



Market Efficiency Update

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2024/25 Market Efficiency Input Assumptions



2024/25 ME Cycle Assumptions Overview

- Study Years
 - 2025, 2029, 2032, 2035, and 2039.
- PROMOD Database posted on [ME secure page](#) (2029 modeled year only)
 - Fall 2023 Data Release from Hitachi Energy
 - Fuel/Emissions price forecasts from Hitachi Energy, May 2024 update.
 - Load forecast from PJM 2024 Load Forecast Report.
 - Topology based on the final 2028 Summer Peak powerflow from the RTEP 2023 18-month Reliability cycle.
 - Includes all RTEP baseline projects approved by the PJM Board up to including reliability Window 1 2023.
- Generation Expansion based on queue status as of May 14, 2024.
 - Additional capacity needed beyond 2030 to meet the assumed 17.8% Installed Reserve Margin.
- Simulations performed using PROMOD IV v11.4 engine.



PJM Peak Load and Energy Forecast

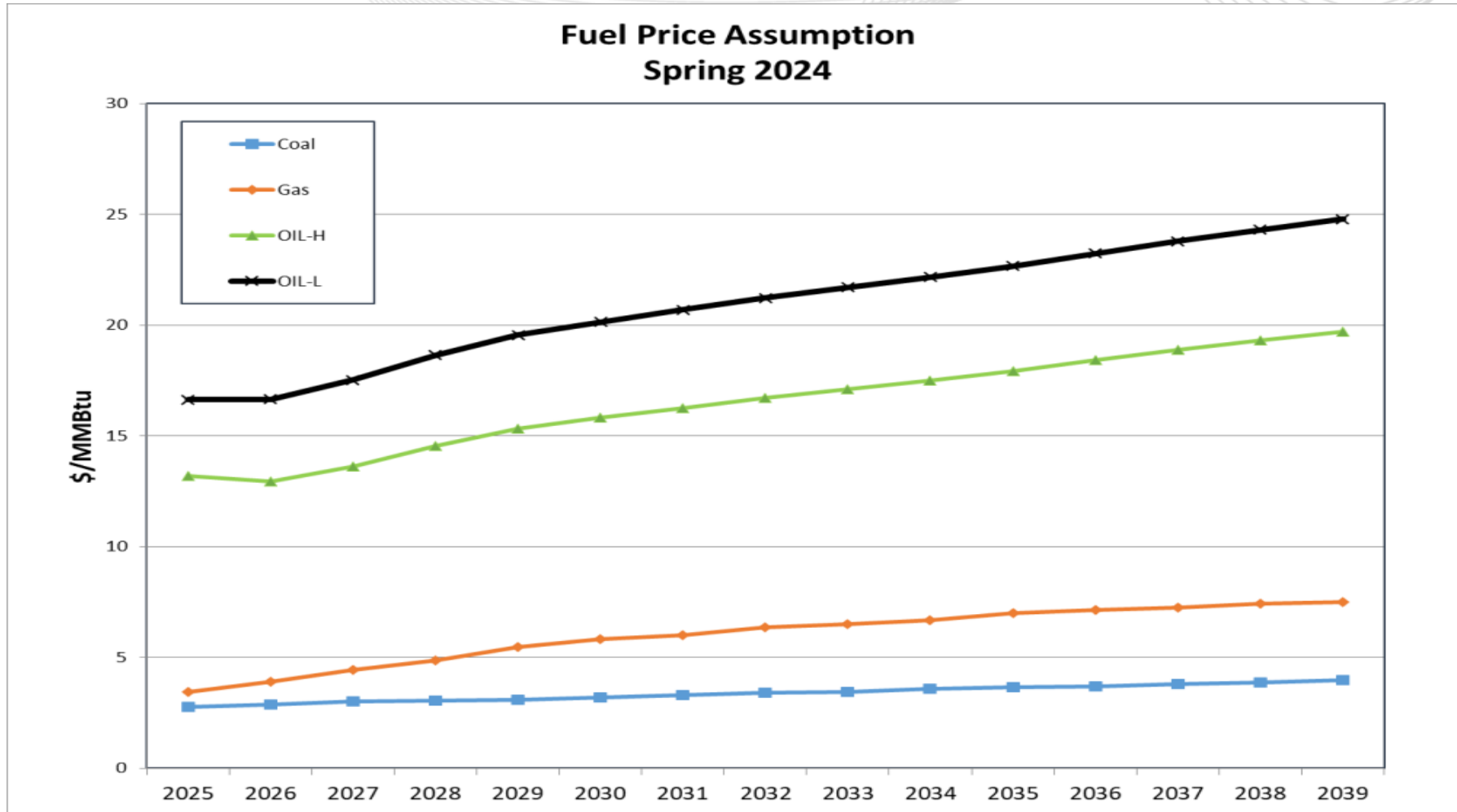
Load	2025	2029	2032	2035	2039
Peak (MW)	153,493	165,681	172,109	179,622	190,752
Energy (GWh)	829,683	933,146	991,188	1,041,217	1,120,928

- Notes: 1.) Peak and energy values from the February 2024 PJM Load Forecast Report Table B-1 and Table E-1, respectively.
2.) Model inputs are at the zonal level. To the extent zonal load shapes create different diversity, modeled PJM peak load may vary.

PJM Demand Resource Forecast

	2025	2029	2032	2035	2039
Demand Resource (MW)	7,814	8,265	8,500	8,772	9,210

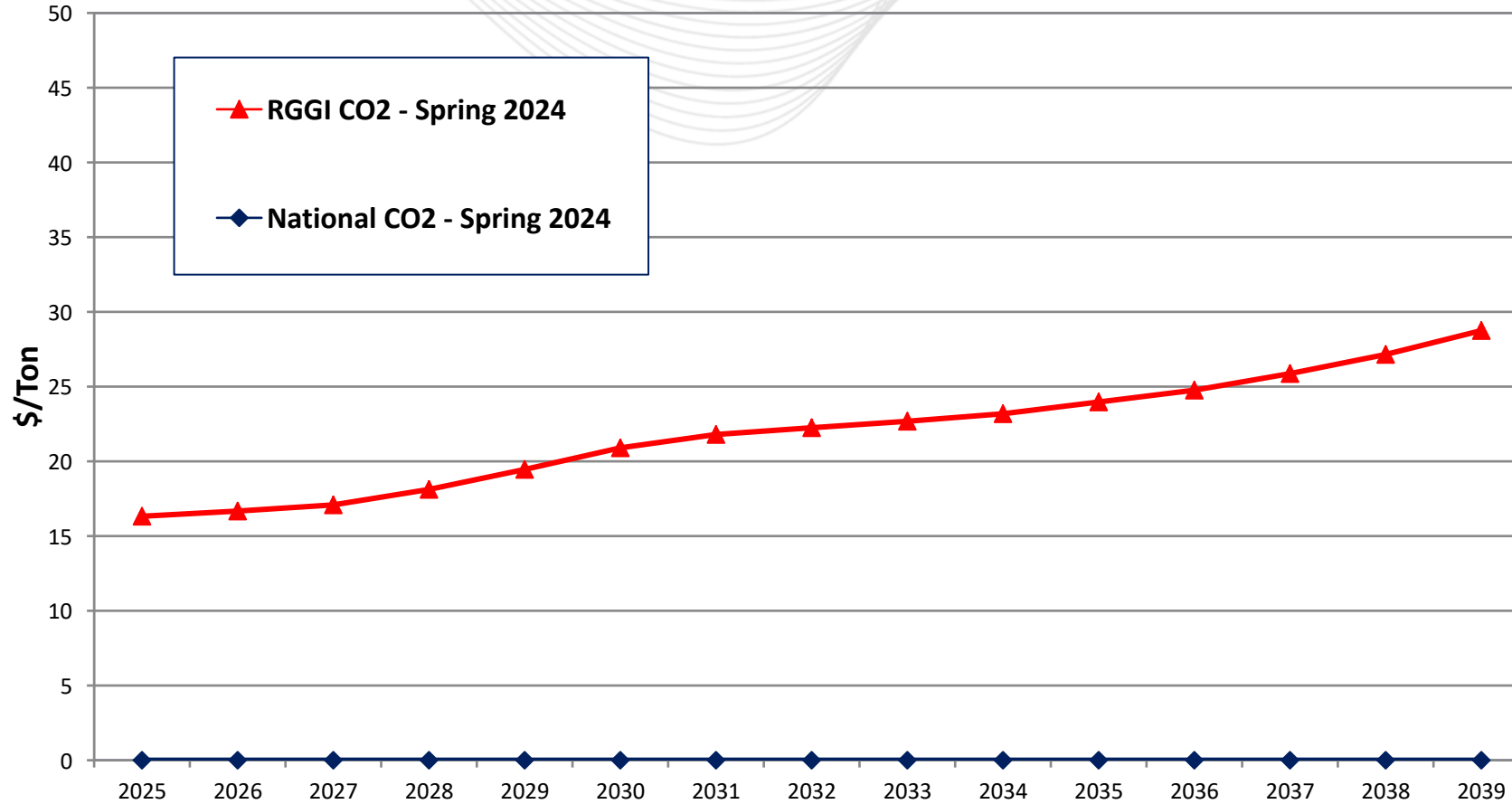
Note: 1.) Values from the February 2024 PJM Load Forecast Report Table B-7.



Notes: Coal – Annual average of PJM unit burner-tip prices
 Gas – Annual average Henry Hub price
 Oil-H, Oil-L – Annual average prices

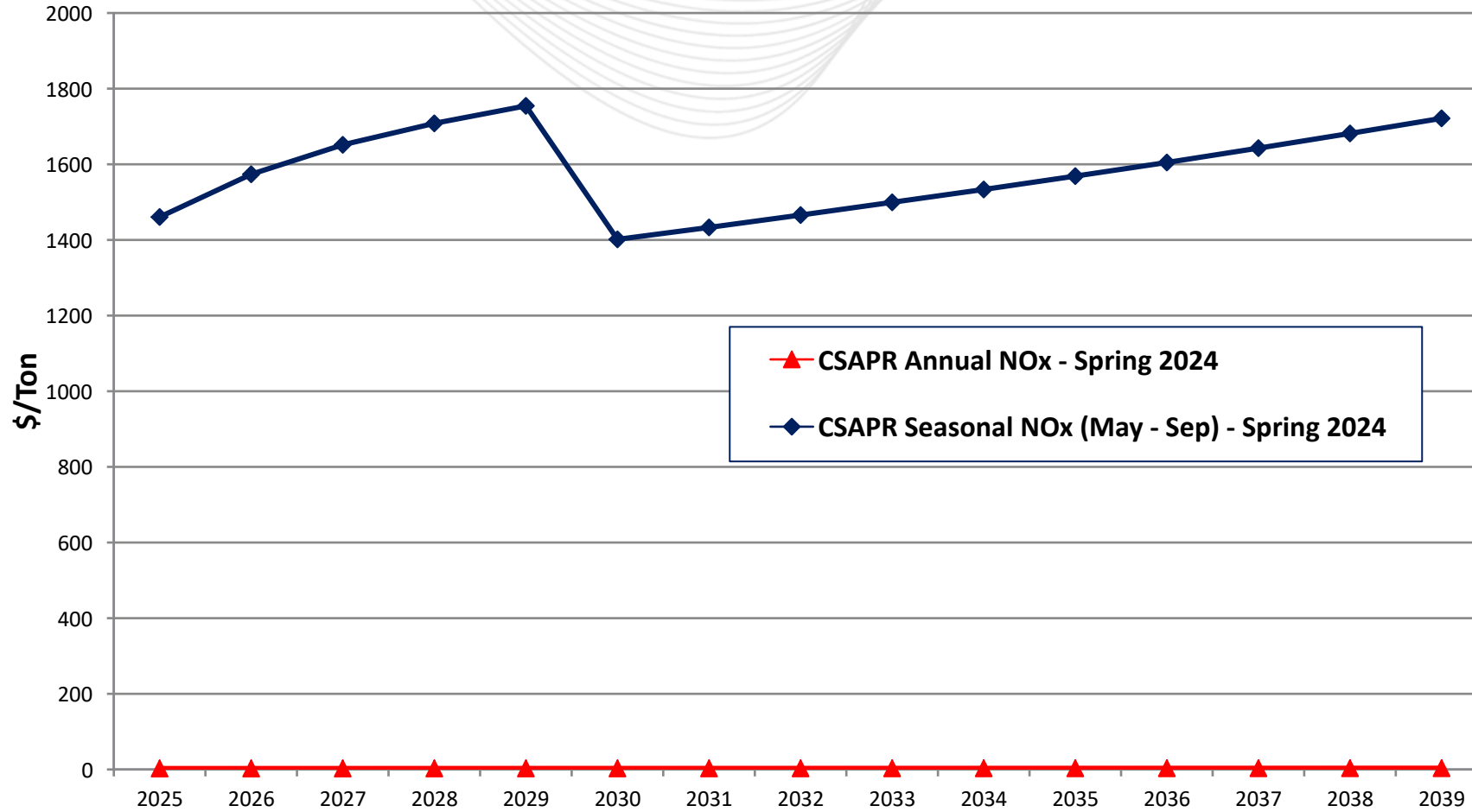
* Provided by Hitachi Energy – May 2024

CO₂ Price Assumption



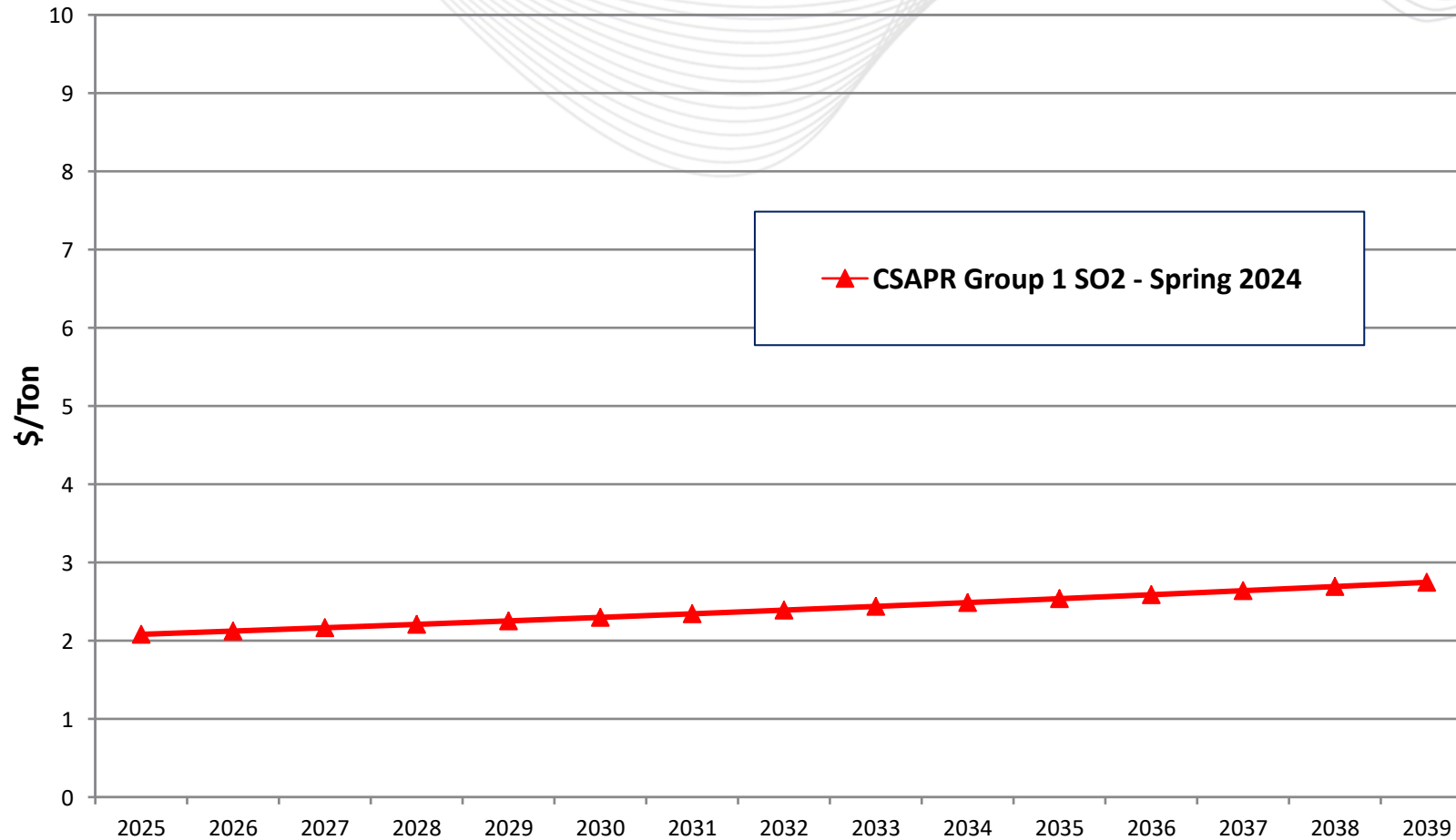
* Provided by Hitachi Energy – May 2024

NO_x Price Assumption

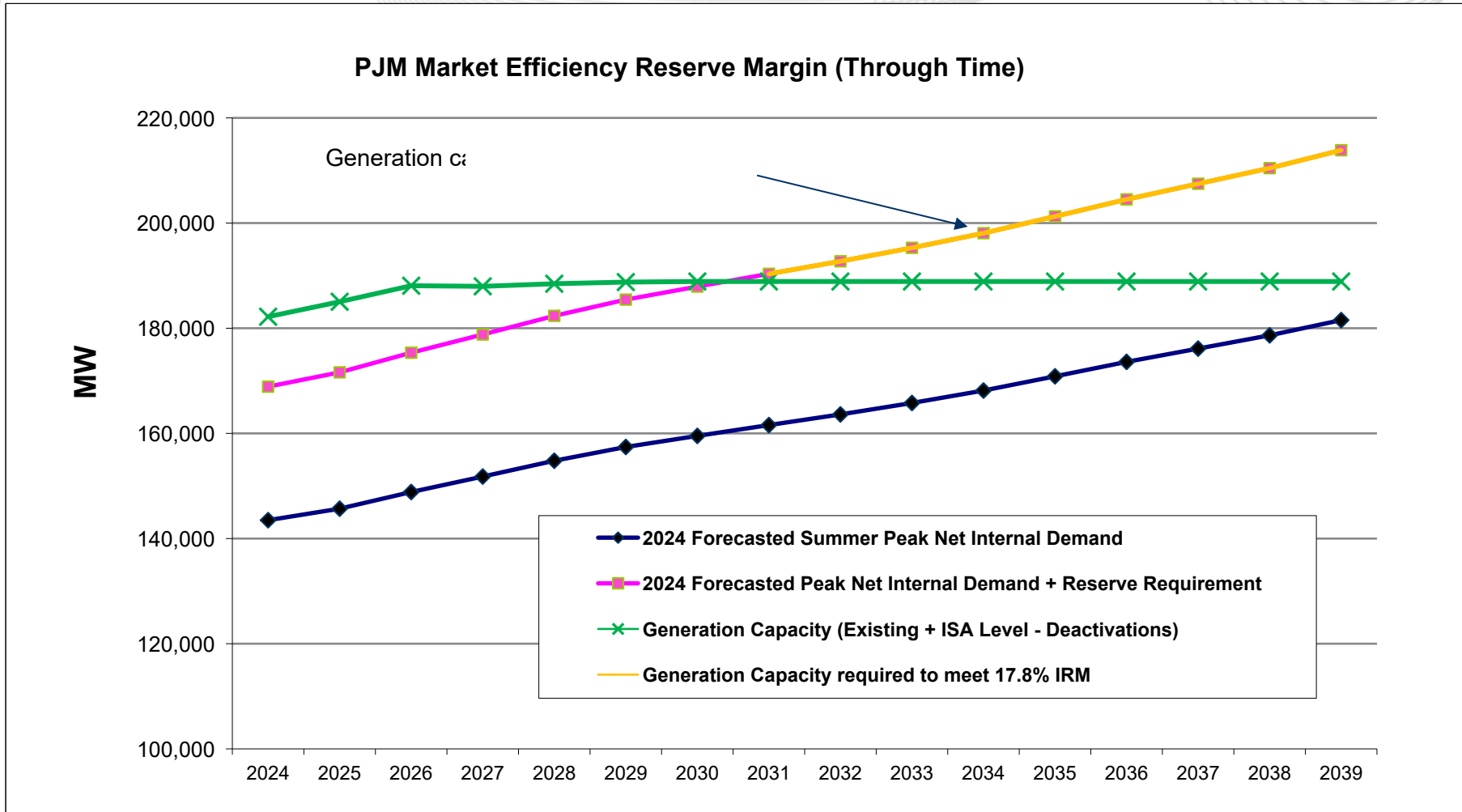


* Provided by Hitachi Energy – May 2024

SO₂ Price Assumption



* Provided by Hitachi Energy – May 2024



Notes: Generation includes existing and projected PJM internal capacity resources.
 Unit level solar and wind resource capacity at 38% and 13% of maximum capability, respectively.
 Model informed by the 2029 RTEP Powerflow and the Generation Interconnection Queue (Queue status as of 5/14/24)

- Financial parameters based on the Transmission Cost Planner ([5/15/2024 version](#)).
 - Discount Rate: 7.11%
 - Levelized Annual Carrying Charge Rate: 11.94%



2024/25 ME Base Case Congestion Driver Candidates

Constraint*	Area	Type	Simulated 2029 Annual Congestion (\$M)	Comment
Benton-Segreto 345 kV	AEP	Line	1.05	
Clifford-Boxwood 138 kV	AEP	Line	30.57	
R.P. Mone-Allen 345 kV	AEP	Line	1.66	To be addressed in 2023W2
Scottsville-Bremo 138 kV	AEP-DOM	Line	4.80	
Mt. Zion-Westvaco 138 kV	APS	Line	20.76	
Dans Mountain-Ridgeley 138 kV	APS	Line	8.23	
Frostburg-Ridgeley 138 kV	APS	Line	2.10	
Cherry Valley-Silver Lake 345 kV	COMED	Line	4.67	
Hegewisch-Hegewisch Tap 138 kV	COMED	Line	1.40	
Devon-Rose Hill 138 kV	COMED	Line	1.87	
Greenacre-Olive 345 kV	COMED-AEP	Line	43.57	Potential M2M
Crescent Ridge-Corbin 138 kV	COMED-AMIL	Line	10.88	Potential M2M
Kincaid-Pana North 345 kV	COMED-AMIL	Line	1.95	Potential M2M
Dune Acres-Michigan City 138 kV	NIPS	Line	31.68	Potential M2M
Chicago Avenue-Praxair 138 kV	NIPS	Line	1.62	Potential M2M

*Includes constraints with annual congestion greater than \$1M



2024/25 ME Base Case Congestion Driver Candidates (cont.)

Constraint*	Area	Type	Simulated 2029 Annual Congestion (\$M)	Comment
Person-Hendrick-Sedge Hill 230 kV	CPLE-DOM	Line	9.87	DOM-CPLE Tie
Aspen-Brambleton 500 kV	DOM	Line	1.76	
Earleys-Nucor 230 kV	DOM	Line	2.85	
Charlottesville-Proffit Rd Del Pt 230 kV	DOM	Line	2.44	
Black Walnut-Clover 230 kV	DOM	Line	2.44	
Kittatinny-Bushkill 230 kV	JCPL-PPL	Line	4.89	
South Reading-Boonetown 230 kV	METED	Line	4.30	
North Waverly-E Sayre 115 kV	NY-PENELEC	Line	10.25	NY-PJM Tie
AP South Interface	PJM	Interface	45.39	Interface
AEP DOM Interface	PJM	Interface	5.48	Interface
Siegfried #4 230/138 kV XFMR	PPL	XFMR	5.55	
Dauphin-Juniata 230 kV	PPL	Line	1.42	

*Includes constraints with annual congestion greater than \$1M

- In June 2024, PJM posted the updated 2024/2025 ME Base Case database:
 - Case was posted on the [ME secure page](#).
- This database is the starting point for the 2024/2025 Market Efficiency Cycle and it provides the complete congestion view at the end of the 18-months 2023 RTEP Reliability Cycle.
- Solicit feedback from stakeholders by August 31, 2024.
- Next Steps – add modeled years 2032 and beyond:
 - Update interregional data.
 - Update generation expansion to observe 17.8% IRM (beyond year 2030).
 - Update powerflow for consistency with RTEP 8-years out case.



2024 Acceleration Analysis of RTEP Reliability Projects

1.5.7 Development of Economic-based Enhancements or Expansions.

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(b) Following PJM Board consideration of the assumptions, the Office of the Interconnection shall perform a market efficiency analysis to compare the costs and benefits of:

- (i) accelerating reliability-based enhancements or expansions already included in the Regional Transmission Plan that if accelerated also could relieve one or more economic constraints;
- (ii) modifying reliability-based enhancements or expansions already included in the Regional Transmission Plan that as modified would relieve one or more economic constraints; and
- (iii) adding new enhancements or expansions that could relieve one or more economic constraints, but for which no reliability-based need has been identified. Economic constraints include, but are not limited to, constraints that cause:
 - (1) significant historical gross congestion;
 - (2) pro-ration of Stage 1B ARR requests as described in the Operating Agreement, Schedule 1, section 7.4.2(c); or
 - (3) significant simulated congestion as forecasted in the market efficiency analysis.

The timeline for the market efficiency analysis and comparison of the costs and benefits for items in the Operating Agreement, Schedule 6, section 1.5.7(b)(i-iii) is described in the PJM Manuals.

(c) The process for conducting the market efficiency analysis described in subsection (b) above shall include the following:

- (ii) The Office of the Interconnection shall identify any planned reliability-based enhancements or expansions already included in the Regional Transmission Expansion Plan, which if accelerated would relieve such constraints, and present any such proposed reliability-based enhancements and expansions to be accelerated to the Transmission Expansion Advisory Committee for review and comment. The PJM Board, upon consideration of the advice of the Transmission Expansion Advisory Committee, thereafter shall consider and vote to approve any accelerations.

- Scope
 - Determine which Reliability upgrades, if any, have an economic benefit if accelerated or modified.
- Study Assumptions
 - Analysis will use the most recent 2029 Market Efficiency Base Case available at the time.
 - Two simulated years used to study impacts of approved RTEP reliability projects:
 - Near-Term simulations
 - Future simulations
- Process
 - Compare market congestion for near term vs. future simulations.
 - Estimate economic impact of accelerating planned reliability upgrades.

- Complete production cost simulations:
 - Near-Term and Future study years with AS-IS Topology.
 - Near-Term and Future study years with RTEP Topology.
- Identify reliability upgrades responsible for congestion reductions between the AS-IS and RTEP topology cases.
- Check the feasibility of accelerating schedules for the identified reliability upgrades.
- Results to be presented at future TEAC meetings.



2023 Market Efficiency Annual Re-evaluation IEC (9A) Project B2743, B2752

- PJM is required by Schedule 6 of the Operating Agreement (OA) to “annually review the cost and benefits” of Board-approved market efficiency projects that meet certain criteria to assure that a project continues to be cost beneficial.
 - The annual re-evaluation is not required for projects already in-service, that have commenced construction, or have received state siting approval.
- On September 22, 2021, the PJM Board endorsed PJM’s recommendation to suspend the Transource IEC (9A) Project, due to siting risks, in order to remove it from the models pending any future developments in the regulatory process.
- On December 21, 2023, FERC issued an order granting a waiver for delaying the 2023 re-evaluation and directed that the analysis be completed by June 30th, 2024.

[PC Informational Posting: FERC Waiver of Timing Requirement for Annual Market Efficiency Reevaluation](#)

Re-evaluation	B/C Ratio (May 2024)	Notes
Project 9A Base Case Analysis	0.81	B/C Ratio (Sunk Costs Excluded) = 1.09 In-Service Cost: \$420.94 millions Sunk Cost: \$107.96 millions

Assumptions:

- **Re-evaluation** used the [2022/23 Market Efficiency assumptions](#) (Final [2022/23 ME Base](#) Case posted Feb '24).
 - Base topology* includes upgrades approved through the December 2023 PJM board meeting.
 - Load forecast from 2023 PJM Load Forecast Report.
 - Generator status updated as of November 2023.
- **Project Costs**
 - 9A assumed in-service cost: \$420.94 million (RTEP year).
 - Sunk cost updated as of Q1 2024: \$107.96 million.
 - Excluded costs associated with the component B2752.7, rebuild Conastone – Northwest 230 kV lines.

**Note: Component B2752.7, rebuild the two Conastone – Northwest 230 kV lines, now duplicates the RTEP reliability upgrade B3771 included in the 2028 RTEP powerflow.*



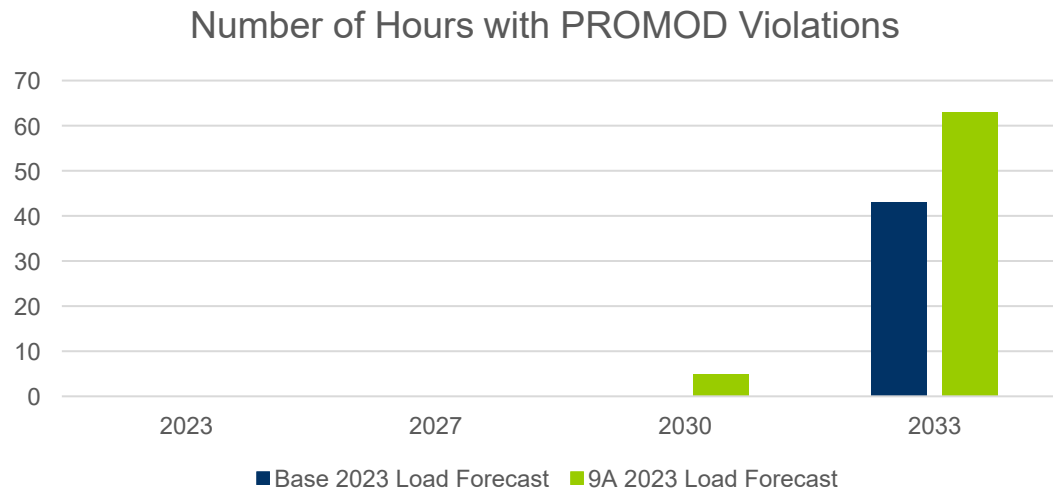
2023 Re-evaluation – Simulated Congestion (2030,2033) Basecase vs. Basecase with 9A Project

Constraint	From Area	To Area	Base 2030 Congestion (\$M)	Base 2033 Congestion (\$M)	9A 2030 Congestion (\$M)	9A 2033 Congestion (\$M)	Delta 2030 (\$M)	Delta 2033 (\$M)
Boonetown-S.Reading 230 kV	METED	METED	\$ 3.73	\$ 9.04	\$ 1.78	\$ 7.25	\$ (1.95)	\$ (1.79)
Safe Harbor-Graceton 230 kV	PLGRP	BGE	\$ 0.39	\$ 3.85	\$ 0.10	\$ 1.85	\$ (0.29)	\$ (2.00)
Morgan-Cherry Run 138 kV	APS	APS	\$ 2.94	\$ 5.72	\$ 0.14	\$ 0.00	\$ (2.81)	\$ (5.72)
Westvaco-Mt Zion 138 kV	APS	APS	\$ 5.77	\$ 50.73	\$ 1.33	\$ 18.76	\$ (4.44)	\$ (31.97)
AP South Interface	0	0	\$ 39.85	\$ 361.53	\$ 24.49	\$ 276.56	\$ (15.36)	\$ (84.97)
Ringgold-Frostown Jct 230 kV	APS	APS	\$ -	\$ -	\$ 50.38	\$ 341.72*	\$ 50.38	\$ 341.72
Clifford-Boxwood 138 kV	AEP	AEP	\$ 101.02	\$ 280.67	\$ 102.36	\$ 313.82	\$ 1.34	\$ 33.15
Ringgold 230/138 XFMR #4	APS	APS	\$ -	\$ -	\$ 18.88	\$ 17.82	\$ 18.88	\$ 17.82
Scottsville-Bremo 138 kV	DOM	AEP	\$ 22.55	\$ 65.59	\$ 24.00	\$ 81.88	\$ 1.45	\$ 16.29
Colleen-Clifford 138 kV	AEP	AEP	\$ -	\$ 2.05	\$ -	\$ 5.74	\$ -	\$ 3.69

*9A increases PROMOD congestion.

System conditions with projects in the RTEP approved after Project 9A suspension have changed the topology and impacts of Project 9A:

- Project 9A increases uncontrollable congestion on a number of constraints.
- The increased number of hours with PROMOD violations may indicate reliability concerns for years starting 2030.



Number of hours with PROMOD violations

Scenario Year	2023 Load Forecast	
	Base	9A
2023	0	0
2027	0	0
2030	0	5
2033	43	63

- This concludes the 2023 Market Efficiency Re-evaluation Analysis.
- Project 9A is currently suspended.
- Due to the issues related to the potential reliability violations in the base case, impacts of approved RTEP projects, constructability concerns, and regulatory uncertainties, further review is needed for the 9A project.

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Market Efficiency Update



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- V1 – 5/30/2024 – Original slides posted
- V2 – 6/18/2024 – Modified slide 3 to reference Hitachi Energy

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