Day-Ahead Market Pricing Impact : Multi-Step ORDCs with Extended Requirements

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Introduction

- Analyze the pricing and commitment impacts in the Day-Ahead (DA) market for the following:
  - Unnested Synchronized Reserve from 30-min Reserve with the 30-min reserve having a nested 30-min online product.
  - The proposed reserve products are represented using updated hourly Operating Reserve Demand Curves (ORDCs) with Multi-Step segments.
- Simulations are performed for 8 days in 2025 including high-load summer and winter days with a few low-risk shoulder season days.
- Two scenarios are simulated:
  - **Scenario 1**: Base Case with no changes
  - **Scenario 2**: Updated ORDCs for all products with PR not optimized, 30-min reserve is unnested from SR with a nested 30-min Spin component
- PROBE Day-Ahead is used to run the simulations for the DA market.

Selected Simulation Days

- The following days are selected for the simulations.

Day	Season	Assessed Risk	Reason
1/22/2025	Winter	High	High-risk winter day with high winter loads
2/16/2025	Winter	Medium	Medium-risk winter day
4/1/2025	Spring	Low	Shoulder season day
6/23/2025	Summer	Low	High-load summer day
6/24/2025	Summer	Low	High-load summer day
7/29/2025	Summer	Low	High-load summer day
9/17/2025	Fall	Low	Shoulder season day
10/1/2025	Fall	Low	Shoulder season day

10-Min Online Reserve Requirements

- The table below shows daily statistics comparing Spin Reserve in Base case to 10-Min Online reserve requirements in the Multistep case that includes both Spin Reserve and 10-Min RUR.

Day	Season	Average MW (Base)	Average MW (Multistep)	Delta (MW)	Max MW (Base)	Max MW (Multistep)	Delta (MW)
1/22/2025	Winter	2,515	3,031	516	2,515	4,232	1,717
2/16/2025	Winter	1,935	2,268	333	1,961	3,422	1,461
4/1/2025	Spring	1,945	2,348	403	1,954	3,515	1,561
6/23/2025	Summer	2,515	3,315	800	2,515	4,714	2,199
6/24/2025	Summer	2,515	3,209	694	2,515	4,565	2,050
7/29/2025	Summer	2,515	3,195	680	2,515	4,413	1,898
9/17/2025	Fall	2,515	2,885	370	2,515	3,597	1,082
10/1/2025	Fall	1,927	2,302	375	1,944	3,129	1,185

30-Min Online Reserve Requirements

- The table below shows daily statistics of the 30-min online reserve requirements in the Multi-Step cases. The 30-Min Online reserve includes the 30-min RUR for all days and additionally includes Energy Gap reserves for Jan 22nd and Feb 16th.

Day	Season	Average MW (Multistep)	Max MW (Multistep)
1/22/2025	Winter	4,941	7,166
2/16/2025	Winter	4,584	6,060
4/1/2025	Spring	2,672	6,230
6/23/2025	Summer	4,043	8,388
6/24/2025	Summer	3,708	7,982
7/29/2025	Summer	3,661	7,563
9/17/2025	Fall	2,960	5,442
10/1/2025	Fall	2,541	5,093

30-Min Reserve Requirements

- The table below shows daily statistics comparing 30-Min reserve requirements. The requirements in the Multistep case reflect the nested 30-Min Online reserve service as well as the Day-Ahead Scheduling Reserve (DASR) procured for each day.

Day	Season	Average MW (Base)	Average MW (Multistep)	Delta (MW)	Max MW (Base)	Max MW (Multistep)	Delta (MW)
1/22/2025	Winter	3,678	14,945	11,267	3,678	15,132	11,454
2/16/2025	Winter	3,190	11,714	8,524	3,190	12,288	9,098
4/1/2025	Spring	3,190	5,031	1,841	3,190	7,580	4,390
6/23/2025	Summer	3,678	7,276	3,598	3,678	10,176	6,498
6/24/2025	Summer	3,678	6,995	3,317	3,678	9,770	6,092
7/29/2025	Summer	3,678	6,813	3,135	3,678	9,351	5,673
9/17/2025	Fall	3,678	5,195	1,517	3,678	7,230	3,552
10/1/2025	Fall	3,190	4,755	1,565	3,190	6,435	3,245

Day-Ahead Simulation Results - LMPs

- The following table shows the daily average generation weighted LMPs in the DAM.

Day	Base Case ($/MWh)	MultiStepORDC ($/MWh)	MultiStepORDC – Base Case ($/MWh)
01/22/2025	162.42	170.94	8.52
02/16/2025	31.56	31.63	0.07
04/01/2025	34.65	34.51	-0.14
06/23/2025	110.4	115.19	4.79
06/24/2025	169.78	175.92	6.14
07/29/2025	193.47	198.19	4.72
09/17/2025	37.46	37.42	-0.04
10/01/2025	38.77	38.48	-0.29

* The results are rounded to two decimal places.

Day-Ahead Simulation Results – AS MCPs

- The following table shows the daily average MCPs for the Online 10-Min Reserve and Primary Reserve products in the DAM.

10-Min Online Reserve

Day	Base Case ($/MWh)	MultiStepORDC ($/MWh)	MultiStepORDC - Base Case ($/MWh)
01/22/2025	12.98	55.62	42.63
02/16/2025	0.00	0.29	0.29
04/01/2025	3.52	5.50	1.98
06/23/2025	33.79	44.91	11.12
06/24/2025	63.88	81.44	17.56
07/29/2025	97.14	104.84	7.70
09/17/2025	2.57	3.24	0.67
10/01/2025	3.47	5.36	1.89

Primary Reserve

Day	Base Case ($/MWh)	MultiStepORDC ($/MWh)
01/22/2025	10.43	-
02/16/2025	0.00	-
04/01/2025	2.97	-
06/23/2025	32.17	-
06/24/2025	63.88	-
07/29/2025	93.18	-
09/17/2025	2.17	-
10/01/2025	3.31	-

Day-Ahead Simulation Results – AS MCPs

- The following table shows the daily average MCPs for the 30-min Online and total 30-min Reserve products in the DAM.

30-min Online Reserve

Day	Base Case ($/MWh)	MultiStepORDC ($/MWh)
01/22/2025	-	55.62
02/16/2025	-	0.29
04/01/2025	-	3.45
06/23/2025	-	34.03
06/24/2025	-	50.14
07/29/2025	-	62.49
09/17/2025	-	0.00
10/01/2025	-	2.58

30-min Reserve

Day	Base Case ($/MWh)	MultiStepORDC ($/MWh)
01/22/2025	0.00	51.08
02/16/2025	0.00	0.29
04/01/2025	0.00	0.00
06/23/2025	0.00	18.99
06/24/2025	0.00	22.53
07/29/2025	0.00	24.59
09/17/2025	0.00	0.00
10/01/2025	0.00	0.00

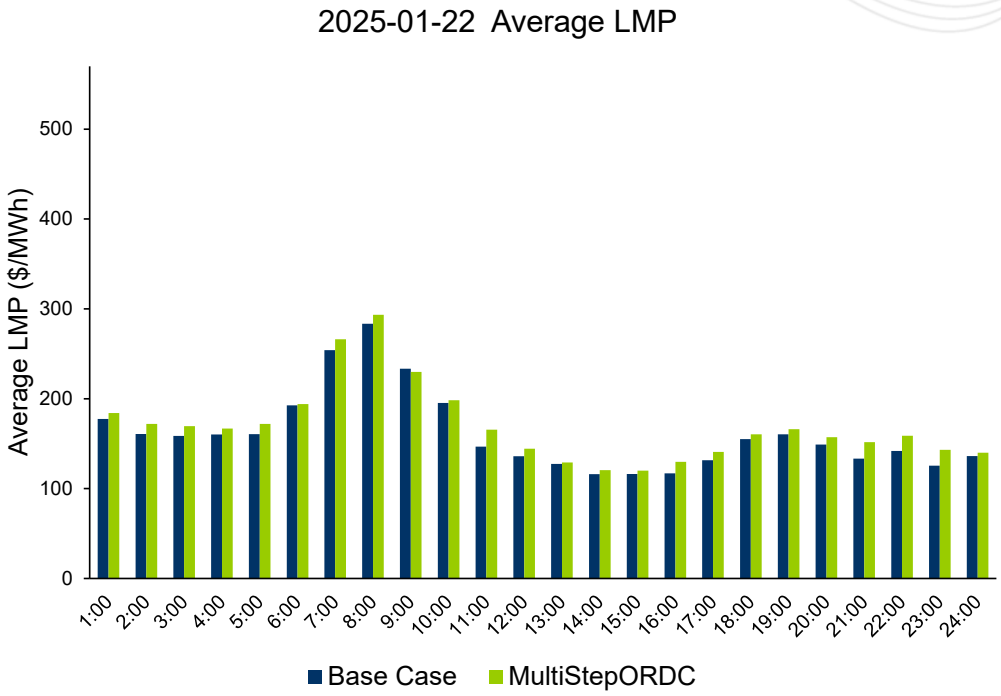
Day-Ahead Simulation Results – Total Commitments

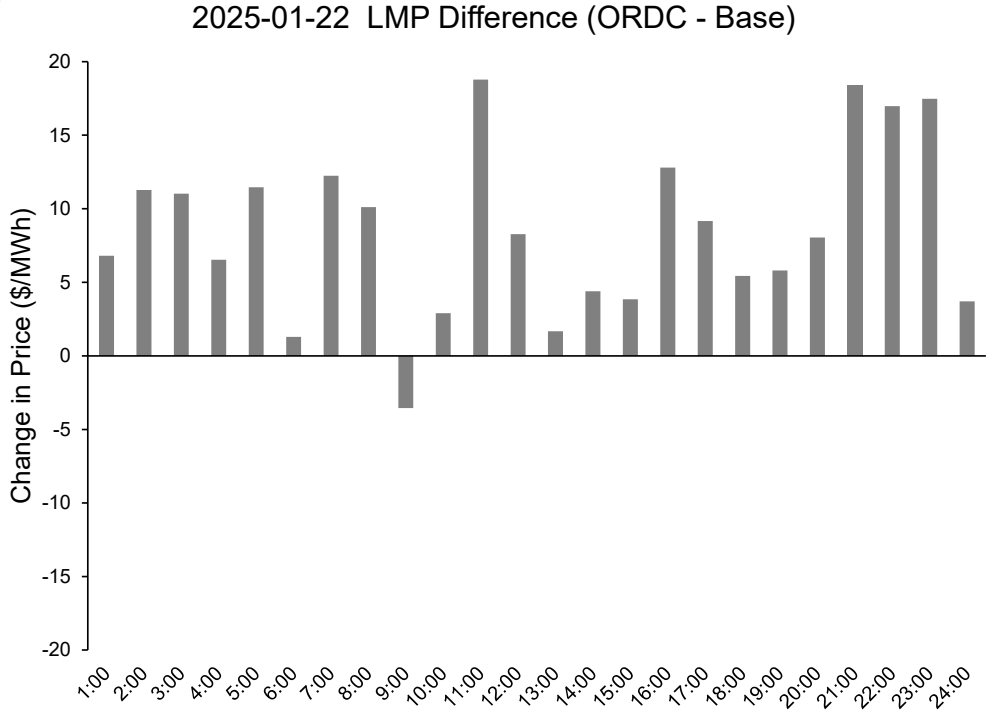
- The following table presents the daily commitment differences for generators in the two simulated cases.

Market Day	Base Case	MultiStepORDC	MultiStepORDC – Base Case
01/22/2025	923	932	11
02/16/2025	664	668	4
04/01/2025	636	640	4
06/23/2025	1110	1106	-4
06/24/2025	1159	1183	24
07/29/2025	1163	1187	24
09/17/2025	726	732	6
10/01/2025	797	789	-8

Day-Ahead Simulation Results – Hourly LMPs

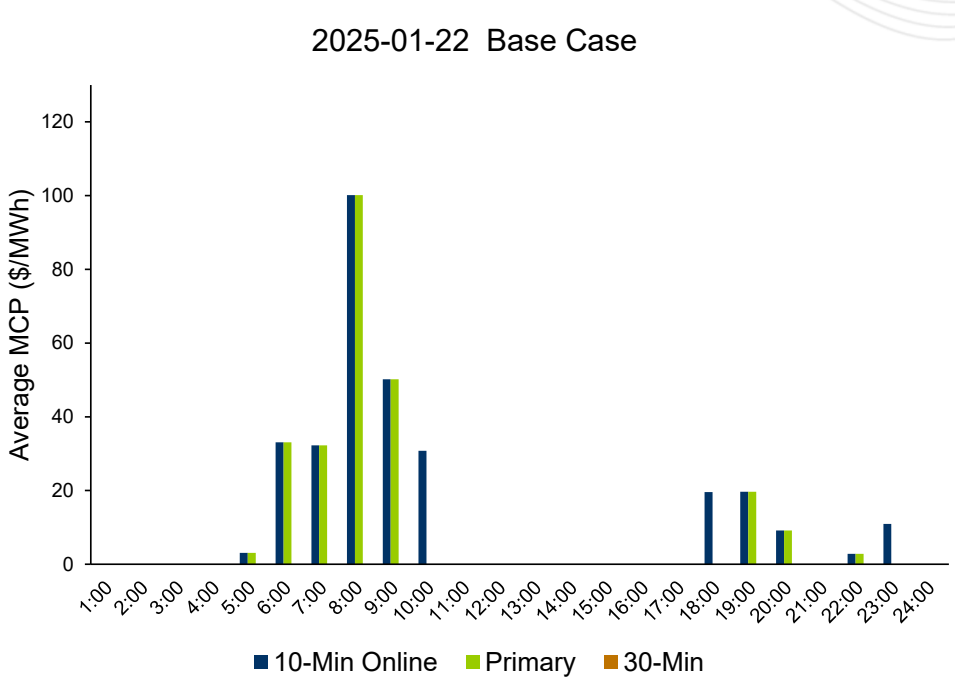
- High-Risk Winter day 1/22/2025

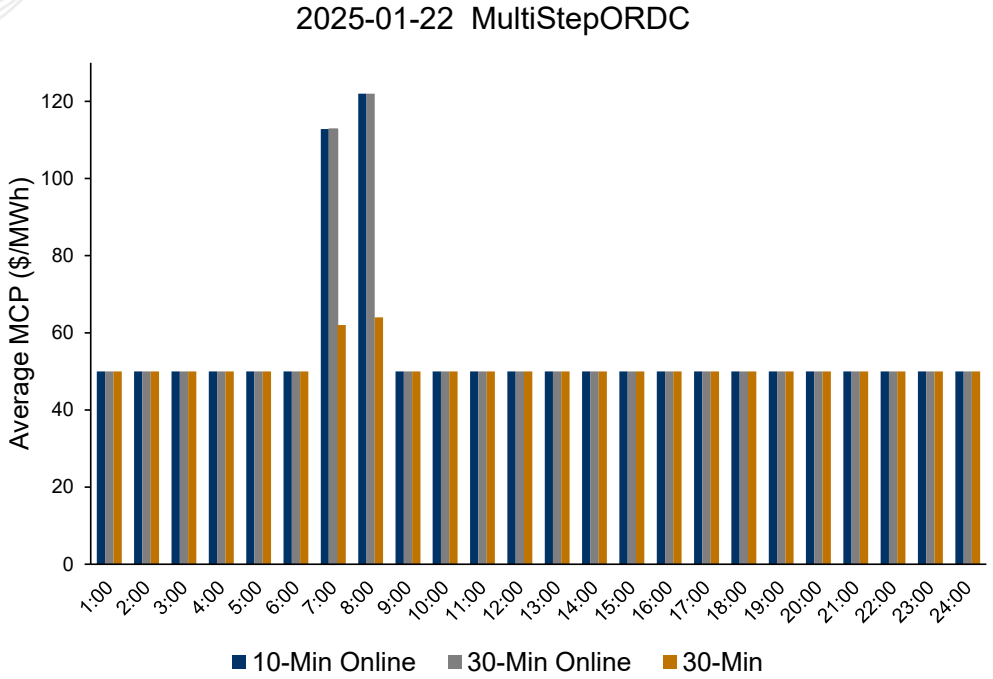




Day-Ahead Simulation Results – Hourly MCPs

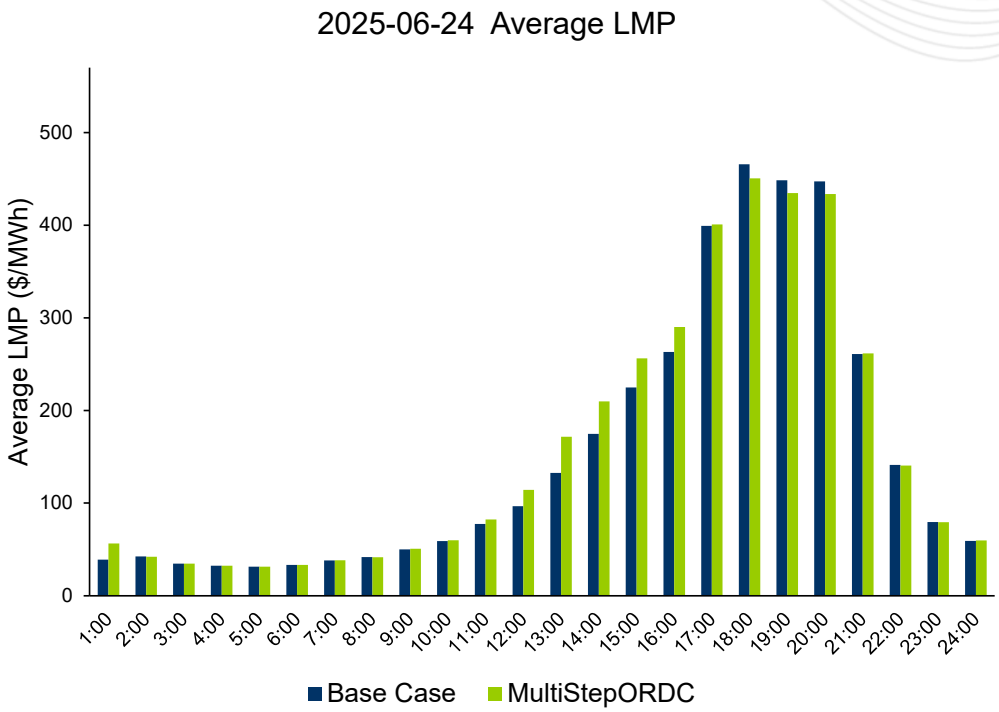
- High-Risk Winter day 1/22/2025

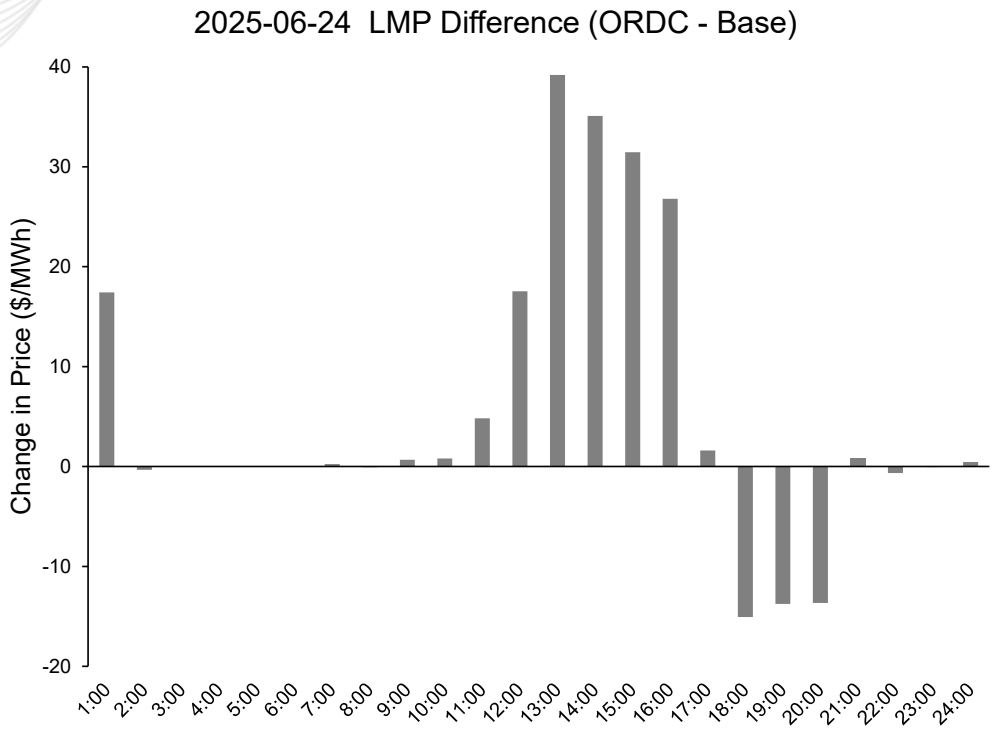




Day-Ahead Simulation Results – Hourly LMPs

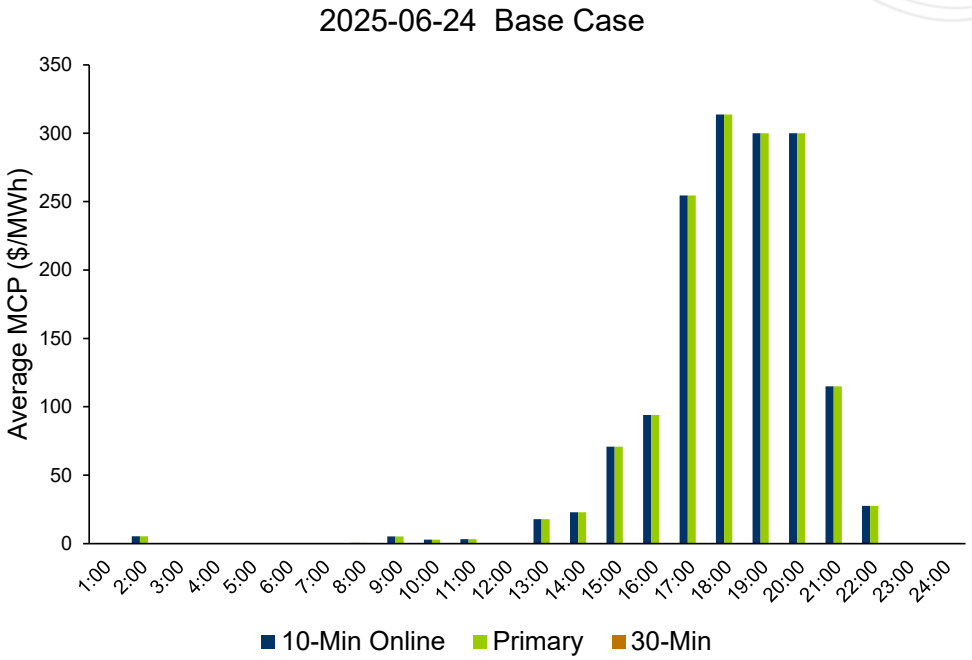
- High-Load Summer day 6/24/2025

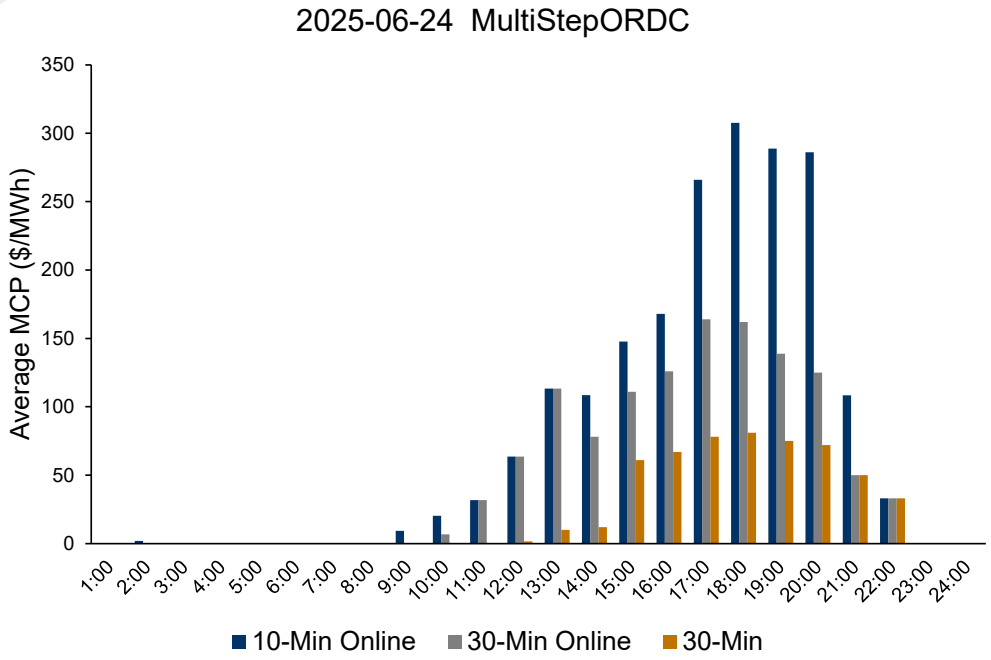




Day-Ahead Simulation Results – Hourly MCPs

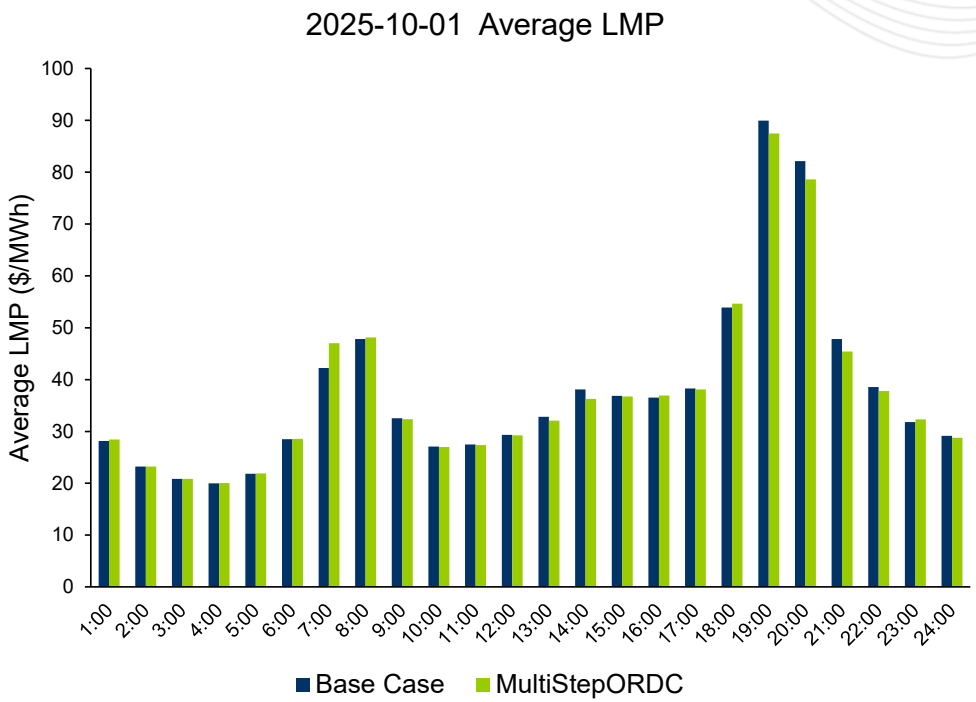
- High-Load Summer day 6/24/2025

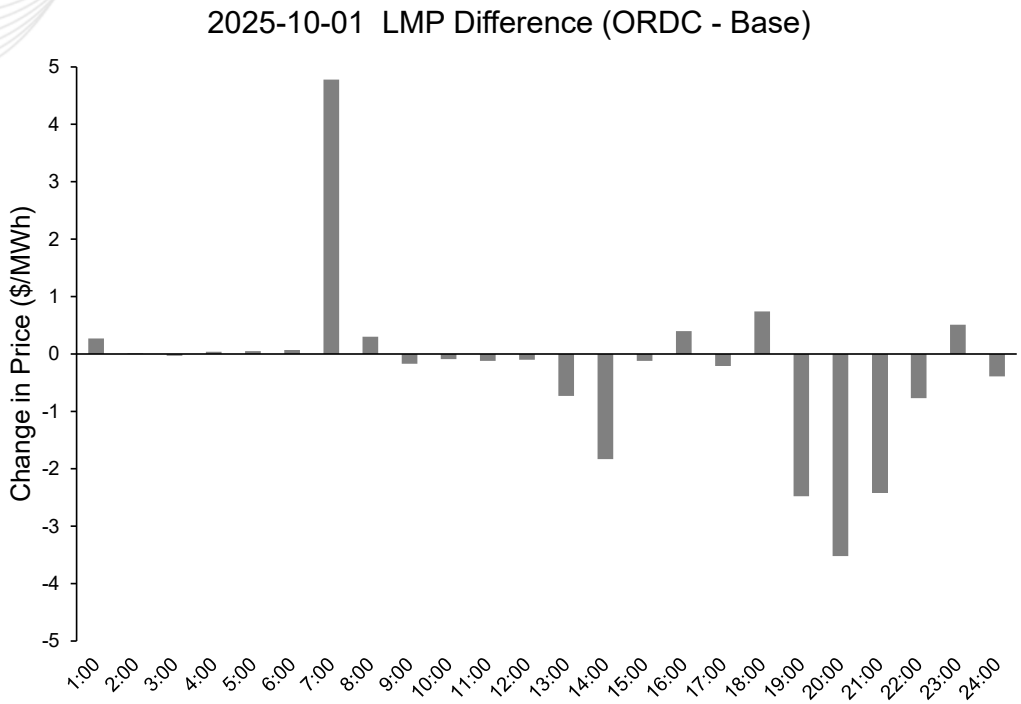




Day-Ahead Simulation Results – Hourly LMPs

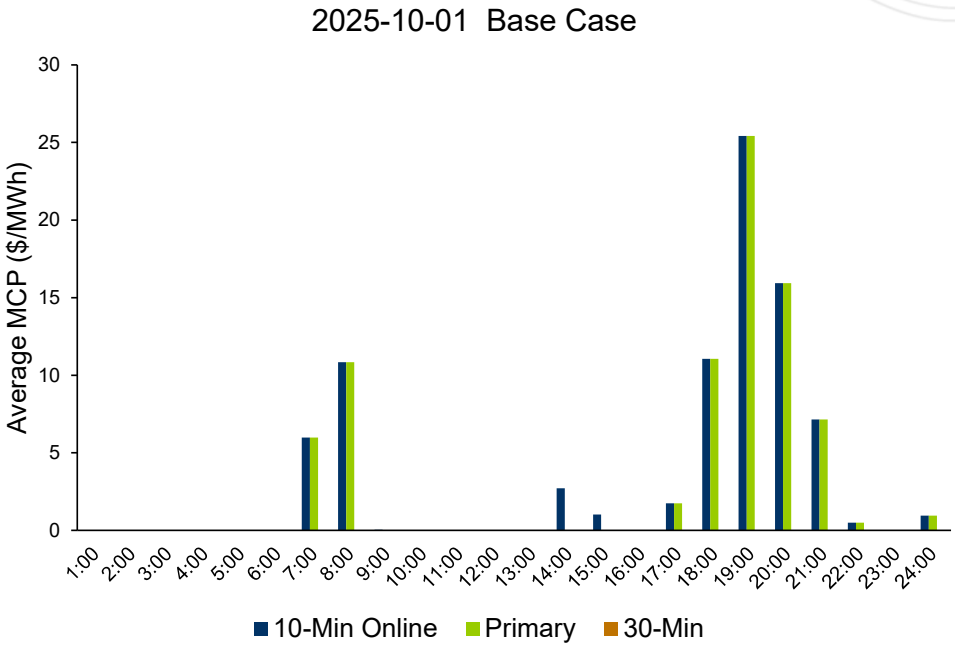
- Representative Fall day 10/1/2025

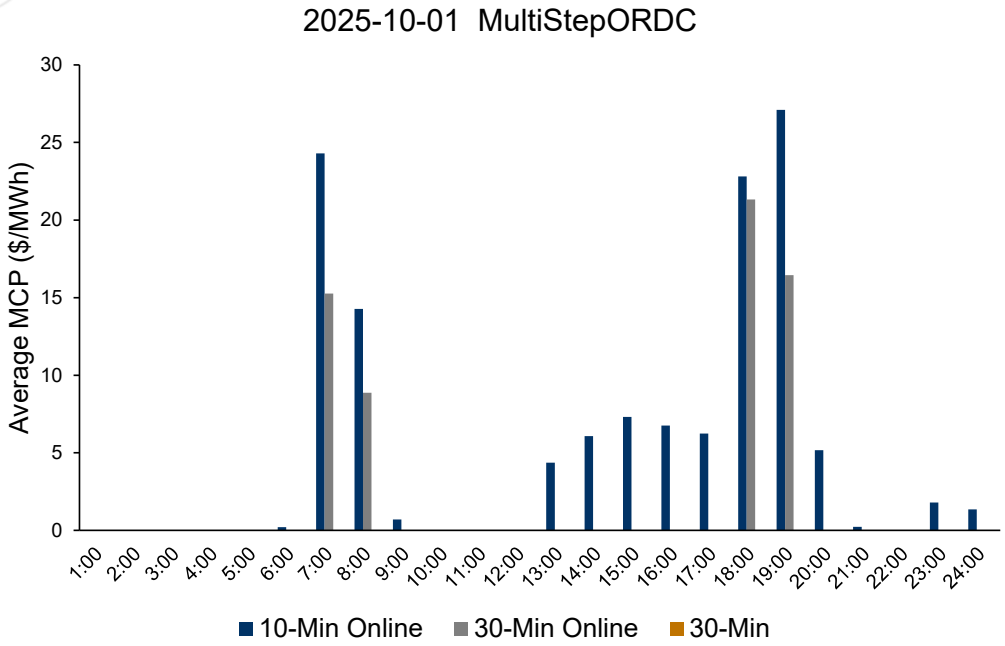




Day-Ahead Simulation Results – Hourly MCPs

- Representative Fall day 10/1/2025





Simulation Results Summary

- Day-ahead energy LMPs increases on average in the Multistep ORDC case compared to the Base Case especially for high-load days. The additional commitments in the Multistep ORDC cases are made to satisfy the increased reserve requirements, especially 30-min reserves.
- On high-load summer days, higher LMPs are observed leading up to the peak and lower LMPs coming off the peak.
- The Multistep ORDC case result in higher average SR MCPs compared to the Base Case. In the Base Case, the AS MCPs are mainly driven by Primary Reserve. However, in the Multistep Case, 30-min reserves (both 30-min online and total 30-min) drive the pricing due to higher requirements.
- Note, small changes in the unit commitment can result in both positive and negative changes to the LMPs and reserve MCPs.

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Day-Ahead Market Pricing Impact : Multi-Step ORDCs with Extended Requirements

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