Analysis of Price Formation Compromise Proposal

MC

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Elements of Compromise Proposal

- No scarcity true up mechanism in the capacity market
- Penalty factor rises from $1,000 per MWh to $2,000 per MWh during hot and cold weather alerts
- Two year phase in of penalty factor
- ORDC slope adjustments
  - 30 to 20 minute uncertainty
  - Removed outlier units in forced outage risk calculation
- Reserve price cap of $4,000
- Increase in DR participation limit in synchronized reserve market

Scarcity True Up Mechanism

- **The scarcity true up mechanism is necessary for an efficient, effective, and equitable transfer of scarcity revenues from the capacity market to the energy market.**
- **The compromise proposal creates a windfall to generators.**
- **The compromise proposal does not support a long term transition to the energy market as a daily source of scarcity rents.**

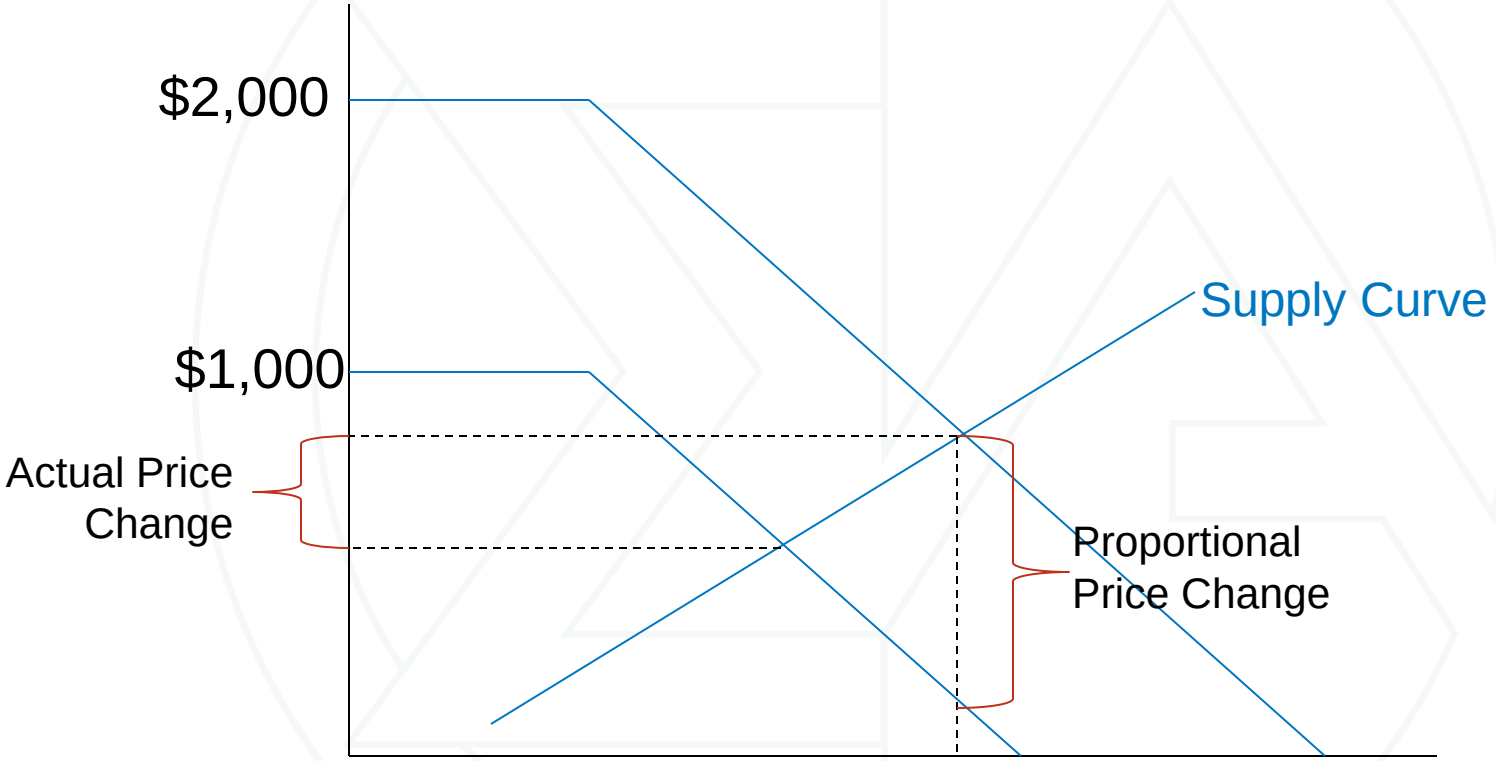
Penalty Factor

- **Hot and cold weather alerts are the wrong trigger for raising the penalty factor from $1,000 per MWh to $2,000 per MWh.**
- **Greater than $1,000 per MWh is only needed when PJM approves cost-based offers over $1,000 per MWh.**
- **Hot and cold weather alerts are much more frequent.**
- **Hot and cold weather alerts may only apply to a subsection of the PJM footprint.**
- **Hot and cold weather alerts may only apply for a portion of the day, creating sudden intraday market transitions.**

Penalty Factor and Revenues

- **The penalty factor is not directly proportional to the reserve or energy price impact of the ORDC.**
- **Prices result from both supply and demand.**
- **Lowering the demand curve does not decrease prices by the dollar or percent amount of the decrease.**

Penalty Factor and Revenues



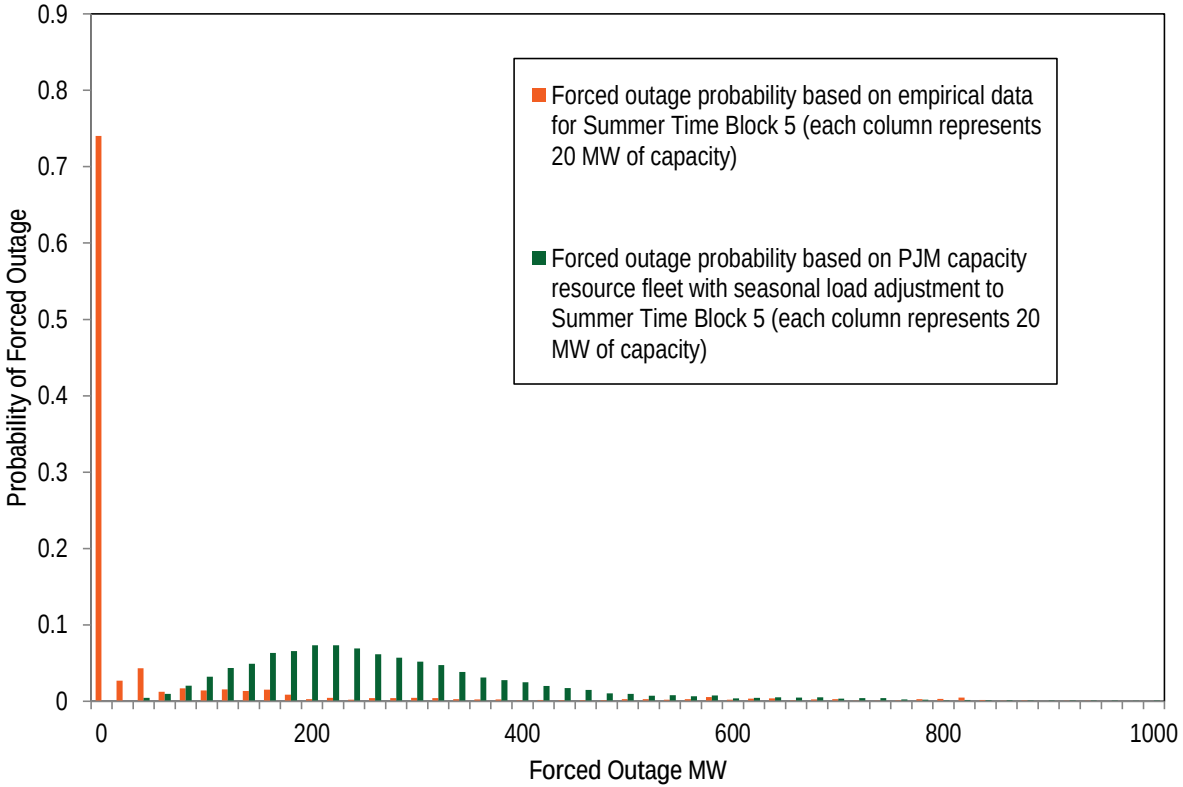
ORDC Slope Forecast Time Horizon

- **Forecast error is not a good predictor of operator actions.**
- **The relevant forecast error for 10 minute reserves is no greater than 15 minutes.**
- **The compromise proposal does not address the time horizon for 30 minute reserves.**

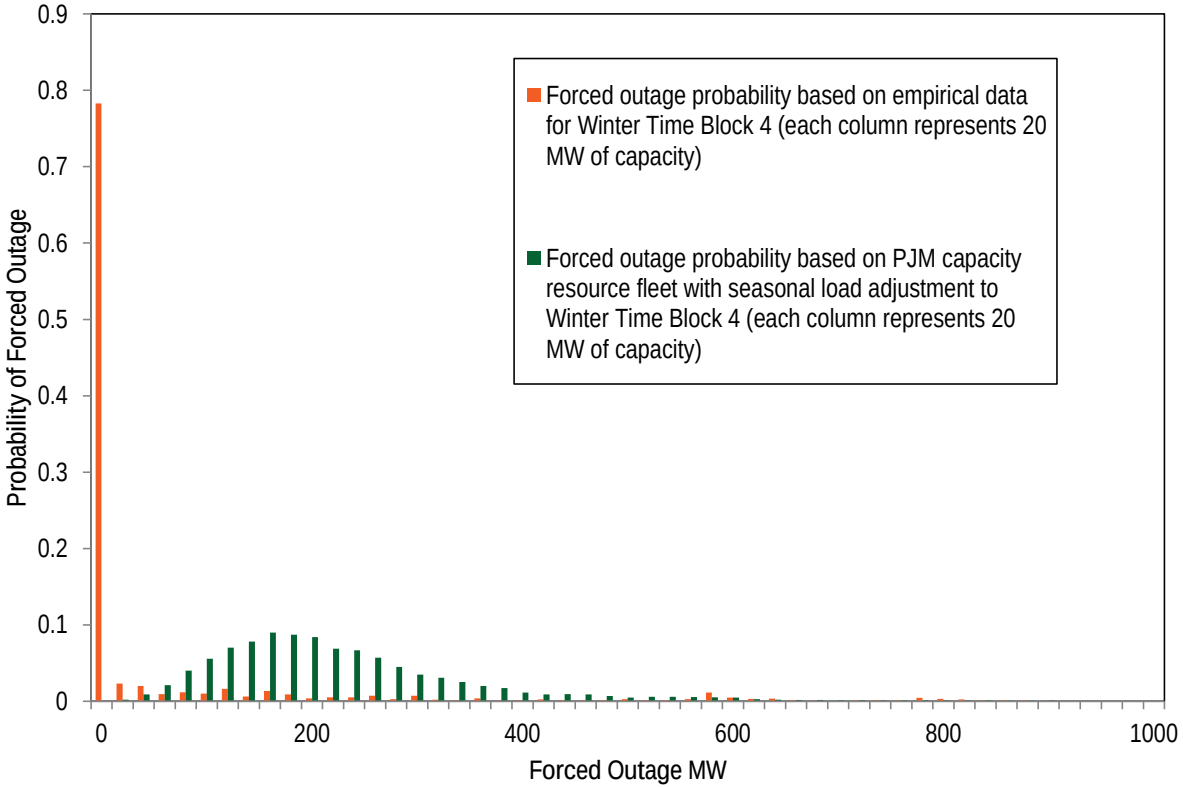
ORDC Forced Outage Distribution

- **PJM's approach to the inclusion of forced outages in the ORDC is not accurate.**
- **PJM's approach overstates the forced outage MW and the ORDC.**
- **PJM's approach assumes that all units are always online.**
- **PJM's approach misses the fact that there is a significant probability of zero outages for each 30 minute time horizon.**
- **Removing 30 units from PJM's calculation does not correct the problem.**

Forced Outage Distributions



Forced Outage Distributions



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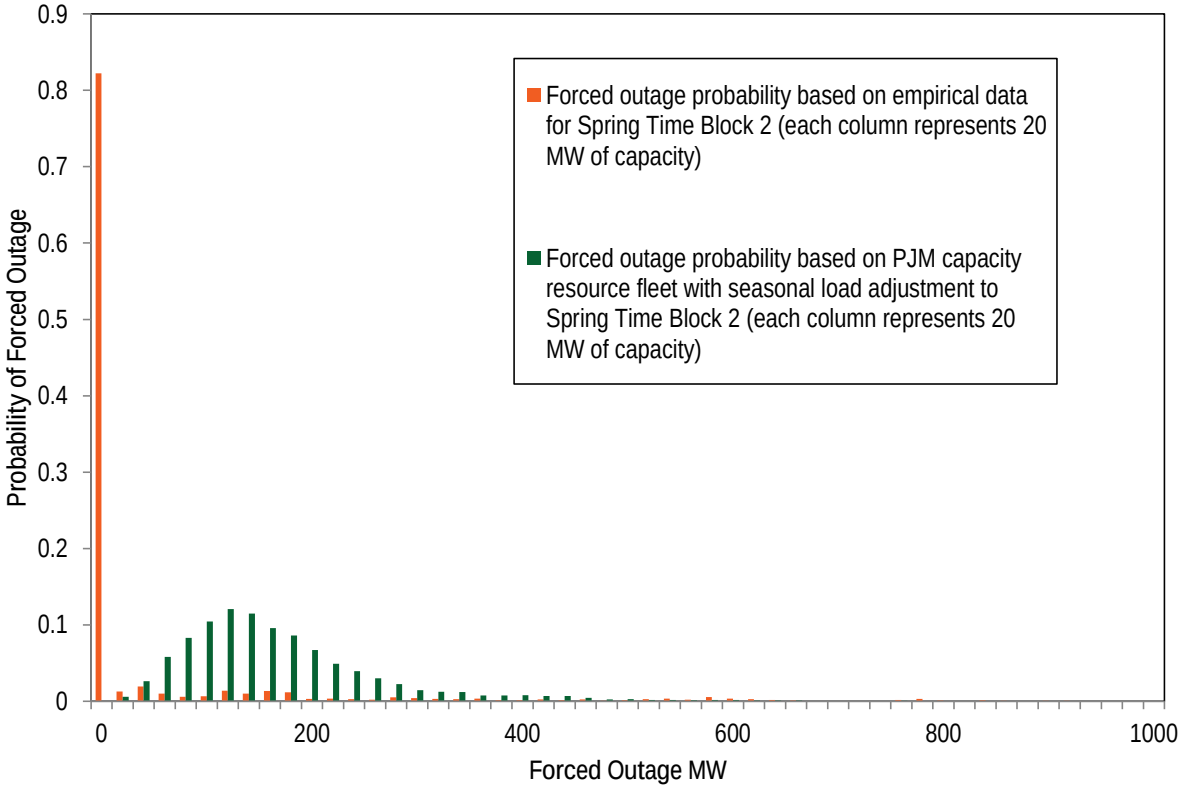
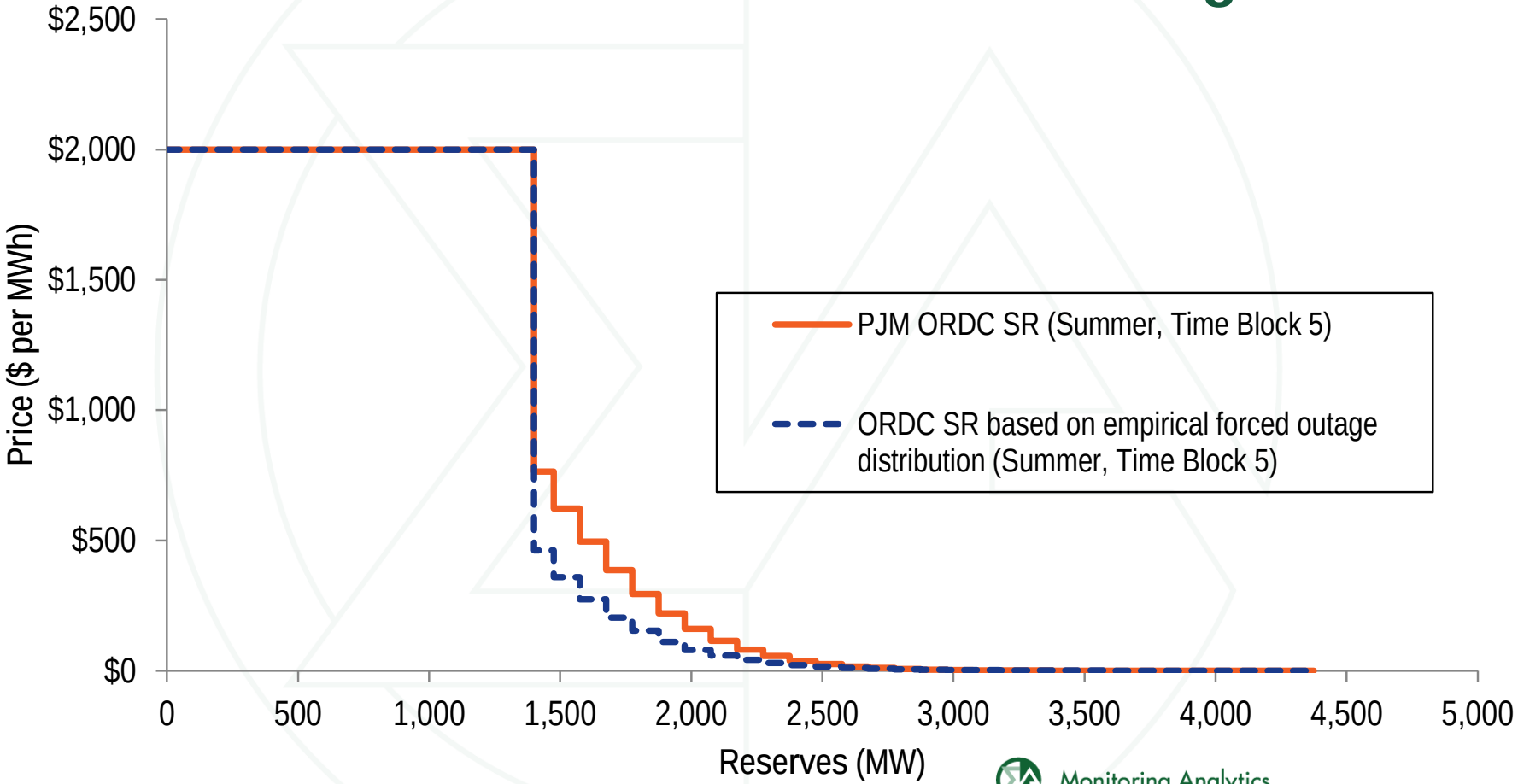
Forced Outage Distributions



PJM ORDC with Corrected Forced Outage Rate



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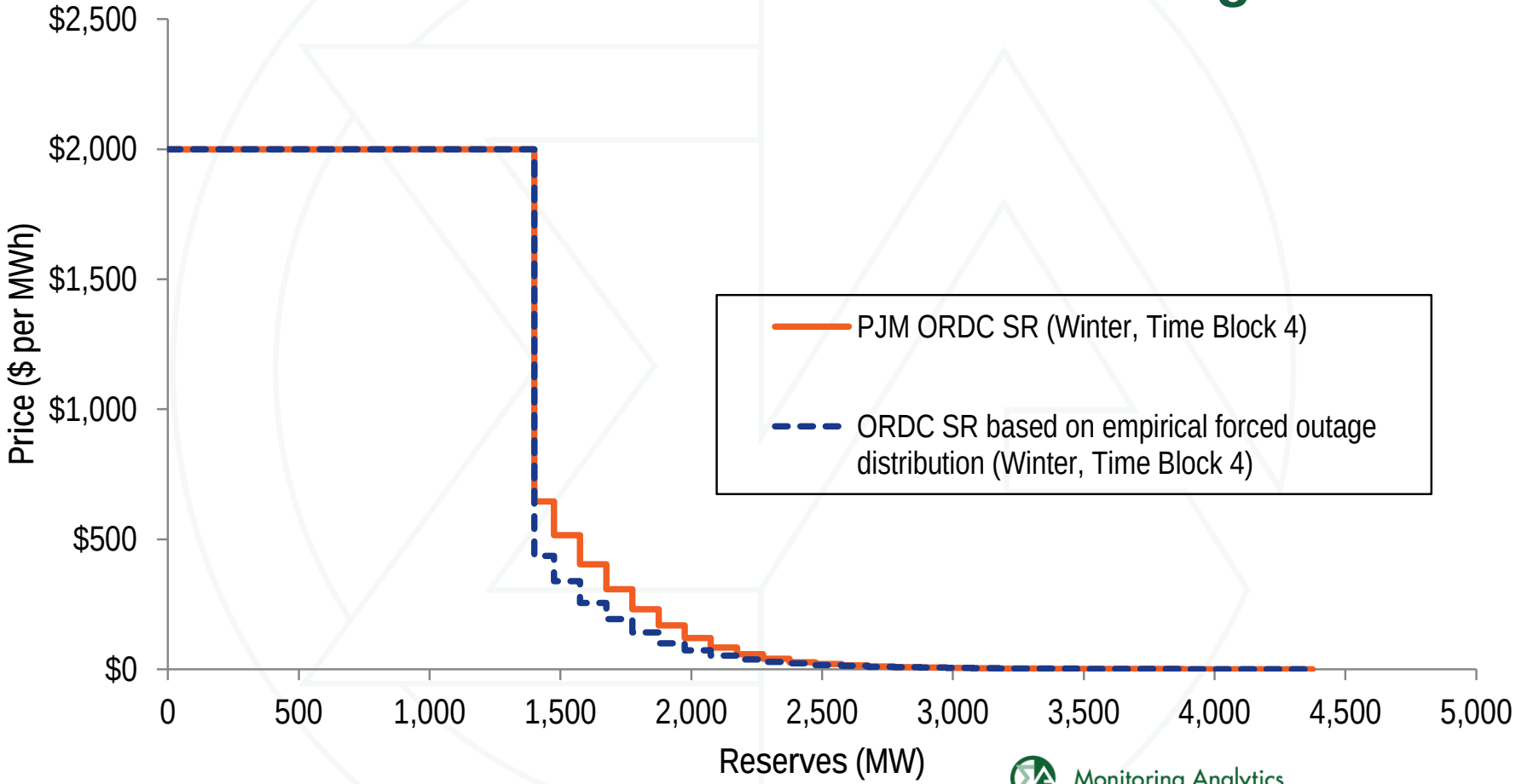

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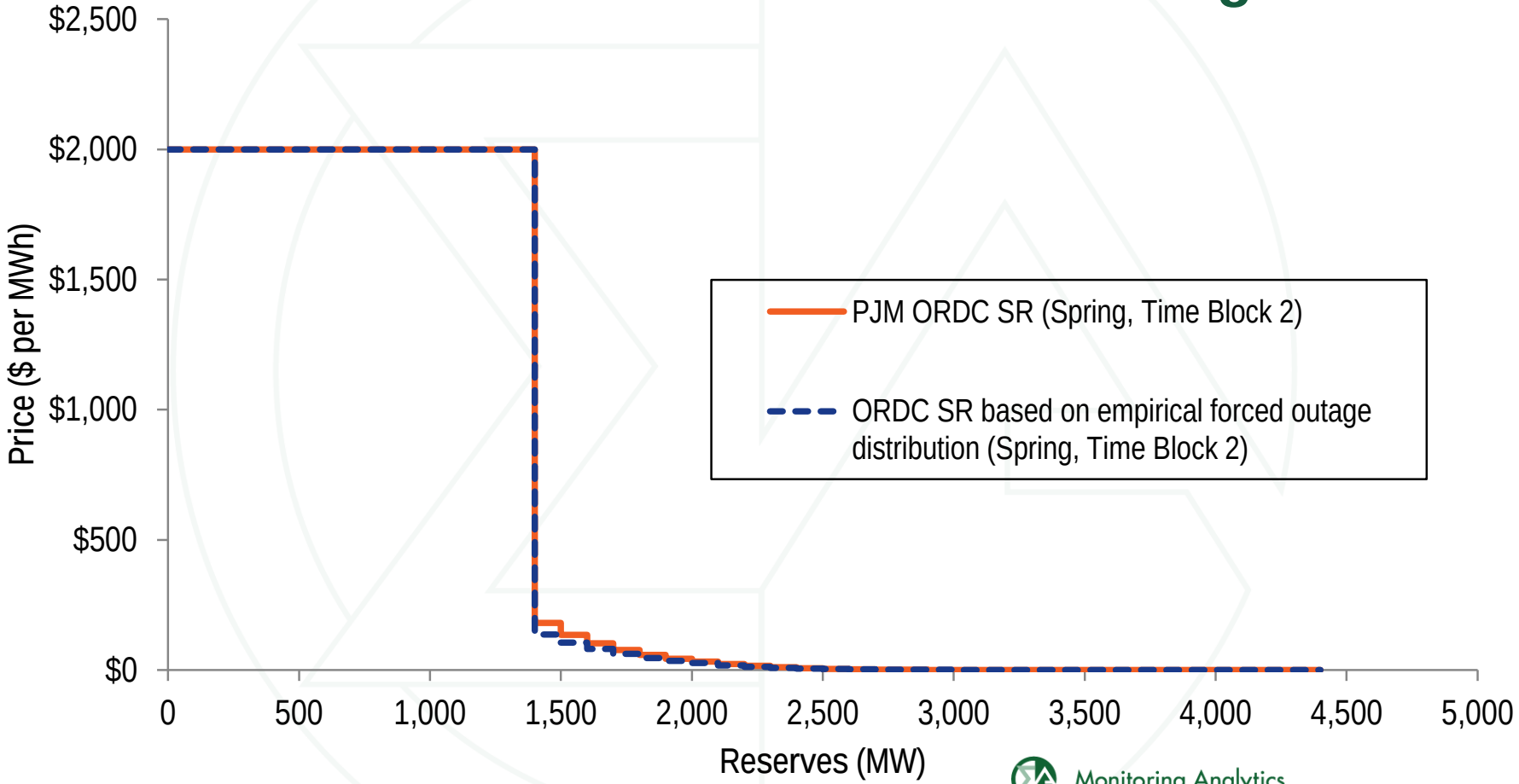
PJM ORDC with Corrected Forced Outage Rate



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ORDC Price Comparison

Season	Time Block	PJM Method Reserve Level (MW) 1500	2000	2500	Using Empirical Forced Outage Distribution Reserve Level (MW) 1500	2000	2500
Summer	1	$213.7	$21.9	$2.7	$135.4	$24.3	$4.8
	2	$145.2	$29.3	$4.1	$100.8	$20.5	$3.0
	3	$206.0	$37.8	$6.1	$136.9	$27.9	$4.5
	4	$191.2	$24.0	$2.5	$101.3	$16.1	$2.3
	5	$622.5	$160.7	$25.3	$358.4	$79.7	$15.4
	6	$396.9	$114.1	$22.0	$244.6	$59.7	$11.0
Winter	1	$426.0	$69.1	$7.6	$282.0	$54.7	$10.9
	2	$304.3	$86.5	$26.1	$217.7	$68.2	$19.9
	3	$651.9	$196.2	$31.3	$459.7	$124.6	$24.8
	4	$515.4	$120.4	$19.6	$338.3	$73.2	$16.6
	5	$435.0	$170.9	$51.1	$316.0	$114.9	$30.9
	6	$300.6	$47.2	$4.1	$153.4	$25.2	$2.8

ORDC Price Comparison

Season	Time Block	PJM Method Reserve Level (MW) 1500	2000	2500	Using Empirical Forced Outage Distribution Reserve Level (MW) 1500	2000	2500
Spring	1	$183.7	$12.6	$0.9	$114.1	$16.9	$3.4
	2	$180.7	$42.3	$7.1	$136.7	$34.9	$5.1
	3	$495.5	$115.4	$20.5	$349.7	$81.4	$17.0
	4	$387.7	$50.2	$3.3	$218.2	$31.9	$4.9
	5	$202.1	$40.1	$7.8	$122.5	$28.3	$6.3
	6	$445.4	$186.9	$63.4	$337.0	$137.7	$44.1
Fall	1	$231.7	$18.1	$1.3	$148.2	$21.8	$5.9
	2	$232.2	$76.2	$19.4	$184.4	$61.7	$13.8
	3	$379.6	$56.7	$4.7	$234.4	$36.8	$3.9
	4	$327.7	$36.2	$1.7	$177.0	$23.8	$3.1
	5	$359.9	$131.6	$44.1	$252.6	$97.6	$28.2
	6	$282.6	$106.1	$28.1	$197.6	$77.1	$15.6

Demand Response

- **There should be no cap on demand response participation in any reserve market.**
- **The compromise proposal to increase participation up to 50 percent only applies to synchronized reserve.**
- **The compromise proposal does not allow 30 minute capacity DR to participate in 30 minute reserves.**

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