

Joint Stakeholder Briefing

February 03, 2025 03:00 PM - 05:00 PM Central Time
(US and Canada) Central Standard Time



Agenda Topic	Presenter	Page
1. Federal Energy Regulatory Commission Update	Patrick Clarey, FERC Attorney Advisor MISO/SPP	
2. Engineering Update	Casey Cathey, VP Engineering	2
3. Operations Update	Bruce Rew, SVP Operations	24
4. Markets Update	Antoine Lucas, VP Markets	46

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QUARTERLY JOINT STAKEHOLDER BRIEFING: ENGINEERING

CASEY CATHEY

*Working together to responsibly and economically
keep the lights on today and in the future.*



SouthwestPowerPool



SPPorg



southwest-power-pool

2025 WORK PLAN

2025 CORPORATE GOALS FOR ENGINEERING

Goal 2025-1: Mitigate Resource Adequacy Risks

- Focus on finalizing long-term Planning Reserve Margins (PRMs).
- Develop demand response policies to ensure adequate resources meet growing electricity demands.

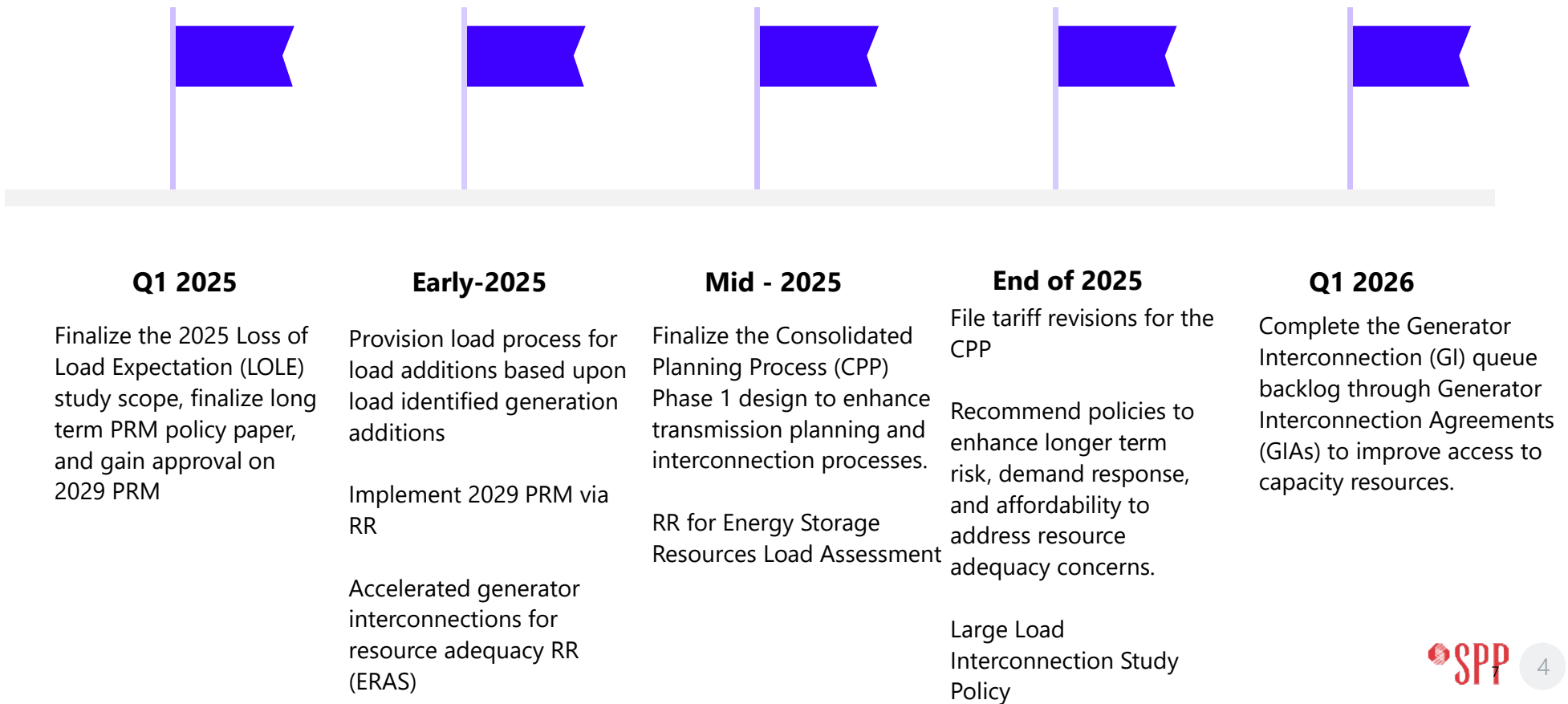
Goal 2025-2: Accelerate Generator & Load Interconnections

- Enhance transmission planning policies to improve access to capacity resources.
- Streamline interconnection processes, addressing stakeholder concerns and preparing for load growth.

Goal 2025-3: Continue Western Expansion

- Expand SPP's RTO footprint to enhance economic and reliability benefits.
- Focus on implementing Markets+ and progressing on RTO expansion projects.

KEY MILESTONES FOR 2025 ENGINEERING GOALS



GENERATOR INTERCONNECTION (GI) UPDATE

GI QUICK HITS

100 GW+

Cumulative Generation

Cumulative generation studied in DISIS and special studies for 2024.

6.7 GW

Expected Online

Expected to come online in 2025 with 4 clusters entering GIA negotiations.

108 GIAs

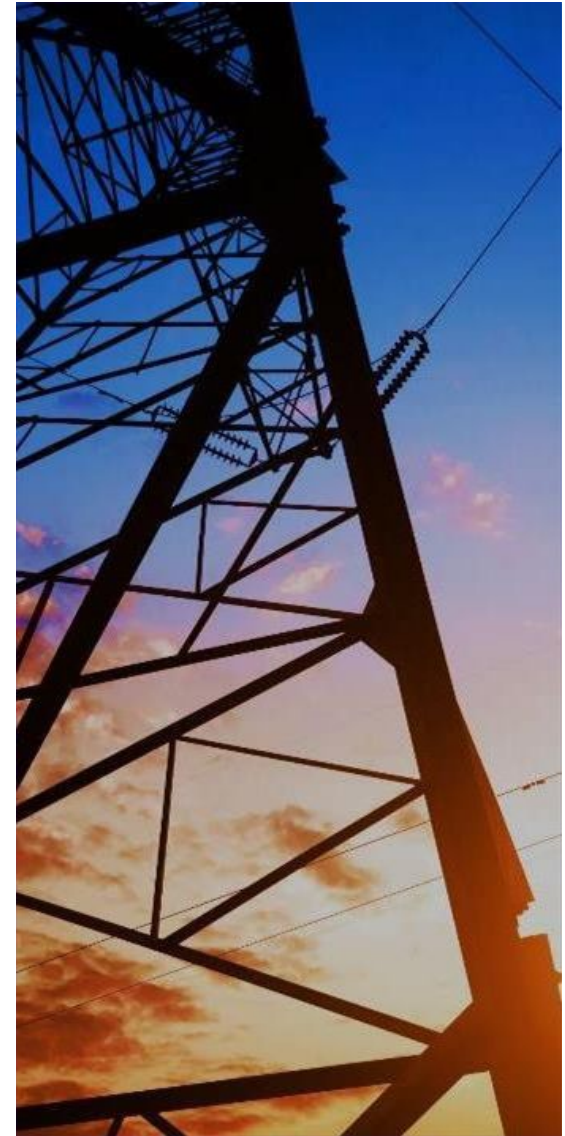
Signed Agreements

Signed for a total of 18.2 GW in 2024, marking a significant milestone.

150 GIAs

Anticipated Agreements

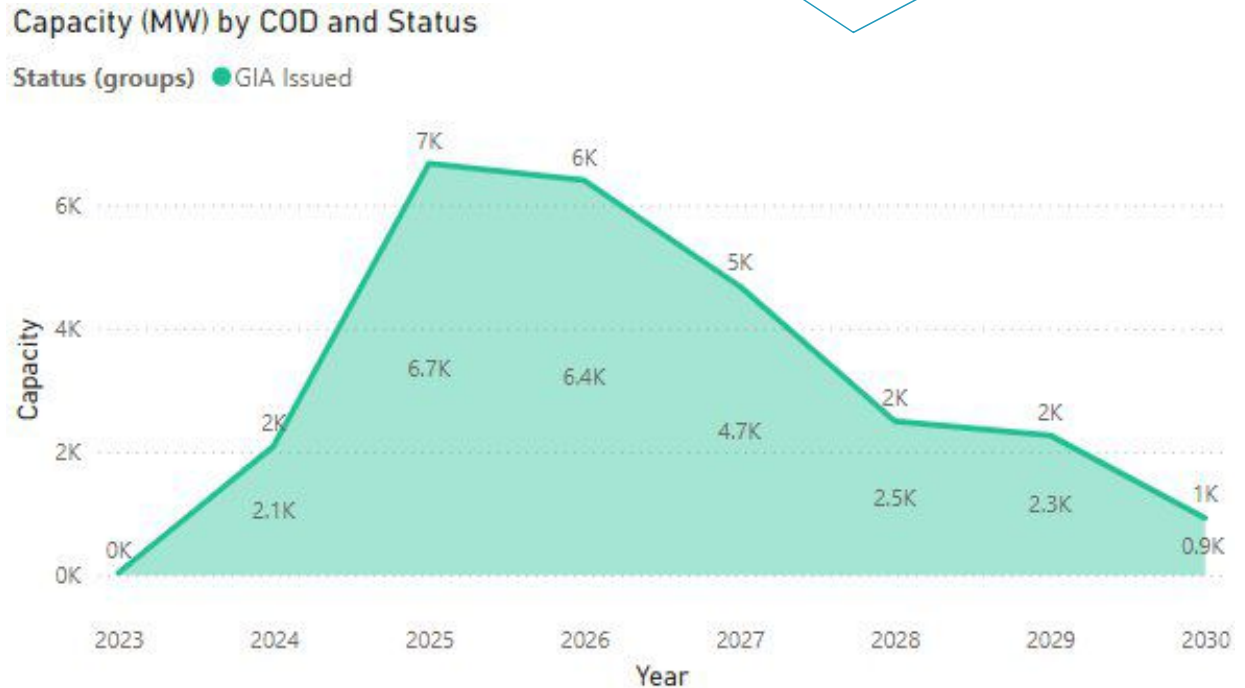
Anticipated agreements in 2025, reflecting continued growth in the Generator Interconnection process.



COMMERCIAL OPERATION VISIBILITY

- COD of projects with executed GIA*
- Milestone Tracking
- Will continue to update as new GIA are signed and amended
- GIA to COD expectations from 3GW (2024) to 7GW (2025) from GI to Market Registration

108 GIAs executed in 2024;
 First time hitting over 100 GIAs; Expect to see around 150 agreements in 2025



*Could see a 3-Year shift (right) COD assumptions

ADDITIONAL QUEUE REFORMS

Cash Deposit Amount*	Description
\$10,000	Non-Refundable Application Fee – all requests – DISIS Study Queue
\$35,000 + \$1,000 per MW	<80 MW – DISIS Study Queue
\$150,000	> 80 MW and < 200 MW – DISIS Study Queue
\$250,000	> 200 MW – DISIS Study Queue

Cash Deposit Amount	Description
\$60,000	Surplus Interconnection Service Impact Study
\$15,000	Surplus Interconnection Service Facilities Study (if applicable)
\$60,000	Material Modification Evaluation and/or Permissible Technological Advancement
\$120,000	Generating Facility Replacement Study (See Section 1, Definition of Generating Facility Replacement)
\$1,000	Fast Track (Jurisdictional / Distribution)
\$300	Pre-Application Evaluation

FERC Order 2023 (filed May 2024)

Increased study deposits and non-refundable application fee

Site control and GIA milestone monitoring

Online Application Tool

BACKLOG MITIGATION PLAN

In 2025, complete GI backlog through DISIS 2022 GIAs and DISIS 2023 P2 Restudy

SPP Generation Interconnection Queue Study Schedule*

Green shaded cells indicate milestone completion. *Actual Start and Completion dates may vary and are subject to change. **Restudy start dates may change pending the outcome of the previous restudy.

DISIS Cluster	Projects	MWs	*Projected DISIS Study Start	Phase 1 Posting	Projected DP 1 Completion	Phase 2 Start	Phase 2 Posting	Projected DP2 Completion	Projected Restudy Start	Projected Restudy Completion	Projected Facilities Studies Start (pending restudy)	Projected GIA Start	Current Status	Postings & Comments
DISIS-2017-002	59	11,727	6/21/2021	2/18/2022	3/14/2022	3/15/2022	8/21/2022	9/20/2022	1/5/2024	6/26/2024	6/27/2024	8/26/2024	GIA's in progress	Restudy posted
DISIS-2018-001	32	4,955	3/15/2022	7/19/2022	8/23/2022	9/21/2022	3/30/2023	4/24/2023	6/27/2024	9/23/2024	9/24/2024	11/25/2024	GIA's in progress	Restudy posted
DISIS-2018-002 & DISIS-2019-001	54	7,298	8/24/2022	10/25/2022	12/1/2022	4/25/2023	8/23/2023	10/13/2023	9/24/2024	12/10/2024	12/11/2024	2/10/2025	Facility Studies in progress	Restudy posted
DISIS-2020-001	49	11,186	12/2/2022	3/17/2023	4/7/2023	10/16/2023	2/16/2024	3/11/2024	1/3/2025	3/3/2025	3/4/2025	5/5/2025	Restudy pending	Phase 1 Final posted 3/17/2023 Phase 2 Final posted 2/16/2024
DISIS-2021-001	55	11,483	4/10/2023	6/8/2023	7/17/2023	3/12/2024	8/9/2024	9/16/2024	3/24/2025	5/22/2025	5/23/2025	7/22/2025	Restudy pending	P1 Final re-posted 6/30/2023, P2 posted 8/9/24, re-posted 8/30/24
DISIS-2022-001	108	22,729	7/18/2023	9/28/2023	11/3/2023	9/17/2024	1/4/2025	2/5/2025	6/16/2025	8/14/2025	8/15/2025	10/15/2025	Phase 2 in progress	Phase 1 Final re-posted 10/20/23
DISIS-2023-001	129	28,354	1/2/2024	3/1/2024	3/22/2024	2/6/2025	6/1/2025	6/27/2025	9/5/2025	11/3/2025	11/4/2025	1/5/2026	Phase 2 pending	Phase 1 Final posted 3/1/2024
DISIS-2024-001	13	2,233	11/10/2025	1/8/2026	1/30/2026	2/2/2026	6/1/2026	6/23/2026	7/1/2026	9/14/2026	9/15/2026	11/16/2026	Window Open	Application window closes 3/1/2025
DISIS-2026-001	TBD	TBD	1/4/2027	3/4/2027	3/25/2027	3/26/2027	7/23/2027	8/13/2027	8/27/2027	10/25/2027	10/26/2027	12/27/2027	Planning	Application window opens 4/1/2026

*Pulled 1/2/2025

CPP UPDATE

2025 CPP KEY ITEMS

01

ITP Scope Approvals

Ongoing work to secure necessary approvals for the CPP transition assessment.

02

Entry Fee Calculation

Establishing the calculation methodology for Entry Fee

03

Tariff Revision Request

Preparation for the submission of a tariff revision request.

04

RSC Approvals

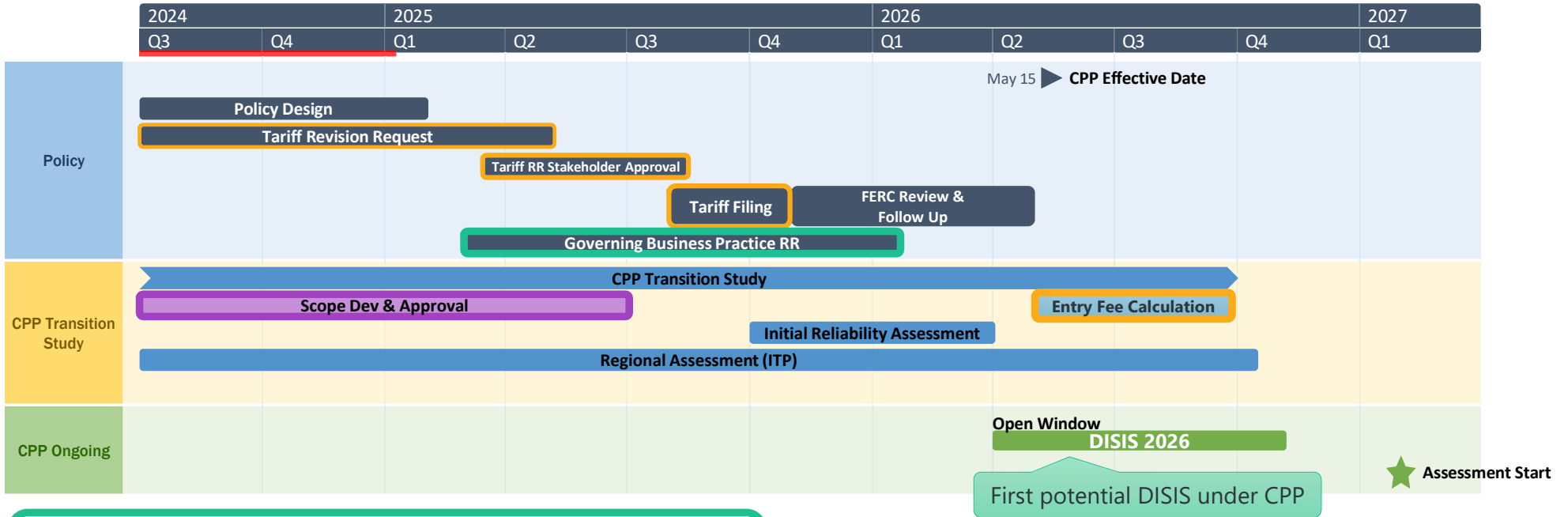
Directional approval from the RSC followed by full approval in August.

05

FERC Filing

Anticipated filing with the Federal Energy Regulatory Commission (FERC), marking a significant step in the CPP transition process.

ANTICIPATED CPP POLICY SCHEDULE



CPP Ready ITP and GI Manual Approvals

- January 2026 MOPC

2026 ITP Scope Approvals

- January 2025 Phase: Futures – Model Assumptions
- July 2025 Phase: Transmission Needs – Final Report

CPP Tariff Revision Request will be filed with the Entry Fee methodology before the actual Entry Fee calculation. CPPTF is working on forecasting the anticipated Entry Fee costs to assess commercial viability for generators.



ITP UPDATE

2025 ITP RESILIENCY

Objective

- Integrate extreme weather events into the 2025 ITP cycle

Model Development

- Creation of new economic and power flow models
- Development of Resiliency Market Powerflow Models

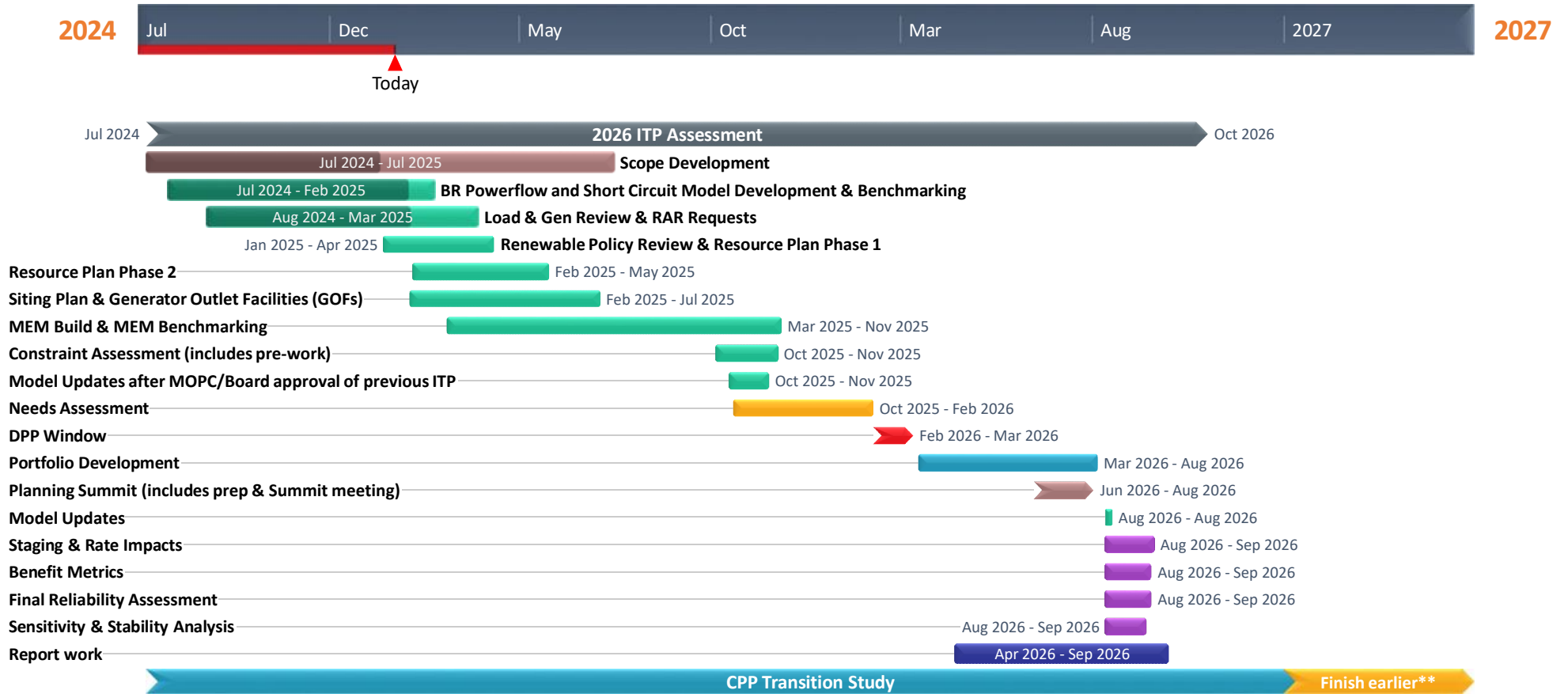
Resiliency Needs Criteria

- Establishment of new resiliency needs criteria to address various extreme weather impacts

Key Milestones

- Posting of the Consolidated Needs Assessment on February 21, 2024
- DPP Window opening from February 24, 2025, to March 25, 2025

2026 ITP ASSESSMENT/CPP TRANSITION STUDY – TIMELINE*



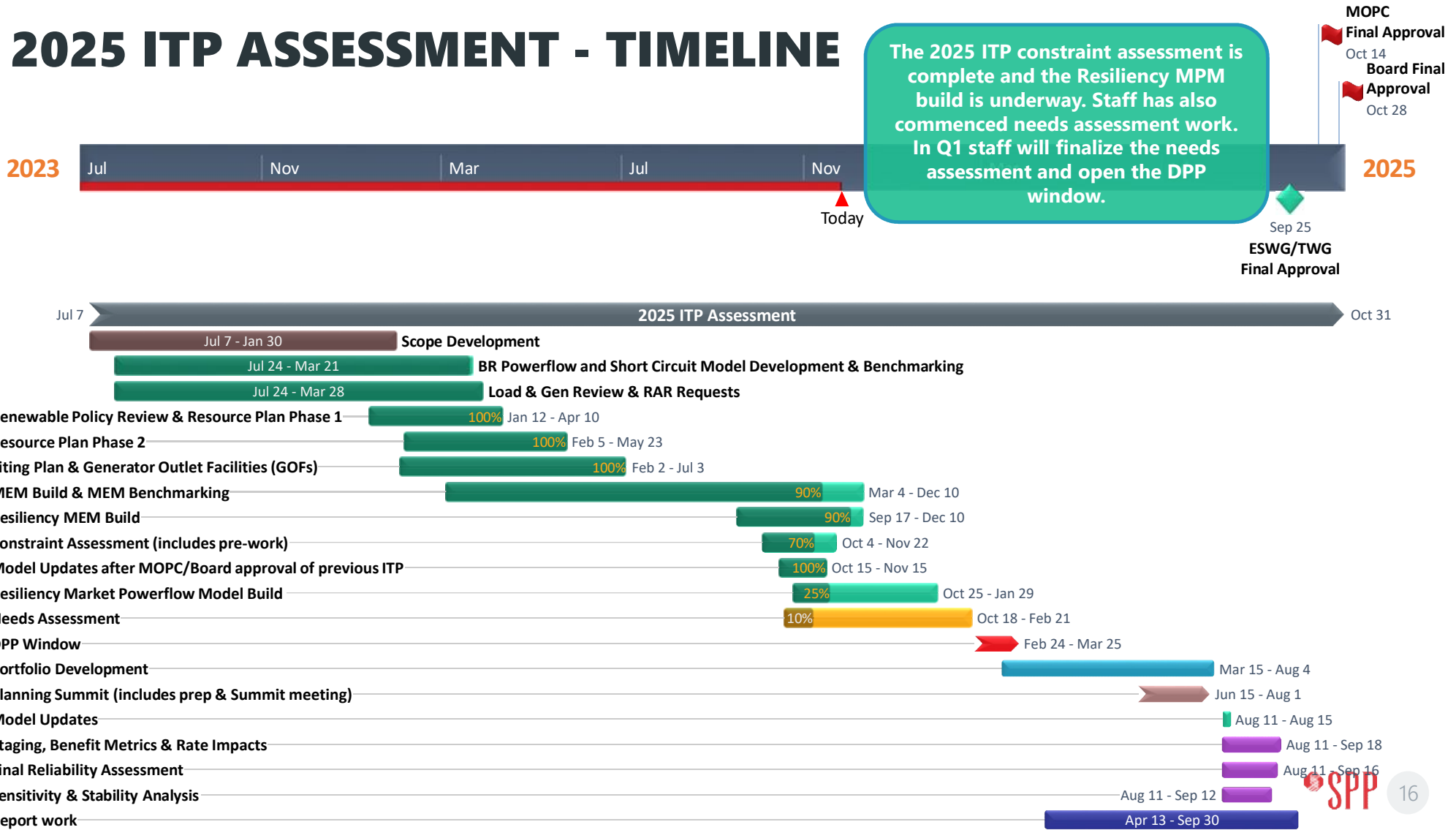
Notes:

*Additional schedule updates will be made to the 2026 ITP and CPP Transition Study as the studies progress

**Evaluate the possibility of completing the CPP transition study ahead of the current 20 year requirement tariff requirement

2025 ITP ASSESSMENT - TIMELINE

The 2025 ITP constraint assessment is complete and the Resiliency MPM build is underway. Staff has also commenced needs assessment work. In Q1 staff will finalize the needs assessment and open the DPP window.



SPP EXPEDITED RESOURCE ADEQUACY STUDY (ERAS)

SPP ERAS AT-A-GLANCE

Driving the need:

Planning Reserve Margin /
Resource Adequacy

Increased load projections

GI Queue backlog

Generator Retirements



Special **one-time study** process to expedite the interconnection of new resources to meet resource adequacy needs



Must be approved by the Regional State Committee (RSC)



Conducted outside of the regular generator interconnection study queue on a shortened timeframe.



Generation projects selected by Load Responsible Entities (LRE) within resource adequacy needs established by SPP policy.

ERAS CEILING FORMULA AND LRE EXAMPLE

LRE Ceiling Capacity

$$= \text{Maximum} \{0, [(Projected Resource Adequacy Requirement) - Projected LRE Capacity] * Ceiling Multiplier\}$$

Winter 2030 Projection

- LRE Accredited Capacity = 900 MW
- Net Peak Demand = 1,000 MW
- Accredited Capacity (ACAP) PRM = 15.7%
- Ceiling Multiplier = 1.25

Winter ERAS Ceiling Capacity

$$(1,000 \times (1 + 15.7\%) - 900) \times 1.25 = 321 \text{ MW}$$

Summer 2030 Projection

- LRE Accredited Capacity = 1,100 MW
- Net Peak Demand = 1,300 MW
- Accredited Capacity (ACAP) PRM = 7.6%
- Ceiling Multiplier = 1.25

Summer ERAS Capacity Ceiling

$$(1,300 \times (1 + 7.6\%) - 1,100) \times 1.25 = 374 \text{ MW}$$

ERAS Max Ceiling Capacity is 374 MW

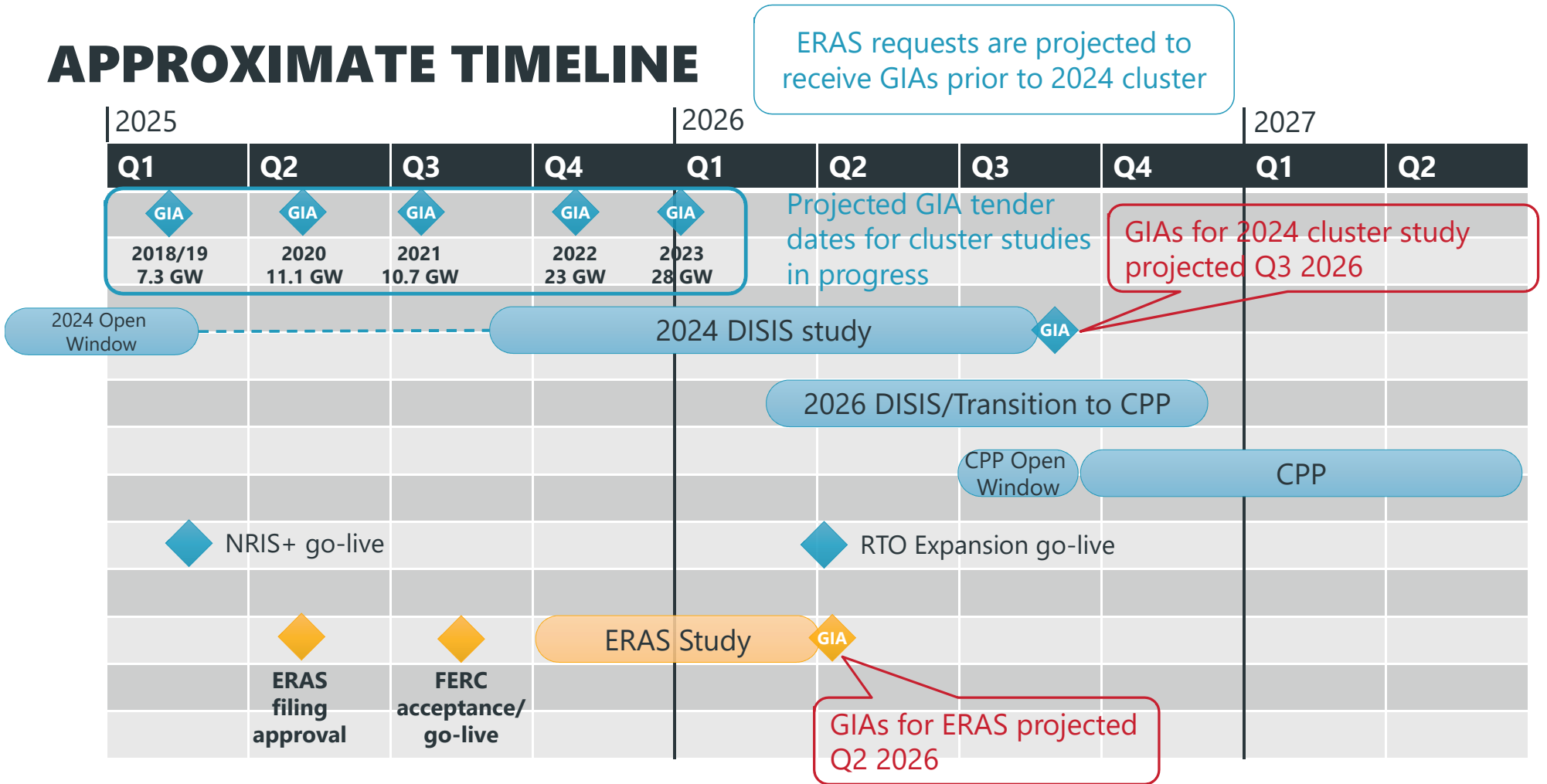
LRE Ceiling Capacity is max between both seasons

PRELIMINARY ERAS ESTIMATIONS


Potential Regional Ceiling Capacity from all LREs between 10GW and 20GW

- Calculated based on Accredited Capacity (ACAP) while applying new SPP accreditation policies
 - Applies class average values to all resources equally based on technology type
- Considers current retirement, contract, and demand projections provided by LREs in the 2024 RA Workbook submission for planning year 2030
- Considers projected future resources provided by LREs for the 2024 LOLE Study resource plan refresh for planning year 2030
- Lower bookend assumes resources in current GI study will not move to ERAS
- Not all LREs may use ERAS even if they have ERAS available
- Applies projected 2029 ACAP PRM

APPROXIMATE TIMELINE



REVIEW AND APPROVAL PROCESS

- Finish collecting feedback → refine Revision Request draft
- REAL to endorse ERAS *policy* in January
- MOPC endorsed ERAS *policy* in January
-  RSC, Board to endorse ERAS *policy* February 3-4
- CAWG, TWG, RTWG, GIAG, SAWG, reviews RR in January, February, March
- MOPC education session March TBD
- REAL approves RR March 6
- MOPC approval April 15-16
- RSC & BOD approval May 5-6
- Filing mid-May



SPP OPERATIONS UPDATE

Q4 2024

BRUCE REW, PE

SENIOR VICE PRESIDENT, OPERATIONS

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KEY TAKEAWAYS – Q4 2024

SPP BA experienced on average a 1GW higher BA load level in Q4 2024 compared with Q4 2023

SPP BA added total 3 GW new Generation capacity in 2024, not all operational yet. Some Gas plant retirements in 2024, but no accredited capacity.

SPP BA experienced higher forced outage levels in Fall 2024 compared with Fall 2023

SPP BA issued Resource Advisory on 10 days this Fall and Conservative Operations on 2 days.

OPERATIONS METRICS UPDATE

Load

- Load SPP BA Summary
- Weekly Averages

Generation

- Generation outages
- Wind Generation
- Installed Capacity SPP BA

Transmission

- Transmission outages
- Congestion

SPP OPERATIONS HIGHLIGHTS

MARKETPLACE OPERATIONAL HIGHLIGHTS

- No New Operational peaks set during the quarter
- SPP issued a Resource Advisory for its entire SPP Balancing Authority (BA) footprint on 10 days in October 2024 and Conservative Operations on 2 days in October 2024.

DARUC forecast error % improved for Wind and Load compared to last year's quarter

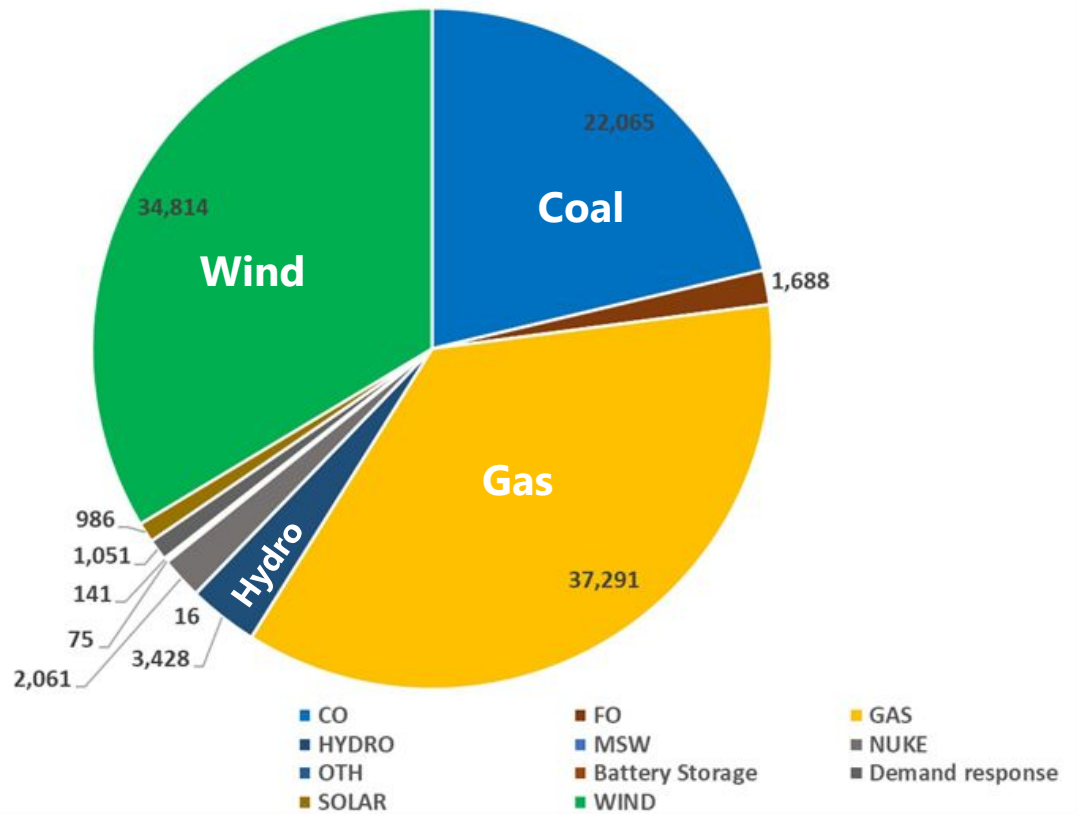
Forecast Error	2024		2023
	Q4	Q3	Q4
Load	1.74%	1.97%	1.75%
Wind	3.74%	3.34%	4.18%
Solar	1.99%	3.50%	1.66%

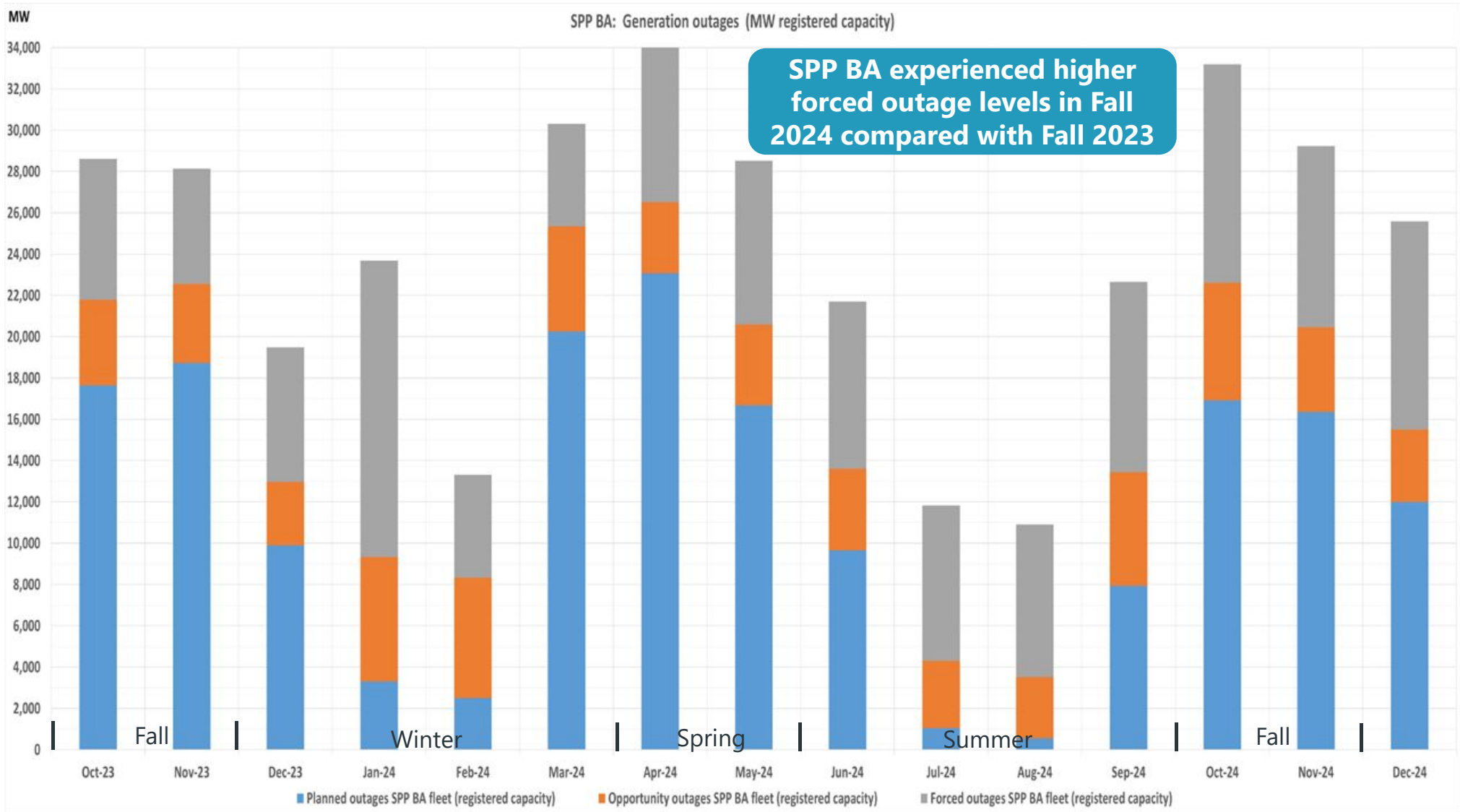
Available Wind		
IM	34,814	MWs
WEIS	5,814	MWs

SPP BAA GENERATION CAPACITY UP 2.9 GW OVER PAST 12 MONTHS

Capacity increase in last 12 months	
Wind	+1,083 MW
Gas	+892 MW
DFO	+52 MW
Solar	+502 MW
Demand Response	+260 MW
Battery Storage	+130 MW
Coal	<u>+0 MW</u>
Total	+2,900 MW

SPP BAA fleet: Registered Capacity 1/1/2025







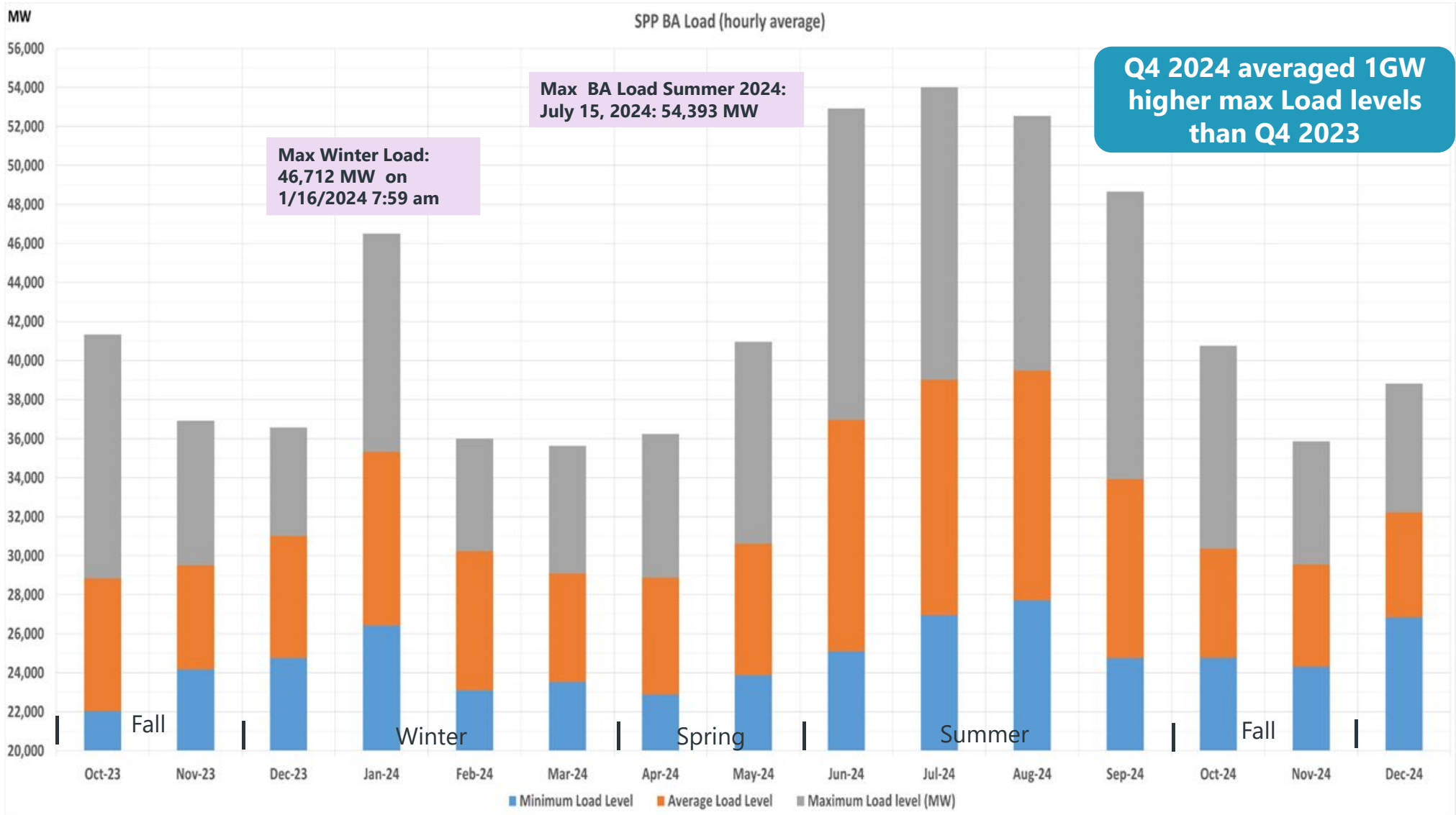
CONTACT

Bruce Rew, PE

Senior Vice President, Operations

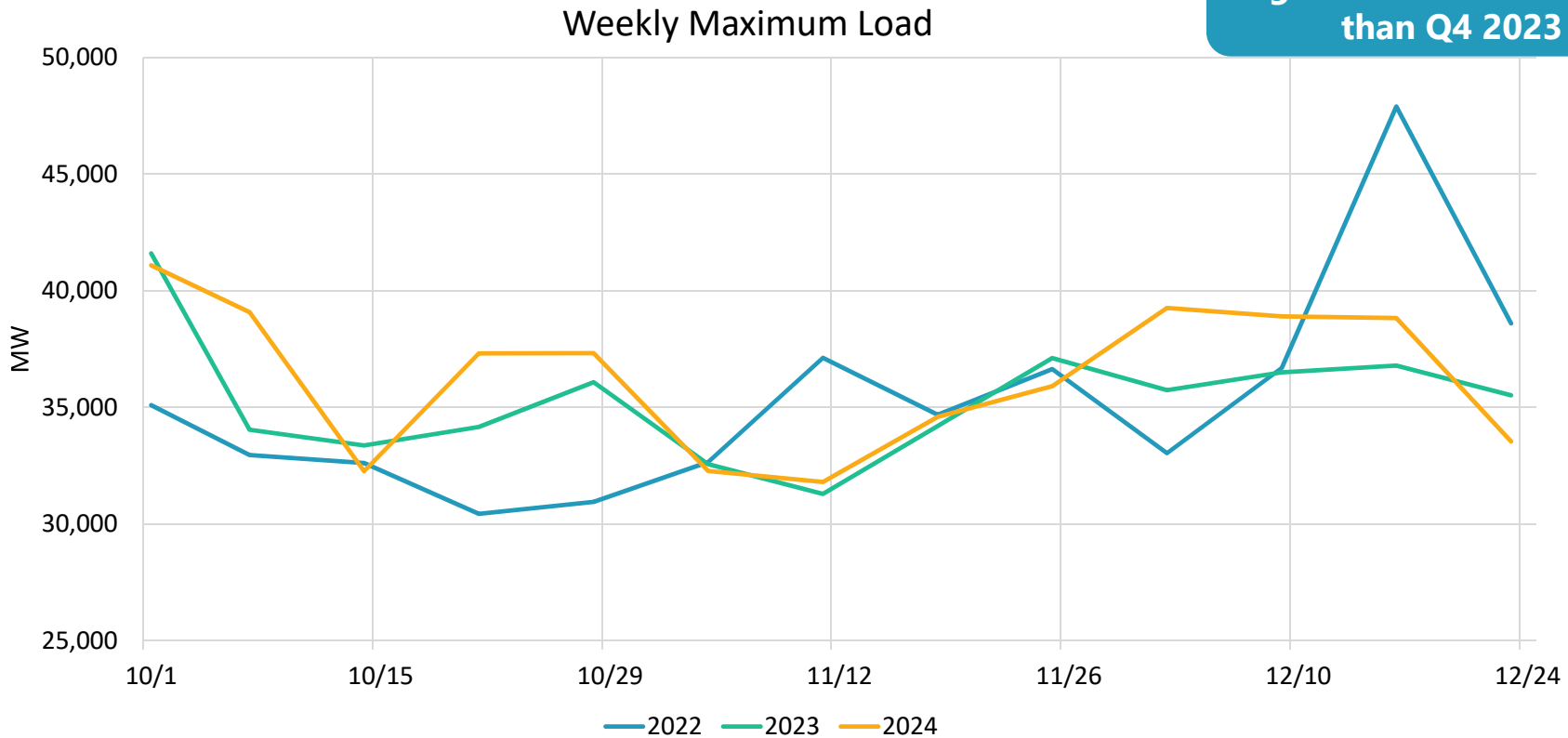
BRew@spp.org

APPENDIX: **SPP BA LOAD**



WEEKLY MAXIMUM LOAD PROFILE BY YEAR

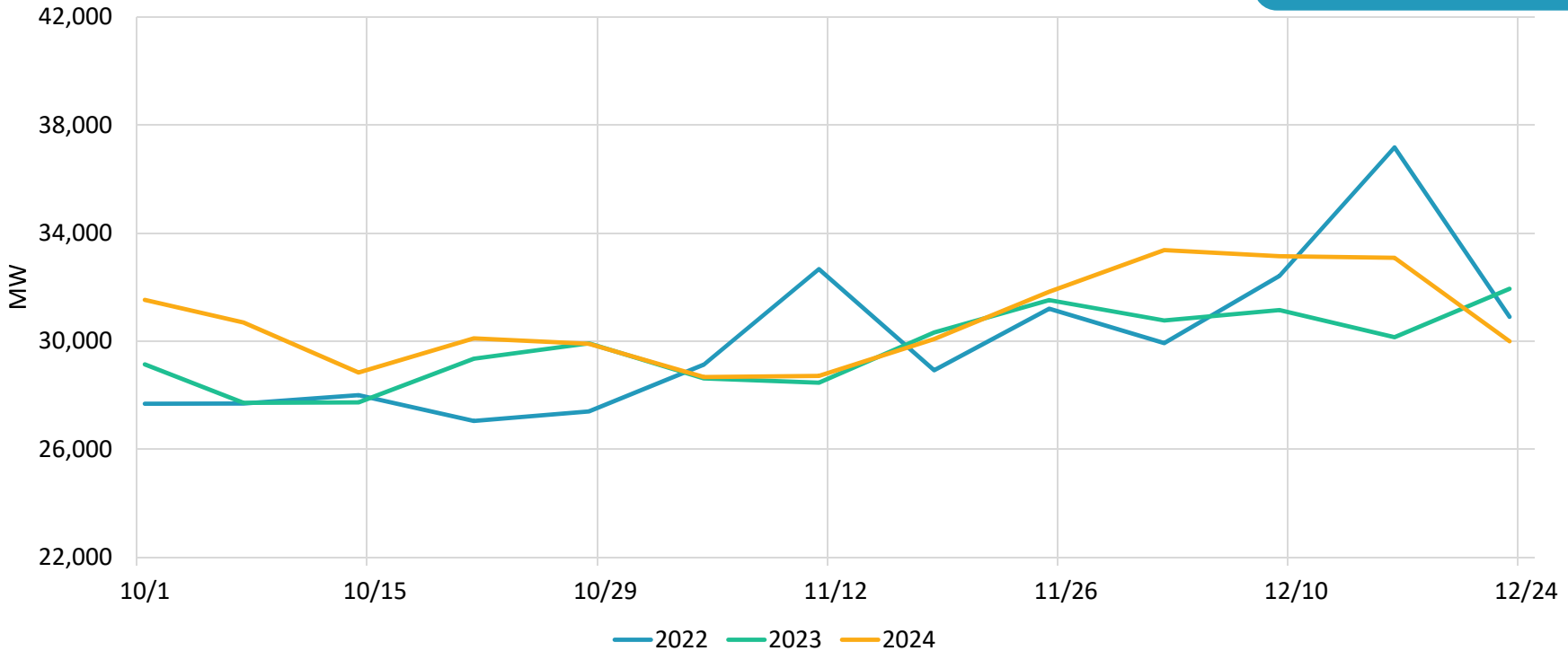
Q4 2024 averaged 1GW higher SPP BA Load levels than Q4 2023



WEEKLY AVERAGE LOAD PROFILE BY YEAR

Weekly Average Load

Q4 2024 averaged 1GW higher SPP BA load levels than Q4 2023



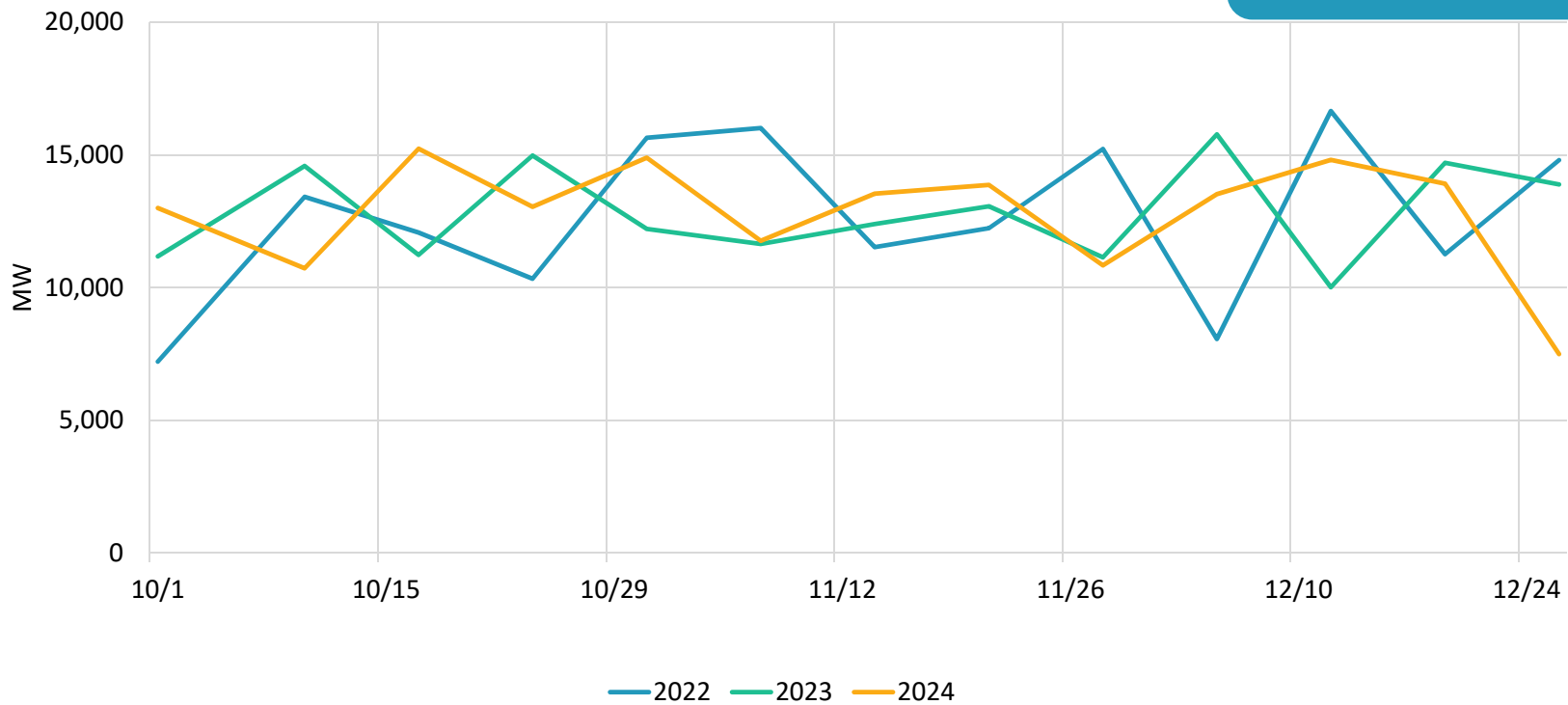
SPP BA GENERATION

SPP BA WIND GENERATION

WEEKLY AVERAGE WIND PROFILE BY YEAR

Weekly Average Wind

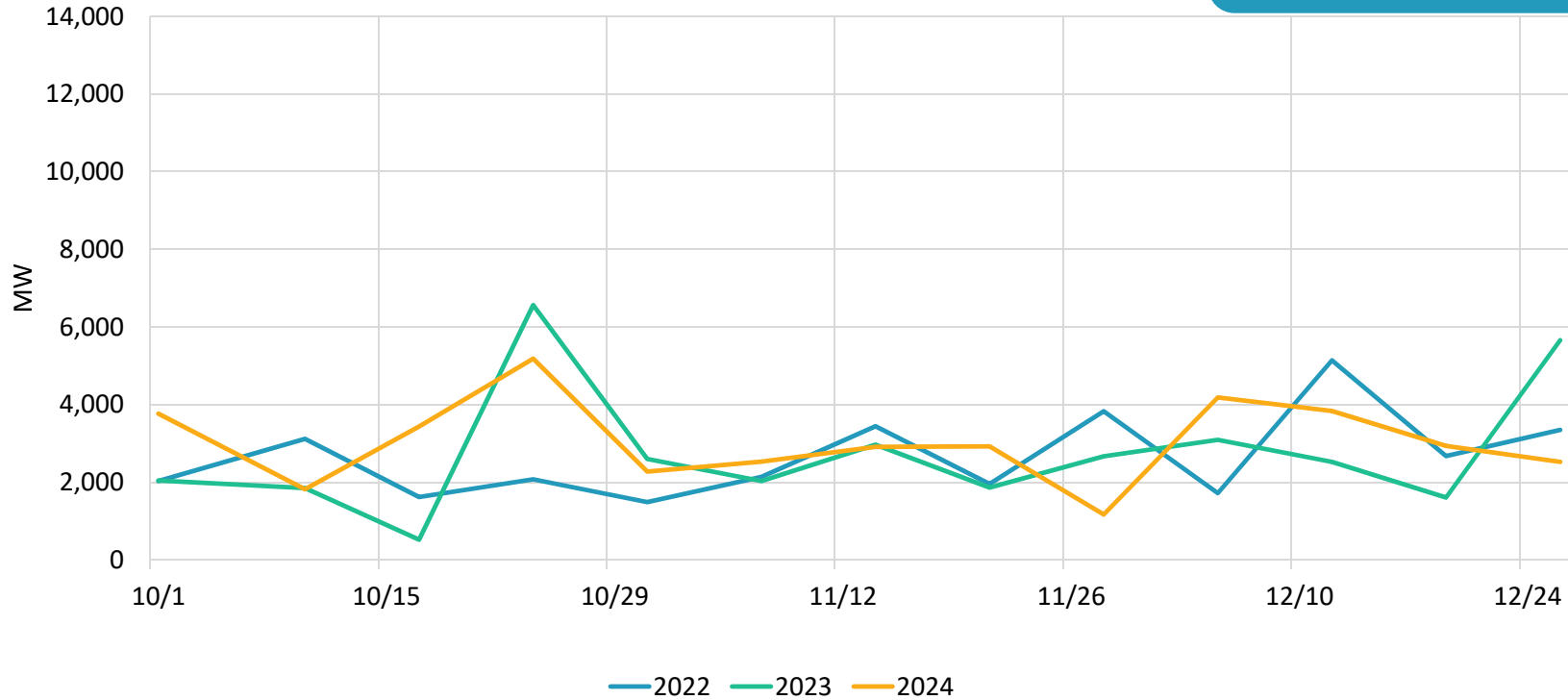
Steady wind throughout Q4 until end of December



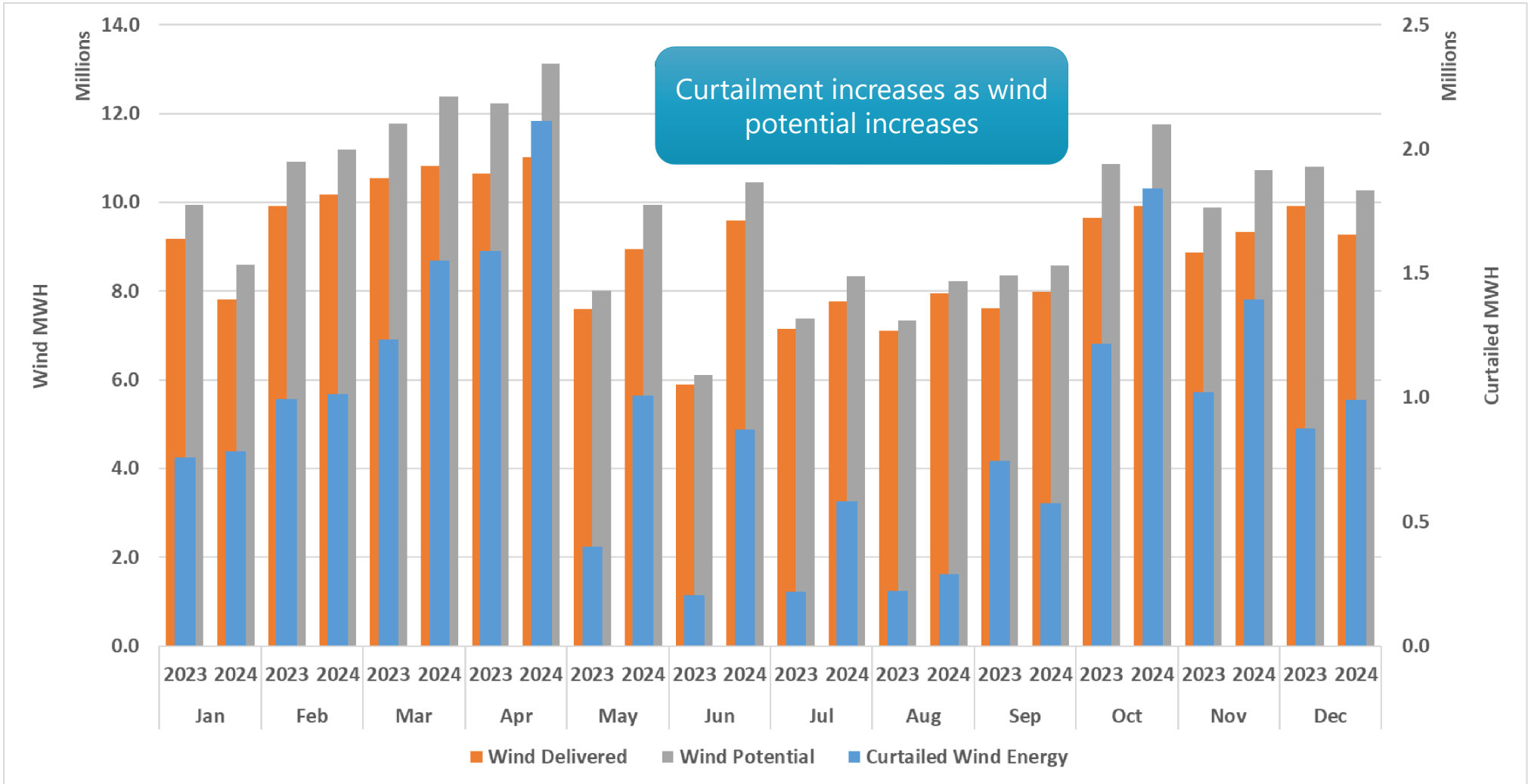
WEEKLY MINIMUM WIND PROFILE BY YEAR

On average, Q4 2024 experienced higher min wind levels compared to previous years

Weekly Minimum Wind



WIND CURTAILMENT



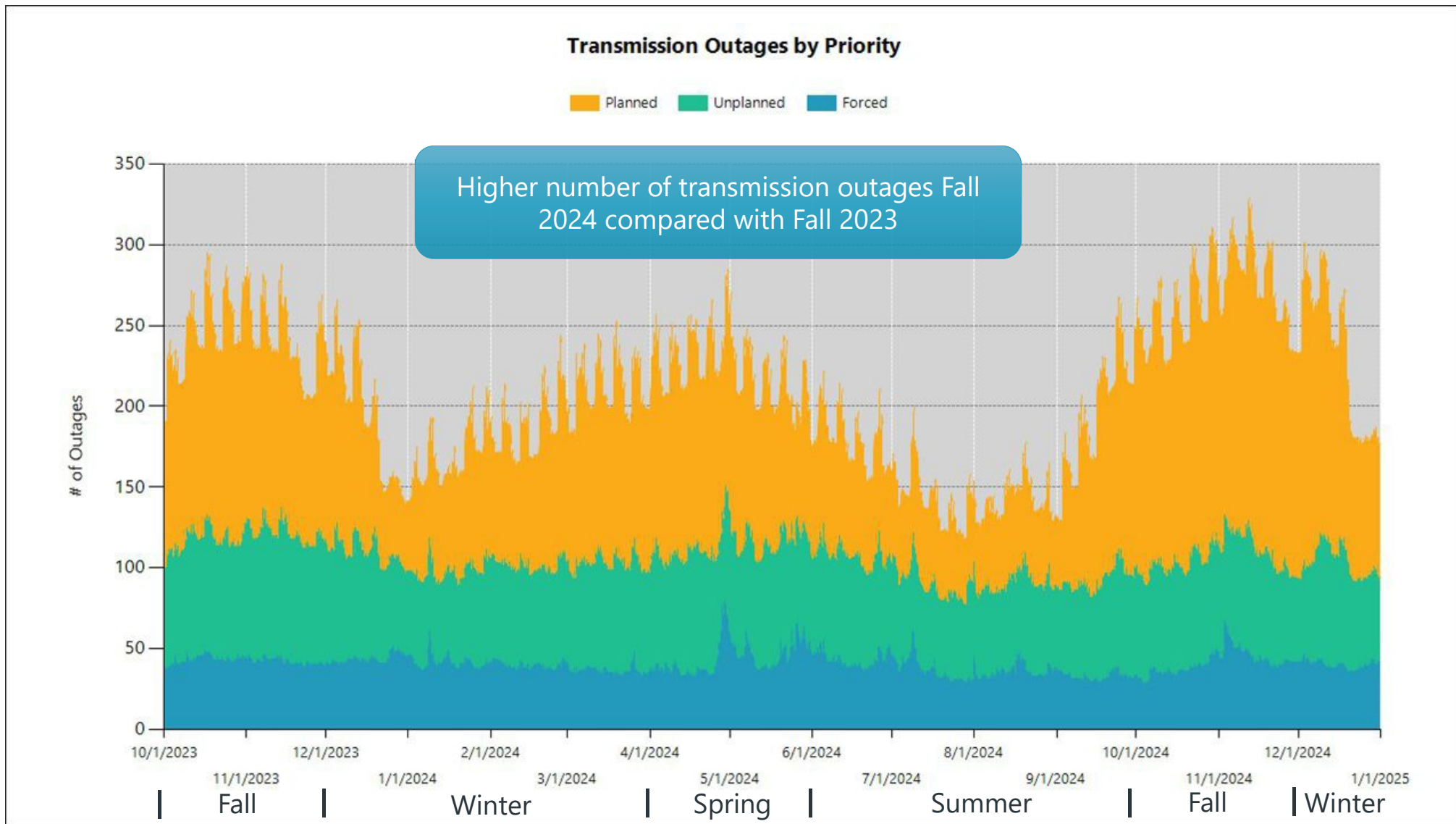
WIND OUTPUT: OCTOBER – DECEMBER 2024

	@ Max Wind Output	@ Min Wind Output
MW Wind	21,542.90 MW	1146.42 MW
Time	11/25/2024 8:38:00 AM	12/1/2024 10:19:00 AM
SPP Load	32,986.59 MW	32,814.21 MW
<i>Gen Mix Percent</i>		
Wind	62.56%	3.73%
Coal	13.63%	43.03%
Nat. Gas	14.82%	42.88%
Nuclear	5.06%	5.97%
Hydro	2.92%	2.47%
Other	0.99%	1.93%

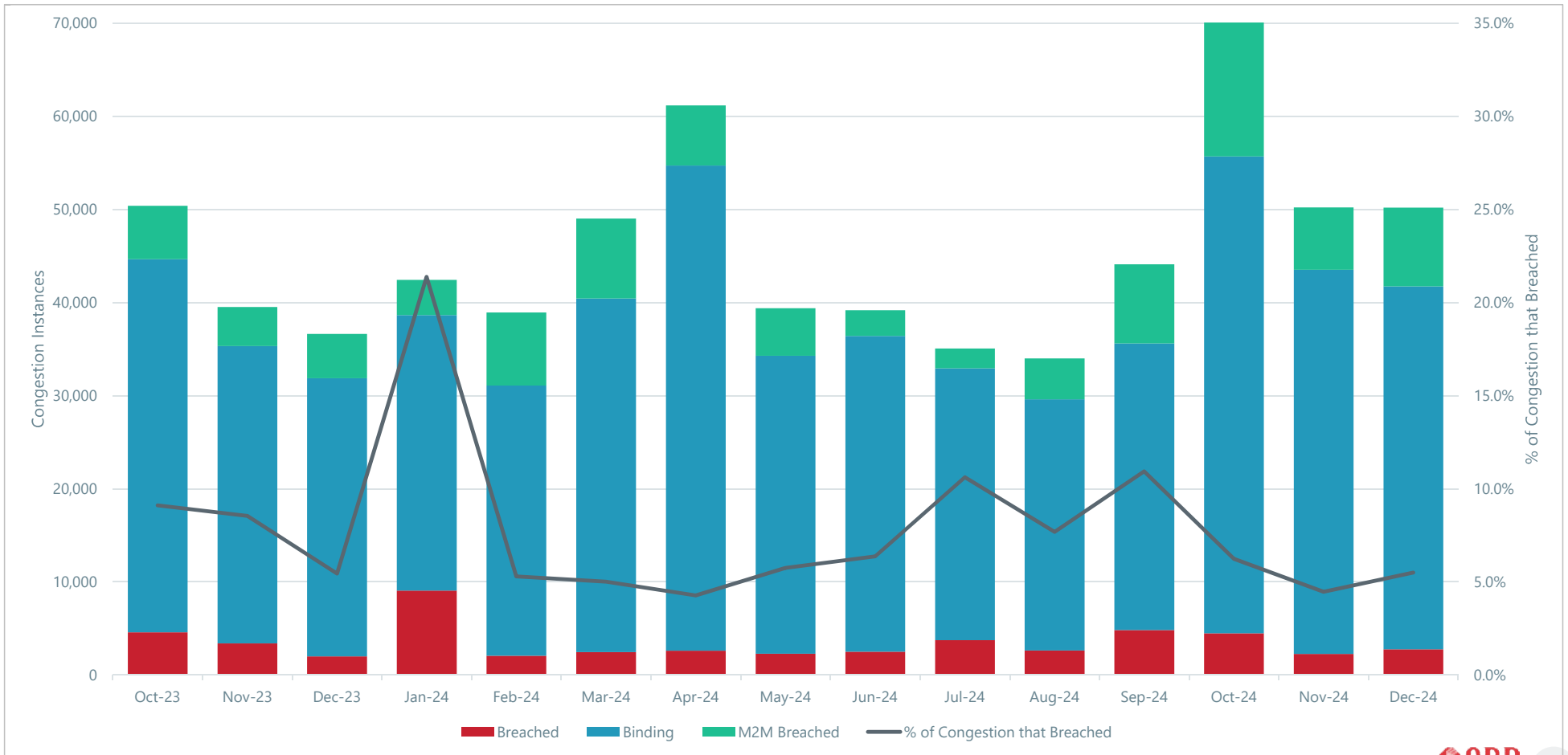
WIND OUTPUT: OCTOBER – DECEMBER 2024

	@ Max Penetration	@ Min Penetration
Wind Penetration	74.91% of load	3.48 % of load
Time	10/17/2024 at 4:00:44	12/1/2024 at 10:06:32
SPP Load	26,476.31 MW	32,993.48 MW
Wind Output	19,796.11 MW	1,155.33 MW
<i>Gen Mix Percent</i>		
Wind	71.85%	3.74%
Coal	10.33%	42.91%
Nat. Gas	11.80%	42.97%
Nuclear	3.01%	5.94%
Hydro	2.98%	2.52%
Other	0.02%	1.92%

SPP BA : TRANSMISSION



RTBM CONGESTION – LAST 15 MONTHS



A "congestion instance" here is defined by constraint-interval occurrences. So an RTBM interval with 3 constraints congested at that time would count as 3 "instances"



SPP MARKETS UPDATE

Q4 2024

ANTOINE LUCAS

VICE PRESIDENT, MARKETS

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SPP MARKETS UPDATE

Integrated Marketplace Performance

- Price Convergence
- Generation Outages
- Revenue Neutrality Uplift

WEIS Performance

- Pricing Trend

Market Initiatives Update

- Key initiative status

KEY TAKEAWAYS – MARKETS METRICS UPDATE

Prices for Q4 are lower than previous year and trending upward as we transition to Winter

Increased outage levels and increased congestion in Q4 than Q3

Day-Ahead and Real-Time Price Convergence and Revenue Neutrality Uplift align with recent trends

Key market initiatives are on track

INTEGRATED MARKETPLACE PERFORMANCE METRICS Q4 2024

CONTINUED DAY-AHEAD AND REAL-TIME PRICE CONVERGENCE GOOD OVERALL



Day-ahead and real-time market prices converged within expectations in Q4 2024

October price convergence is representative of system conditions: Higher forced outage levels, increased Congestion

December 2024 Net Load up 12% from 2023, December 2024 gas prices up 26% from 2023

DAY-AHEAD AND REAL-TIME PRICES CONVERGE

Prices are continuing to converge due to alignment of market conditions

Congestion Prices increased due to increased generation and transmission outages

Day Ahead - Average Settlement Location Price

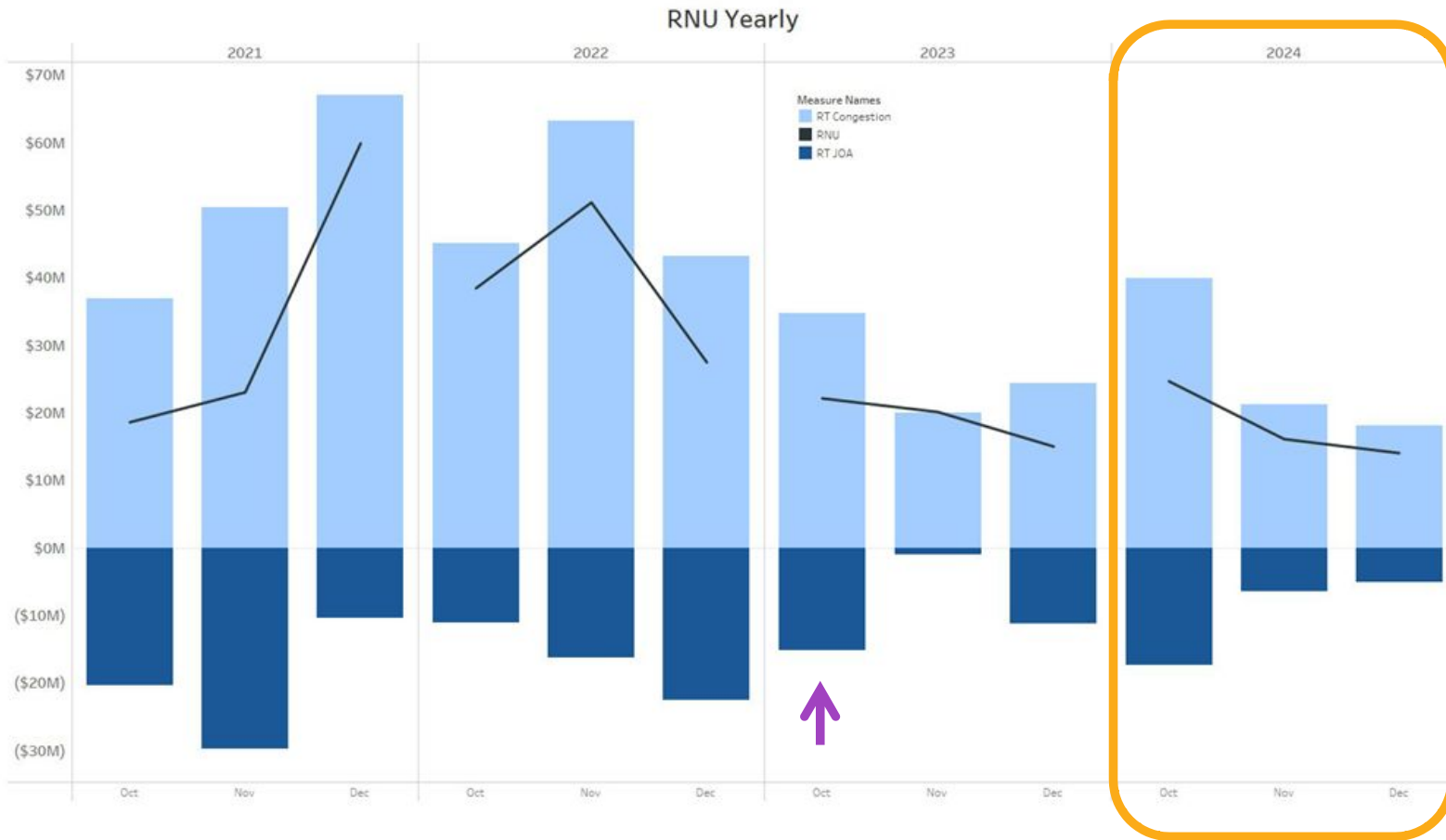
		DA MEC	DA MLC	DA MCC	DA LMP
2024	January	57.13	-1.01	-5.64	50.48
	February	17.21	-0.28	-2.38	14.56
	March	16.80	-0.29	-2.84	13.67
	April	19.83	-0.34	-5.12	14.37
	May	23.39	-0.38	-2.00	21.01
	June	26.13	-0.47	-2.67	22.99
	July	29.35	-0.36	-1.73	27.26
	August	30.43	-0.53	-2.34	27.56
	September	27.39	-0.46	-3.16	23.77
	October	29.34	-0.54	-6.24	22.55
	November	24.20	-0.42	-4.19	19.59
	December	28.43	-0.45	-2.61	25.37

RTBM - Average Settlement Location Price

		RT MEC	RT MLC	RT MCC	RT LMP
2024	January	46.41	-0.80	-5.94	39.68
	February	18.18	-0.30	-2.65	15.23
	March	19.57	-0.36	-4.39	14.82
	April	19.26	-0.35	-4.55	14.37
	May	22.93	-0.40	-2.76	19.77
	June	24.35	-0.45	-3.37	20.53
	July	28.26	-0.36	-2.06	25.84
	August	28.38	-0.53	-2.72	25.14
	September	28.06	-0.53	-4.41	23.13
	October	27.63	-0.57	-7.14	19.92
	November	22.51	-0.40	-3.77	18.34
	December	27.64	-0.48	-2.90	24.26

Good overall price convergence for Q4

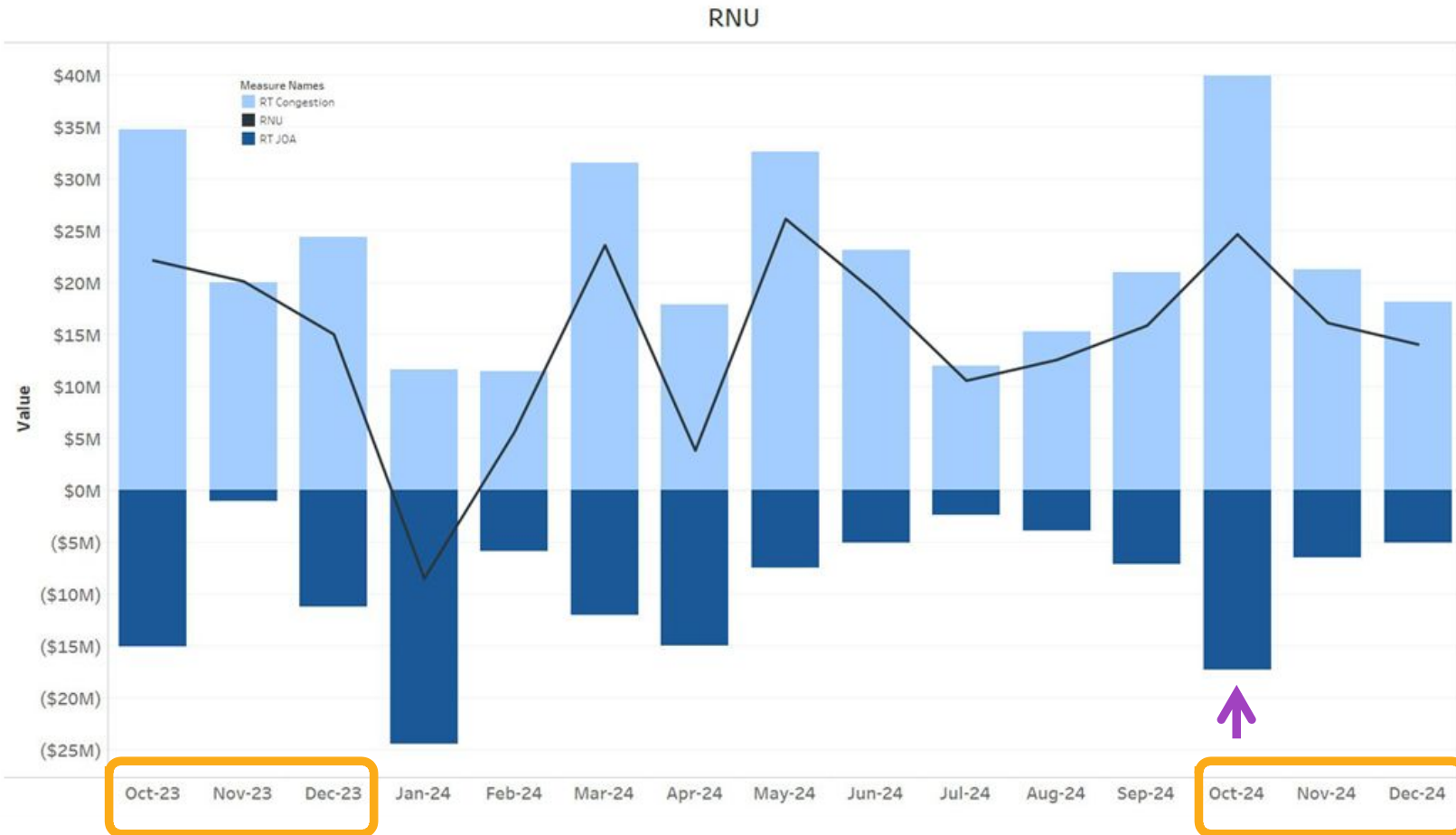
RNU VALUES SHOW CONTINUED IMPROVEMENT SINCE DAMKT EFFECTIVE LIMITS IMPLEMENTATION



Effective limits in the Day-Ahead Market was implemented in June 2023

Overall RNU **3.5%** lower for Q4 2024 than 2023

RNU TRENDS REFLECT OUTAGE SEASON AS EXPECTED



Increase in generation and transmission outages caused higher real-time congestion on the system in October

Slight decrease in RNU values for Q4 2024 vs Q4 2023

WEIS PERFORMANCE

Q4 2024

WEIS REAL-TIME PRICES ARE REPRESENTATIVE OF SYSTEM CONDITIONS



WESTERN SERVICES

Q4 2024

KEY TAKEAWAYS – WESTERN SERVICES

Markets+

- Markets+ Tariff approved by FERC on January 16th
- Phase 2 Funding Agreements are in final stages of preparation for execution
- Phase 2 planning has initiated and expected to launch in early Q2 2025

RTOE

- Filed response to deficiency letter on 11/4/24, currently awaiting response from FERC
- Staff and vendors are currently building out market systems
- Project is on schedule but in yellow status due to software development delays

KEY MARKET INITIATIVES

Q4 2024

KEY TAKEAWAYS – MARKET INITIATIVES UPDATE

FERC Order 2222 Compliance Status

- Staff performed extensive analysis to make informed decisions in allowing distributed energy resources participation in accordance with FERC's order and proposed a multi-nodal design
- Filing was made on December 13, 2024

Winter Storm Uri Initiative Update

- All initiatives are now complete through the stakeholder process

Economic Topology Optimization

- Process development continues; MWG, ORWG and RTWG approved policy direction
- Staff is outlining a process to implement the policy and will meet jointly with MWG, ORWG, SAWG, and RTWG in Q1 2025 to check and adjust
- Policy will be recommended to the MOPC in Q2 2025

Day-Ahead Variable Energy Resource (VER) Participation

- Incentivizing convergence between Day-Ahead and Real-Time Markets, addressing systematic under-bidding in the Day-Ahead market
- Progress continues, expect policy for MOPC Q2 2025

Load of the Future

- Staff is developing a policy paper that proposes proper treatment of behind-the-meter load and generation
- SPP will host an Energy Synergy Symposium in early March



CONTACT

Antoine Lucas
Vice President, Markets
alucas@spp.org

Yasser Bahbaz
Senior Director, Market Development
ybahbaz@spp.org

Steve Johnson
Senior Director, Market Administration
sjohnson@spp.org