

# Joint Stakeholder Briefing

Virtual



February 05, 2024 03:00 PM - 05:00 PM Central Time  
(US and Canada) Central Standard Time

<b>Agenda Topic</b>	<b>Presenter</b>	<b>Page</b>
1. Call to order & administrative items	Chair Susan Certoma	
2. Federal Energy Regulatory Commission update	Mr. Patrick Clary	
3. <a href="#">Holistic Integrated Tariff Team update</a>	Mr. Paul Suskie	2
4. <a href="#">Transmission planning update</a>	Mr. David Kelley	29
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# HITT PROGRAM UPDATE

PAUL SUSKIE

JOINT STAKEHOLDER BRIEFING





FEBRUARY 5, 2024

*Helping our members work together to keep the lights on... today and in the future.*








# Holistic Integrated Tariff Team Recommendations

## Reliability

-  Essential & other reliability services (ERS/ORS)
-  ERS/ORS compensation model
-  Marketplace enhancements
-  Uncertainty market product
-  Additional operational tools










## Marketplace

-  Congestion hedging improvements
-  Offer requirements for variable resources
-  Mitigation of unduly low offers that create uneconomic dispatch
-  Economic evaluations of reliability




-  Study/Evaluate
-  Implement



## Planning & Cost Allocation

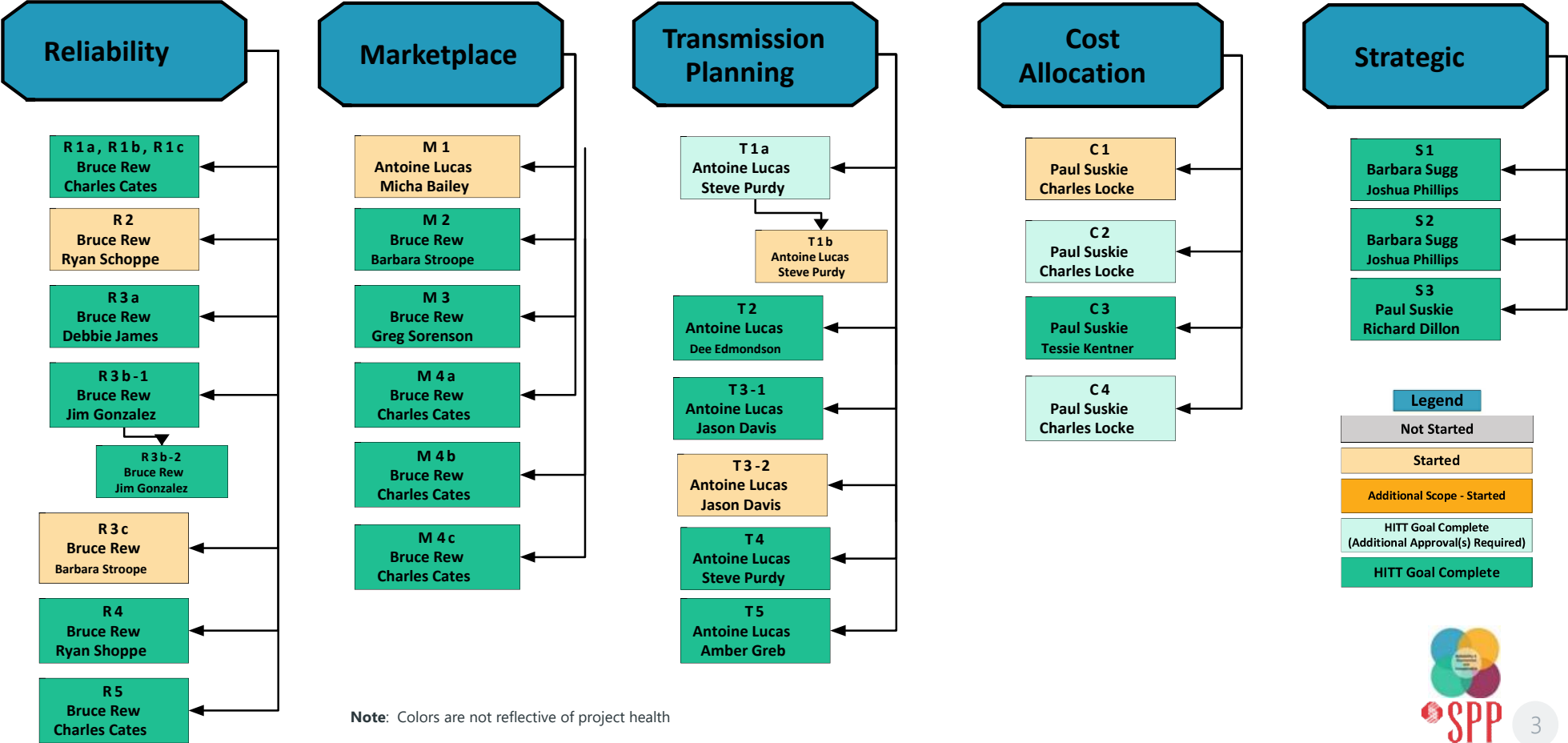
-  NRIS/ERIS modifications
-  Uniform Sch. 9 local planning criteria
-  New load addition modifications
-  Three-phase GI process effectiveness
-  B/C ratio for economic projects
-  Decouple Sch. 9 & 11 pricing zones
-  Byway cost allocation review process
-  Eliminate Z2 revenue crediting
-  Cost allocation for transmission storage

## Strategic

-  Add tech advances to strategic plan
-  Keep seams a priority in strategic plan
-  Create storage white paper

January 2024

# HITT PROGRAM UPDATE



# UPDATE BY CATEGORY

# Reliability

## STATUS

### COMPLETE:

R1 Study ERS And ORS

R5 Study additional operational tools

R3a Implement Marketplace Enhancements:  
Ramping Capability

R3b Implement Marketplace Enhancements:  
Fast Start

R4 Implement uncertainty market product

## IN PROGRESS OR NEEDING ADDITIONAL APPROVALS

### R2 Implement ERS/ORS Compensation Model

- RR 562 should be withdrawn because there is already sufficient Frequency Response available in SPP and with FERC Order 842. SPP proposes an increased and expedited focus on the need to incentivize Energy Adequacy through the REAL Markets Subgroup
- **December 2023:** Pause HITT R2 until REAL Market Subgroup completes its efforts.

### R3c Implement Marketplace Enhancements: Multi-Day Market

- Winter Weather Event (WWE FA2.1/MKT2.11) Initiative has been combined with R3c (Comprehensive Roadmap)
- **Q3 2024:** Anticipated approval of tariff language

# Marketplace

## STATUS

### COMPLETE:

M2 Study offer requirements for variable resources

M3 Study mitigation of unduly low offers that create uneconomic dispatch

M4 Study Economic Evaluations of Reliability

## IN PROGRESS OR NEEDING ADDITIONAL APPROVALS

### M1 Implement Congestion Hedging Improvements

- **February 2024:** Anticipating RSC/BOD action on M1 staff recommendations #2, 3, 4, 5 and 7 via RR591
- **Throughout 2024:** Staff is working with CAWG on recommendation #1; Staff is working with Transmission Planning and Stakeholders on recommendation #8; Training being developed on recommendations #6 and 9



# Strategic

## STATUS

## IMPLEMENTATION PROCESS

### COMPLETE:

S1 Add technological advances to SPP strategic plan

S2 Continue to include seams in SPP strategic plan

S3 Energy storage white paper

All HITT Strategic Recommendations are deemed complete



# Cost Allocation



## STATUS

### COMPLETE:

C2 Establish byway facility cost allocation review process

C3 Eliminate Attachment Z2 Revenue Crediting For New Upgrades

C4 Study cost allocation for transmission storage (FERC approved 5/26/23)

## IN PROGRESS OR NEEDING ADDITIONAL APPROVALS

### C1 Decouple Schedule 9 & 11 pricing zones

- **March 2023:** Complete Analysis requested by stakeholders
- **October 2023:** CAWG begins review and consideration of deliverability zones
- **March 2024:** Anticipate CAWG policy recommendations
- **May 2024:** Anticipate RSC action on policy
- **August 2024:** Anticipate RSC/BOD action regarding RR language

### C2 Establish Byway Facility Cost Allocation Review Process

- **July 2023:** FERC accepted initially, then reversed course in July 2023. CAWG and RSC to continue to work on a new policy implementing C2 after SPP is able to discuss paths forward with FERC staff.
- **January 2024:** SPP expects to refile

# Planning & Cost Allocation

## STATUS

### COMPLETE:

T4 Study three-phase GI process effectiveness

T5 Evaluate Benefit-to-cost Ratio For Economic Projects

T2 Establish uniform Schedule 9 local planning criteria (part of 2025 ITP)

## IN PROGRESS OR NEEDING ADDITIONAL APPROVALS

### T1 NRIS/ERIS modifications

- **October 2020:** White paper approved
- **April 2021:** RR435 approved (Business Practice)
- **June 2021:** BP7250 updated with new language
- **April 2022:** Work continues on Phase 1/Work started on Phase 2
- **February 2024:** Anticipating BOD approval of deliverability areas
- **August 2024:** Anticipating SPC/BOD action on tariff language

### T3 Implement new load addition modifications

- **October 2020:** Policy white paper approved
- **October 2021:** RR467 Tariff language approved (T3-1)
- **June 2022:** RR467 (ER22-1012) – **FERC approved June 1, 2022**
- **September 2023:** More research required for TWG approval of ATC methodology
- **November 2023:** TWG approval of ATC methodology and create RR
- **March 2024:** Anticipating TWG/RTWG action on tariff language (T3-2)



# HITT T1 CRIS DELIVERABILITY AREAS

BOARD OF DIRECTORS

FEBRUARY 6, 2024

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the lights on... today and in the future.*



# BACKGROUND

# HITT Transmission Planning Recommendation #1: Implement modifications to NRIS and ERIS

Create the appropriate balance between cost assessed and value attained from ERIS and NRIS interconnection products and resources with long-term firm transmission service.

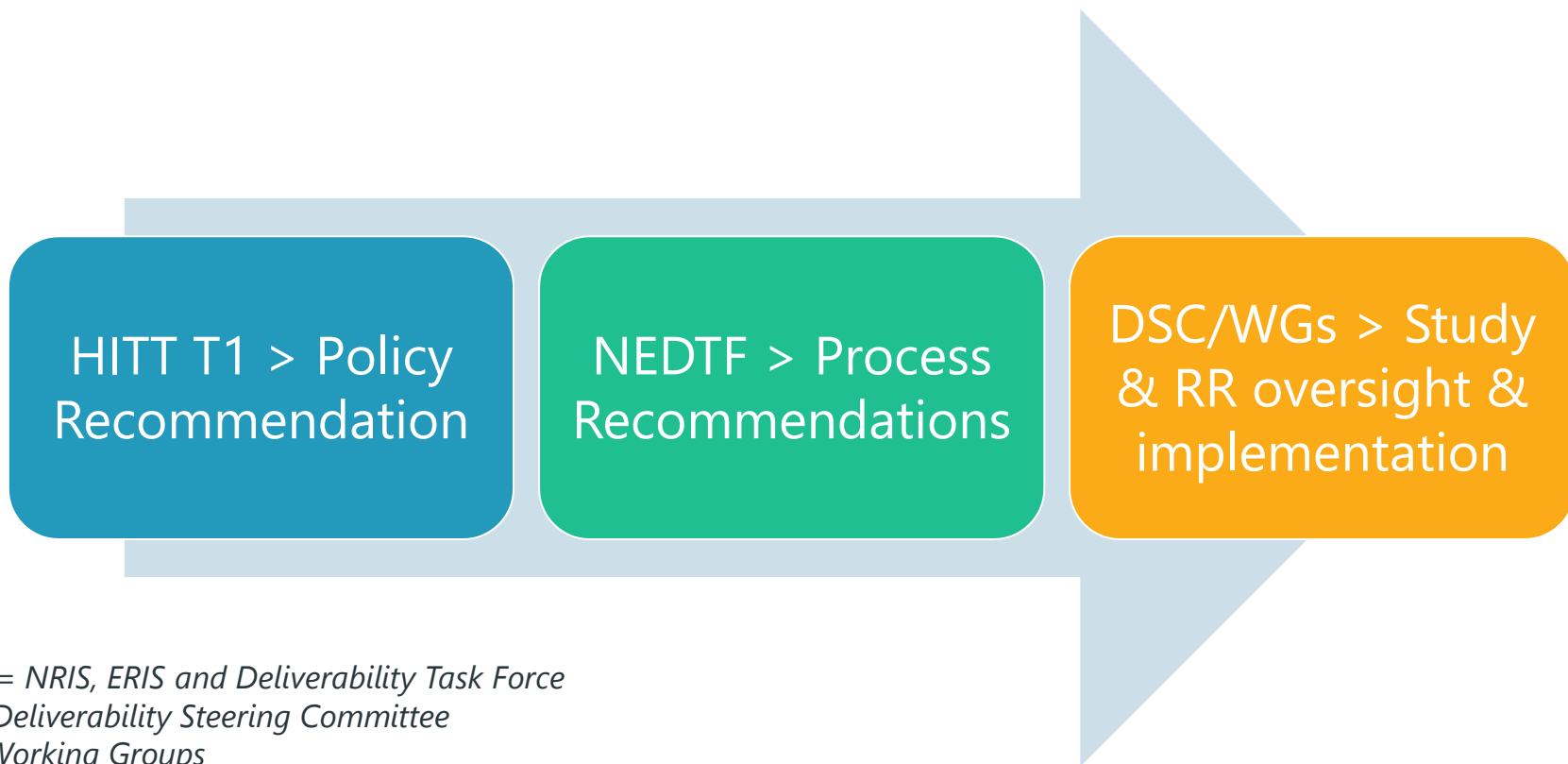
Add more value to the NRIS product by making it eligible for benefits like those awarded to designated network resources (DNR) without the requirement for a transmission service study while also tightening thresholds for mitigating ERIS impacts.

Include deliverability on a sub-regional basis.

Address capacity accreditation.

Maintain value throughout all transmission services, transmission planning and Integrated Marketplace processes to ensure effectiveness and equity for stakeholders.

# HITT Transmission Planning Recommendation #1: Implement modifications to NRIS and ERIS



*NEDTF = NRIS, ERIS and Deliverability Task Force*

*DSC = Deliverability Steering Committee*

*WG = Working Groups*

*RR= = Revision Request*

# WHAT IS CRIS?

*Capacity Resource Interconnection Service*

CRIS is a replacement interconnection service product that adds value to traditional NRIS

## NRIS\* plus deliverability

- Integration into the system like a Network Resource
- Pre-qualification as a DNR for any Network Loads in the same Deliverability Area
- Enabled by upgrades identified in the Generator Interconnection study process

## Benefits to Network Customers/Load Serving Entities

- Expedited designation → fast access to capacity for resource adequacy and load serving
- No Aggregate Study for resources in the same Deliverability Area as CRIS resource
- No risk of additional upgrade costs

## Benefits to Generation Developers

- Reduced congestion/curtailment due to deeper system integration
- Enhanced marketability to Network Customers due to expedited designation process and no unknown upgrade costs

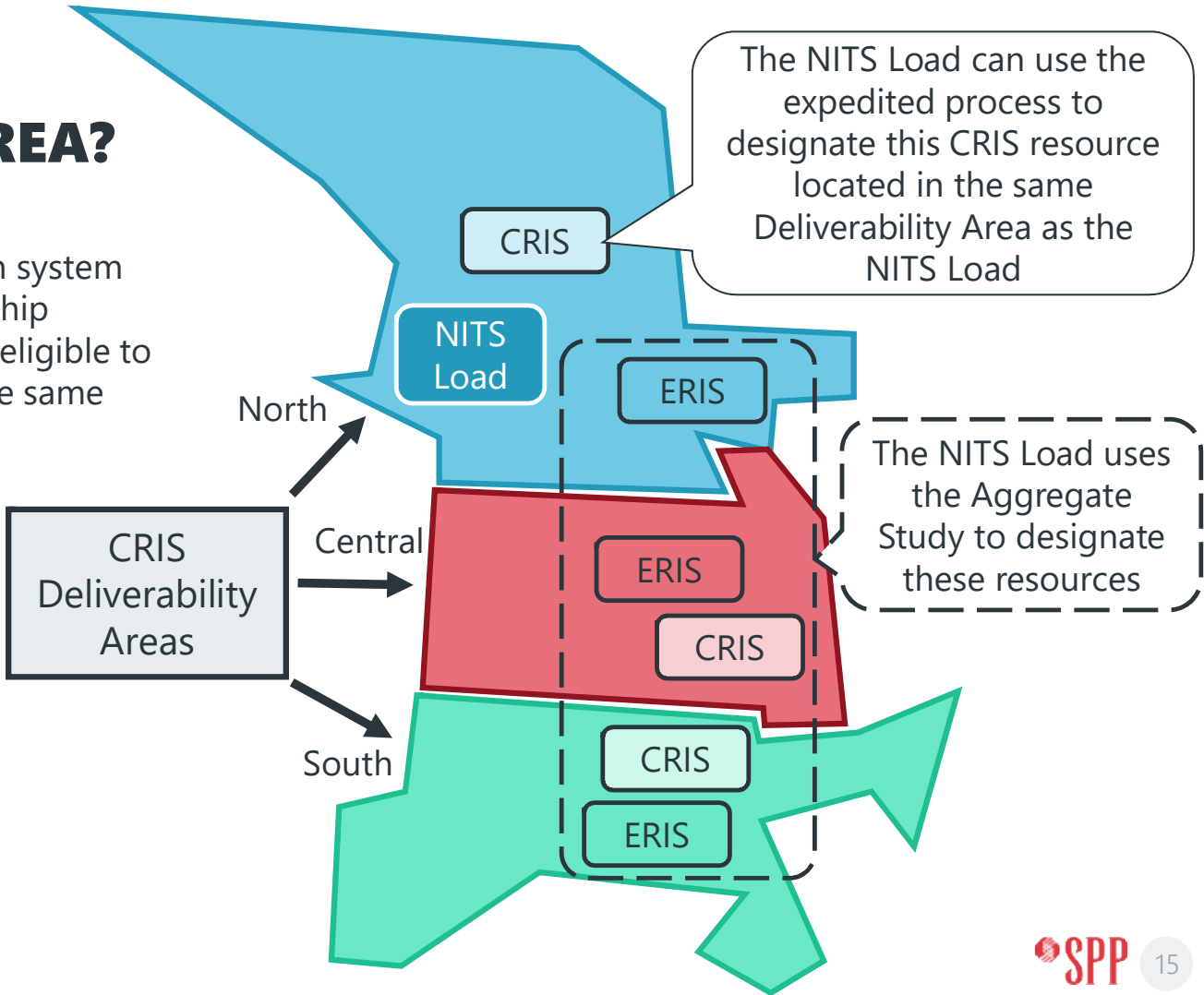
\*NRIS: *Network Resource Interconnection Service*



# WHAT IS A CRIS DELIVERABILITY AREA?

Deliverability Areas are

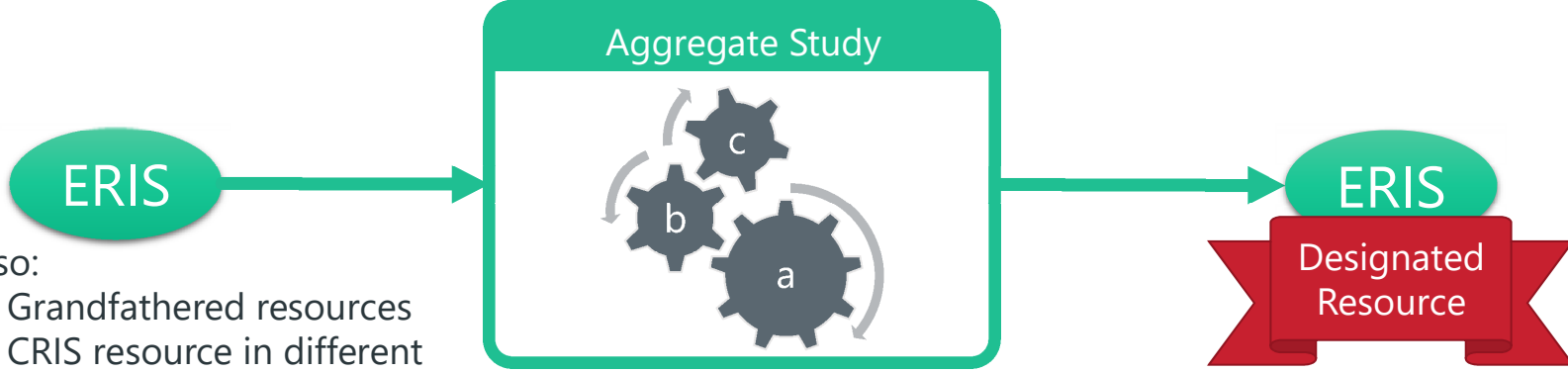
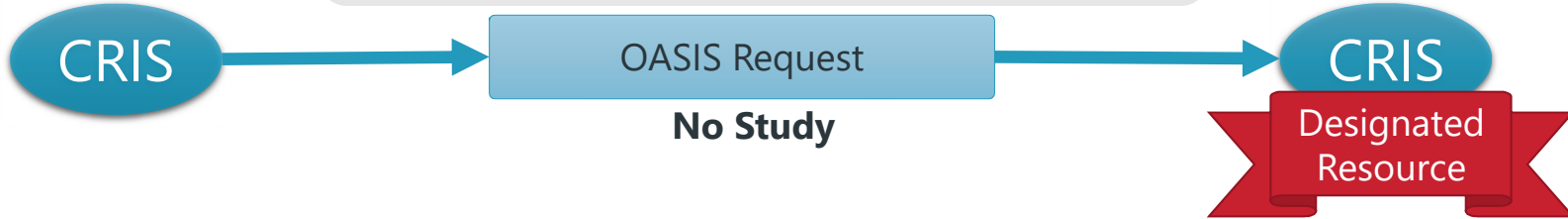
- Portions of the SPP transmission system
- Defined by transmission ownership
- Within which a CRIS resource is eligible to deliver to any load located in the same deliverability area




# EXPEDITED DESIGNATION PROCESS

This is the main benefit of CRIS and what adds value to both developers and load customers

CRIS resources can bypass the aggregate study to become a Designated Resource when the resource and load are in the same Deliverability Area



- Also:
- Grandfathered resources
  - CRIS resource in different Deliverability Area than load

Z2 revenue credit costs apply in both cases  16

# WHAT WILL CRIS MEAN TO EXISTING RESOURCES?

## Continuity of Network Service

- No change to existing designated resources (DR) or network resources (NR)
- Existing DR/NRs continue at current levels regardless of assigned CRIS deliverability amount
- Renewal rights are unaffected – can renew current DR/NRs without limitation

## Enhanced Value of Interconnection Service

- Existing eligible resources will be assigned CRIS deliverability
  - SPP-connected (no behind-the-meter or off-system) generators with NRIS or SPP DR/NR
  - Amounts based on transition study
- Expedited designation process for assigned CRIS amounts over and above DR/NR level
  - e.g. CRIS=120, existing DRs=100, may use expedited process to designate 20

## Expedited designation process for full CRIS deliverability, post-DR/NR term

# CRIS STUDY RESULTS

Transition study is a bridge to the CRIS product

## WHAT IS THE CRIS TRANSITION STUDY?

### Recommendations from the NEDTF\* **whitepaper**

#7 - Conduct transition study to set size and scope of deliverability areas

#8 - Grant CRIS deliverability to existing resources with firm transmission service and to existing NRIS resources

#9 - Identify potential upgrades to optimize deliverability for existing resources and expand deliverability areas

### Process

Consultant conducts study



TWG oversight of scope, process & results

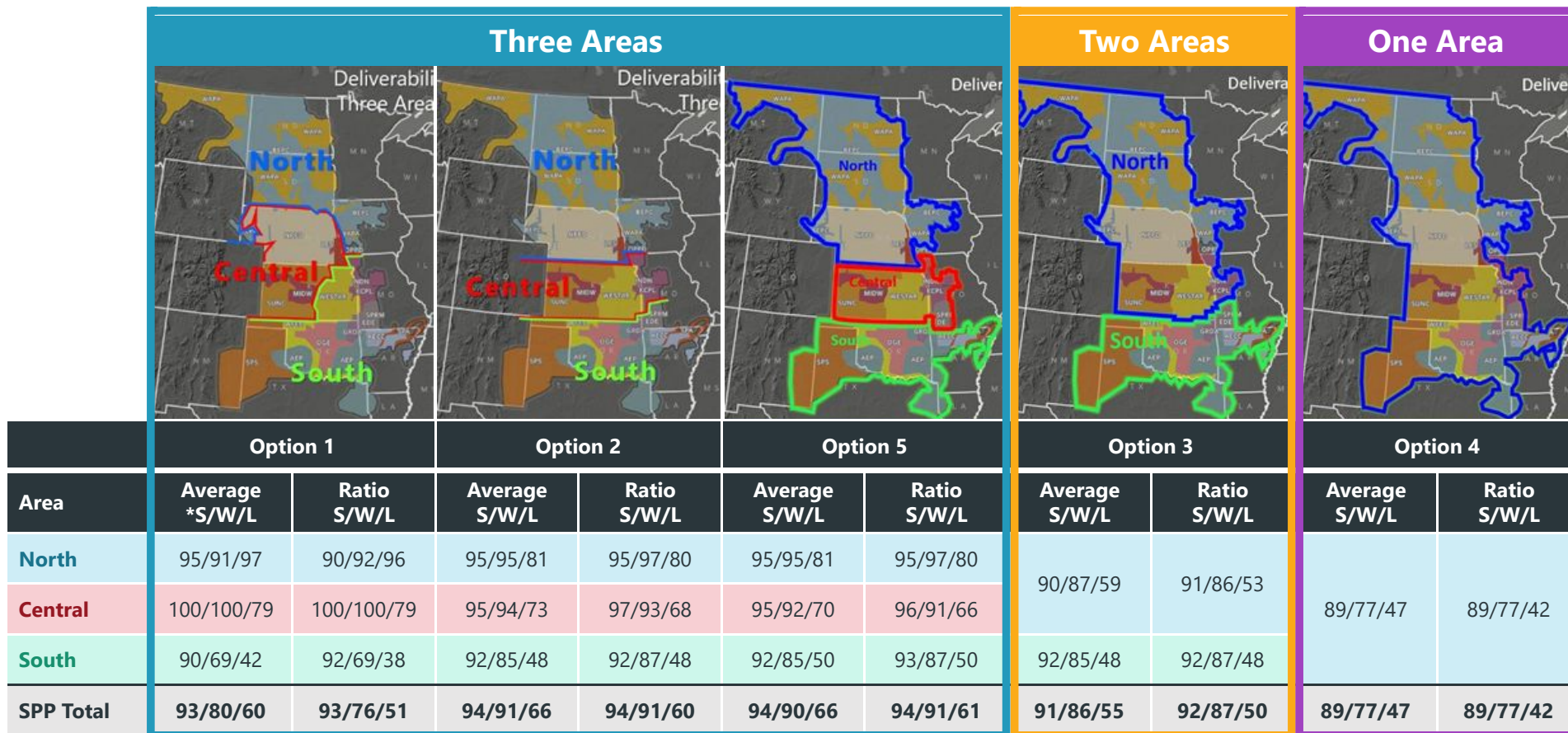


CPPTF guidance and coordination

\*NEDTF: NRIS, ERIS and Deliverability Task Force

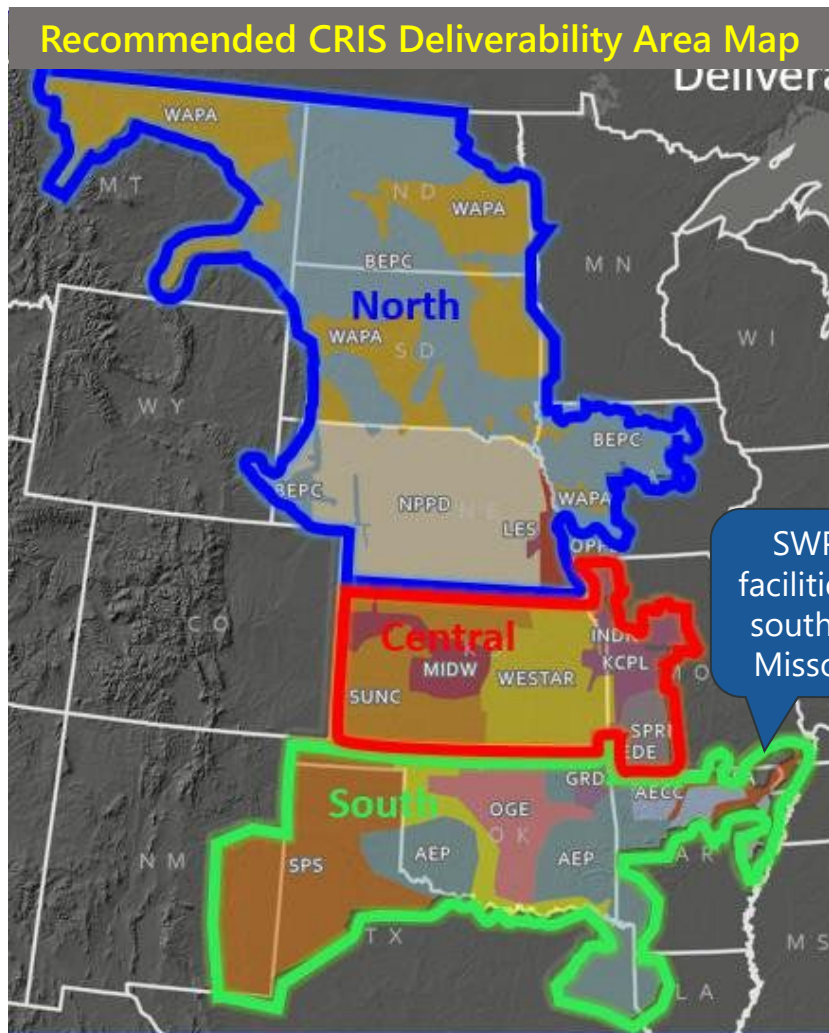
# CRIS DELIVERABILITY COMPARISON

Updated 11/27/2023



\*S/W/L: Summer Peak/Winter Peak/Light Load

Average is calculated by first calculating the percentage of each unit's maximum eligible capacity that is actually deliverable, then summing those percentages and dividing by the number of eligible units in the Deliverability Area. Ratio is the ratio of total MW of output actually deliverable divided by the sum of maximum eligible capacity for all units in the Deliverability Area.



Recommended CRIS Deliverability Area Map with three areas: Nebraska-Iowa-North, Kansas-Missouri-Central, Oklahoma-Arkansas-South

**TWG Motion:** TWG recommends that MOPC approve Option 5 for CRIS Deliverability Areas and development of RRs necessary to implement them.  
**Approved unanimously** with 5 abstentions: OMPA, MRES, OPPD, CU, EDE  
**Action item:** Review placement of SWPA facilities. *Should they be in the central deliverability area?*

**CPPTF Motion:** Endorse from a CPP perspective supporting Option 5 for CRIS Deliverability Areas and development of RRs necessary to implement them.  
**Approved** with one opposed (MEC) and one abstention (OPPD)

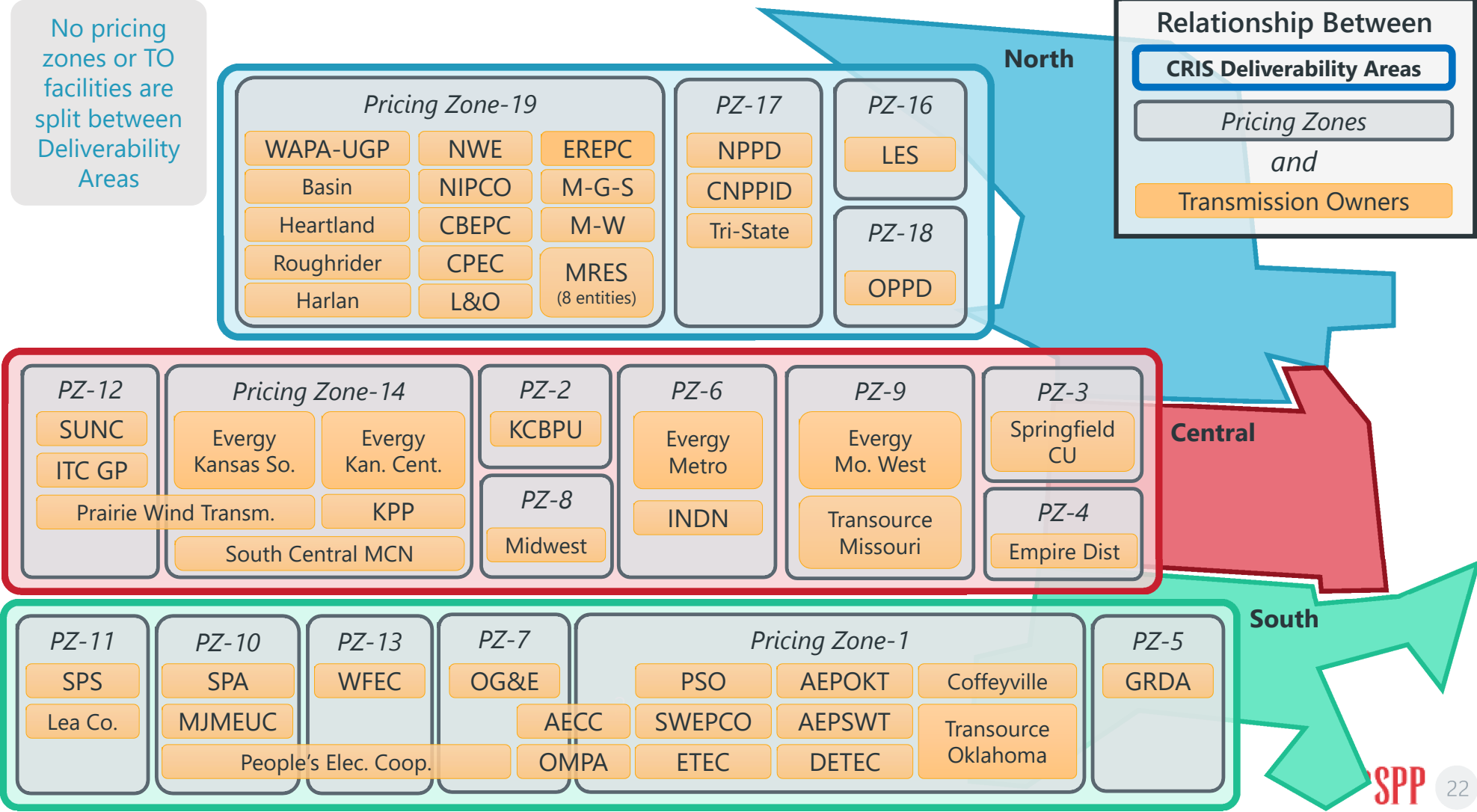
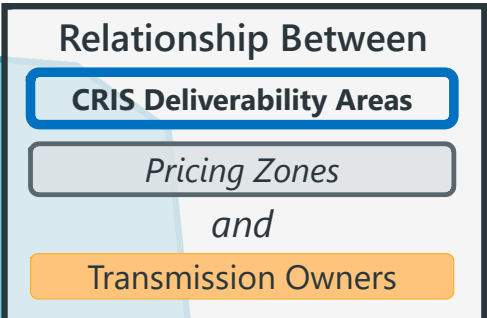
*Recommendation only sets the boundaries for CRIS Deliverability Areas. It does not address upgrades or assignment of amounts to existing generators.*

CU – Springfield (Mo.) City Utilities  
 EDE – Empire District Electric  
 MEC – Missouri Electric Commission

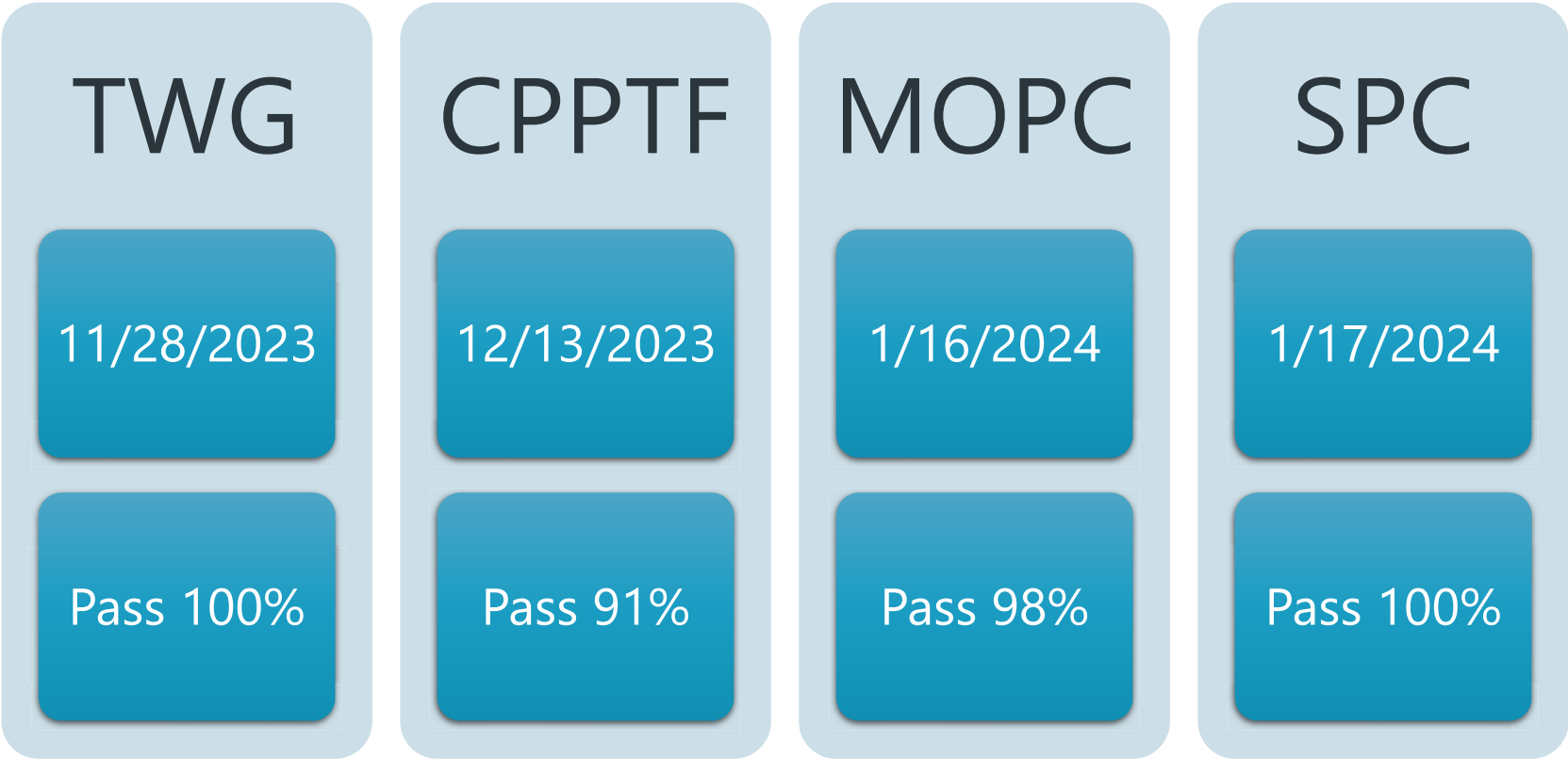
MRES – Missouri River Energy Services  
 OMPA – Oklahoma Municipal Power Authority  
 OPPD – Omaha Public Power District



No pricing zones or TO facilities are split between Deliverability Areas

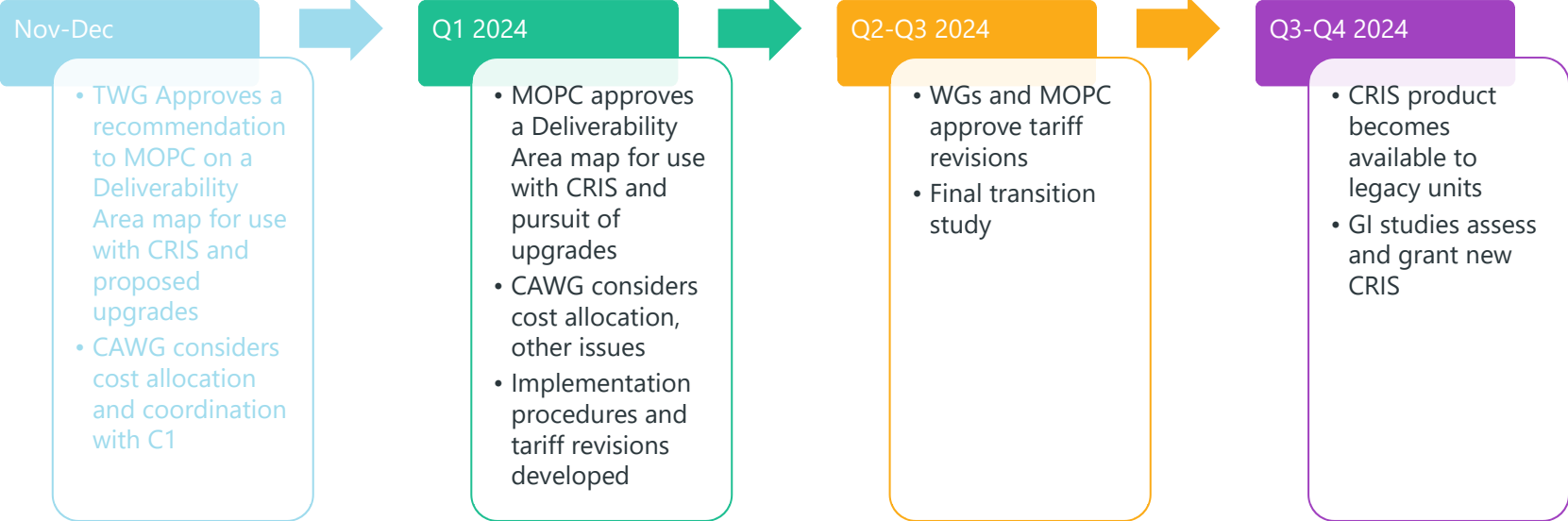


# SUMMARY OF STAKEHOLDER REVIEW AND VOTING



# APPROVAL AND IMPLEMENTATION TIMELINE

**Request is to approve the map of Deliverability Areas only.**  
**Approval for upgrades or CRIS amounts for existing generators is not requested at this time.**



# APPENDIX

# ACRONYMS

CAWG	Cost Allocation Working Group	HITT	Holistic Integrated Tariff Team
CPP	Consolidated Planning Process	LOLE	Loss of Load Expectation
CPPTF	CPP Task Force	NEDTF	NRIS, ERIS and Deliverability Task Force
CRIS	Capacity Resource Interconnection Service	NITS	Network Integration Transmission Service
DR	Designated Resource	NR	Network Resource
DSC	Deliverability Steering Committee	NRIS	Network Resource Interconnection Service
ERIS	Energy Resource Interconnection Service	OASIS	Open Access Same Time Information System
GI	Generator Interconnection	RR	Revision Request
GIITF	GI Improvement Task Force	TWG	Transmission Working Group
		WG	Working Group



## CONTACT:

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# TRANSMISSION PLANNING UPDATE

QUARTERLY JOINT STAKEHOLDER BRIEFING  
FEBRUARY 2024

DAVID KELLEY

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SouthwestPowerPool



SPPorg



southwest-power-pool

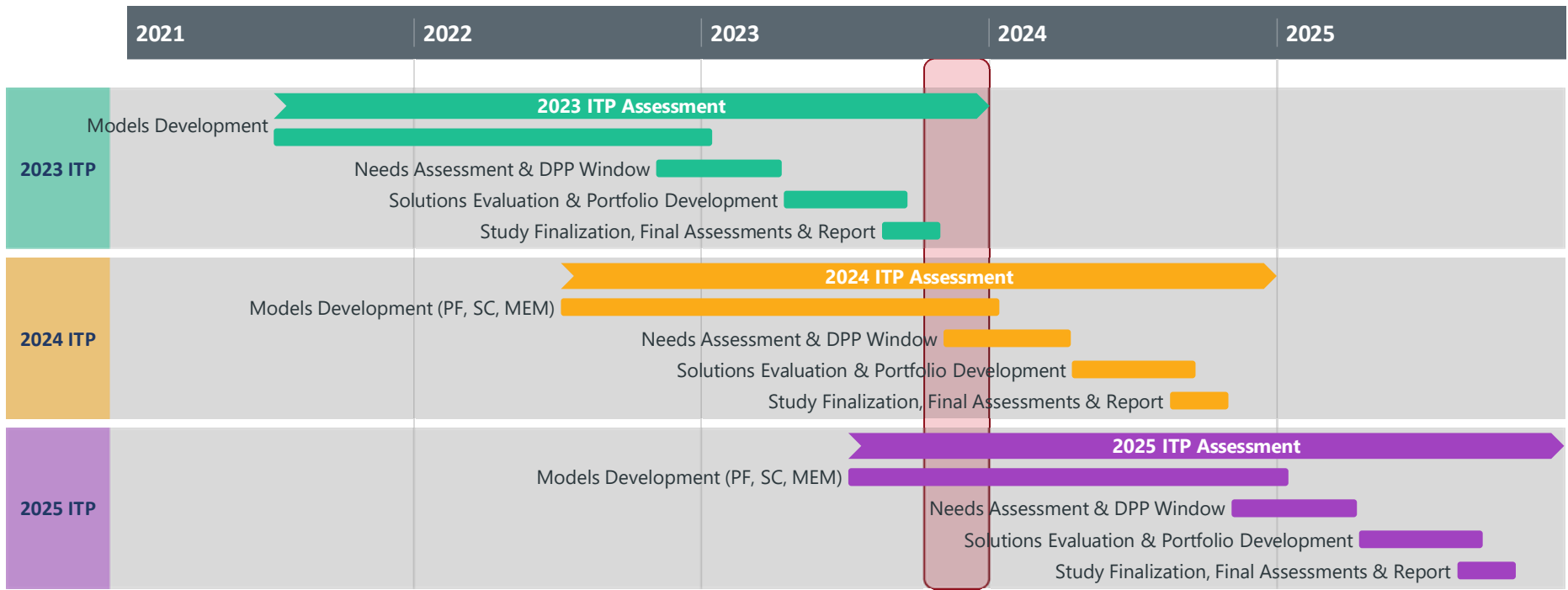


# ITP QUARTERLY REPORT

# ITP Study Overlaps

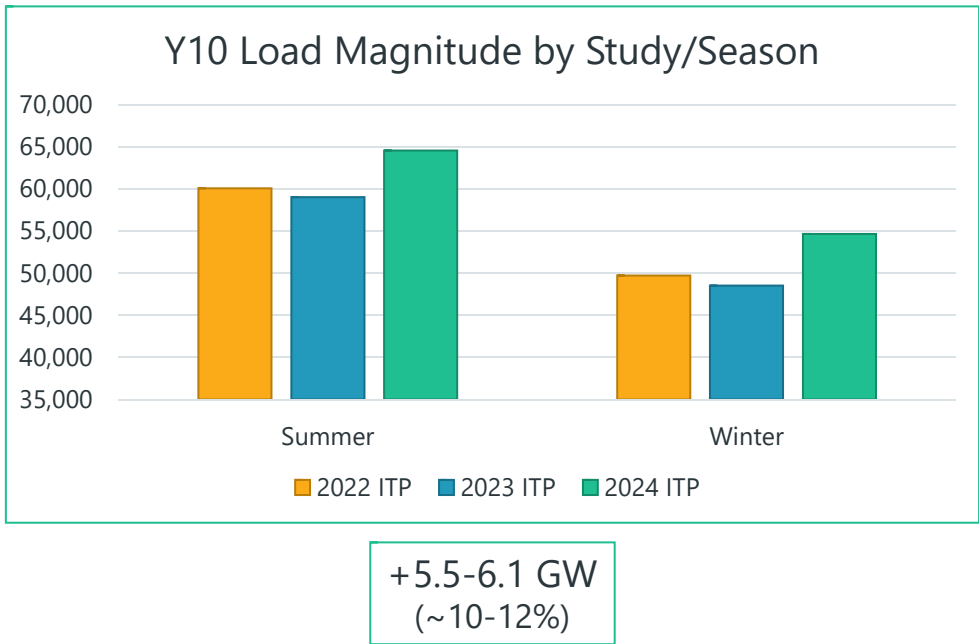
2023 ITP: Completed and approved in October

2024 ITP: Market Economic Model Build and Constraint Assessment milestones completed and the Needs Assessment milestone on track.



2025 ITP: Scope approved. Load and Gen Review activities are in progress along with Base Reliability model development.

# AGGRESSIVE LOAD GROWTH



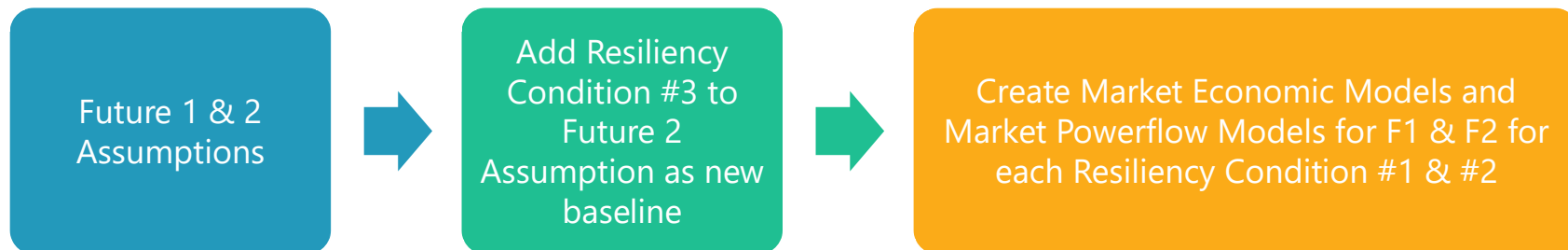
- 2024 ITP observed large increase over the 2023 ITP with over 2,000 MW of the increase due to Delivery Point Additions
- Load increases in the 2024 ITP impact the ability for entities to cover their load with their own resources.
  - By 2033 Summer Peak, SPP experienced shortfall which led to adding resources from the GI queue
  - 4 times the amount of thermal needs and increased voltage stability issues

# 2025 ITP SCOPE UPDATE

## RESILIENCY CONDITIONS

1. Condition #1: Summer Scenario
2. Condition #2: Winter Scenario
3. Condition #3: Increased load

Scope to be high level with TWG and ESWG to establish details



# 2025 ITP SCOPE FUTURES

Futures have same structure as last study with focus on more electrification potential

Main changes are Storage, Solar, and Wind values; based primarily on GI Queue

32.2 GW existing

KEY ASSUMPTIONS	DRIVERS				
	Year 2	Future 1 – Reference Case		Future 2 – Emerging Technologies	
	2 (2026)	5 (2029)	10 (2034)	5 (2029)	10 (2034)
Peak Demand Growth Rates	As submitted in load forecast	Increase due to electric vehicle growth		Higher Increase due to electric vehicle growth & additional loads	
Energy Demand Growth Rates	As submitted in load forecast	Increase due to electric vehicle growth		Higher Increase due to electric vehicle growth & additional loads	
Natural Gas Prices	Current industry forecast (Hitachi & S&P Global)	Current industry forecast (Hitachi & S&P Global)		Current industry forecast (Hitachi & S&P Global)	
Coal Prices	Current industry forecast (Hitachi)	Current industry forecast (Hitachi)		Current industry forecast (Hitachi)	
Emissions Prices	Current industry forecast (Hitachi)	Current industry forecast (Hitachi)		Current industry forecast (Hitachi)	
Fossil Fuel Retirements	Current forecast	based on IRP feedback; subject to generator owner (GO) review		based on IRP feedback; subject to generator owner (GO) review	
Environmental Regulations	Current regulations	Current regulations		Current regulations	
Demand Response	As submitted in load forecast	As submitted in load forecast (Separate load forecast may be submitted for use in Resource Planning)		As submitted in load forecast (Separate load forecast may be submitted for use in Resource Planning)	
Distributed Generation (Solar)	As submitted in load forecast	As submitted in load forecast		As submitted in load forecast	
Energy Efficiency	As submitted in load forecast	As submitted in load forecast		As submitted in load forecast	
Resource Siting	N/A	Per ITP Resource Siting Manual		Per ITP Resource Siting Manual	
Storage	Existing + RARs	6.6	13.2	9.6	19.2
<b>Total Renewable Capacity</b>					
Solar (GW)	Existing + RARs	9.1	18.4	19.1	26.1
Wind (GW)	Existing + RARs	48.9	55.2	54.8	61.1

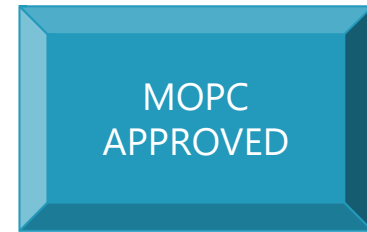
# IN-SERVICE DATE DELAY UPDATE



# IN-SERVICE DATE DELAY UPDATE

## Phase1: RR574 BP7060 IN-SERVICE DATE DELAY REPORT

- Define In-Service Date
- Develop a process to identify project in-service dates
- Establish routine project updates for SPP stakeholders
- Outline escalation process of DTO's with severe and reoccurring delays



## Phase2: Further Improvements (more resource intensive)

- Continue development of a long-term resolution to increase project certainty
- Utilize SPP's Roadmap Process given the significance of the effort and multiple stakeholder groups impacted
- Need and priority impacted by effectiveness of Phase 1

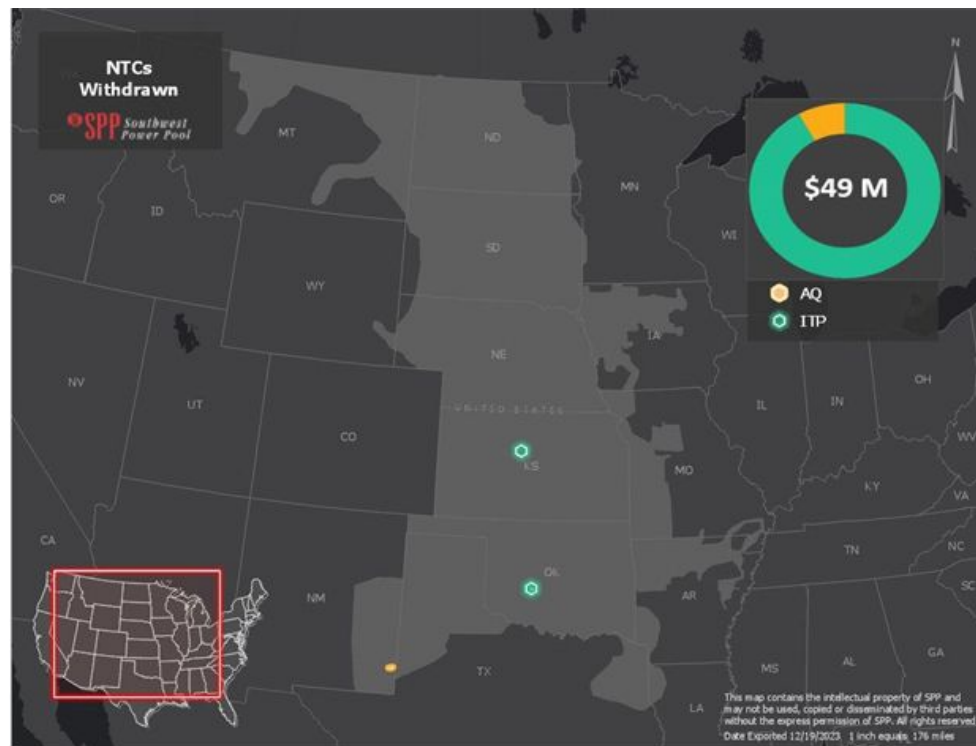
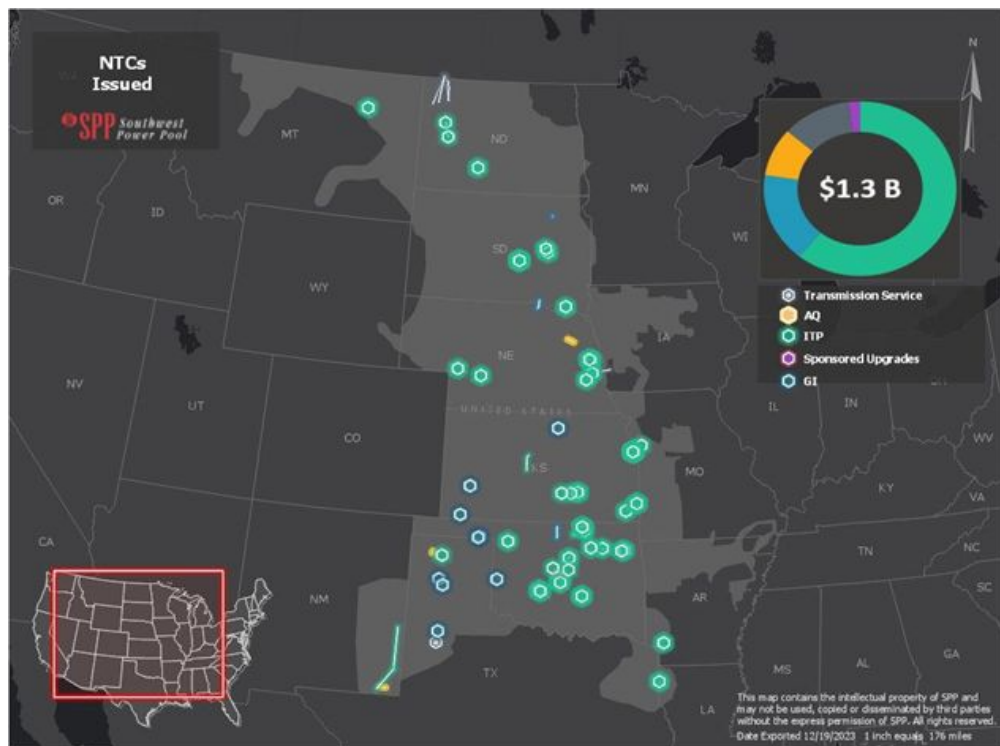
# 2024 SPP TRANSMISSION EXPANSION PLAN (STEP) REPORT

## 2024 SPP TRANSMISSION EXPANSION PLAN (STEP) REPORT

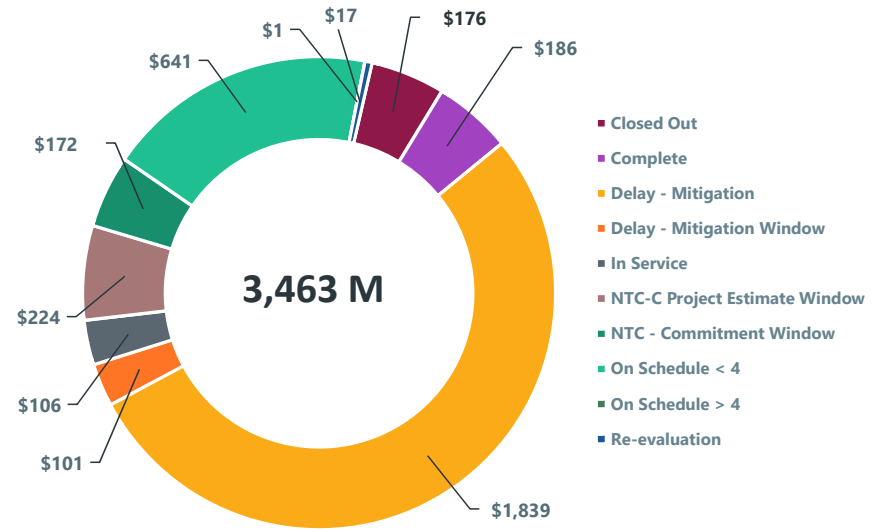
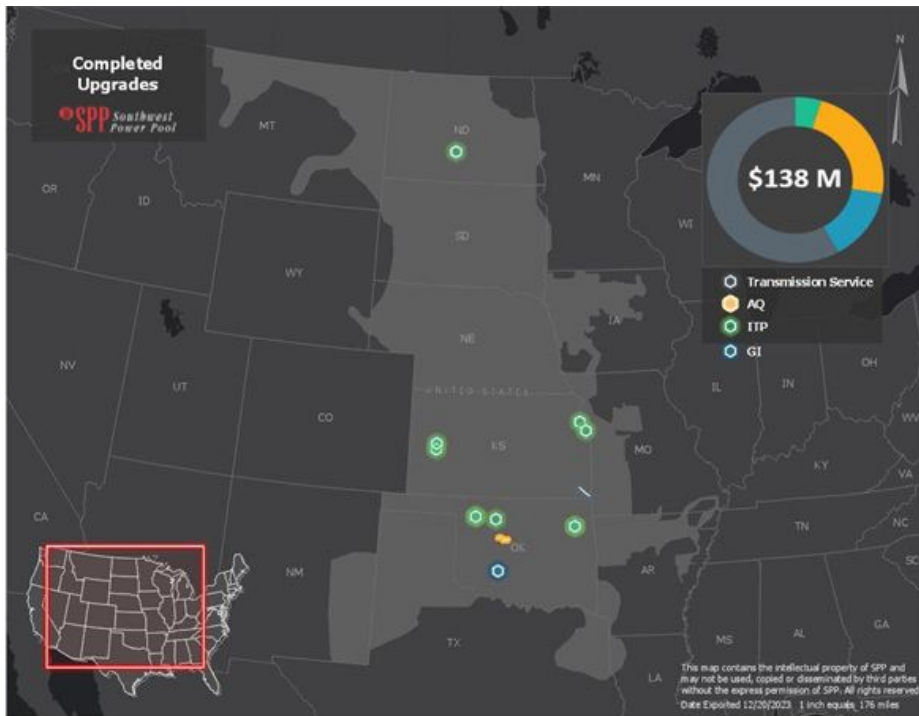
- Required by Attachment O of Tariff
- Includes endorsed and approved projects from planning processes
- Includes changes to existing projects since previous STEP report
- MOPC and Board approval required



# NTCS ISSUED AND WITHDRAWN



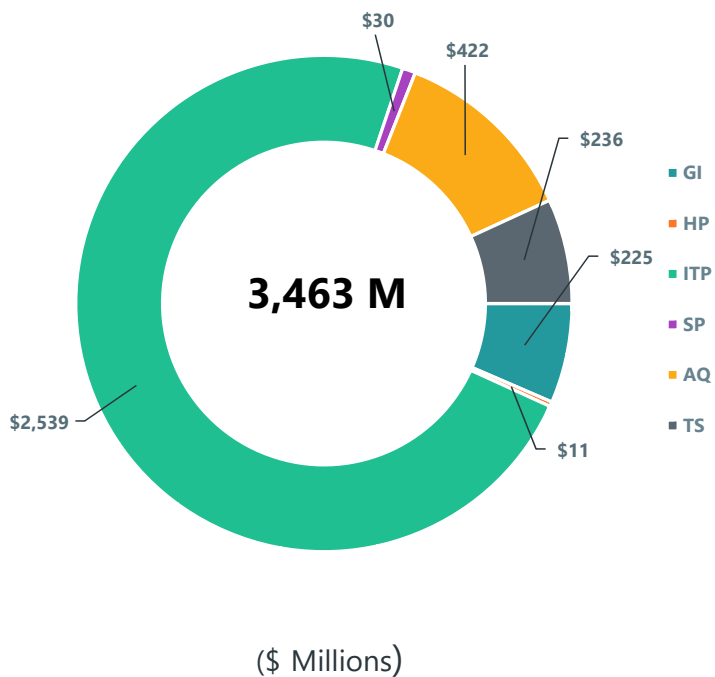
# COMPLETED UPGRADES & UPGRADES BY STATUS



(\$ Millions)

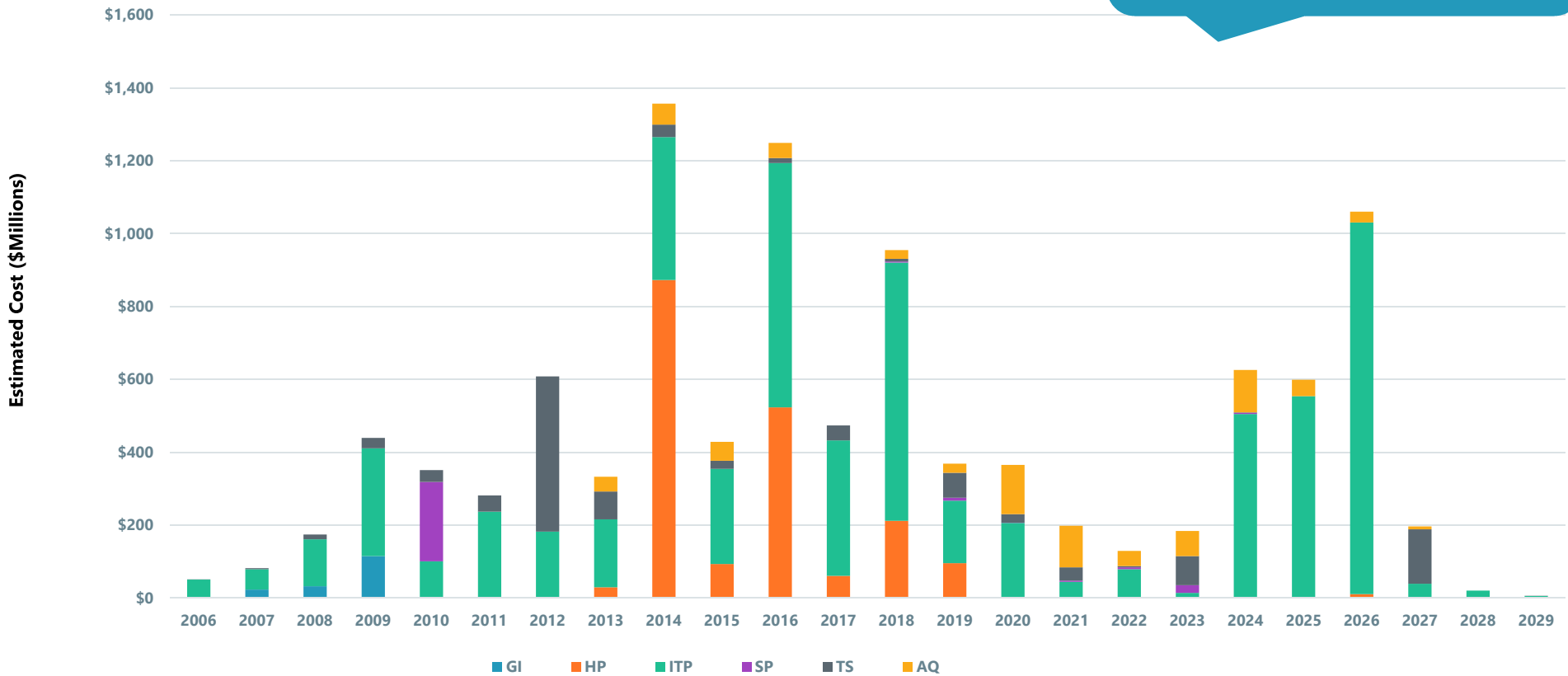
\$167 M in upgrades closed out since 2023 STEP

# UPGRADES BY PROCESS



# INVESTMENT BY IN-SERVICE YEAR

\$12,476 Billion  
total upgrades in-service or  
scheduled to be in-service between  
2006 - 2029



## 2023 PROJECT BENEFITS

TS 3,336 MW New Transmission Service

AQ 2,332 MW New AQ Load

GI 67 GIA=12,322 MW

ITP 43 new projects ~ 213 miles of new/rebuilt lines

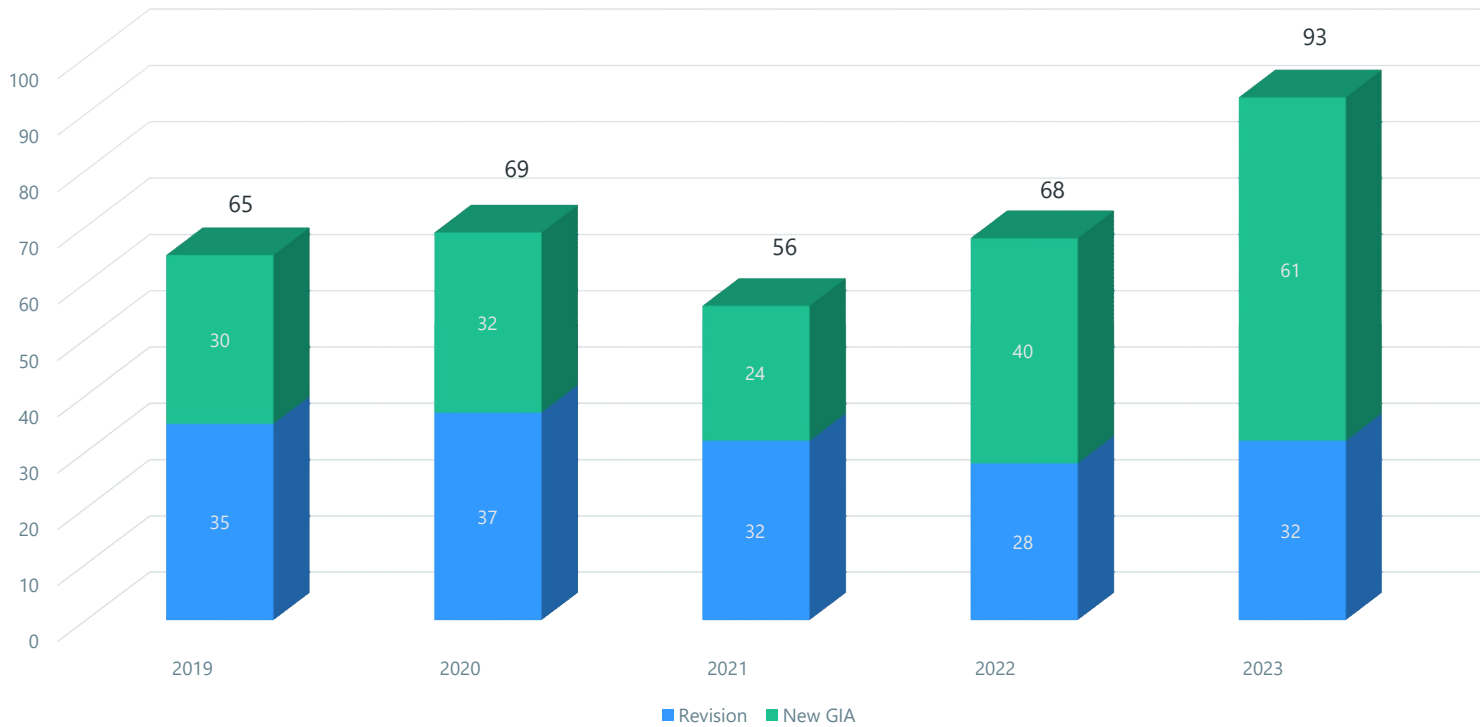


# GENERATOR INTERCONNECTION AGREEMENTS

# GENERATOR INTERCONNECTION

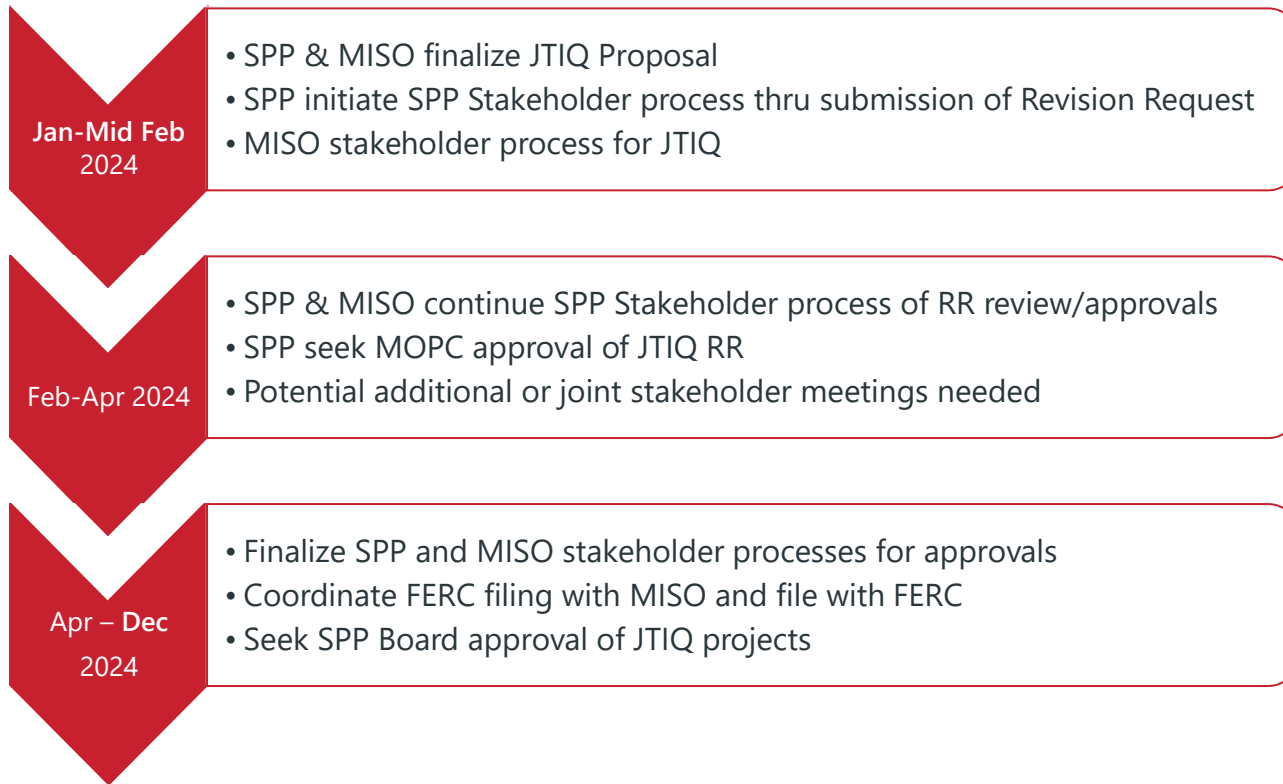
SPP processed 93 GI Services Agreements in 2023, with 78 of them being finalized in the last 2 quarters of the year.

Generator Interconnection Agreement Processed



# MISO-SPP JOINT TARGETED INTERCONNECTION QUEUE (JTIQ) STUDY

# UPCOMING JTIQ TIMELINE



# CONSOLIDATED PLANNING PROCESS UPDATE

## Recent Approvals

- The generator interconnection process for Definitive Interconnection System Impact Study (DISIS) to be part of the regional planning process under CPP Phase 1
- Ready go to load additions that pass screening tests will be part of the CPP Phase 1
- Initiated the start of a CPP Transition Study by leveraging the next 20 Year Assessment
- Continual development of CPP Entry Fee concept





# INTEGRATED MARKETPLACE UPDATE

ANTOINE LUCAS

VICE PRESIDENT, MARKETS

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keep the lights on today and in the future.*



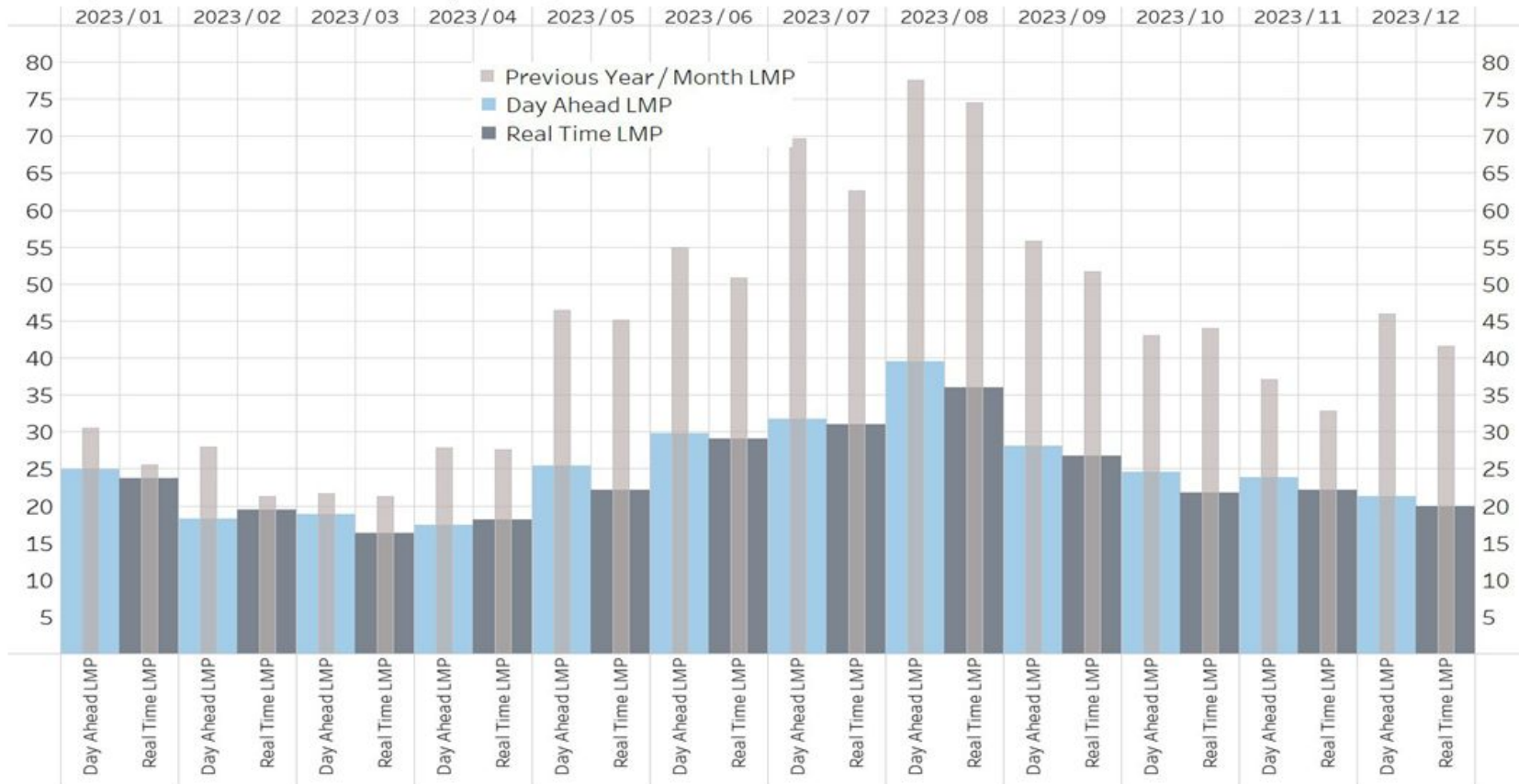
## MARKETPLACE HIGHLIGHTS

- Day-ahead prices decreased from an average of \$33.13/MWh in Q3 2023 to \$23.20/MWh in Q4 2023, a decrease of 30%.
- Real-time prices decreased from an average of \$31.26/MWh in Q3 to \$21.28/MWh in Q4, a decrease of 32%.
- Total revenue neutrality uplift (RNU) for Q4 increased from Q3
- No New Operational peaks set during the quarter
- Gas prices decreased from an average of \$2.21/MMBtu in Q3 to \$2.19/MMBtu in Q4
- Total Wind generation available in the market is 33.73 GWs



# MARKETPLACE PRICING

Average Settlement Location LMP (2 years)



# MARKETPLACE PRICING

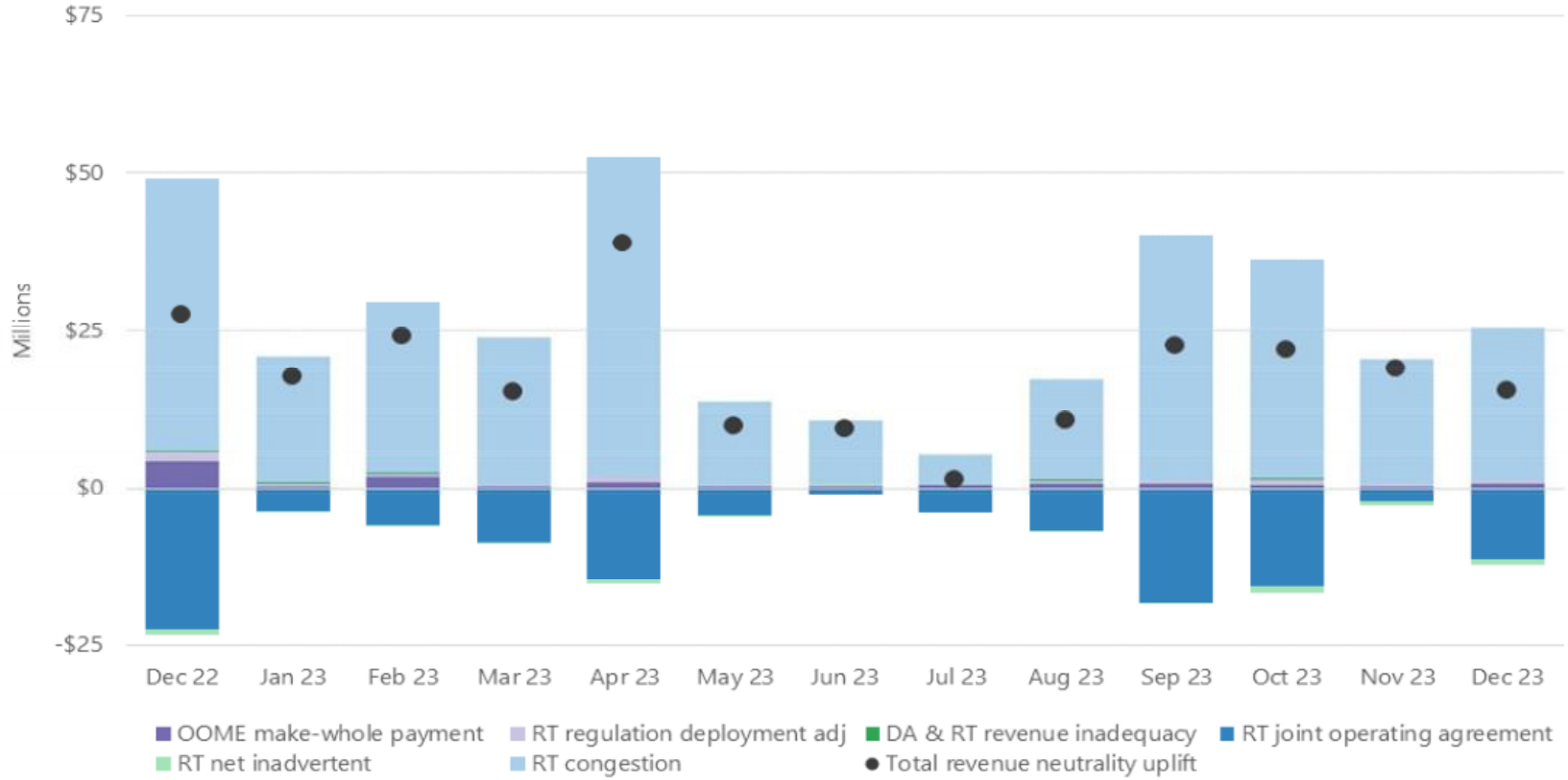
Day Ahead - Average Settlement Location Price

		DA MEC	DA MLC	DA MCC	DA LMP
<b>2023</b>	January	26.72	-0.39	-1.46	24.87
	February	20.49	-0.38	-1.93	18.18
	March	21.03	-0.37	-1.84	18.82
	April	20.71	-0.33	-3.01	17.36
	May	27.19	-0.43	-1.36	25.41
	June	32.20	-0.50	-1.96	29.75
	July	33.64	-0.51	-1.39	31.74
	August	43.03	-0.71	-2.78	39.54
	September	32.57	-0.51	-3.94	28.12
	October	31.36	-0.54	-6.21	24.61
	November	27.83	-0.48	-3.56	23.78
	December	23.82	-0.38	-2.21	21.23

RTBM - Average Settlement Location Price

		RT MEC	RT MLC	RT MCC	RT LMP
<b>2023</b>	January	25.78	-0.39	-1.72	23.67
	February	22.40	-0.40	-2.51	19.49
	March	19.11	-0.34	-2.50	16.27
	April	23.34	-0.38	-4.81	18.16
	May	24.48	-0.44	-1.89	22.15
	June	31.26	-0.46	-1.77	29.04
	July	33.02	-0.48	-1.53	31.01
	August	40.26	-0.72	-3.57	35.98
	September	31.50	-0.53	-4.19	26.78
	October	27.73	-0.48	-5.46	21.79
	November	26.27	-0.45	-3.66	22.16
	December	22.67	-0.38	-2.39	19.89

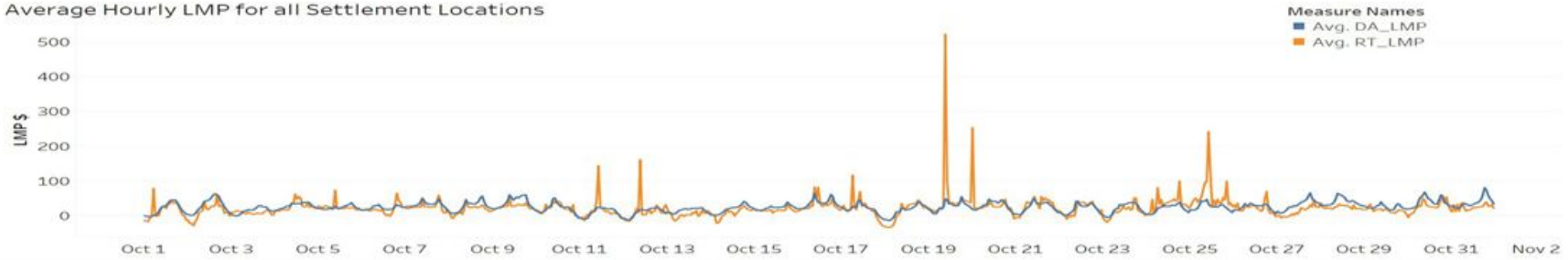
# REVENUE NEUTRALITY UPLIFT



Source: MMU MWG Update for September

# DA/RT CONVERGENCE (OCTOBER, NOVEMBER & DECEMBER)

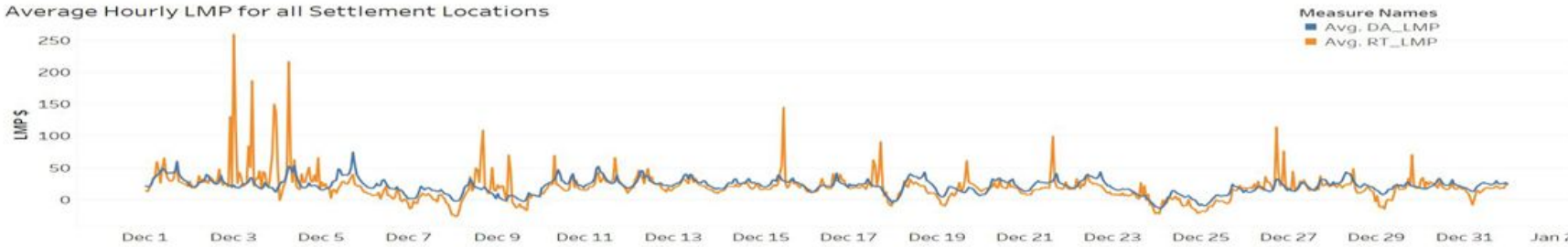
Average Hourly LMP for all Settlement Locations



Average Hourly LMP for all Settlement Locations



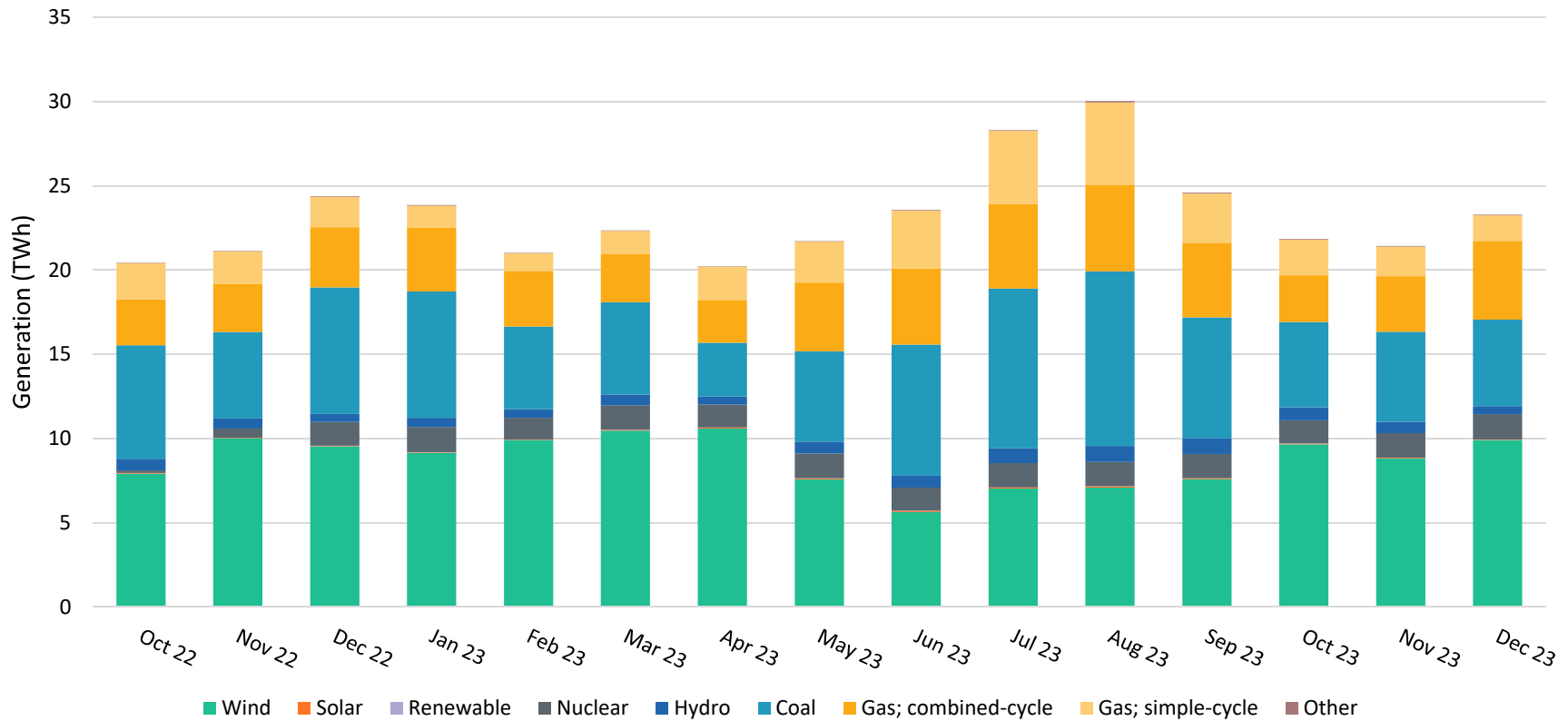
Average Hourly LMP for all Settlement Locations



SPP Internal Only

# DISPATCH BY FUEL TYPE

Dispatch by Fuel - Integrated Marketplace



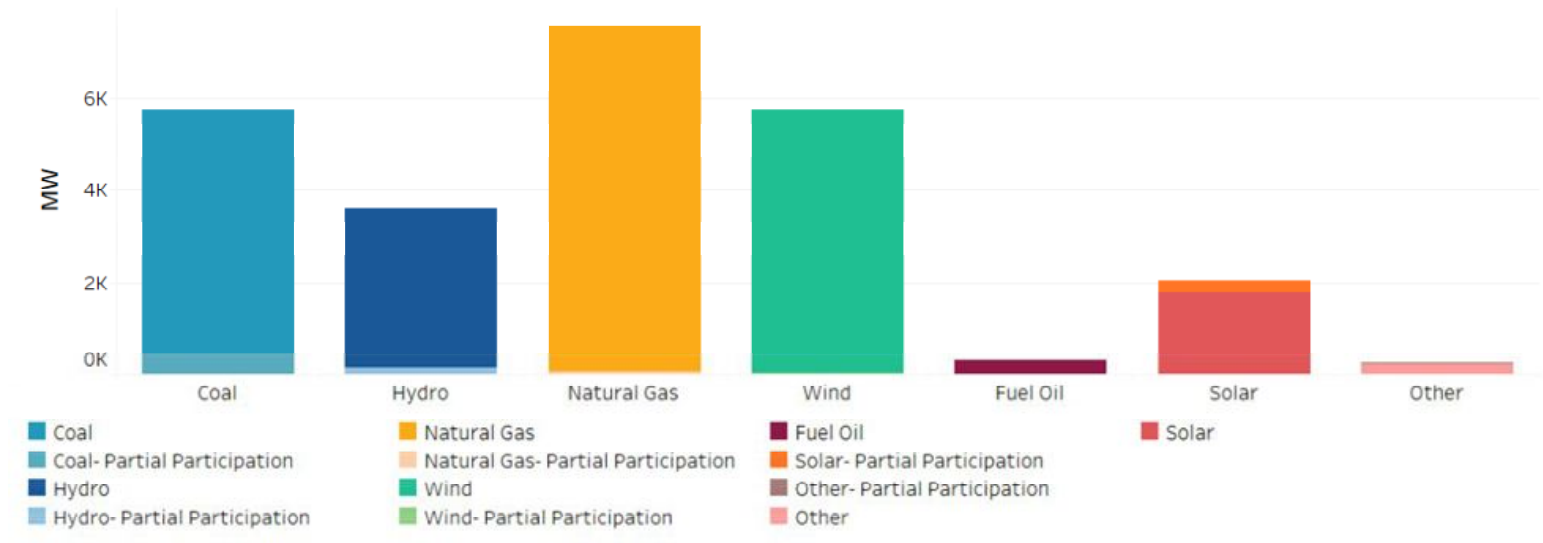
## MARKETPLACE OVER LAST 12 MONTHS

- 339 Market Participants
- SPP BA has successfully maintained NERC control performance standards (BAAL & CPS)
- High System availability
  - Day-Ahead Market results have posted 99.73 % on time in past 12 months and 100 % during Q4 2023
  - Real-Time Balancing Market has successfully solved 99.94 % of all intervals in the past 12 months and 99.98% during Q4 2023

# WESTERN ENERGY IMBALANCE SERVICE

# WEIS MARKET INSTALLED CAPACITY

Installed Capacity by Resource Type

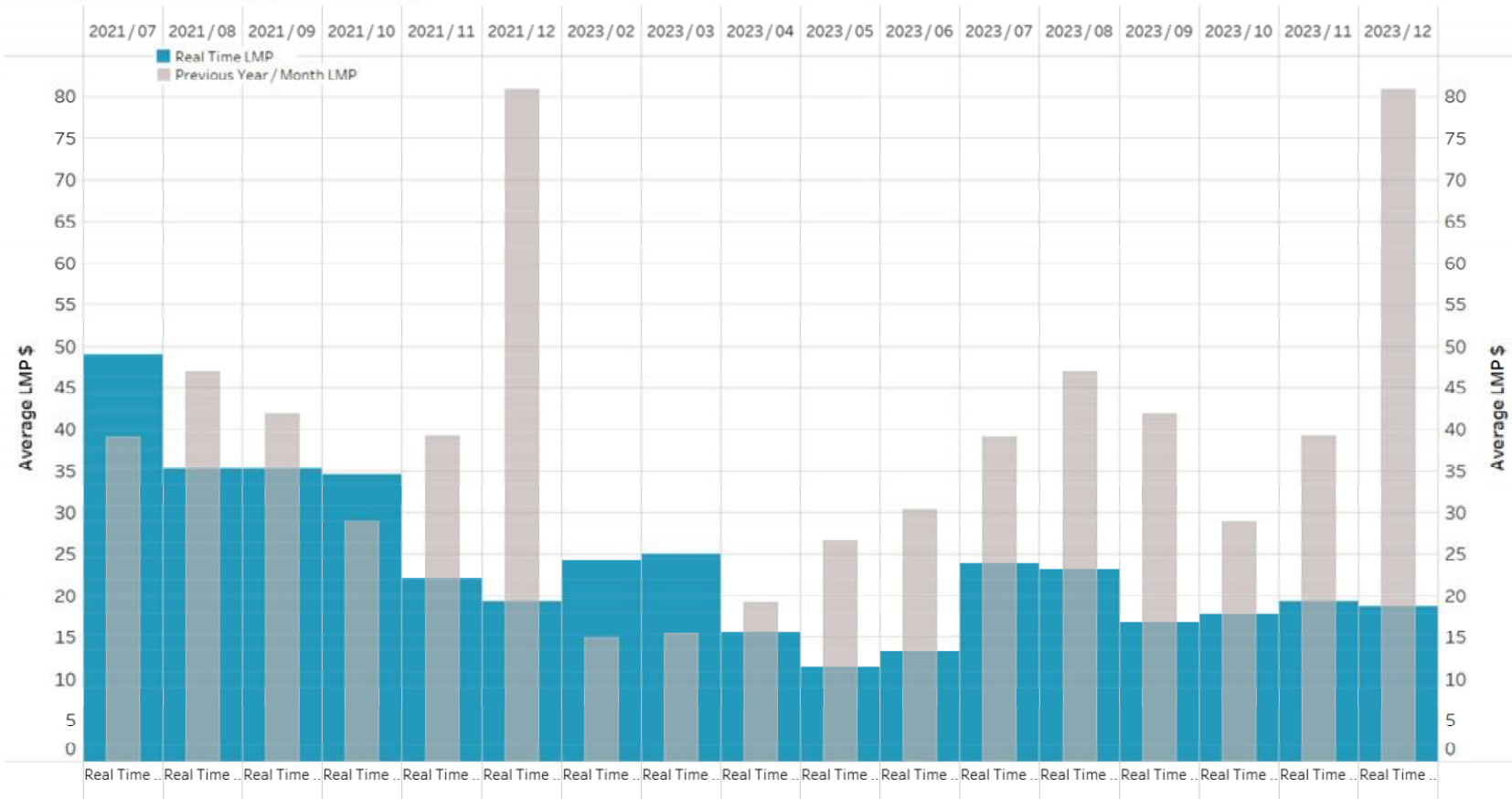


Resource Type	Full Participation	Partial Participation
Coal	5,328	422
Fuel Oil	292	
Hydro	3,454	142
Natural Gas	7,504	64
Other	225	13
Solar	1,773	254
Wind	5,710	30
<b>Total</b>	<b>24,286</b>	<b>924</b>

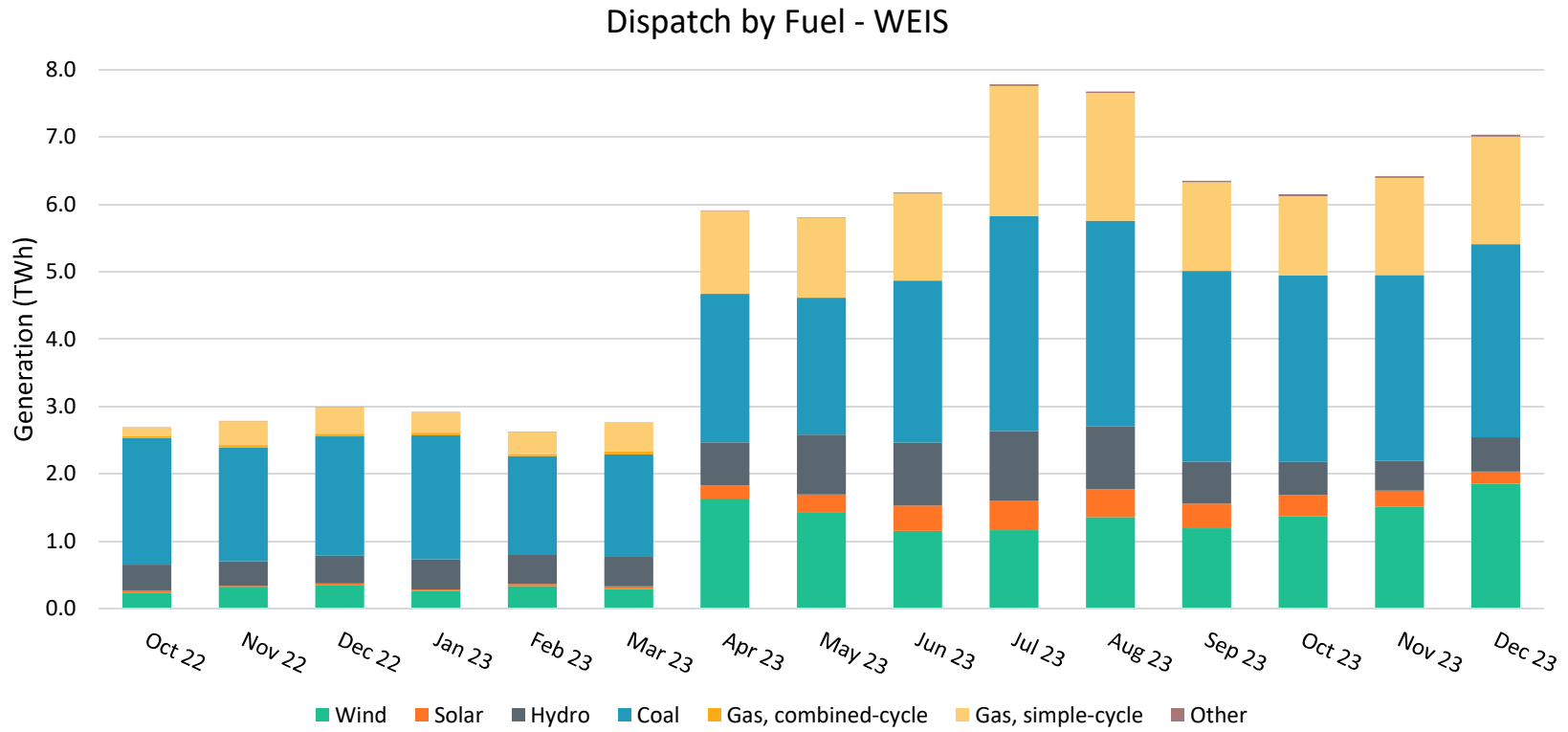


# WEIS PRICING

Average Settlement Location LMP (2 years)



# DISPATCH BY FUEL TYPE





# MARKETS+ UPDATE

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## PHASE 1 STATUS & NEXT STEPS

### Phase 1 Scope: Draft Tariff and Protocol Language

- Draft Tariff complete and under Markets+ participant review
- Final tariff approvals
  - Markets+ Participant Executive Committee (Feb. 20<sup>th</sup>)
  - Interim Markets+ Independent Panel (Early March)
  - SPP Board (March 25<sup>th</sup>)
- Markets+ tariff filed at FERC (March 28<sup>th</sup>)
- Post tariff filing activity
  - Develop Markets+ protocols
  - Support tariff filing as needed

## PHASE 2 STATUS & NEXT STEPS

### Phase 2 Scope: Develop Markets+ systems for go live

- SPP Staff
  - Develop Markets+ participant funding proposal (Q1 '24)
  - Draft key contractual terms needed to mitigate risk exposure (Q2 '24)
  - Vet funding proposal with SPP Finance Committee and Board (Q2 '24)
- Markets+ Participants
  - Seek regulatory/governing body approval to join Phase 2 (Q2-Q4 '24)
  - Execute Phase 2 funding agreements upon FERC approval (Q4 '24)
- Markets+ development begins (Q1 '25)



# OPERATIONS UPDATE 4Q 2023

BRUCE REW, PE

SENIOR VICE PRESIDENT, OPERATIONS

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# OPERATIONS METRICS THIRD QUARTER 2023

- **Load**
  - Load SPP BAA Summary
  - Weekly Averages
  - Net Load SPP BAA
- **Generation**
  - Generation outages
  - Wind Generation
  - Installed Capacity SPP BAA
- **Transmission**
  - Transmission outages
  - Congestion
- **RTO Expansion**



# BALANCING AUTHORITY AREA: LOAD

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## MARKETPLACE OPERATIONAL HIGHLIGHTS

- No New Operational peaks set during the quarter
- Load forecast error average for the quarter was 1.75%, compared to 1.89% in Q4 2022
- Wind forecast error average for the quarter was 4.18%, compared to 4.12% in Q4 2022
- Solar forecast error average for the quarter was 1.66%, compared to 3.65% in Q4 2022
- Total Wind generation available in the market 33.73 GW

Forecast Error	2023		2022
	Q4	Q3	Q4
Load	1.75%	1.89%	1.89%
Wind	4.18%	3.63%	4.12%
Solar	1.66%	4.71%	3.65%

Available Wind		
IM	33,725	MWs
WEIS	5,816	MWs

# LOAD SPP BAA

SPP winter peak loads continue to be high

- **Winter 2022/2023 Load peak**

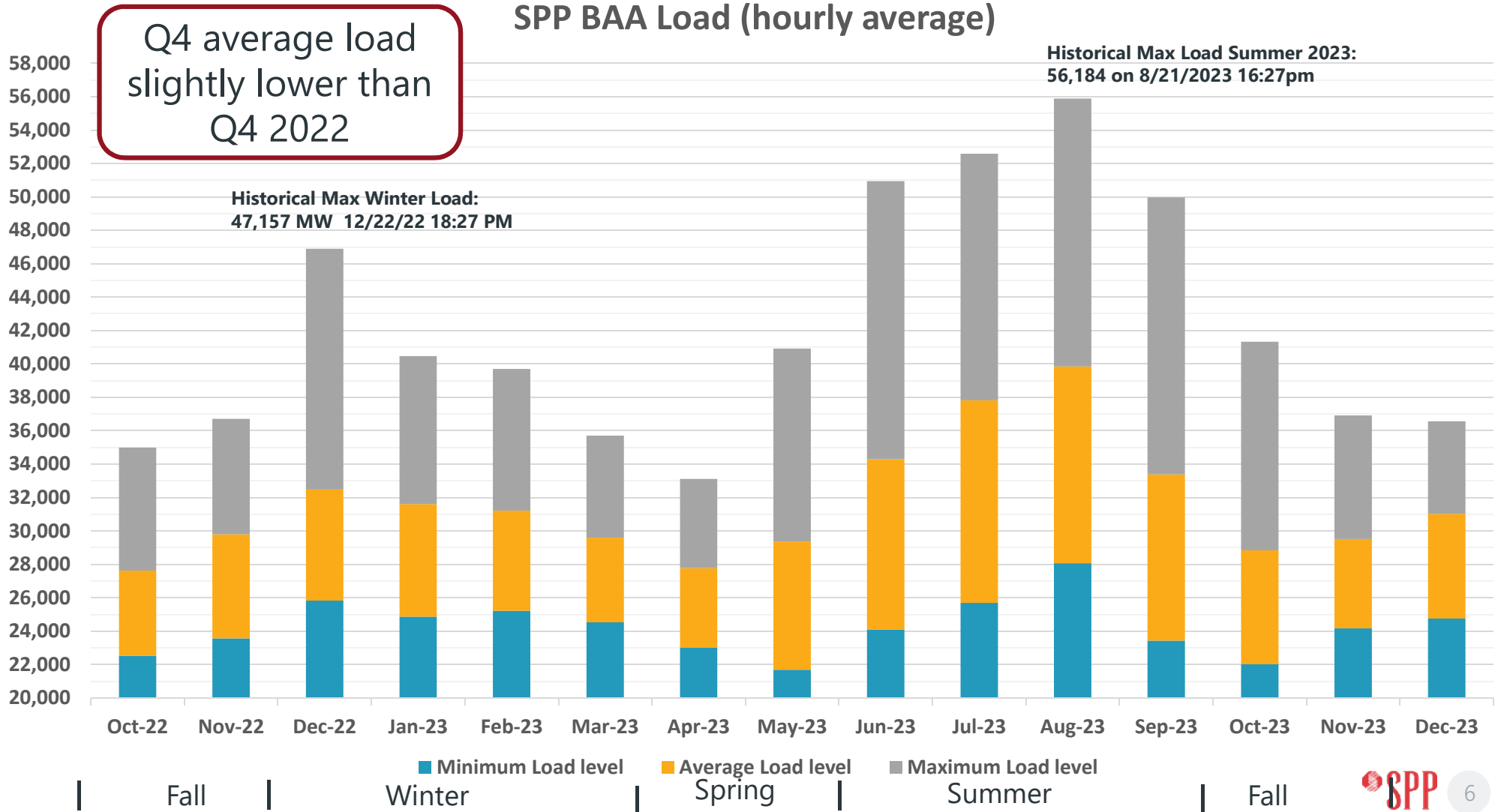
- Historical Max Winter Load (All-time BA Winter Load Nov - April): **47,157 MW** 12/22/22 6:27 PM
- Historical Max RC Winter Load (All-time Winter RC Load Nov - April): **47,257 MW** 12/22/22 6:27 PM

- **Summer 2023 Load peak**

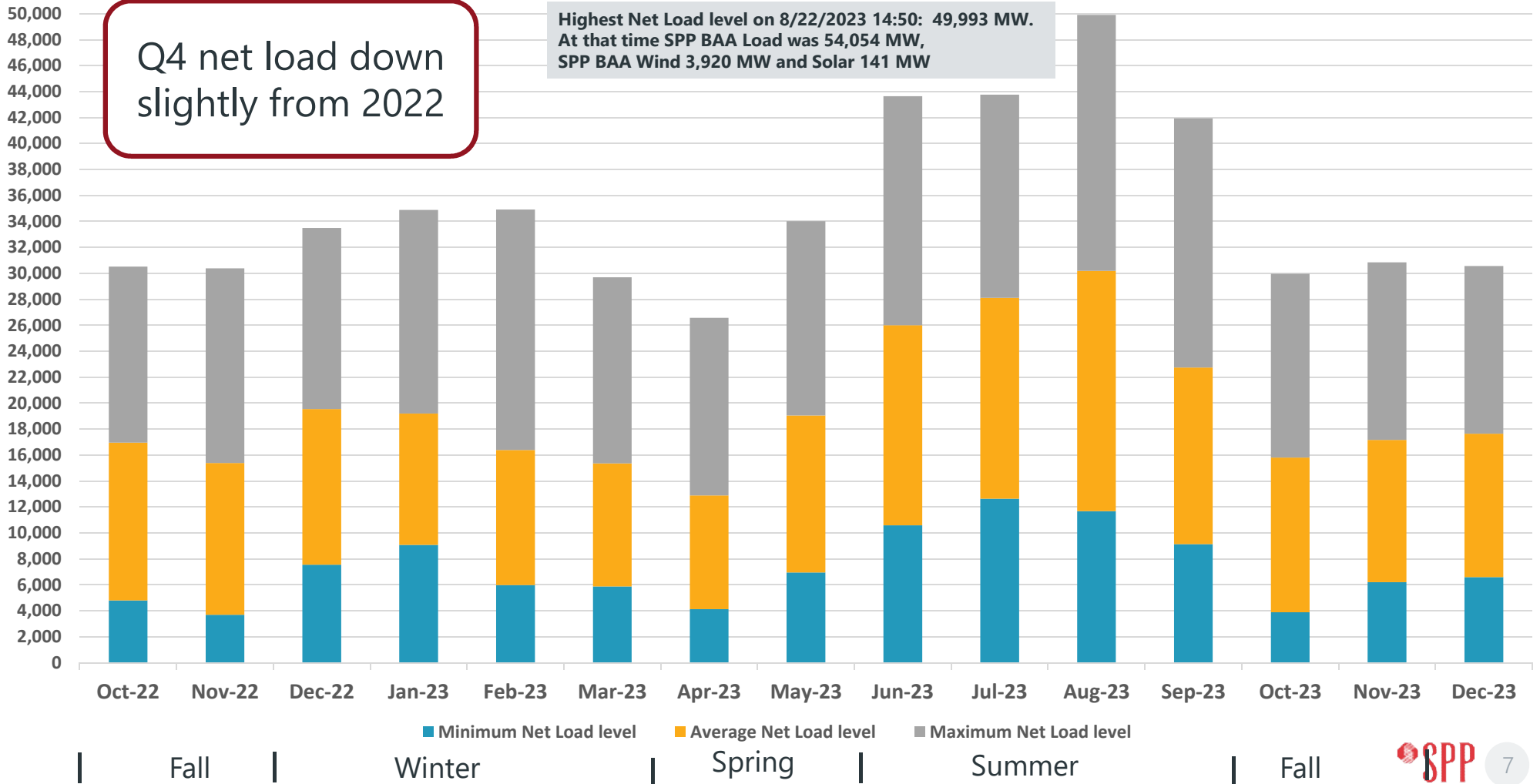
- Historical Max Load (All-time BA/Market Load) and Historical Max Summer Load (All-time BA Summer Load May - October): **56,184 MW** 8/21/2023 16:27 pm
- Historical Max RC Load (All-time RC load) and Historical Max RC Summer Load (All-time Summer RC Load May - October): **56,215 MW** 8/21/2023 16:27 pm

Winter Year	Winter 1 min data	Summer Year	Summer 1 min data
2016/2017	40,323	2016	50,622
2017/2018	43,584	2017	50,574
2018/2019	41,084	2018	49,685
2019/2020	39,258	2019	50,662
2020/2021	43,661	2020	48,835
2021/2022	41,328	2021	51,037
2022/2023	47,157	2022	53,243
2023/2024		2023	56,184

### SPP BAA Load (hourly average)



### SPP BAA Net Load (Load - Wind - Solar)



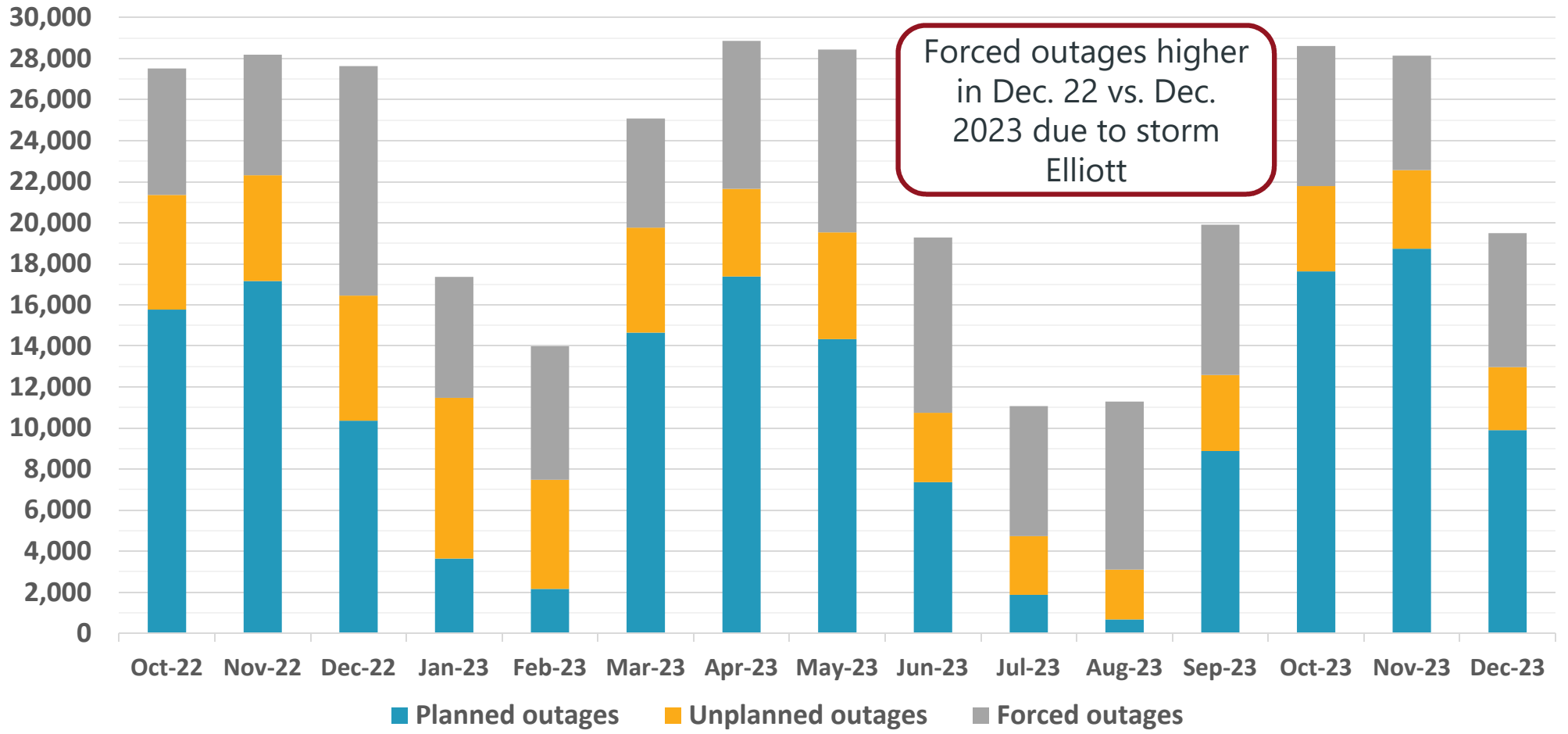


# BALANCING AUTHORITY AREA: GENERATION

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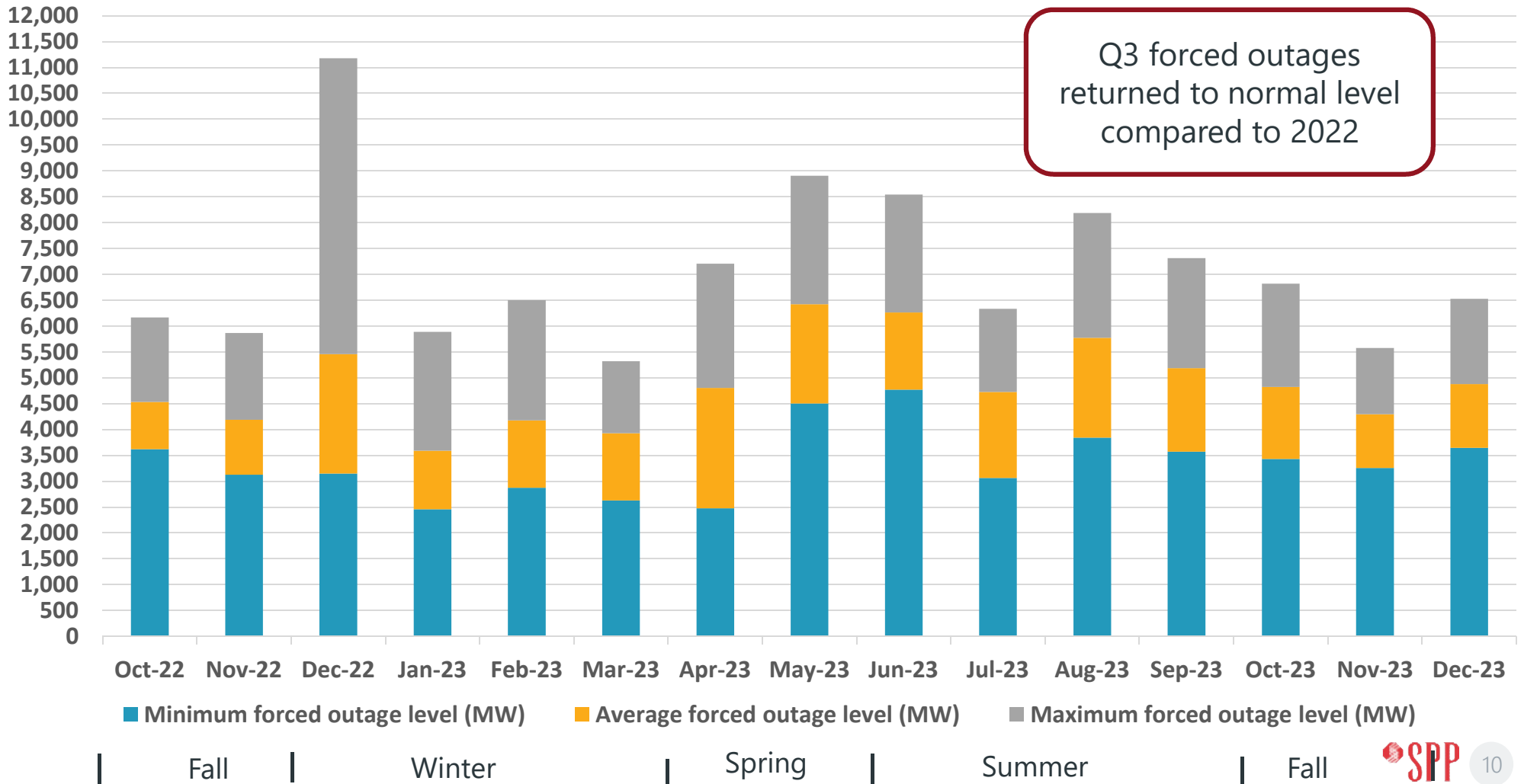


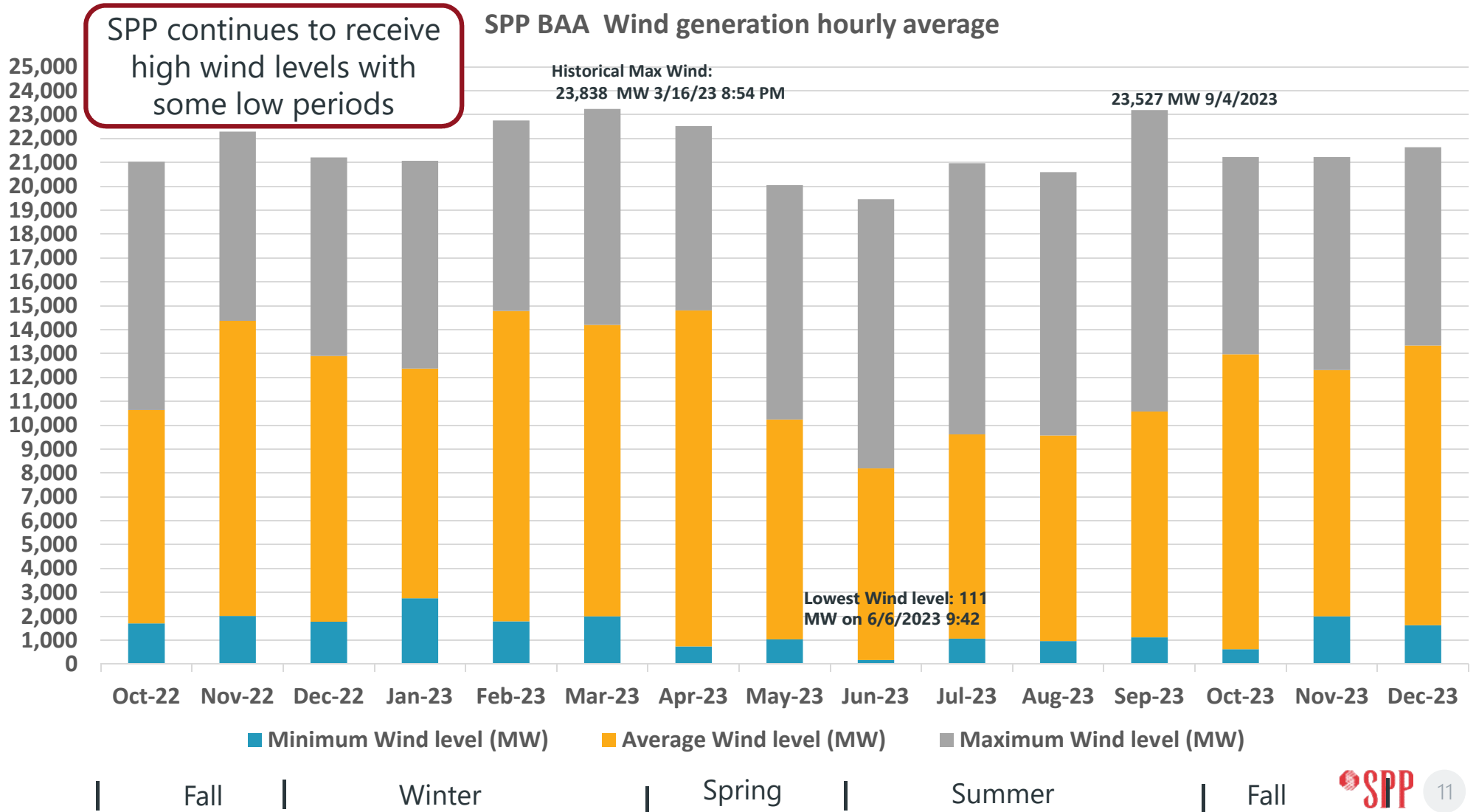
### SPP BAA: Generation outages (MW registered capacity)



| Fall | Winter | Spring | Summer | Fall

SPP BAA: Forced outages levels SPP resource fleet (MW registered capacity)

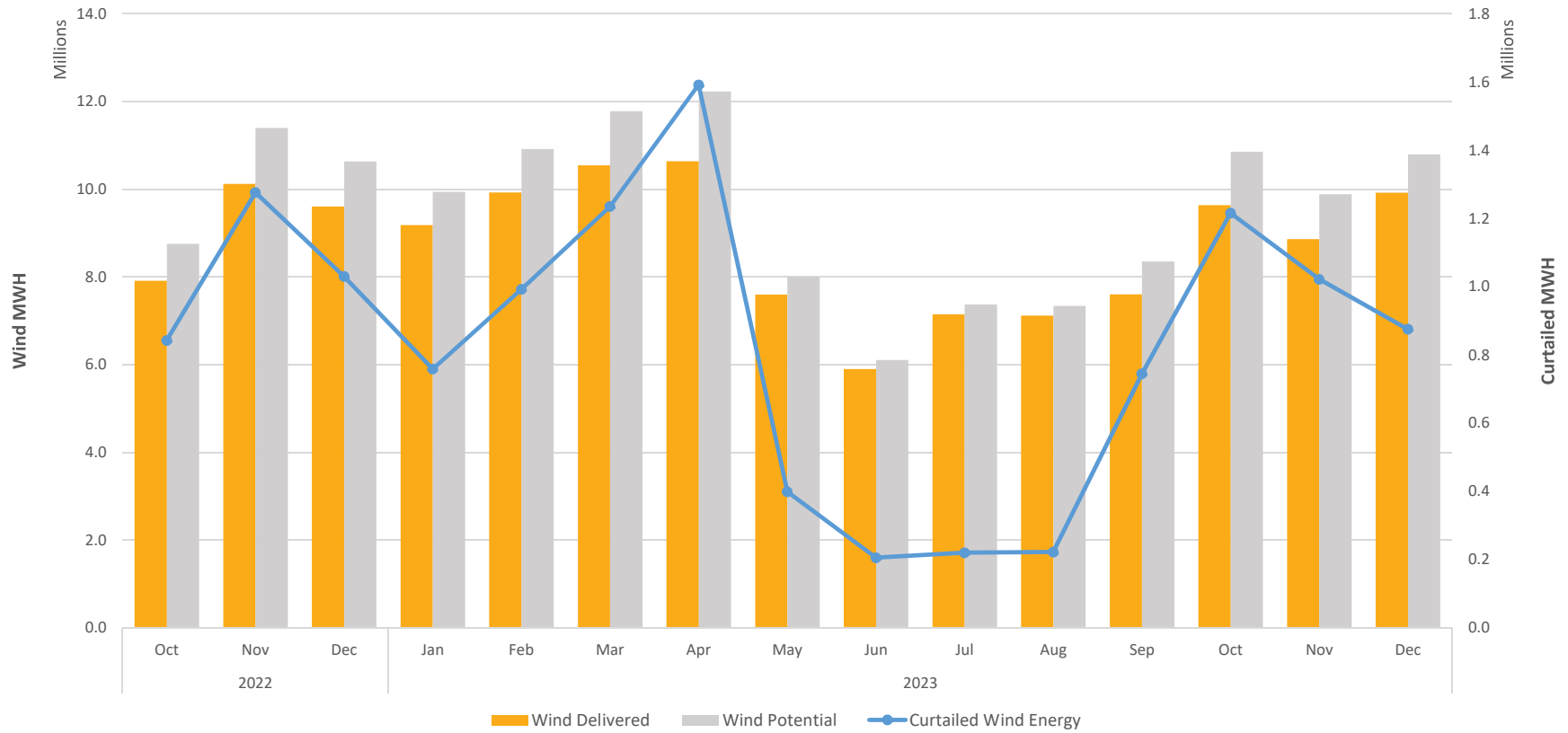






# WIND POTENTIAL VS DELIVERED

Curtailed energy continues to remain about the same year-over-year



## WIND OUTPUT: OCTOBER– DECEMBER 2023

	@ Max Wind Output	@ Min Wind Output
MW Wind	21,961.37 MW	502.80 MW
Time	12/19/23 at 08:08:08	10/16/23 at 18:11:52
SPP Load	36,810.94 MW	28,526.74 MW
<i>Gen Mix Percent</i>		
Wind	59.10%	1.81%
Coal	10.67%	35.71%
Nat. Gas	22.05%	49.10%
Nuclear	5.53%	7.30%
Hydro	2.46%	5.43%
Other	0.18%	0.66%

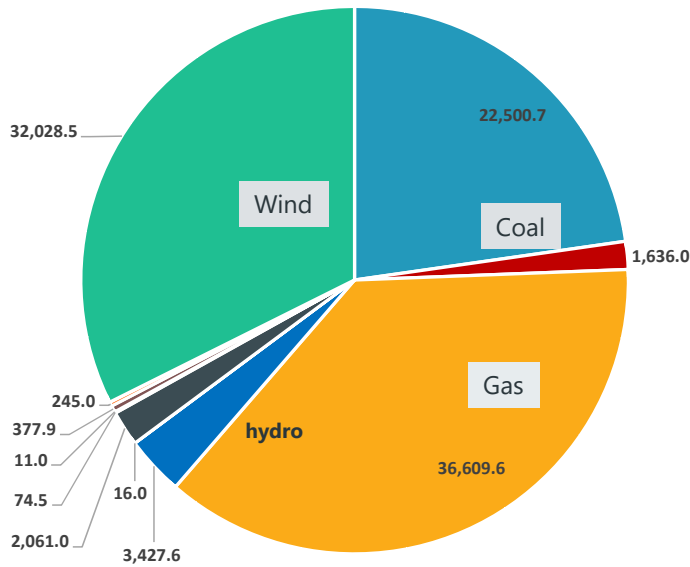
## WIND PENETRATION: OCTOBER– DECEMBER 2023

	Max Penetration	Min Penetration
Wind Penetration	76.55 % of load	1.76 % of load
Time	11/21/23 at 03:22:24	10/16/23 at 18:14:24
SPP Load	27,017.4 MW	28,531.01 MW
Wind Output	20,661.2 MW	506.02 MW
<i>Gen Mix Percent</i>		
Wind	70.12%	1.83%
Coal	12.6%	35.74%
Nat. Gas	8.71%	49.11%
Nuclear	6.92%	7.27%
Hydro	1.5%	5.43%
Other	0.11%	0.62%

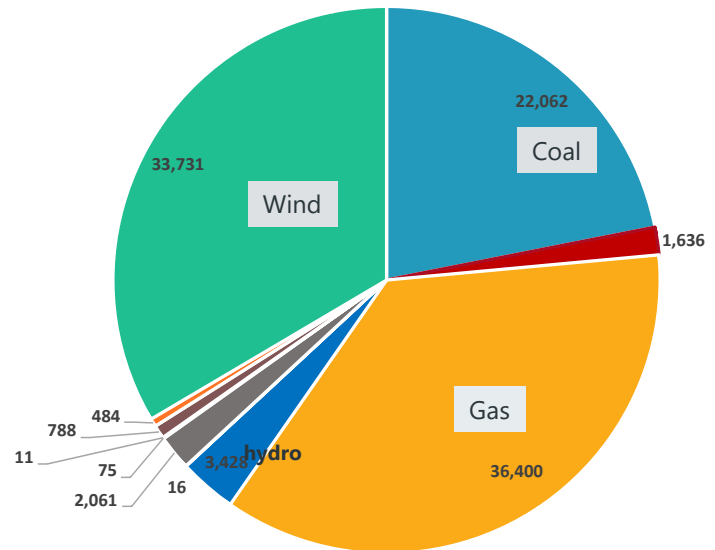
# Generation Changes during past year: Net change +1,704 MW

Changes to fuel mix in last 12 Months	
Coal	-439 MW
GAS	-210 MW
Solar	+239 MW
Wind	+1,703 MW
Demand Response	+411 MW

SPP BBA fleet: Registered Capacity 1/1/2023



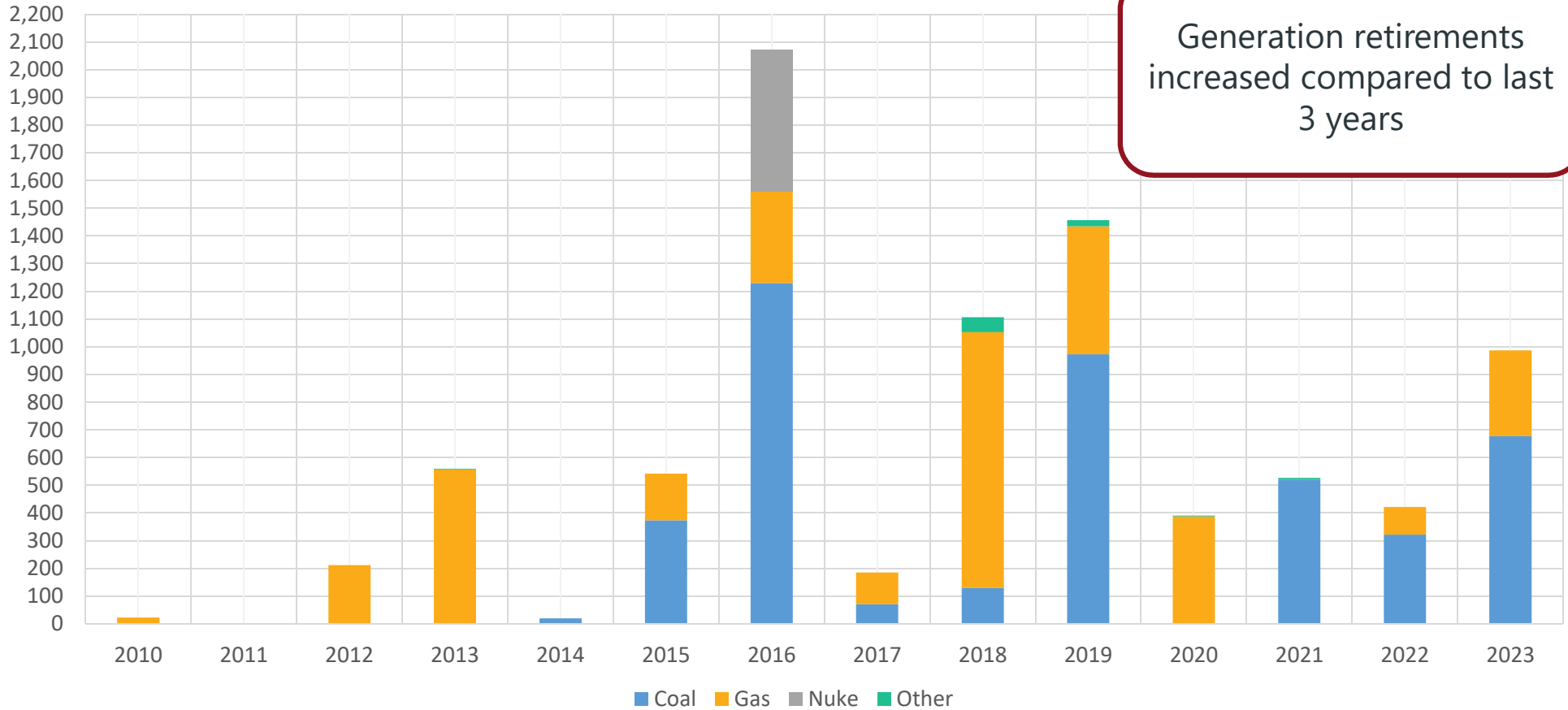
SPP BBA fleet: Registered Capacity 1/1/2024



CO FO GAS HYDRO MSW NUKE OTH Battery Storage Demand response SOLAR WIND

CO FO GAS HYDRO MSW NUKE OTH Battery Storage Demand response SOLAR WIND

Retirements SPP BAA Generation (Total MW Registered Capacity)





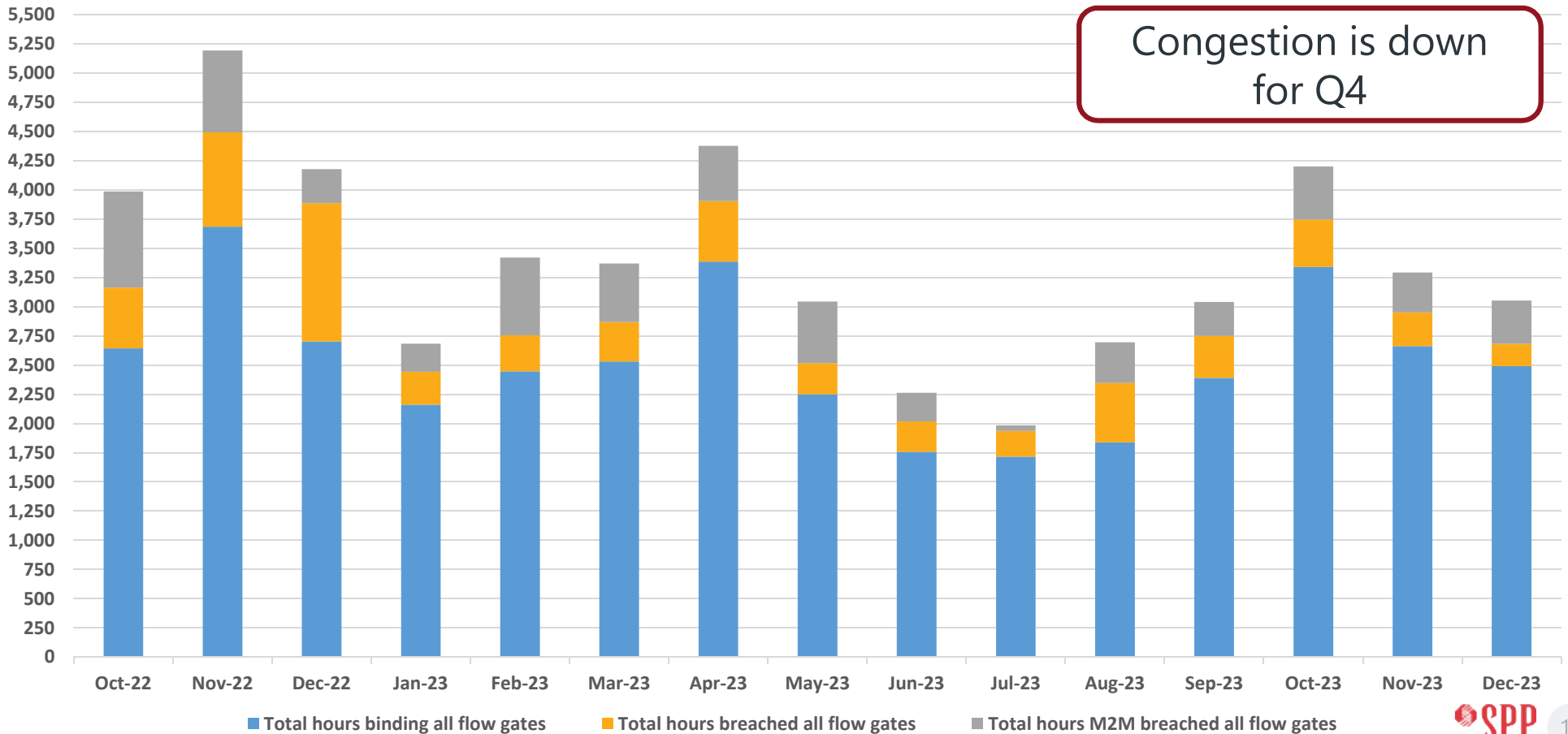
# BALANCING AUTHORITY AREA: TRANSMISSION

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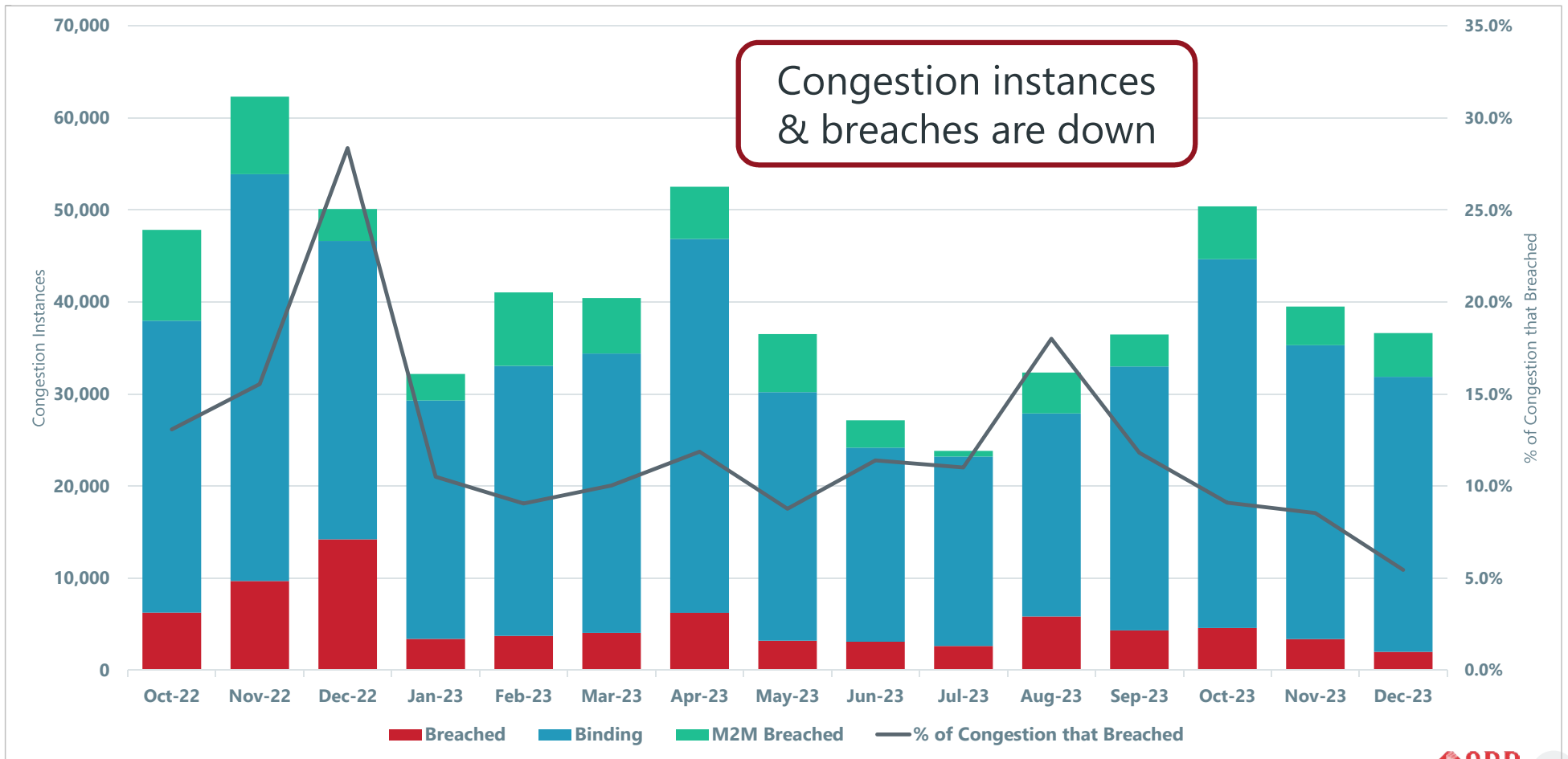


# RTBM CONGESTION - LAST 15 MONTHS

Total Congestion hours SPP BAA: Real time Balancing Market



# RTBM CONGESTION - LAST 15 MONTHS



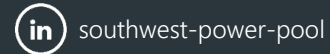
A "congestion instance" here is defined by constraint-interval occurrences. So an RTBM interval with 3 constraints congested at that time would count as 3 "instances"





# RTO EXPANSION PROGRAM

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# PROJECT OVERVIEW

High-Level Information	
Description & Purpose	<ul style="list-style-type: none"><li>• Initial offering of SPP’s RTO services in Western Interconnection</li><li>• Full RTO Membership</li><li>• DC Ties become dispatchable transmission elements</li></ul>
Benefits (Internal and External)	<ul style="list-style-type: none"><li>• Positive net revenue requirement (RTO) post-implementation</li><li>• Optimized use of DC ties realizes market savings</li><li>• Increased resilience by leveraging additional resources and DC ties</li></ul>

## ACCOMPLISHMENTS

Endorsement by WAPA of proposed changes to Bylaws and Membership Agreement

- CGC meeting on 01/24/24 presenting redlines.

Completed drafting of Tariff changes for western expansion

Created 15 Revision requests

First six revision requests unanimously approved by MOPC

## REVISION REQUESTS

600.1 Applicability to the SPP East Region Only for Attachment AU

600.2 Modify Attachment AI Transmission Definition

600.3 Revise Schedules 7, 8 and 9 and Attachment H

600.4 Remove Attachment AT

600.5 WAPA Name Change in Attachments J, V and AP

600.6 Attachment S

600.7 Add Schedule 14 to Tariff

600.8 Incremental Market Efficiency Use

600.9 BA-BAA Terminology Changes

600.10 DC Tie Congestion Hedging Solution

600.11 Attachment AN

Four additional revision requests (RR) pending endorsement and assignment of RR number.

# PENDING REVISION REQUESTS TO BE ENDORSED BY 01/31/24

RR##

- Section 39.3 Participation by Western Area Power Administration Subject to Federal Laws and Regulations
- Schedule 11 Base Plan Zonal Charge And Region-Wide Charge
- Attachment L Treatment Of Revenues

RR## Attachment: AS Contract Services Agreement Between Western Area Power Administration And Southwest Power Pool, Inc

RR## Attachments: AE Integrated Marketplace / U Rate Schedule For Compensation For Rescheduled Maintenance Costs

RR## Attachment: AA Resource Adequacy

## UPCOMING MILESTONES

Endorsement by WAPA of proposed changes to Bylaws and Membership Agreement:

- Board approval on 02/15/24

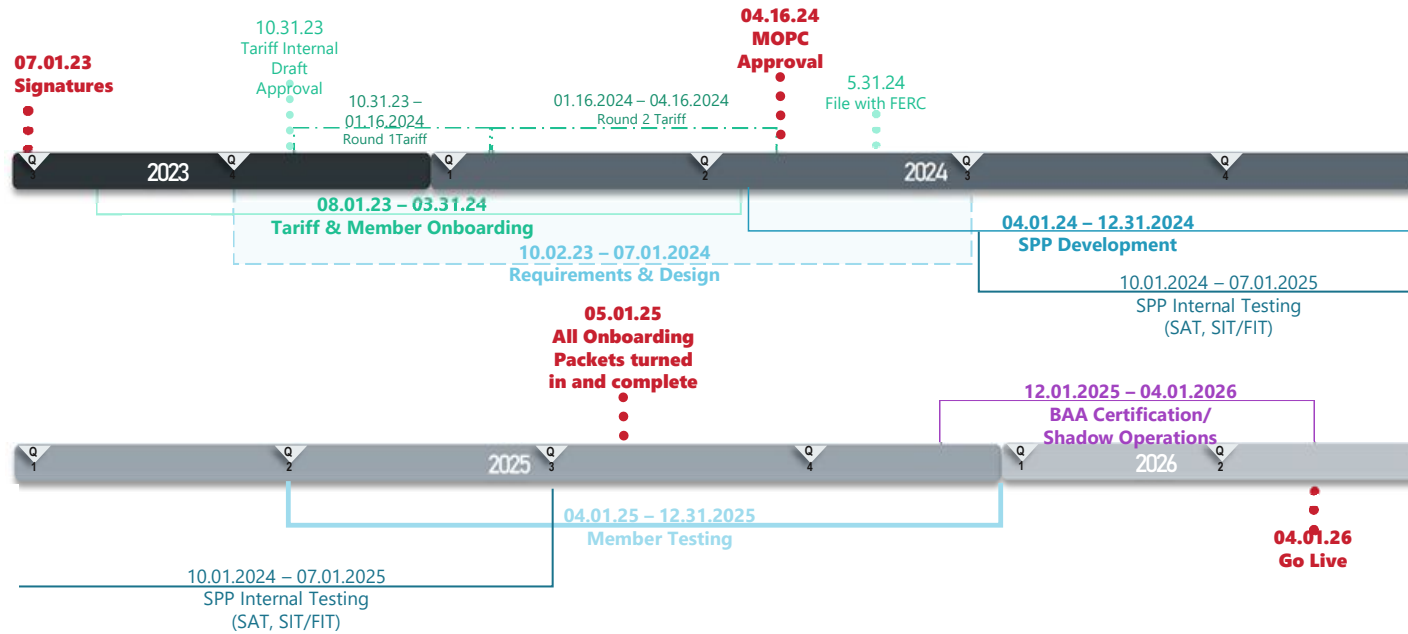
Embedded entities declare intent: 04/01/24

SPP development begins: 04/01/24

MOPC approval of remaining Revision Requests: 04/16/24

File all Tariff changes with FERC: 05/31/24

## RTO EXPANSION HIGH LEVEL TIMELINE





# QUESTIONS

BRUCE REW

BREW@SPP.ORG

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SouthwestPowerPool



SPPorg



southwest-power-pool