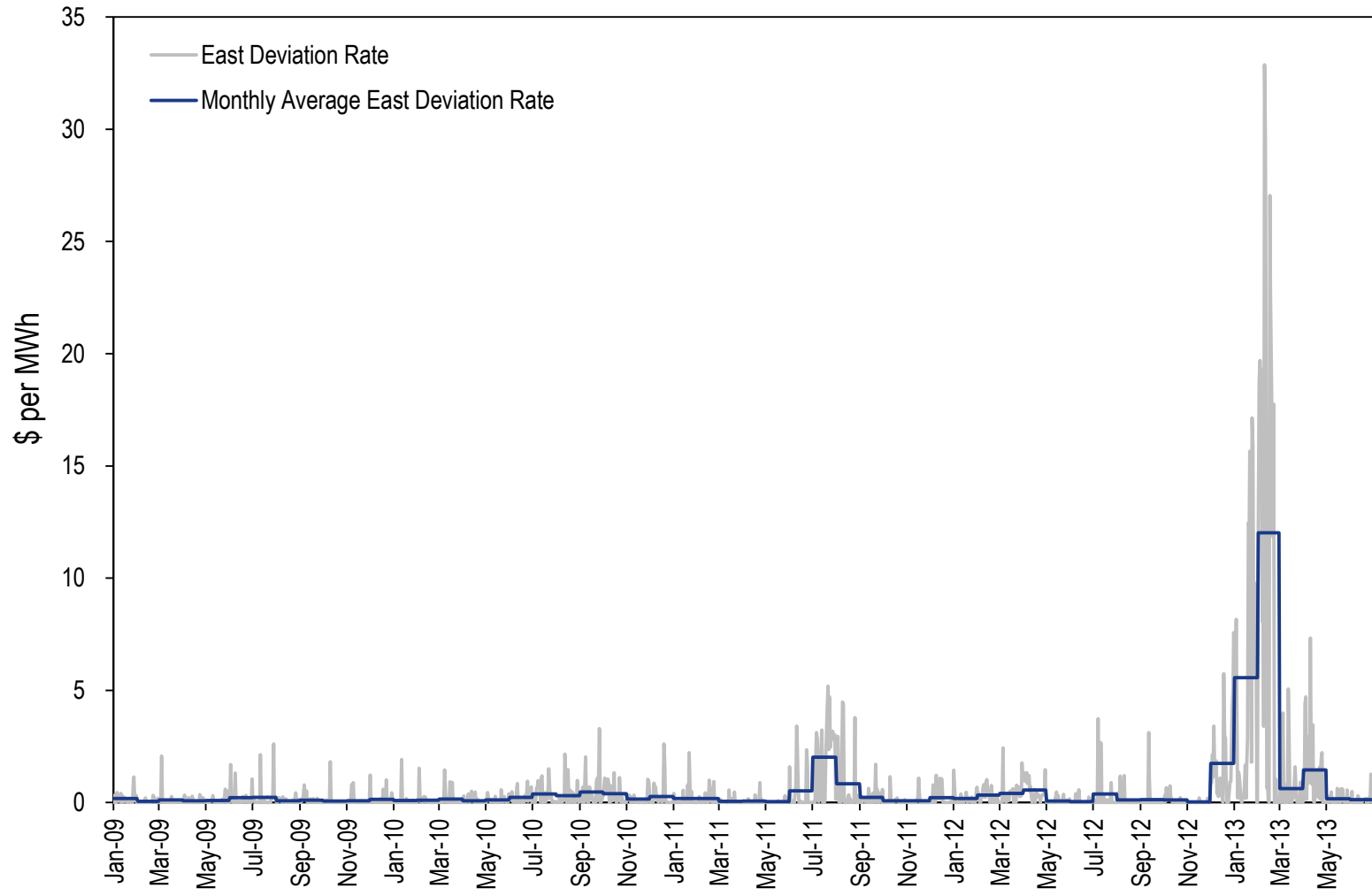
# West Reliability Rate



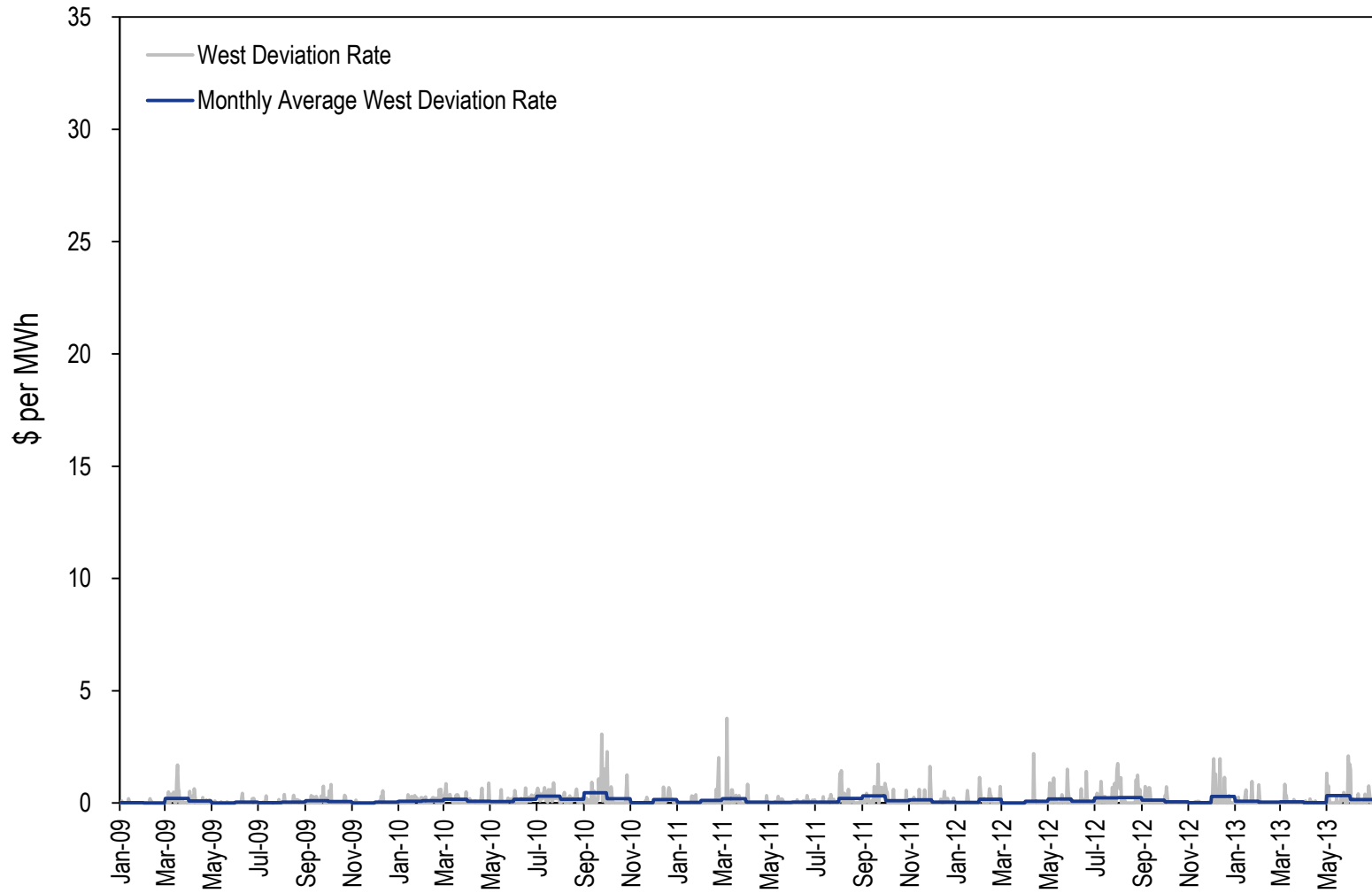
# RTO Deviation Rate



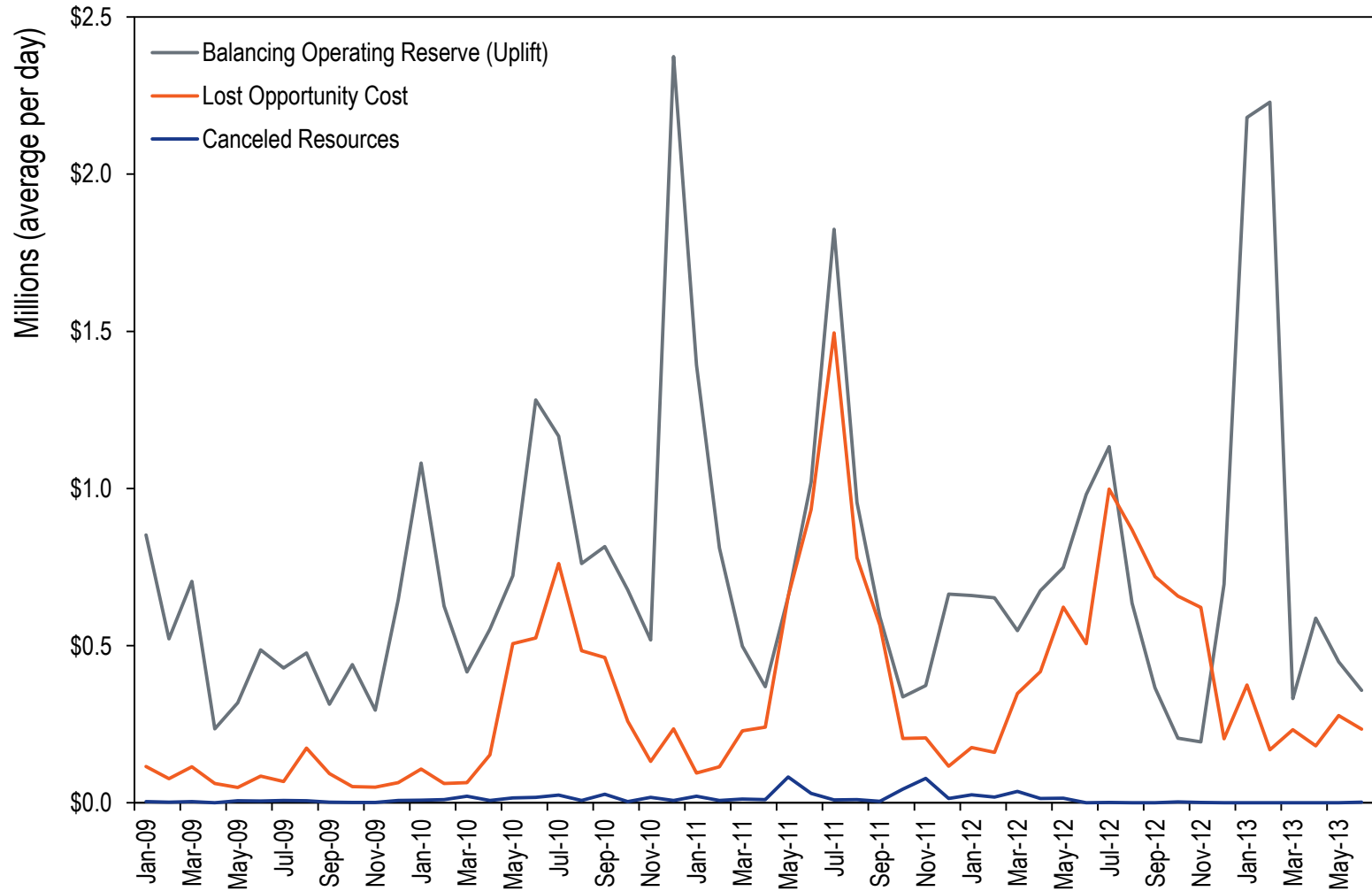
# East Deviation Rate



# West Deviation Rate



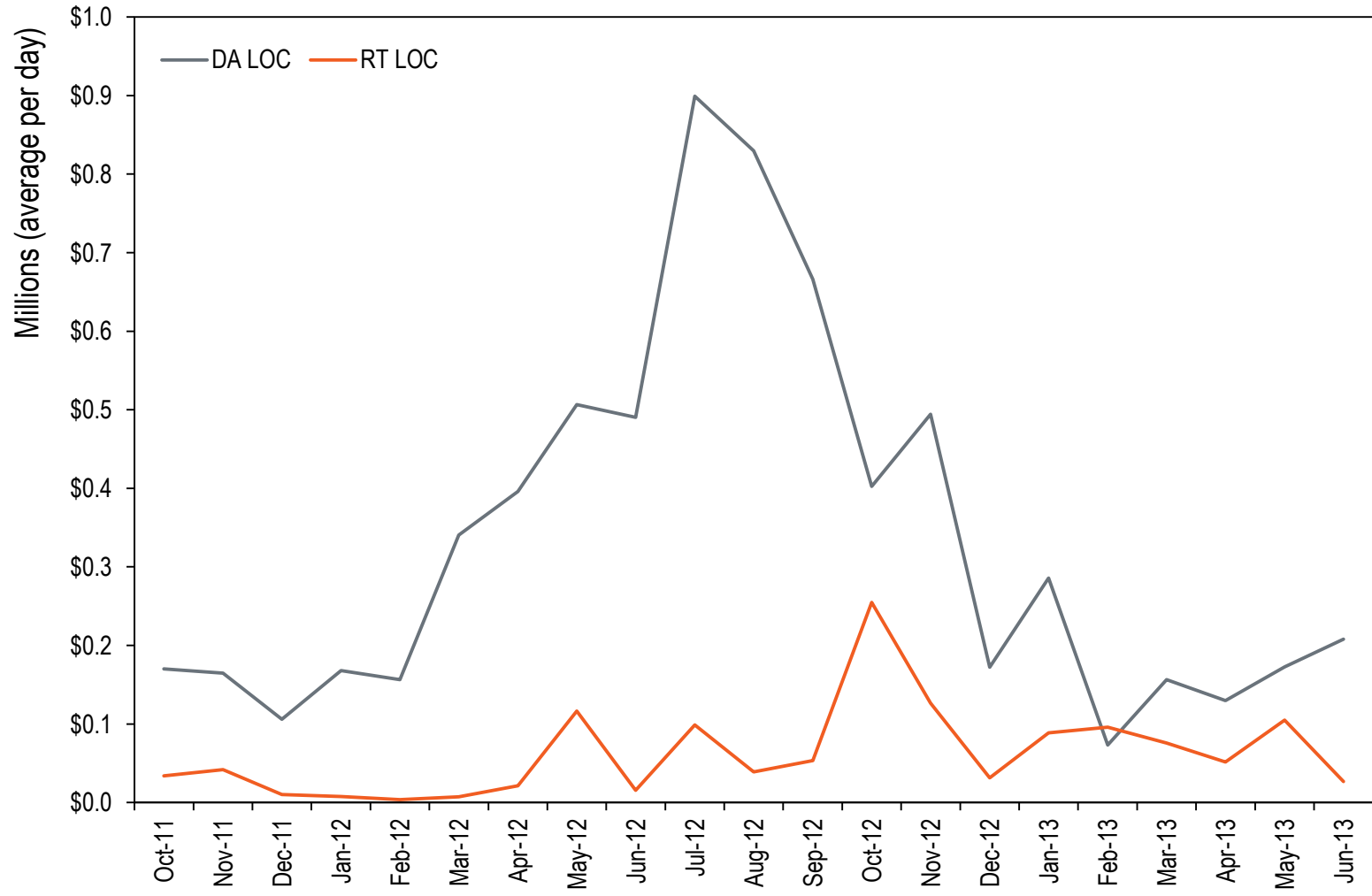
# Lost Opportunity Cost



# Lost Opportunity Cost Recap

- **LOC is paid to units when:**
  - **Combustion turbine or diesel scheduled DA not called in RT. For purposes of this presentation, labeled as DA LOC.**
  - **Units reduced in real-time. For purposes of this presentation, labeled as RT LOC.**
- **LOC is paid by RTO deviations.**
- **Currently PJM posts one RTO Deviation Rate which combines the RTO Deviation Charges and the LOC Charges.**

# Lost Opportunity Cost



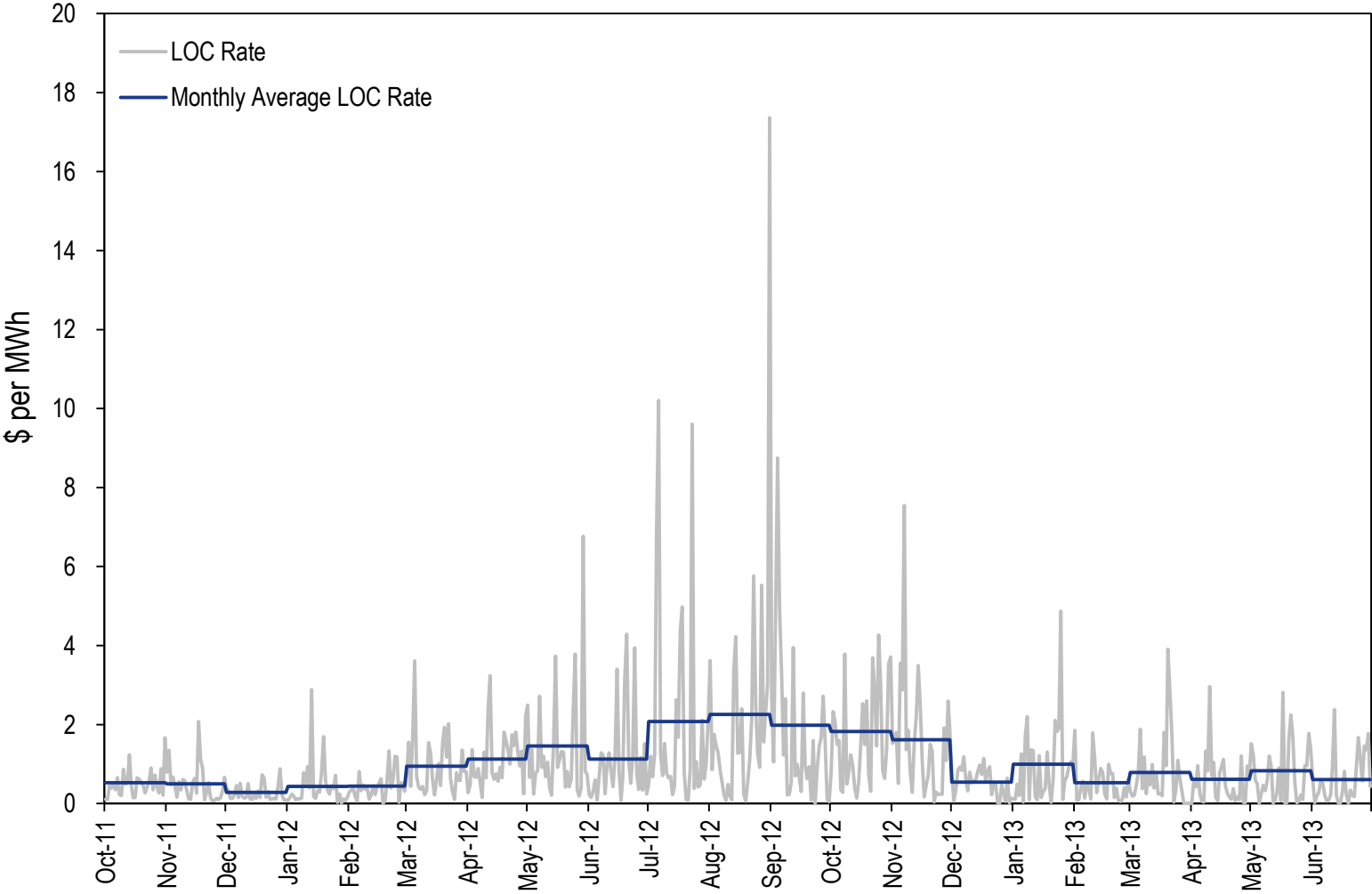
# Lost Opportunity Cost

- **LOC from Oct-2011 through Jun-2013: \$253 million**
  - **Oct-2011: LOC calculations in settlement software were corrected to take into account “higher of price vs. cost offer” rule.**
- **DA LOC: \$214 million (84%)**
- **RT LOC: \$40 million (16%)**

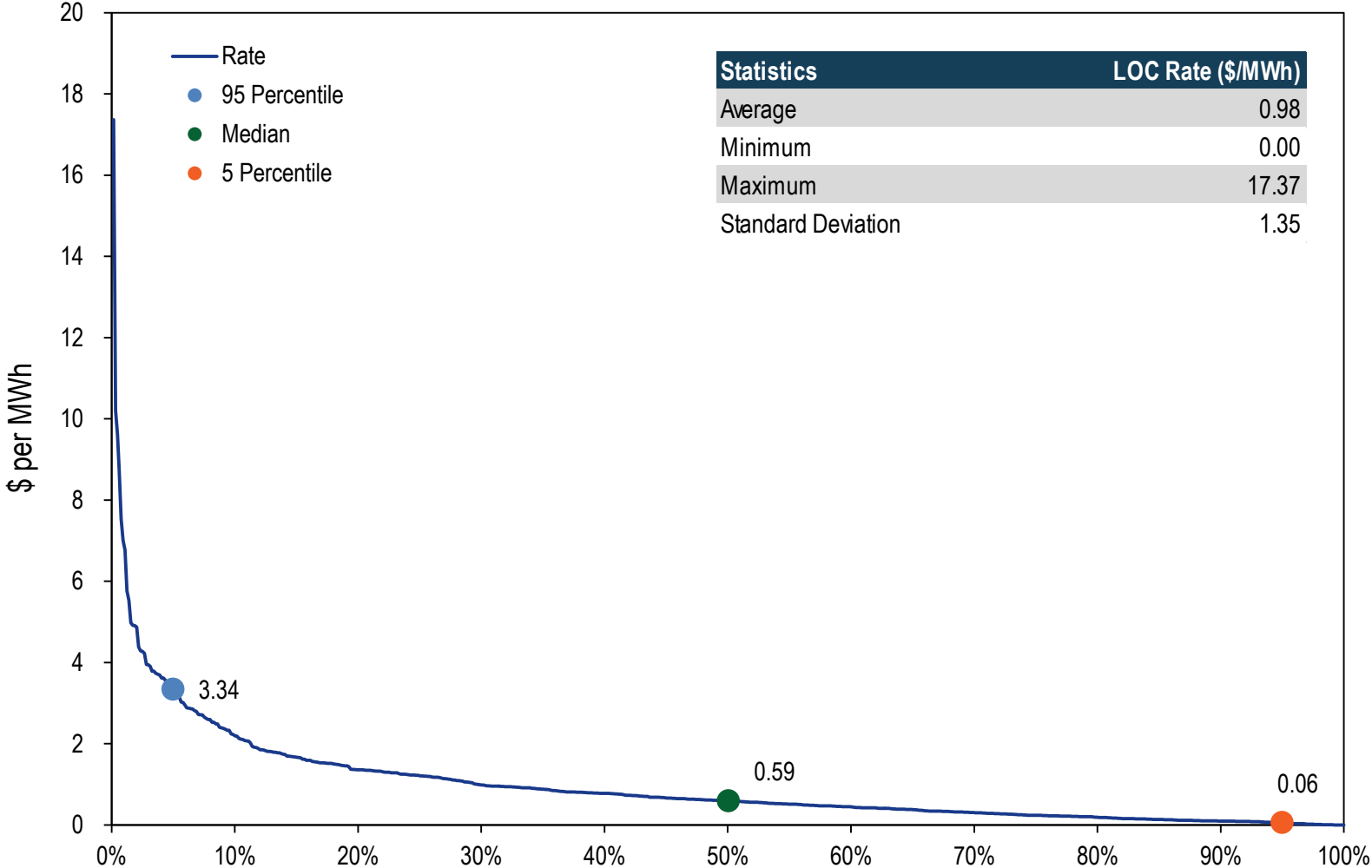




# LOC Rate



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