SOUTHWEST POWER POOL
ECONOMIC STUDIES WORKING GROUP MEETING

August 4, 2022
Tulsa, OK

SUMMARY OF MOTIONS AND ACTION ITEMS

- Approved **ESWG Action Item 201** recommendation to implement 3-year historical average of MISO-PJM interchange directly without trending starting in 2023 ITP MEM
- Approved **RR 498: SPP Resource Addition Requests** and marked **action item 215 complete**
- Approved staff's recommendation to **add 10% to the NREL toolkit output solar capacity factors** to better align with operational capacity factors and hourly profiles starting in the 2023 ITP and 2022 20-Year assessment and to make no change to wind capacity factors
- Approved the **20-Year Assessment (20YA) F3&4 siting plan**.

SOUTHWEST POWER POOL
ECONOMIC STUDIES WORKING GROUP MEETING
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MINUTES

AGENDA ITEM 1 – ADMINISTRATIVE ITEMS

Economic Studies Working Group (ESWG) Chair Alan Myers called the meeting to order at 9:00 a.m. The following members were in attendance or represented by proxy:

Al Tamimi, SUNC
Alan Myers, ITC
Anita Sharma, AEP
Calvin Daniels, WFEC
Derek Brown, Evergy
Gayle Nansel, WAPA
Jeremy Severson, BEPC
Jody Holland, GHP
Jordan Schmick, SPS
Kurt Stradley, LES
Kyle McKinney, GSEC
Randy Collier, CUS
Steve Gaw, APA
Steve Hohman, OPPD
Tim Owens, NPPD
Zac Hager, OGE

(Attachment 1) (Attachment 2)

Joshua Norton confirmed there was a quorum and provided the antitrust statement. Alan Myers reviewed the agenda for any changes. Agenda item 5 was removed. (Attachment 3)

> **Jordan Schmick made a motion, seconded by Steve Gaw to approve the agenda. The motion was approved unanimously.**

AGENDA ITEM 2 – CONSENT AGENDA

The consent agenda included the following items:

- ESWG Action Item 201 (Attachment 4)

The consent agenda was approved unanimously.

AGENDA ITEM 3 – JULY MOPC-BOARD DEBRIEF

Joshua Norton reviewed actions taken at the July meetings of MOPC and Board. (Attachment 5)

AGENDA ITEM 4 – ESRSC UPDATE

Richard Dillon provided an update on the disbanded ESRSC and discussed multiuse of storage as an outstanding item that will eventually come back up with many groups involved. (Attachment 6)

AGENDA ITEM 5 – RR 497 – BP7060 SECTION 2.2 UPDATE

This item was not covered due to outstanding questions at the TWG. It will be brought back to the group in a future meeting. (Attachment 7) (Attachment 8) (Attachment 9)

AGENDA ITEM 6 – RR 498 SPP RESOURCE ADDITION REQUESTS (RARS)

Brooke Keene presented RR 498 and answered questions. She stated the criteria isn't changing for RARs, but the RR clarifies the process. (Attachment 10)

Tim Owens made the motion, seconded by Kurt Stradley, to approve RR 498. The motion passed unanimously.

AGENDA ITEM 7 – MOPC ACTION ITEM (AI) 314 UPDATE

Sherri Maxey provided an update on MOPC action item 314. She reviewed the list of documents to be reviewed and stated the goal to bring to the October MOPC. (Attachment 11)

AGENDA ITEM 7A – MOPC AI 314: RR 500 SECTION 10.3 DATA SUBMISSION UPDATE

Nick Parker updated the group on RR 500. He noted there would not be an approval requested and that it would come back in an upcoming meeting for final approval. Nick reviewed a draft 10.3 submission form. He received feedback from the group on the form and the 10.3 process overall. (Attachment 12) (Attachment 13)

AGENDA ITEM 7B – MOPC AI 314: MARKET POWERFLOW MODELS IN THE ITP

Joshua Pilgrim reviewed the status of MPM models in the ITP. He and Kirk Hall answered questions from the group. (Attachment 14)

AGENDA ITEM 8 – ITP SCHEDULES

Dara Solomon reviewed the schedules for the 2022 ITP, 2022 20-Year Assessment, and the 2023 ITP. Several members asked for follow up on including LRTP Tranche 1 projects in the 20-Year Assessment. (Attachment 15) (Attachment 16) (Attachment 17)

AGENDA ITEM 9 – ITP WIND & SOLAR CAPACITY FACTOR BENCHMARKING

Ben Mitchell presented results of the wind and solar capacity factor benchmarking. After some discussion of the results, staff presented a recommendation to add 10% to the NREL toolkit output solar capacity factors to better align with operational capacity factors and hourly profiles starting in the 2023 ITP and 2022 20-Year assessment and to make no change to wind capacity factors. (Attachment 18)

Anita Sharma made the motion, seconded by Jeremy Severson, to approve staff's recommendation to add 10% to the NREL toolkit output solar capacity factors to better align with operational capacity factors and hourly profiles starting in the 2023 ITP and 2022 20-Year assessment and to make no change to wind capacity factors. The motion passed unanimously.

AGENDA ITEM 10A – 20YA: SCOPE & STUDY ACTION ITEMS UPDATE

Sherri Maxey gave an update on the 20-year action items. (Attachment 19)

AGENDA ITEM 10B – 20YA: SCOPE & STUDY ACTION ITEMS UPDATE

Joshua Norton noted that the 20YA F3&4 siting plans had been posted to Globalscape and reviewed the methodology used to develop the plans for wind and solar resources. He presented staff's recommendation to approve the plans. (Attachment 20)

Jordan Schmick made the motion, seconded by Tim Owens, to approve staff's recommendation to approve the 20YA F3&4 siting plan. The motion passed unanimously.

AGENDA ITEM 10C – 20YA: MARKET ECONOMIC MODEL (MEM) UPDATE

Brooke Keene updated the group on the status of the 20YA MEM. (Attachment 21)

AGENDA ITEM 11 – 2024 ITP - SCOPE & FUTURES DEVELOPMENT KICKOFF

Kirk Hall presented on the 2024 ITP scope and futures. He discussed challenges and improvement opportunities for futures development and the consideration of resource planning software and company Integrated Resource Plans (IRP). It was mentioned that the generator replacement process should be reviewed in an upcoming meeting. (Attachment 22)

AGENDA ITEM 12 – CPPTF GUIDANCE FOR SCRIPT C3 RECOMMENDATION

Brandon Hentschel presented an overview of the SCRIPT C3 Common Model Set Guidance and reviewed workflow, timeline, and next steps. (Attachment 23)

AGENDA ITEM 13 – REVIEW OF ACTION ITEMS

Joshua Norton provided an update on the list of action items. (Attachment 25)

SPP Southwest Power Pool

ECONOMIC STUDIES WORKING GROUP MINUTES
August 4, 2022

AGENDA ITEM 14 – CLOSING ITEMS

Action items 201 and 215 were marked as complete. There were no action items taken.

EMAIL ITEMS

July 6, 2022

A motion was solicited to approve the 2023 ITP MEM for use in the Benchmarking milestone, as posted to GlobalScape on 06/21/2022.

> **Tim Owens made a motion, seconded by Jeremy Severson, to approve the 2023 ITP MEM for use in the Benchmarking milestone, as posted to GlobalScape on 06/21/2022. The motion was approved unanimously.**

July 8, 2022

A motion was solicited to approve the final 2022 20-Year Assessment (20YA) Resource Plan Phase 2 (RP2) Futures 1 and 2 (F1/F2), as posted to GlobalScape on 06/30/2022.

> **Al Tamimi made a motion, seconded by Jeremy Severson, to approve the final 2022 20-Year Assessment (20YA) Resource Plan Phase 2 (RP2) Futures 1 and 2 (F1/F2), as posted to GlobalScape on 06/30/2022. The motion was approved with one abstention: Chris Mathes (proxy for Anita Sharma).**

July 22, 2022

A motion was solicited to approve the final 2022 20-Year Assessment (20YA) Resource Plan Phase 2 (RP2) Futures 3 and 4 (F3/F4), as posted to GlobalScape on 07/12/2022.

> **Jeremy Severson made a motion, seconded by Calvin Daniels, to approve the final 2022 20-Year Assessment (20YA) Resource Plan Phase 2 (RP2) Futures 3 and 4 (F3/F4), as posted to GlobalScape on 07/12/2022. The motion was approved unanimously.**

July 29, 2022

A motion was solicited to approve the 2022 20-Year Assessment (20YA) Siting Plan F1 & F2, as posted to GlobalScape on 07/15/2022.

Jeremy Severson made a motion, seconded by Kurt Stradley, to approve the 2022 20-Year Assessment (20YA) Siting Plan F1 & F2, as posted to GlobalScape on 07/15/2022. The motion was approved unanimously.

Respectfully Submitted,

Joshua Norton

Secretary

Name	Company/Email	Attendance
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Jordan Schmick	Excel Energy	In-person
Joshua Norton	SPP	In-person
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Tyler Baxter	tyler.baxter@cbpower.coop	Webex

Zac Hager	hagerzc@oge.com	Webex

Proxy Statements

Proxy	Member	Note
Aravind Chellappa	Jody Holland	
Chris Colson	Gayle Nansel	

Alan and Josh,
Aravind Chellappa has my proxy for the 8/4 ESWG meeting. Thx.

Jody Holland

Alan / Josh:

Chris Colson will have my proxy for the ESWG meeting on August 4. He will be attending virtually. I will be in and out of the call also virtually but Chris will have my proxy for the entire meeting.

Thanks.

Gayle R. Nansel | VP of Operations for UGPR

SOUTHWEST POWER POOL, INC.
ECONOMIC STUDIES WORKING GROUP MEETING
August 4, 2022
GRDA Offices – Tulsa, OK

AGENDA

Thursday 8/04, 9:00 a.m. – 5:00 p.m. CDT

Estimated meeting time: 5 hrs 45 mins.

1. Administrative Items .... Alan Myers 15
   - A. Call to Order, Introductions .... Alan Myers
   - B. Receipt of Proxies .... Joshua Norton
   - C. Review of Agenda .... Alan Myers
   - D. Antitrust Reminder .... Joshua Norton
2. Consent Agenda
   - A. ESWG Action Item 201 (Approval)
3. July MOPC-Board Debrief .... Joshua Norton 10
4. ESRSC Update .... Richard Dillon 20
5. ~~RR 497 BP7060 Section 2.2 Update (Approval) .... Tammy Bright 20~~
6. RR 498 SPP Resource Addition Requests (RARs) (Approval) .... Brooke Keene 15
7. MOPC Action Item 314 Update .... Sherri Maxey 30
   - A. RR 500 Section 10.3 Data Submission Update (Approval) .... Nick Parker 30
   - B. Market Powerflow Models in the ITP .... Joshua Pilgrim 30
8. ITP Schedules .... Dara Solomon 15
   - A. 2022 ITP Schedule
   - B. 2022 20-Year Assessment
   - C. 2023 ITP Schedule

Southwest Power Pool

9. ITP Wind & Solar Capacity Factor Benchmarking (Approval)................................. Ben Mitchell 30

10. 20-Year Assessment (20YA)

    A. Scope & Study Action Items Update.. Sherri Maxey 10

    B. Siting Plan – Futures 3 & 4 (Approval)..Joshua Norton 10

    *Posting transmittal with **GlobalScape** location*

    C. Market Economic Model (MEM) Update.. Brooke Keene 30

11. 2024 ITP - Scope & Futures Development Kickoff...Kirk Hall 45

12. CPPTF Guidance for SCRIPT C3 Recommendation .... Sunny Raheem 15

13. Review of Action Items..Joshua Norton 10

14. Closing Items.. All 10

    A. Summary of Action Items

    B. Upcoming Meeting Agenda Items

    C. Future Meetings

        i) August 31-September 1 – Little Rock, AR

        ii) September 28-29 – Evergy Offices, Kansas City, MO

        iii) November 2-3 – Net conference

15. No informational Items

ACTION ITEM 201

TRANSACTIONS BETWEEN SIMULATED AND NON-SIMULATED REGIONS

JOSHUA NORTON

OVERVIEW

- Background - **Refresher**
- Testing revised modeling
- PJM-MISO Data – **Corrected flow direction**
- Run Results – **Updated for flow direction and added hurdle rate sensitivity**
- Discussion Items

BACKGROUND

Former method was inaccurate, timely, and was ultimately removed

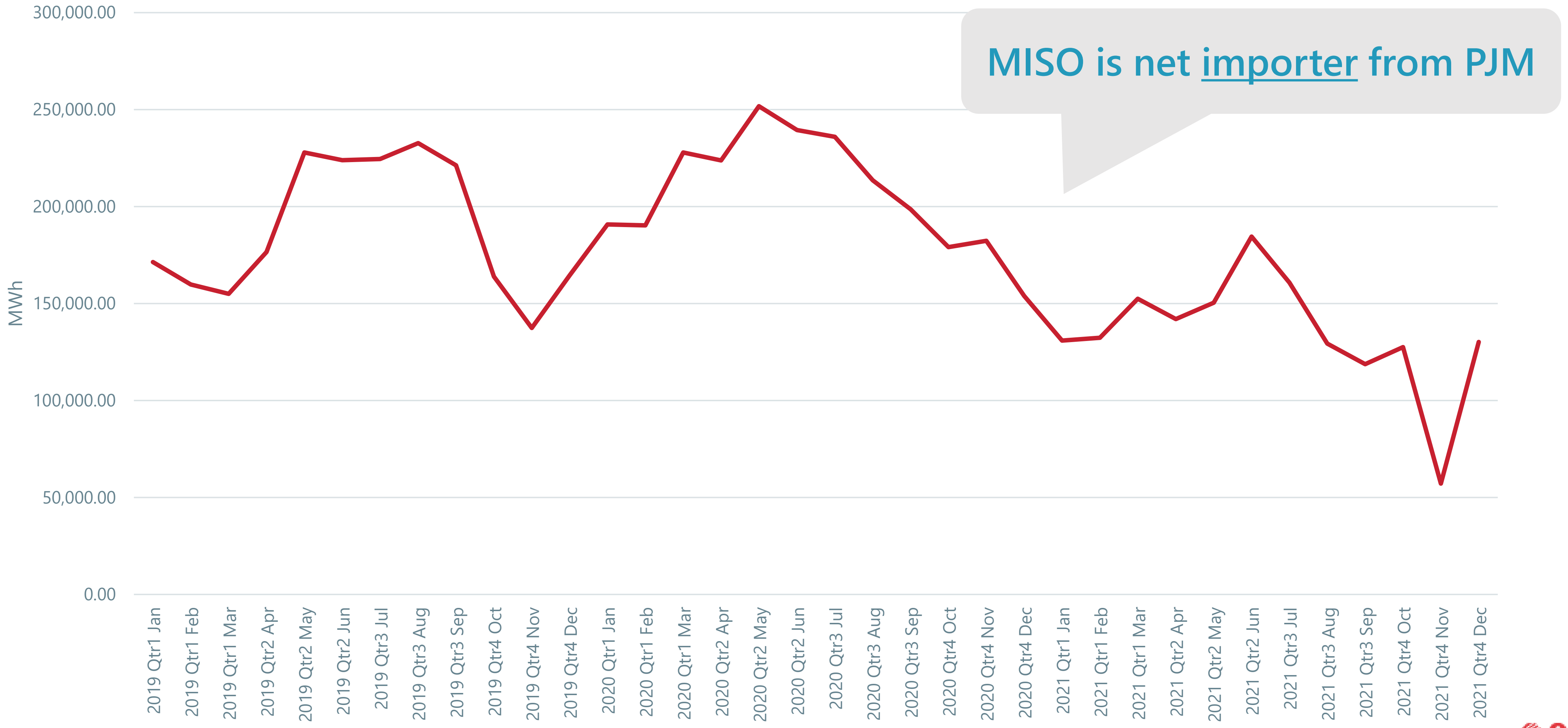
- 2017 ITP 10 Promod model included transactions between MISO and PJM
- Flows based on estimated flows from the Transaction Workbook
- Transactions followed sink area load profiles
- Buses on the <u>immediate edge</u> of MISO were selected

TESTING REVISED MODELING

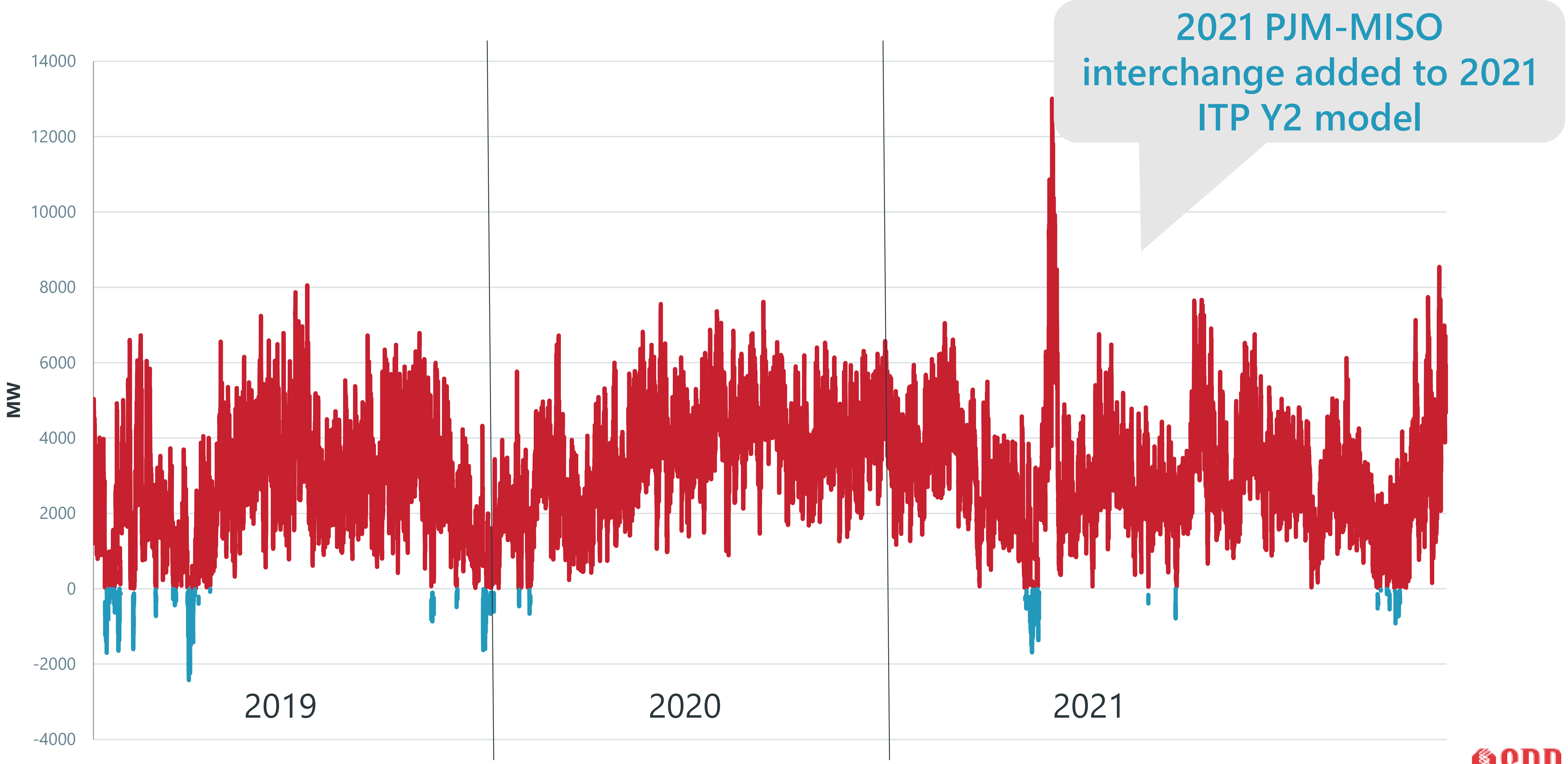
Updated modeling:
-More accurate
-Easier to implement

- Selecting buses on the eastern side of PJM to sink MISO transactions
- Considering using historical data instead of transactions workbook
- Considering using historical data combined with load profile

3 YEAR HISTORY OF NET PJM TO MISO TRANSACTIONS ON QUARTERLY BASIS



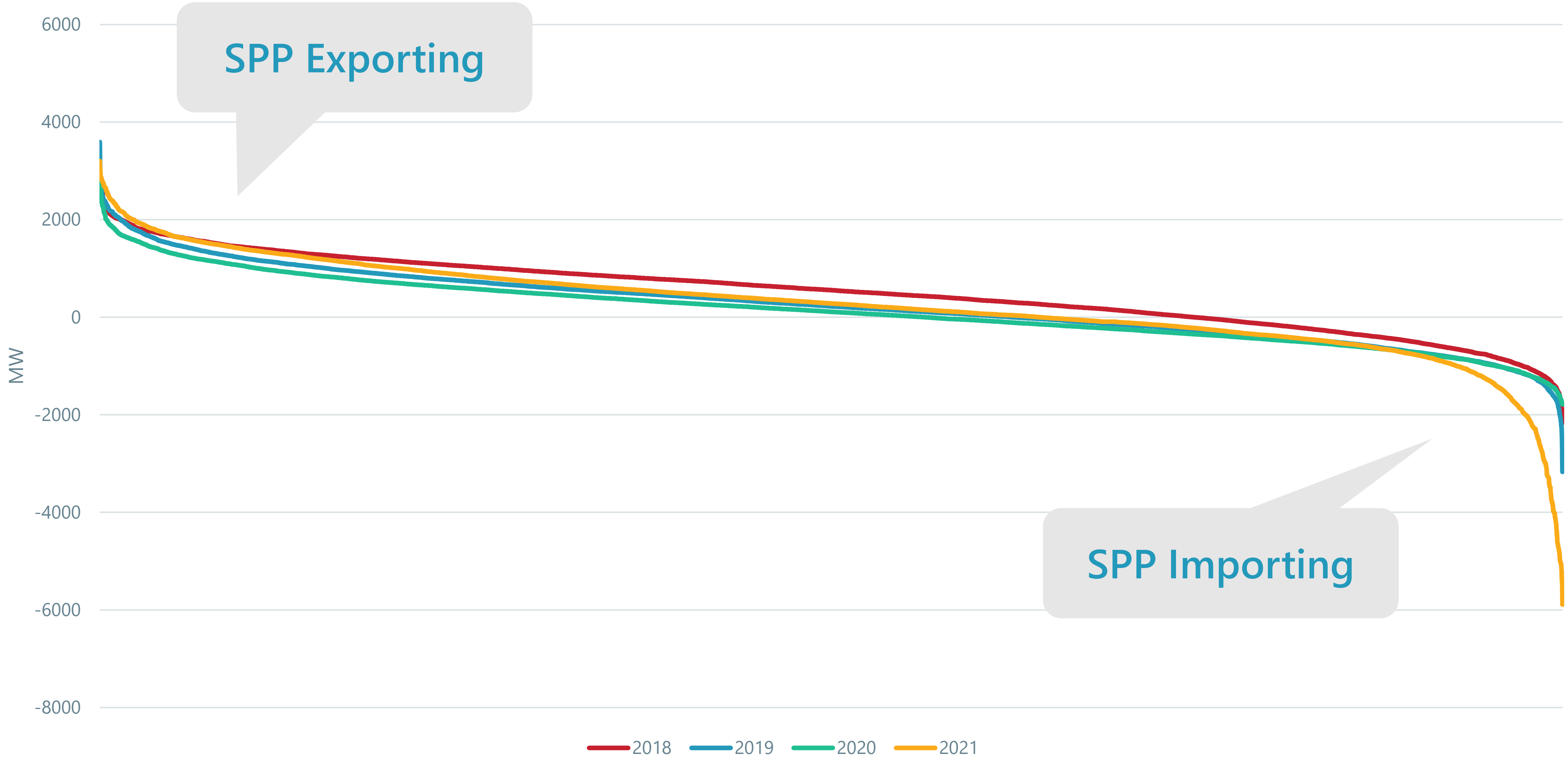
3 YEAR HISTORY OF PJM TO MISO TRANSACTIONS ON HOURLY BASIS



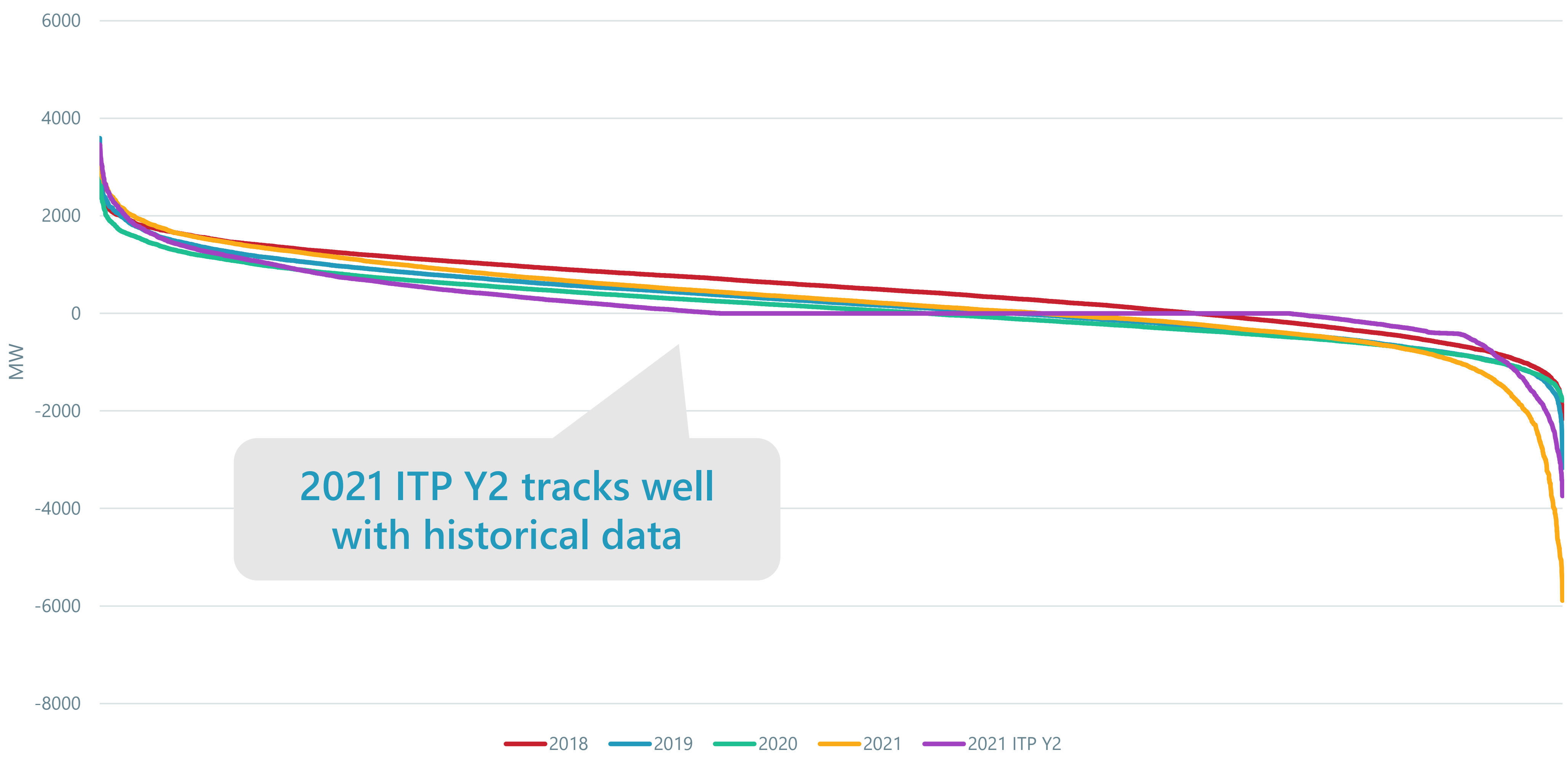
WHAT'S THE IMPACT TO SPP?

- Benchmark 2021 ITP base model runs with added transactions
  - Added comparison of $0 and $8 hurdle rates
  - Added 2021 ITP F2 Y10 cases
- Report on SPP Net Interchange

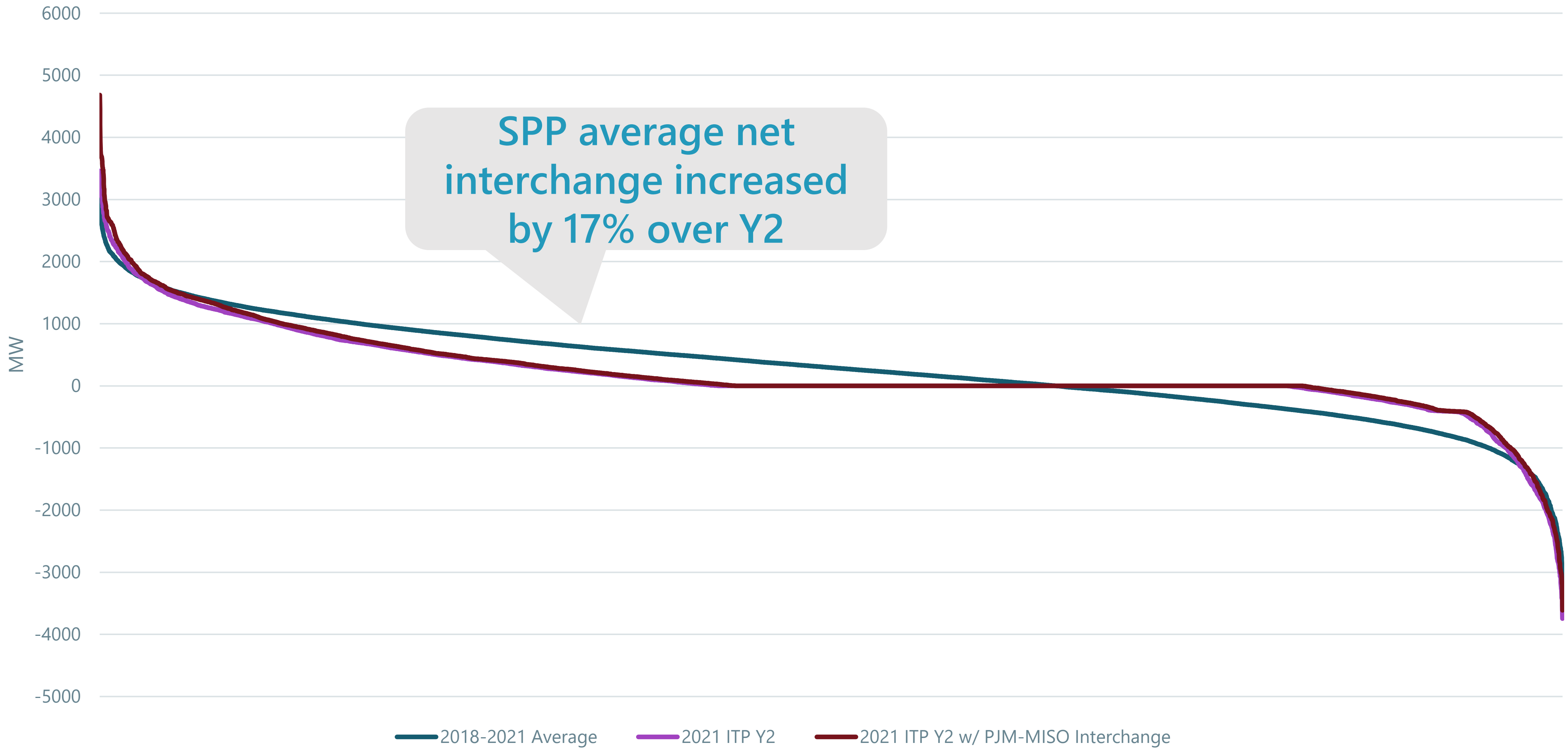
HISTORICAL SPP NET INTERCHANGE



HISTORICAL SPP NET INTERCHANGE VS 2021 ITP Y2

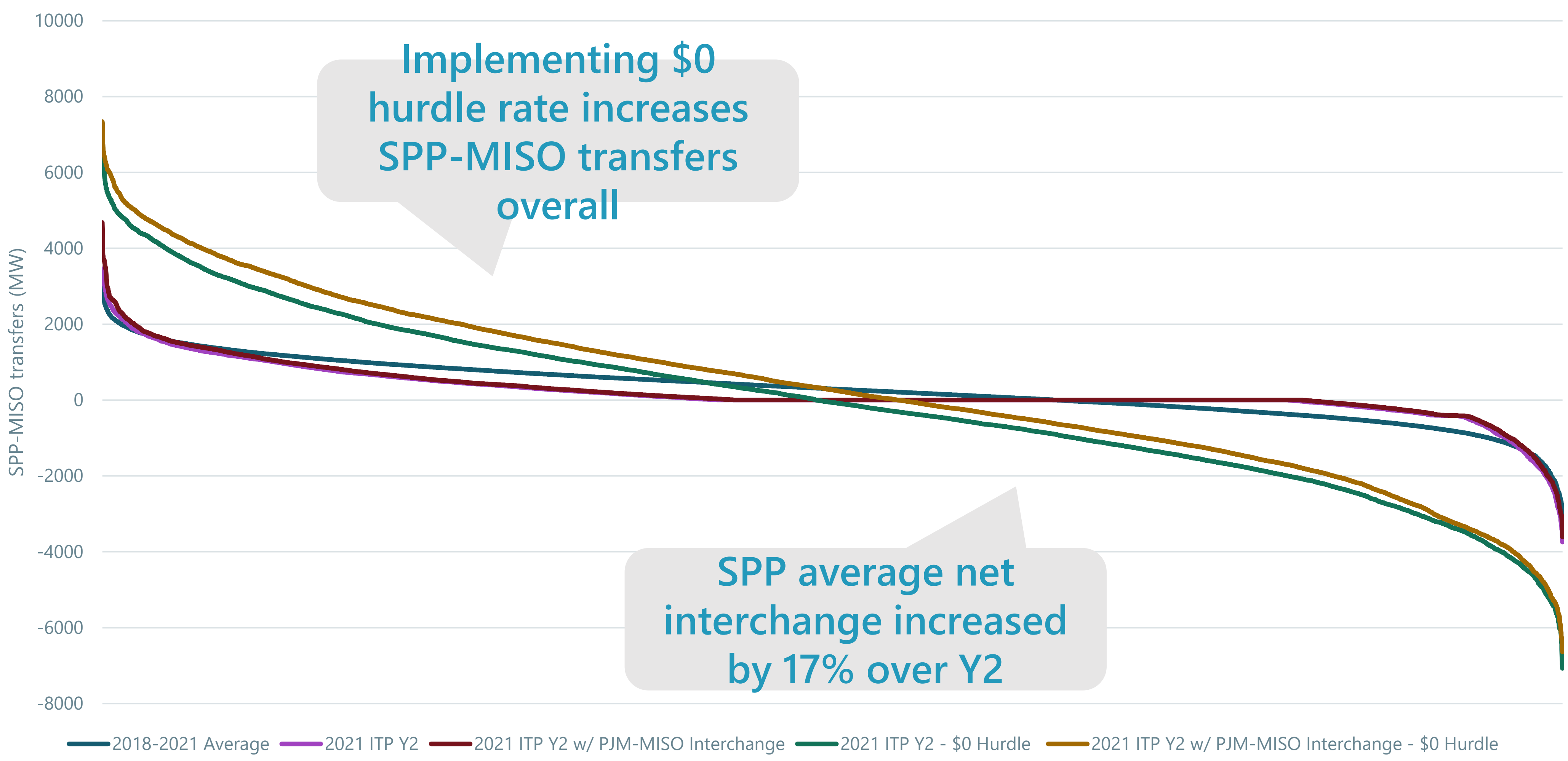


PJM-MISO INTERCHANGE ADDED TO Y2

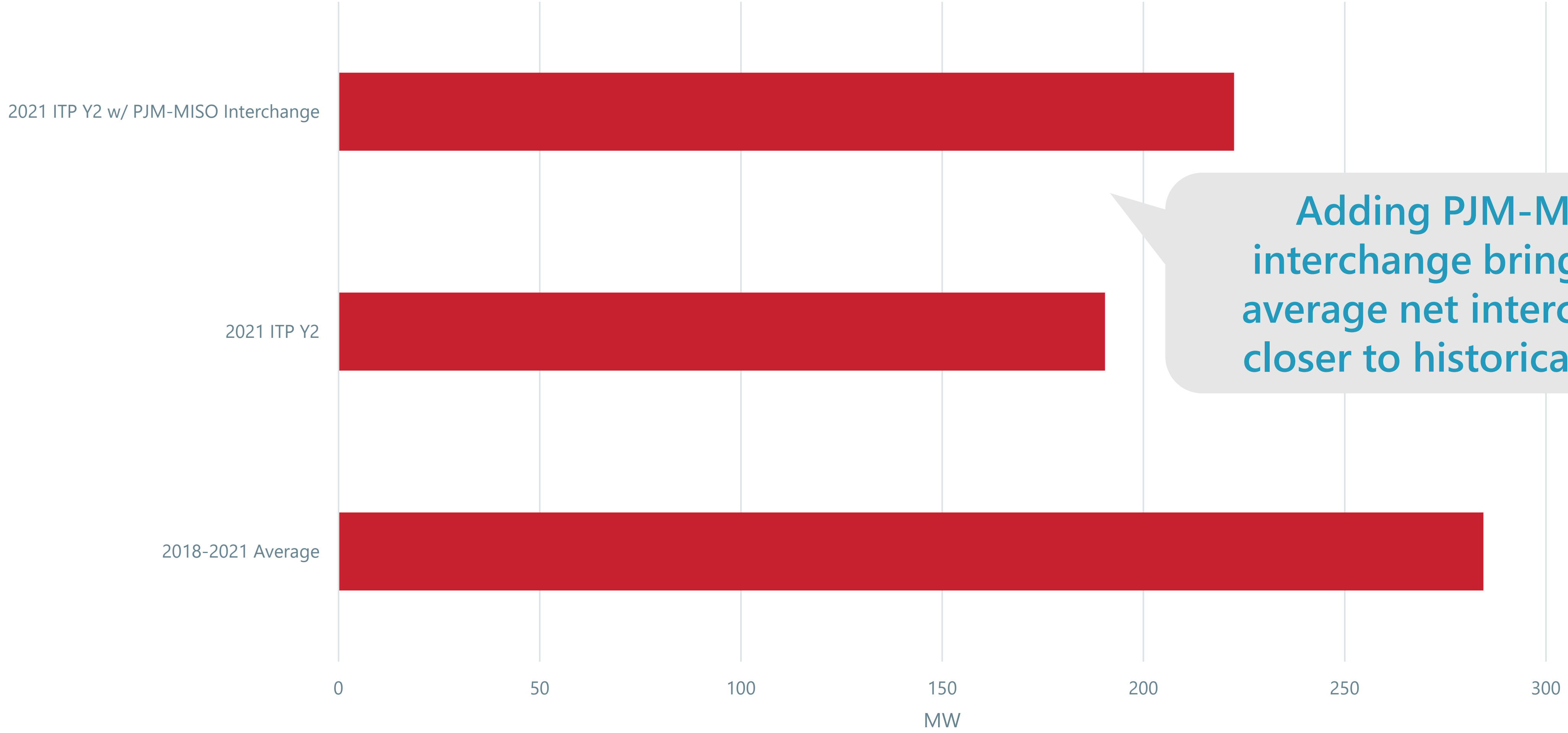


SPP

PJM-MISO INTERCHANGE & $0 HURDLE RATE

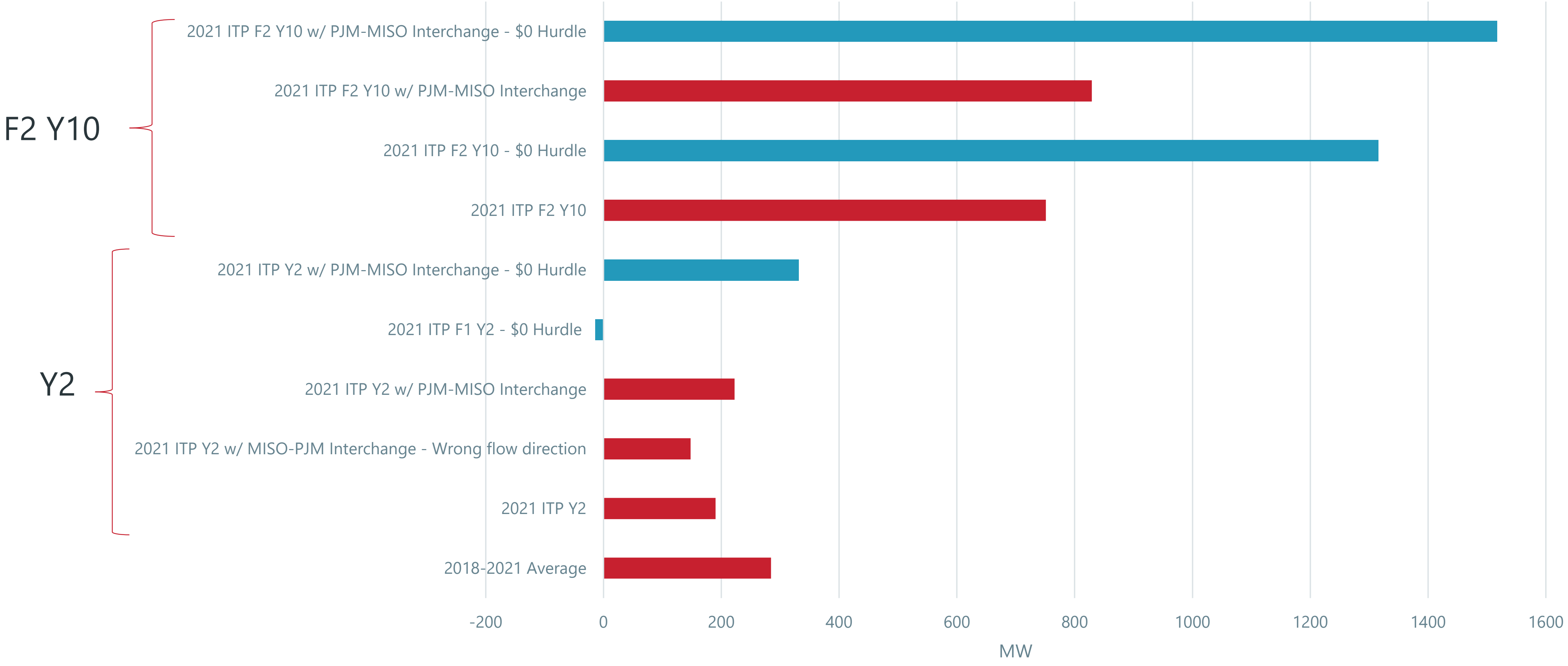


Y2 YEARLY AVERAGE NET INTERCHANGE COMPARISON



Adding PJM-MISO interchange brings SPP average net interchange closer to historical value

AVERAGE NET INTERCHANGE COMPARISON – ALL RUNS



RECOMMENDATION

- Implement 3-year historical average of MISO-PJM interchange directly without trending starting in 2023 ITP MEM

CONTACT

Feel free to reach out to the team working on this action item for more information or questions

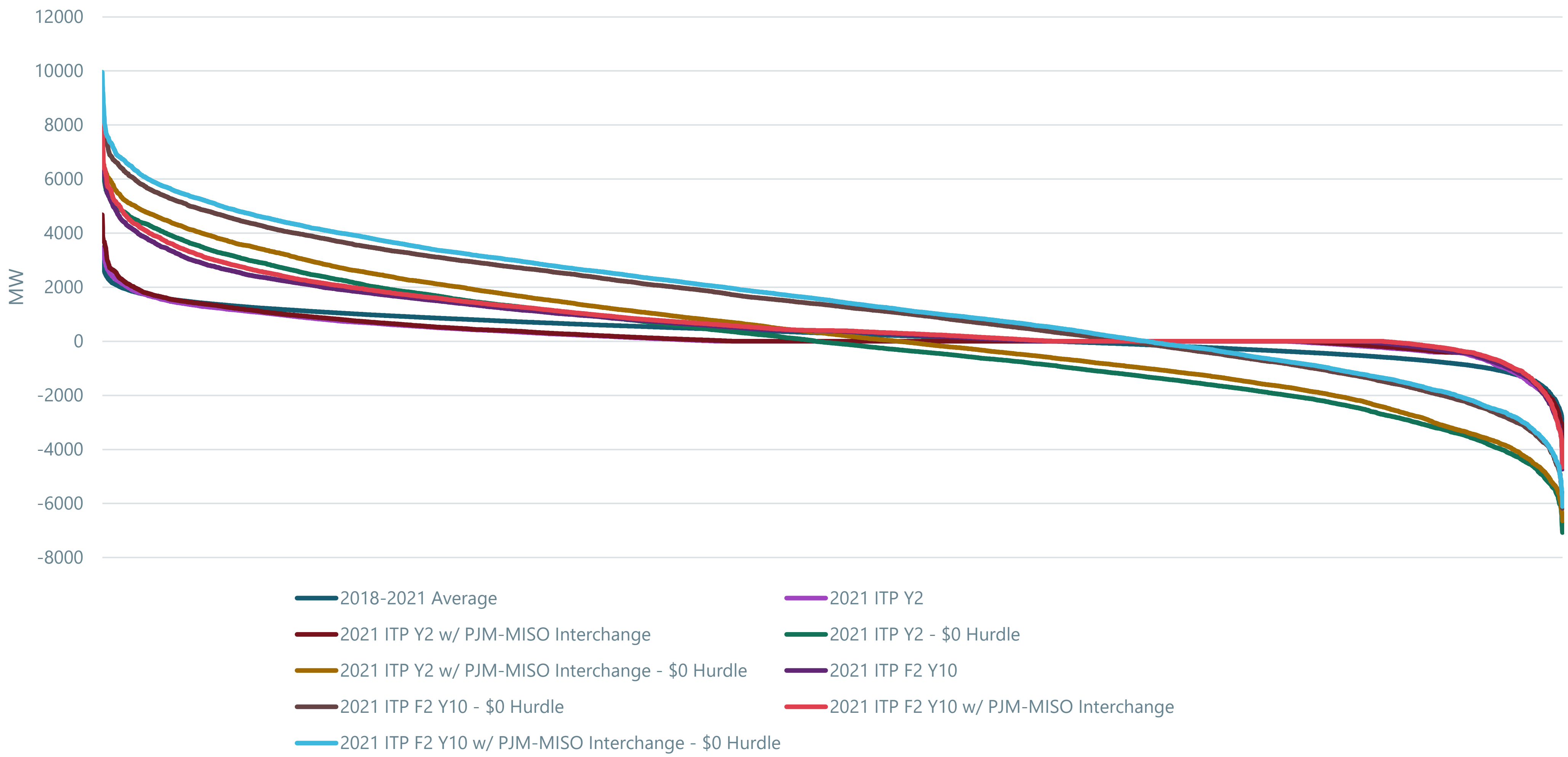
- Joshua Norton
- Ahmed Alazzawi
- Kelsey Allen

APPENDIX

DISCUSSION ITEMS FROM JUNE 29 ESWG MEETING

- How should the historical data be considered in a 5 or 10 year model?
  - Use historical average directly or…
  - Use historical average and trend to study year?
- More seams transfers in model?
    - MISO-SOCO

SPP NET INTERCHANGE – ALL RUNS



JULY 2022 MOPC-BOARD DEBRIEF

JOSHUA NORTON / ALAN MYERS

ESWG AUGUST 2022

MOPC

MOPC – CONSENT AGENDA

- Passed

2. **Consent Agenda**
   Usha Turner (Oklahoma Gas and Electric Company) moved to approve the consent agenda. Steve Gaw (Advanced Power Alliance) seconded the motion. The motion passed with 100% approval.
   a. April 2022 meeting minutes
   b. Credit Practices Working Group: RR484 - Surety bond as a form of financial security
   c. Market Working Group: RR496 - Uncertainty product clean-up
   d. Project Cost Working Group: PCWG scope revision
   e. Transmission Working Group
      i. RR489 - Planning electric storage resources and hybrid resources (ESRSC-E2)
      ii. Sponsored Upgrade Studies
      SUS-025 Warrensburg-Sedalia 161 kV
      SUS-026 Antelope-Hope 345 kV
      SUS-027 Ft Thompson 345/230 kV transformer upgrades
      SUS-030 Beeline-Nation-Jamesville 69 kV

JULY BALLOT RECAP

91% average consensus

Approve the consent agenda as presented **(10 items) – on previous slide.**	PASS	100%
Approve an increase in the planning reserve margin to 13% in 2023 and 15% in 2024; Implement performance based accreditation in accordance with the policy paper approved by the SAWG, but with a one-year delay in the effective implementation date; and direct staff to prepare a waiver process to be incorporated into the tariff that would allow SPP to approve waivers from the penalty provision in instances where it has increased the reserve requirements and parties have not had sufficient time to resolve their deficiency.	FAIL	60%
Approve the SAWG's recommendation to increase the PRM to 13% in 2023, 14% in 2024, and 15% in 2025, and if the RSC rejects the motion, to incorporate a waiver process.	FAIL	48%
Approve an increase in the planning reserve margin to 13% in 2023, 14% in 2024 and 15% in 2025.	PASS	95%
Implement performance based accreditation in accordance with the policy paper approved by the SAWG, but with a one-year delay in the effective implementation date.	PASS	87%
Direct staff to prepare a waiver process to be incorporated into the tariff that would allow SPP to approve waivers from the penalty provision in instances where it has increased the reserve requirements and parties have not had sufficient time to resolve their deficiency.	PASS	84%

RR SUMMARY TO MOPC – JULY 2022

Revision Requests Submitted for MOPC Approval

Primary Working Group	Title	Impacted Document					Estimated Cost	
		Tariff	ITP Manual	Business Practice	Planning Criteria	Market Protocols	Vendor Cost	Staff Hours
CPWG	RR484 Surety bond as a form of financial security	X					None	None
MWG	RR 496 Uncertainty product clean-up					X	None	None
TWG	RR 489 Planning electric storage resources and hybrid resources (ESRSC-E2)		X	X			None	None
TWG	RR 452 Transmission Owner project evaluation process	X	X	X	X		None	None

Approval Implications

- Estimated Vendor Cost for submitted RRs $*0*
- Estimated Staff Hours for submitted RRs is 0

JULY BALLOT RECAP

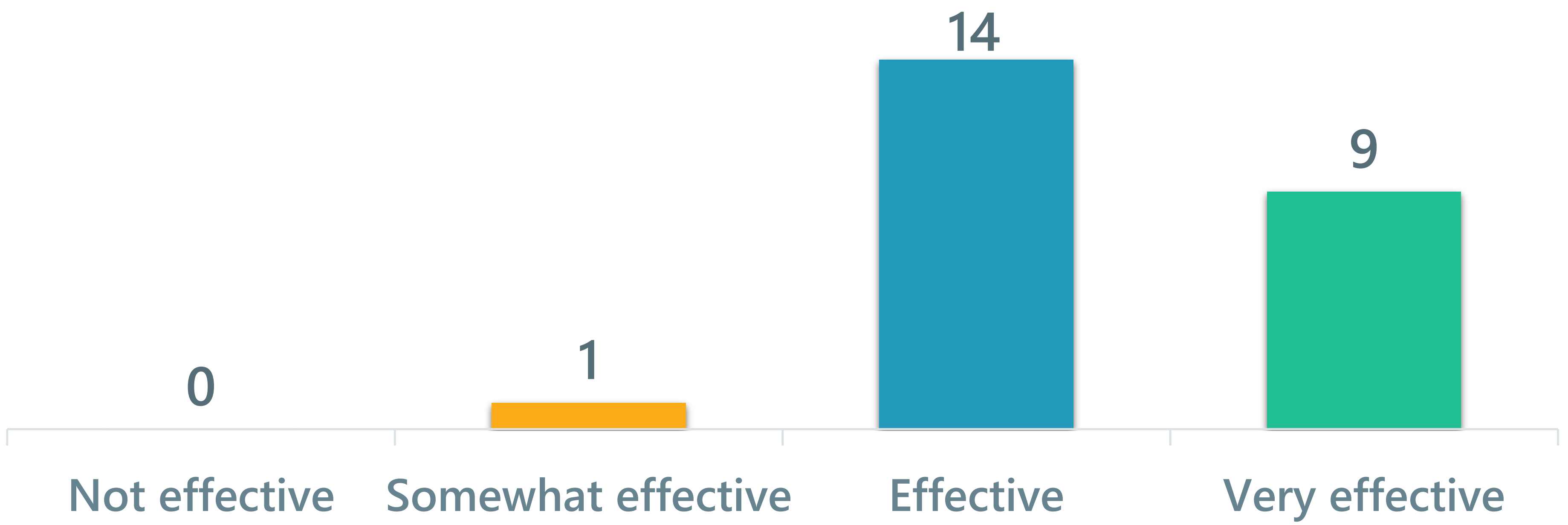
91% average consensus

Endorse moving forward with the concepts and example language proposed by the IRATF, and included in the draft NAESB standards request, to build industry support for staff to submit to NAESB. This is to address SIR213 - Fuel Assurance 2.3 Gas-electric coordination: Force majeure recommendation.	PASS	100%
Endorse the analysis results of the 2021 ITP further evaluation of the Crossroads-Phantom 345 kV double circuit project, and recommend issuance of an NTC for the Crossroads-Hobbs-Roadrunner double circuit 345 kV project.	PASS	88%
Endorse the staff recommendation of the Crossroads-Phantom 345 kV double circuit project as a viable alternative to the Crossroads-Hobbs-Roadrunner solution capable of addressing the needs identified in the 2021 ITP further evaluation.	PASS	67%
Approve RR452: Transmission Owner project evaluation process*	PASS	98%
Direct staff to finalize the Regional Cost Allocation Review 3 Report based solely on operational results in October 2022.	PASS	97%

* New MOPC Action Item 317: Staff to report on its experience related to implementation of RR452 (number of studies, timing, staff resources, etc.)

POST-MOPC SURVEY
CONTINUOUS IMPROVEMENT

Overall positive comments about the group's facilitation through difficult issues



MOPC recommends the Board:

Endorse the analysis results of the 2021 ITP further evaluation of the Crossroads-Phantom 345 kV double circuit project and recommend issuance of an NTC for the Crossroads-Hobbs-Roadrunner double circuit 345 kV project

SPP BOARD

BOARD – CONSENT AGENDA

- Passed unanimously

1. Approved the Consent Agenda
   a. Approved April 26, 2022 Minutes
   b. Corporate Governance Committee
      i. Revisions to RSC Composition- SPP Bylaws, Section 7.2
      ii. Revisions to Withdrawal Deposits- SPP Membership Agreement, Definitions and Section 4.2
      iii. Strategic Planning Committee- Transmission Owner Vacancy
         i. Matt Caves, Western Farmers Electric Cooperative
      iv. Human Resources Committee- Transmission Using Vacancy
         i. Matt Dills, ITC Great Plains
   c. Oversight Committee
      i. Independent Expert Pool
   d. Transmission Working Group
      i. SUS-025 Warrensburg-Sedalia 161 kV
      ii. SUS-026 Antelope-Hope 345 kV
      iii. SUS-027 Ft. Thompson 345/230 kV transformer upgrades
      iv. SUS-030 Beeline-Nation-Jamesville 69 kV
      v. TWG RR452 Transmission Owner project evaluation process
   e. Staff
      i. Sheldon-Monolith 115 kV Re-evaluation results
   f. Finance Committee
      i. 2023 Operating Plan
   g. New Member Forum/SPP Staff Recommendation
      i. DC Tie Proposal

JULY BALLOT RECAP

Approved Staff's recommendation to increase to the Planning Reserve Margin from 12% to 15% effective for the 2023 summer season and direct SPP Staff to prepare a Revision Request to implement this policy.	PASS	5 opposed & 5 abstentions Board voted by email. Motion passed.
Approved Staff's recommendation to approve the performance-based accreditation methodologies described in the "Performance Based Accreditation Recommendations for Conventional Resources" policy paper and direct SPP Staff to prepare a Revision Request to implement this policy.	PASS	1 opposed & 4 abstentions Board voted by email. Motion passed.
Approved the MOPC's recommendation to endorse the results of the 2021 ITP further evaluation of the Crossroads-Phantom 345 kV double circuit project and approve issuance of an NTC per SPP's tariff for the Crossroads-Hobbs-Roadrunner double circuit 345 kV project.	PASS	5 abstentions Board voted by email. Motion passed.

ENERGY STORAGE RESOURCE STEERING COMMITTEE (ESRSC) UPDATE

ESWG

AUGUST 2022

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

SouthwestPowerPool SPPorg southwest-power-pool

ELECTRIC STORAGE RESOURCES STEERING COMMITTEE (ESRSC) UPDATE – AUGUST 2022

- Storage as Transmission Only Asset (SATOA) has been filed with FERC
- SPC direction for Multi-use Storage is to obtain experience with SATOA and allow SPP Staff to re-initiate this initiative
- ESRSC was **retired** effective with the July 2022 MOPC and SPC meetings

Chair	Staff Secretary
Denise Buffington (Evergy)	Richard Dillon (rdillon@spp.org)

Revision Request Recommendation Report

RR #: 497	**Date: 7/26/2022**
RR Title: Modification of BP 7060 Section 2.2 Applicable Projects	

SUBMITTER INFORMATION

Submitter Name: Tammy Bright	**Company:** SPP
Email: tbright@spp.org	**Phone:** 501-688-1644

EXECUTIVE SUMMARY AND MOTION FOR RECOMMENDED MOPC/BOD ACTION

(Executive summary is high-level explanation of what the revision request will accomplish and should include a summary of voting records and opposition. The motion for recommended MOPC/BOD action should be written such that the organization group "recommends" the action needed.)

This revision request will provide clarification on the criteria of an applicable project and clearly defined PCWG's oversight for an applicable project to close the potential gap of a transmission services upgrade with 100% directly assigned costs that vary outside of established bandwidth, not being identified for stakeholder review prior to SPP Staff reporting the variance in a Quarterly Project Tracking report.

OBJECTIVE OF REVISION

(Ensure the objective has been updated to reflect the intent of the revisions presented for approval)

This revision will clearly defined PCWG's oversight for applicable projects that are funded through direct assignment of cost. The benefit of these changes is clarification of which projects require PCWG oversight.

SPP STAFF COMMENTS

IMPACT ANALYSIS

(See RR Impact Analysis Form for complete impact details)

System Changes ☒ No ☐ Yes

Process Changes? ☒ No ☐ Yes

Impact Analysis Required? ☒ No ☐ Yes | **If no, but system or process changes are expected please explain why an Impact Analysis will not be performed** (e.g. FERC Order, work included in another Impact Analysis for a related RR):

Estimated Vendor Cost: *ROM based on information available at the time of the estimate* ***Cost Categories: A>0-20k, B>20-60k, C>60-100k, D>100-300k, E>300k – 600k, F>600k – 1mm, *G>1mm*** **If greater than 1mm an upper limit will also be provided.*	**Estimated Implementation Staff Hours:** *ROM based on information available at the time of the estimate*

Estimated Implementation Time: *ROM based on information available at the time of the estimate*	**Primary Working Group Priority:**	
SPP DOCUMENTS IMPACTED		
☐ **Market Protocols**	**Protocol Section(s):**	**Protocol Version:**
☐ **Operating Criteria**	**Criteria Section(s):**	**Criteria Date:**
☐ **Planning Criteria**	**Criteria Section(s):**	**Criteria Date:**
☐ **Tariff**	**Tariff Section(s):**	
☒ **Business Practice**	**Business Practice Number:** 7060	
☐ **Integrated Transmission Planning (ITP) Manual**	**Section(s):**	
☐ **Revision Request Process**	**Section(s):**	
☐ **Minimum Transmission Design Standards for Competitive Upgrades (MTDS)**	**Section(s):**	
☐ **Reliability Coordinator and Balancing Authority Data Specifications (RDS)**	**Section(s):**	
☐ **SPP Communications Protocols**	**Section(s):**	

ORGANIZATIONAL GROUP ACTION *(Action = Approved, Approved Unanimously, or Rejected)*	
Primary Working Group: PCWG	**Date:** 6/1/2022 **Motion:** SPP staff requests PCWG approval of BP 7060 Section 2.2 revision language in order to submit changes through the RR process **Action: Unanimous Approval** **Abstained:** None **Opposed:**None
Reason for Abstention/Opposition:	
Secondary Working Group:	**Date:** **Motion:** **Action:** **Abstained:** **Opposed:**
Reason for Abstention/Opposition:	
Secondary Working Group:	**Date:** **Motion:** **Action:** **Abstained:** **Opposed:**

Reason for Abstention/Opposition:	
Secondary Working Group:	**Date:** **Motion:** **Action:** **Abstained:** **Opposed:**
Reason for Abstention/Opposition:	
MOPC	**Date:** **Motion:** **Action:** **Abstained:** **Opposed:**
Reason for Abstention/Opposition:	
BOD/Member Committee	**Date:** **Motion:** **Action:** **Abstained:** **Opposed:**
Reason for Abstention/Opposition:	

SUMMARY OF COMMENTS *(See comment forms in the RR folder on SPP.org for full comment details)*
1. Comment Form Date and Submitter:
Summary of Comments:
Organizational Group Review Results *(e.g. Reviewed and accepted, reviewed but not accepted, reviewed with partial acceptance – provide details to explain)***:**
2. Comment Form Date and Submitter:
Summary of Comments:

Organizational Group Review Date and Results *(e.g. Reviewed and accepted, reviewed but not accepted, reviewed with partial acceptance – provide details to explain)*:
3. Comment Form Date and Submitter:
Summary of Comments:
Organizational Group Review Date and Results *(e.g. Reviewed and accepted, reviewed but not accepted, reviewed with partial acceptance – provide details to explain)*:
PROPOSED REVISION(S) TO SPP DOCUMENTS
Market Protocols

SPP Tariff (OATT)

SPP Operating Criteria

SPP Planning Criteria

SPP Business Practices

2.2. Applicable Projects

Applicable Projects are construction projects, including Legacy Projects that meet ~~all of~~ the following criteria:

- ~~Approved for construction and classified as a Base Plan Upgrade in accordance with the Tariff;~~
- ~~Has a nominal operating voltage of 100 kV or above; and~~
- ~~Has a Study Estimate in excess of $20 million~~

1. Has a nominal operating voltage of 100 kV or above; and
2. Has a Study Estimate in excess of $20 million; and either

3a. Approved for construction and classified as a Base Plan Upgrade in accordance with the Tariff; or

3b. Required for transmission service where cost is 100% directly assigned to one or more Transmission Customers who is not the Designated Transmission Owner

A single Applicable Project may consist of multiple upgrades or multiple projects assigned to multiple DTOs. A non-Applicable Project with a nominal operating voltage of 100 kV or above that has been issued an NTC will become an Applicable Project if either its NTC Project Estimate (NPE) or any subsequent cost estimate exceeds $20 million. Applicable Projects will continue to be Applicable Projects even if their subsequent cost estimates fall below $20 million.

For projects which would otherwise be Applicable, but did not receive an NTC from SPP as part of the new member integration process, the initial cost estimate received from the project owner and reported in Quarterly Project Tracking will be used as the established baseline cost estimate for reporting all future cost estimate changes during the Project Tracking process for the project and will be the basis for determining project cost variances.

Integrated Transmission Planning (ITP) Manual

Revision Request Process

Minimum Transmission Design Standards for Competitive Upgrades (MTDS)

Reliability Coordinator and Balancing Authority Data Specifications (RDS)

SPP Communications Protocols

SPP Southwest Power Pool

MODIFICATION OF BP 7060

PCWG ACTION ITEMS 238

TAMMY BRIGHT

ESWG - 8/4/2022

PCWG ACTION ITEM 238

Staff to assess whether applicable projects w/o regional funding or with 100% direct cost assignment be included under BP7060? PCWG Scope statement says “regional funding”

- Created 12/1/2021

BACKGROUND

In December 2021, PCWG reviewed a project that was funded through direct assignment

- PCWG questioned whether or not review of projects funded through direct assignment are in their scope of work

GOVERNING DOCUMENTS

PCWG Scope

In carrying out its purpose, the PCWG

1. Reviews **regionally funded** projects that have been identified by the SPP project tracking process as having estimated costs that have exceeded allowable variance levels.

BP 7060

2.2. Applicable Projects

Applicable Projects are construction projects, including Legacy Projects that meet all of the following criteria

- Approved for construction and classified as a **Base Plan Upgrade** in accordance with the Tariff
- Has a nominal operating voltage of 100 kV or above, and
- Has a Study Estimate in excess of $20 million

POTENTIAL GAP

Transmission Service upgrades can be directly assigned to one or more Transmission Customers

In the event that a Transmission Service upgrade with 100% directly assigned costs vary outside of established bandwidth, no stakeholder review would be required prior to SPP Staff reporting the variance in a Quarterly Project Tracking report

This issue does not impact GI Upgrades. Oversight for GI upgrades is included in milestones listed in Appendix B of the GIA requiring upgrades.

PROPOSED SOLUTION
UPDATES BASED ON 4/7/2022 CAWG DISCUSSION

Applicable Projects are construction projects, including Legacy Projects that meet ~~all of~~ the following criteria:

1. Has a nominal operating voltage of 100 kV or above; and
2. Has a Study Estimate in excess of $20 million; and either

3a. Approved for construction and classified as a Base Plan Upgrade in accordance with the Tariff; or

3b. Required for transmission service where cost is 100% directly assigned to one or more Transmission Customers who is not the Designated Transmission Owner

SPP Staff recommends ESWG:

Approve *RR497 Modification of BP 7060 Section 2.2 Applicable Projects*

STAKEHOLDER CONSENSUS

Group	Date	Action	Abstained	Opposed
PCWG	6/1/2022	**Unanimous Approval**		
TWG	8/1/2022	Approval Needed		
ESWG	8/4/2022	Approval Needed		
RTWG(1)	8/25/2022	Introductory		
CAWG	9/8/2022	Approval Needed		
RTWG(2)	9/22/2022	Approval Needed		
PCWG	10/5/2022	Approval of Secondary WGs suggested changes		
MOPC	10/10/2022-10/11/2022	Approval Needed		
RSC	10/24/2022	On behalf of CAWG		

APPENDICES OR REFERENCES

DIRECT ASSIGNED PROJECTS

Generator interconnection projects- Attachment V, section 4.2.2.a

All Network Upgrades that are required to provide Interconnection Service for all Interconnection Requests included in a Cluster Study shall be included in a cluster cost allocation assessment group (“CCAAG”). **The cost of each Network Upgrade component will be allocated to each Interconnection Customer** in the CCAAG on a pro-rata impact basis as provided for in paragraph b below…

Transmission Service Studies- Attachment J, Section I

Direct Assignment Facilities

Where a System Impact and/or Facilities Study indicates the need to construct Direct Assignment Facilities to accommodate a request for Transmission Service, **the Transmission Customer shall be charged the full cost of such Direct Assignment Facilities**. Such costs shall be specified in a Service Agreement.

DEFINITIONS

Network Upgrades: All or a portion of the modifications or additions to transmission-related facilities that are integrated with and support the Transmission Provider's overall Transmission System for the general benefit of all Users of such Transmission System.

Direct Assignment Facilities: Facilities or portions of facilities that are constructed by any Transmission Owner(s) for the sole use/benefit of a particular Transmission Customer or a particular group of customers or a particular Generation Interconnection Customer requesting service under the Tariff. Direct Assignment Facilities shall be specified in the Service Agreements that govern service to the Transmission Customer(s) and Generation Interconnection Customer(s) and shall be subject to Commission approval.

Base Plan Upgrades: Those upgrades included in and constructed pursuant to the SPP Transmission Expansion Plan in order to ensure the reliability of the Transmission System. Base Plan Upgrades shall also include: (i) those Service Upgrades required for new or changed Designated Resources to the extent allowed for in Attachment J to this Tariff, (ii) ITP Upgrades that are approved for construction by the SPP Board of Directors, (iii) high priority upgrades, excluding Balanced Portfolios, that are approved for construction by the SPP Board of Directors, and (iv) Network Upgrades due to the retirement of a Resource in accordance with Attachment AB to this Tariff. For Zones 1 through 15, all such upgrades shall specifically exclude planned Transmission System facilities identified in the SPP Transmission Expansion Plan that are: (i) placed in service during the 2005 calendar year or (ii) required to be in service to meet the SPP Criteria and the NERC Reliability Standards for the summer of 2005. For Zones 16, 17, and 18, all such upgrades shall specifically exclude planned Transmission System facilities in those zones identified in the SPP Transmission Expansion Plan Report (2009 – 2018) that are required to be in service to meet the SPP Criteria and the NERC Reliability Standards for the summer of 2008 or which are in operation prior to January 1, 2009, except for those upgrades that are in service prior to January 1, 2009 and are components of Phase 1 of the NPPD 345kV Norfolk to Lincoln (ETR) project or OPPD Sub 1255/3455 Transformer project. Network Upgrades that are components of Phase 1 of the NPPD 345kV Norfolk to Lincoln (ETR) project or OPPD Sub 1255/3455 Transformer project that are in service prior to January 1, 2009 will be Base Plan Upgrades, however, the Zonal component of the costs shall be 100% allocated to the respective host zone. The Base Plan Upgrades in Zones 1 through 18 identified by the Transmission Provider with a need date prior to October 1, 2015 shall not be allocable to Zone 19. The upgrades in Zone 19 identified by the Transmission Provider with a need date prior to October 1, 2015, shall not constitute Base Plan Upgrades. The facilities identified in Schedule 2 to Attachment J are expressly deemed to be Base Plan Upgrades pursuant to Attachment J, Section III.A.2

Southwest Power Pool

ITP

MOPC ACTION ITEM 314 UPDATE

SHERRI MAXEY

AUGUST 2022

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

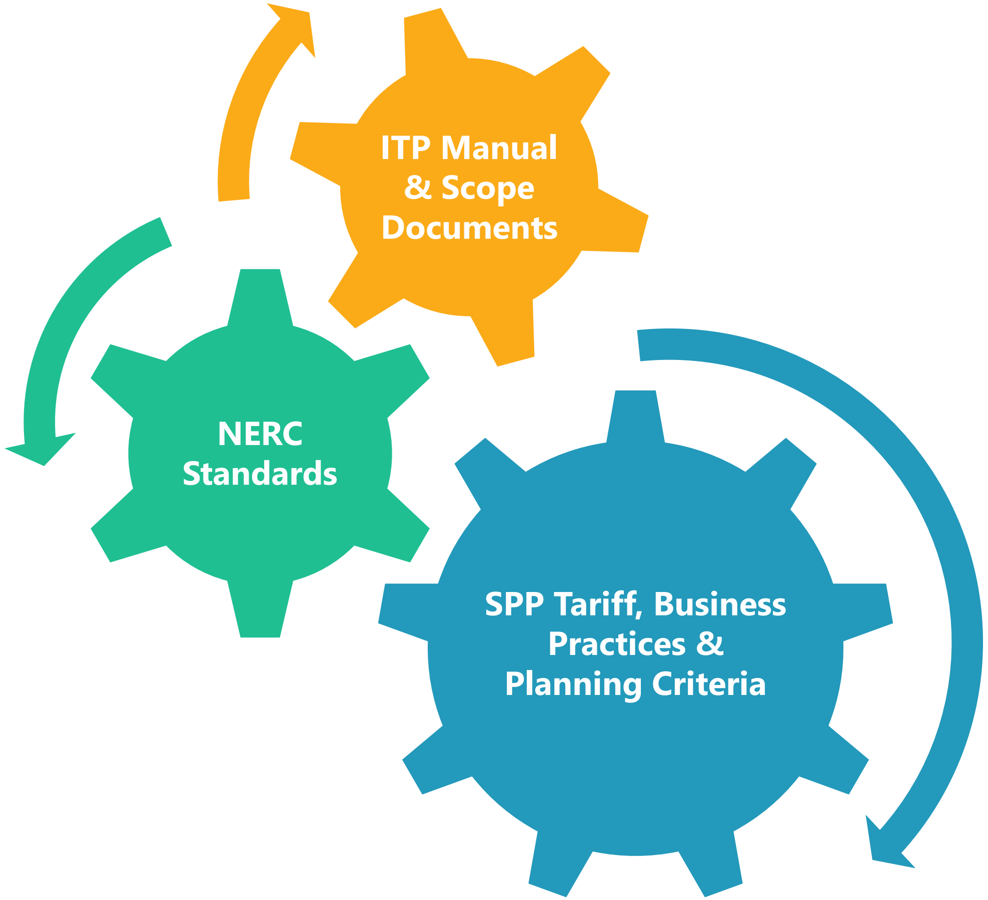
SouthwestPowerPool

SPPorg

southwest-power-pool

MOPC ACTION ITEM 314

As part of rebaselining ITP studies, staff to work with the ESWG and TWG to review Attachment O, the ITP Manual, and current ITP scope documents to look for further process improvements to ensure timely completion of current and future ITP assessments



ITP STUDY PHASES

Planning
- Scope & Futures Development
- Schedule Development

Reliability Models Development
- Base Reliability (BR) Powerflow Models
- Short Circuit Models
- BR Powerflow Benchmarking
- Market Powerflow Models (MPMs)*

Economic Models Development
- Market Economic Model (MEM)
- Load & Generation Review
- Renewable Policy Review
- Resource Plan (Phase 1 & 2)
- Siting Plan
- Generator Outlet Facilities (GOFs)
- MEM Benchmarking
- Constraint Assessment

Needs Assessment
- BR Reliability & Short Circuit
- MP Reliability*
- Economic & Policy
- Operational

Portfolio Development
- DPP Window
- Solutions Development
- DPP Validation
- Solutions Evaluation & Screening
- Draft Portfolio Development
- Study Cost Estimates
- Planning Summit
- Final Portfolio Development
- Optimization & Consolidation

Final Assessments & Reporting
- Model Updates for final assessments
- Staging
- Benefit Metrics
- Sensitivity Analysis
- Final Reliability Assessment
- Stability Assessment
- Rate Impacts/ATRR
- Report Development

**MPMs being discussed as part of MOPC AI 314*

ITP GOVERNING DOCUMENTS

- **ITP Manual** references
  - SPP Tariff
    - Attachments O, V, Z1 & Y
    - Schedule 11
  - NERC Standards
    - TPL-001 (Table 1)
    - MOD-032
  - ITP Scope documents*
  - SPP Planning Criteria
  - FERC Order 890
  - SPP Revision Requests
  - SPP Model Development Procedure Manual (MDAG)*
  - Resource Siting Manual (ESWG)*
  - Benefit Metrics Manual (ESWG)*

** These SPP stakeholder documents do not require an RR to change*

ITP GOVERNING DOCUMENTS – CONT.

- **SPP Tariff, Attachment O for Transmission Planning processes** references
  - Section 2.2 – roll-over rights
  - Att. C – Available Transfer Capability (ATC) related calculation criteria
  - Att. V - GI requests
  - Att. Z1 - TS requests
  - Att. AQ - Delivery point changes or additions
  - Att. Y
  - Schedule 11 - Base Plan Zonal Charge & Region-Wide Charge
  - SPP Bylaws, Sections 3-6, Article 3.0, 3.9
  - SPP Membership Agreement
    - Article 2.0 for Transmission Provider
    - Article 3.0 for the Members
  - NERC Reliability Standards & SPP Criteria
  - Zonal Planning Criteria

- **SPP Tariff, Attachment O, Section III – The Integrated Transmission Planning Assessment** references
  - ITP Manual and Study Scope
  - Sections 19 & 32, Att. Z1 for transmission upgrades related to transmission service requests
  - Att. V for interconnection facilities & other transmission upgrades related to Generator Interconnection Service
  - Att. J, Schedule 1 for sponsored upgrades
  - Att. Y, Section III for DPP incentive points
  - Att. O, Section II.5 for Zonal Planning Criteria

- **SPP Business Practices**
  - 7000 Series – Transmission Planning & Expansion
  - 8000 Series – Resource Adequacy

ITP

PLANNING

PLANNING

Scope & Futures Development

- **Tariff** - Attachment O, Sections III.2.c-d, III.3.q, III.6, III.7.a, and III.7.d.iv
- **ITP Manual** – Sections 1.1, 1.4, 1.5, 1.6, 2.2.1.1, 2.2.1.3, 2.2.1.7 through 2.2.1.11, 2.2.2.1.2, 2.2.2.2.1, 4.1.2, 4.3, 6.1.4, 6.2, 7.2, and 10.1 (also, 11.2 and 11.4)
- **Scope**

Schedule Development

- **Tariff** - Attachment O, Sections II.1.j (model development schedule), II.2.e (working group schedule), and III.1 (commencement of process)
- **ITP Manual** – Sections 1.5, 2.2.1.1, 4.1.2, 5.1.1, and 10.1-10.4
- **Scope** (includes high-level schedule)
- **NERC Standards**

SCOPE & FUTURES DEVELOPMENT
PROPOSED IMPROVEMENT

Futures Development

- Obtain additional input on futures development from industry experts with an R&D background to develop reports to help with futures discussions
  - Value: Time saving during scope development and improved data quality resulting in higher confidence levels and more optimal solutions

RELIABILITY MODELS DEVELOPMENT

RELIABILITY MODELS DEVELOPMENT

BR Powerflow & Short Circuit Models

- **Tariff** - Attachment O, Sections II.1.j, III.5.a-e, III.6.a.iii
- **ITP Manual** – Sections 1.3.1, 1.4, 2, 2.1, 2.1.1 through 2.1.5, 2.2.1.6.1, 2.3.2
- **Scope** – Section 2
- **SPP Model Development Procedure Manual**

BR Powerflow Benchmarking

- **ITP Manual** – Sections 1.3.1, 1.4, 3, 3.1

Market Powerflow Models

- **ITP Manual** – Sections 1.3.1, 1.4, 2, 2.3
- **Scope** under Resource Plan Modeling (e.g., 2023 ITP Scope)

RELIABILITY MODELS DEVELOPMENT
PROPOSED IMPROVEMENTS

Section 10.3 Proposed Change

- RR 500 being presented at August TWG
- Stakeholders have expressed need to have ability to provide critical model updates, such as new AQ load additions, generators interconnecting, retirements, etc., later in the ITP process*
  - Consider using a "showstopper" matrix, and/or
  - Structure 2024 ITP milestones with contingency plans for when critical 10.3 updates are received (*e.g.*, have "backup solutions")

Market Powerflow Models (MPM)

- Presentation at August TWG for discussion
  - TPL sensitivity work around used in 2022 ITP*
- SCRIPT/CPPTF will be reviewing MPM benefit in common model

** Feedback is welcomed for these items*

RELIABILITY MODELS DEVELOPMENT
IMPROVEMENTS COMPLETED

Reliability Models Development

- Model Reductions effort (in 2023 ITP scope)
- Process documentation & training efforts
  - Improved process documentation to assist with onboarding and training new staff
  - Return to office in March 2022 helped with collaboration among staff and onboarding and training of new staff

ECONOMIC MODELS AND INPUTS DEVELOPMENT

ECONOMIC MODELS AND INPUTS DEVELOPMENT

MEM Development

- **Tariff** - Attachment O, Sections III.3
- **ITP Manual** – Sections 1.4, 2.2
- **Scope** – MEM Overview, including Futures

Load & Generation Review

- **Tariff** - Attachment O, Sections II.1.f, III.3.h, III.4
- **ITP Manual** – Sections 1.4, 2.2.1.2, 2.2.1.4, 2.2.1.5, and 2.2.2.1
- **Scope** – Futures

ECONOMIC MODELS AND INPUTS DEVELOPMENT – CONT.

Renewable Policy Review

- **Tariff** - Attachment O, Sections II.1.h, III.3
- **ITP Manual** – Sections 1.4, 2.2.1.3, 2.2.2.1.1
- **Scope**

Resource Plan (Phases 1 & 2)

- **Tariff** - Attachment O, Sections III.3(k)
- **ITP Manual** – Sections 1.4, 2.1.1, 2.2.1.2, 2.2.1.3, 2.2.1.6.2, 2.2.2, 2.2.2.1, 2.2.2.1.1, 2.2.2.1.2, 2.2.2.2.1, 2.3.1.1
- **Scope**

Siting Plan

- **Tariff** - Attachment O, Sections III.3
- **ITP Manual** – Sections 1.4, 2.2.1.10, 2.2.2, 2.2.2.1, 2.2.2.2, 2.2.2.2.1, 2.2.2.2.2, 2.2.2.2.3, 2.2.2.2.4
- **Resource Siting Manual**

ECONOMIC MODELS AND INPUTS DEVELOPMENT – CONT.

Generator Outlet Facilities (GOFs)

- **ITP Manual** – Sections 1.4, 2.2.2.3

MEM Benchmarking

- **ITP Manual** – Sections 3, 3.2

Constraint Assessment

- **ITP Manual** – Sections 1.4, 2.2.3

ECONOMIC MODELS & INPUTS
PROPOSED IMPROVEMENTS

Modeling External Areas

- Current challenges
  - ITP uses the MMWG models which feed the MDAG & ITP BR powerflow models; normally, those external areas are ~2 years old
    - Some external areas are not capturing wind resources from their GI Queue in a timely manner
- Proposed Improvements
  - For MEM, staff could review the ABB base data & determine additional generators to include for external areas
  - Current process is to model external areas as-is (~2 years old)
    - Staff could then feed those additional generators to the BR powerflow build, as identified & as necessary
    - Also, could be an exception process
      - For example, if staff finds a generator and determines it needs to be included, could bring to working group for inclusion approval
- Goal: Staff could better evaluate reliability and economic needs, especially along the seams
  - For BR powerflow, which would flow into MEM, staff could develop a better coordination process with external entities to obtain needed information that is more timely and/or up to date

Siting & Constraint Assessment

- Lots of spreadsheet work, correlation and ranking
  - Consider ways to restructure and/or automate the processes

2024 ITP SCOPE ASSUMPTION IMPROVEMENTS

Generation

- Integrated Resource Plans (IRPs)
- Reconsidering use of age-based retirements

Resource Planning

- GI Queue
- PTCs and Repowers
- Reserve Margin Assumptions
- Resource Planning Software

Load

- Electric Vehicles (light-duty and fleet) energy and demand
- High capacity factor load growth
- Other incremental electrification considerations

ECONOMIC MODELS & INPUTS
IMPROVEMENTS COMPLETED

Economic Models & Inputs

- **Process documentation efforts**
- **Automation**
  - **New DC tie automation** averages 3 years of historical data and shifts it so that it may be input into PROMOD
    - Work was previously done manually or with minimal automation
    - Value: Time savings (~40 hrs. per ITP study) & better data quality
  - **Enhanced solar profile modeling**
    - Previously had to force one hour to Pmax; received PROMOD update and automation was updated to remove proxy hour
    - Value: Improved data quality & accuracy
  - **MEM Benchmarking automation**
    - Utilized for all PROMOD simulations now
    - Provides critical benchmarking analysis results with visuals
    - Value: Time savings, improved data quality & additional reporting

NEEDS ASSESSMENT

NEEDS ASSESSMENT

BR Reliability & Short Circuit

- **Tariff** - Attachment O, Sections II.2.a.vi, II.5, III.1, III.2.c-d, III.6
- **ITP Manual** – Sections 1.4, 2.3.2, 4.2
- **NERC Standard TPL-001**

MP Reliability

- **Tariff** - Attachment O, Sections II.2.a.vi, II.5, III.1, III.2.c-d, III.6
- **ITP Manual** – Sections 1.4, 4.2.2
- **NERC Standard TPL-001**

Economic & Policy

- **Tariff** - Attachment O, Sections II.2.a.vi, II.5, III.1, III.2.c-d, III.6, III.7.g
- **ITP Manual** – Sections 1.3, 1.4, 1.3.1, 4.1.2, 4.3

Operational

- **Tariff** - Attachment O, Sections II.2.a.vi, III.6
- **ITP Manual** – Sections 1.4, 2.4, 4.4

NEEDS ASSESSMENT
IMPROVEMENTS COMPLETED

Preliminary violations posting

- Posted violations for early stakeholder feedback, including reactive settings, model corrections and op guides prior to needs assessment posting
  - Creates a more robust needs assessment posting
  - Value: Time savings (1-2 weeks), improved data quality, insight into stakeholder invalidation criteria & system constraints

ITP

PORTFOLIO DEVELOPMENT

PORTFOLIO DEVELOPMENT

DPP Window

- **Tariff** - Attachment O, Section III.6
- **ITP Manual** – Sections 2, 5.1, 5.1.1
- **SPP Business Practice 7650**

Solutions Development

- **Tariff** - Attachment O, Sections III.2
- **ITP Manual** – Section 5, 5.1.2
- **SPP Planning Criteria**

DPP Validation

- **Tariff** - Attachment O, Section III.6
- **ITP Manual** – Section 5.1.1

PORTFOLIO DEVELOPMENT – CONT.

Solutions Evaluation & Screening

- **Tariff** - Attachment O, Sections III
- **ITP Manual** – Sections 5.3
- **Scope**
- **NERC Standards**

Draft Portfolio Development

- **Tariff** - Attachment O, Section III
- **ITP Manual** – Section 6
- **Scope**
- **NERC Standards**
- **SPP Planning Criteria**

Study Cost Estimates

- **Tariff** - Attachment O, Sections
- **ITP Manual** – Section 5.2
- **Scope**
- **SPP Business Practice 7660**
- **NERC Standards**

PORTFOLIO DEVELOPMENT – CONT.

Planning Summit

- **Tariff** - Attachment O, Sections III.6 and III.7.e-f
- **ITP Manual** – Section 6.1

Final Portfolio Development

- **Tariff** - Attachment O, Section III.7
- **ITP Manual** – Section 6
- **Scope**
- **NERC Standards**
- **SPP Planning Criteria**

Optimization & Consolidation

- **Tariff** - Attachment O, Section III.7
- **ITP Manual** – Section 6.1.5 and 6.2
- **Scope**
- **NERC Standards**

PORTFOLIO DEVELOPMENT
PROPOSED IMPROVEMENTS

DPP Incentive Points & Criteria around it (Att. Y & BP 7650)

- **Current challenges**
  - Process currently causes a "shotgun" approach to DPP submittals, thus increasing the number of DPPs that have to be tracked and validated. Determining DPPs as "same or similar" takes a lot of time and involves some manual work
- **Proposed Improvements**
  - Move towards a participation model rather than incentive points for same or similar
- **Goal:** Awarding the DPP points would become much more streamlined and straightforward
- **Value:** Time savings for DPP intake, tracking and technical validation; would ultimately save time during solution evaluation through portfolio development, as fewer solutions to evaluate/screen; potentially more quality solutions
  - Note: Along with the Section 10.3 proposed updates and a different approach with MPMs, this additional effort would most likely provide us the additional time savings needed

PORTFOLIO DEVELOPMENT
IMPROVEMENTS COMPLETED

Other Automation Improvements

- Developed "some-to-some" tool which gave the user the flexibility to choose certain solutions to be evaluated on specific models and need types
  - Value: Improved analysis efficiency for the reliability solution evaluation; time savings
- Automation improvement which adds a flag when a solution effects a contingency
  - Value: Further analysis insight not previously available; time savings; better data accuracy
- Increased Enfuzion nodes to have more computational power to reduce the time for PROMOD runs
  - Value: Time savings (1-2 weeks depending on volume of PROMOD runs)

PORTFOLIO DEVELOPMENT
IMPROVEMENTS COMPLETED – CONT.

Other Automation Improvements

- Event File Builder for Constraint Assessment - takes in several input files to develop an event file
  - Value: Time savings (2 days), data quality and processing efficiency to reduce time; reduces human error
- Book of Flowgates - Takes Excel document and parses out the data to put it in the PROMOD-compatible format to save time for work previously done manually
  - Value: Time savings (2 days), data efficiency gained for reduction in human error
- Reliability Portfolio Development - Developed automation to create scenarios and reduce runtime
  - Value: Time savings (3 days)
- Sensitivity Analysis script to take the sensitivity model changes and created the input files for PROMOD; then sets up PROMOD batch file and then can be simulated
  - Value: Time savings (2 days), data efficiency gained for reduction in human error

FINAL ASSESSMENTS & REPORTING

FINAL ASSESSMENTS & REPORTING

Model Updates

- Apply final consolidated portfolio to models in order to perform final assessments

Staging

- **ITP Manual** – Sections 1.4, 6.3

Benefit Metrics

- **Tariff** - Attachment O, Section III.7.d.ii-iii
- **ITP Manual** – Section 1.4, 7.1
- **Benefit Metrics Manual**

FINAL ASSESSMENTS & REPORTING – CONT.

Sensitivity Analysis

- **Tariff** - Attachment O, Section III.7.d.iv
- **ITP Manual** – Sections 1.4, 7.2
- **Scope**

Final Reliability Assessment

- **ITP Manual** – Section 1.4, 6.4
- **NERC Standards**

Stability Assessment

- **Scope**

FINAL ASSESSMENTS & REPORTING – CONT.

Rate Impacts / ATRR

- **Tariff** - Attachment O, Section III.7.d.vi
- **ITP Manual** – Section 7

Report Development

- **Tariff** - Attachment O, Sections
- **ITP Manual** – Section 1.4, 8.1
- **Scope**

PORTFOLIO DEVELOPMENT
PROPOSED IMPROVEMENTS

Benefit Metrics

- **Current challenges**
  - Primarily spreadsheet work
- **Proposed Improvements**
  - Find ways to automate the different benefit metrics
- **Value:** Time savings and better data quality

SCRIPT / CPPTF

- Meetings have begun with SMEs/sub-teams to review processes and start identifying changes
  - Majority of those changes will automation or automation-centered in terms of schedule time savings
  - Automation proposed will be evaluated if there is a need to escalate earlier
  - Current plan is to begin incorporating SCRIPT automation and improvements when and where feasible into current study processes before CPP starts (e.g., common model)

NEXT STEPS

- Bring back summary of recommendations for further consideration to September TWG/ESWG
- Goal: October MOPC

SPP Southwest Power Pool

ITP Late Data Submission Form

Summary:	
Applicable ITP:	**Submission Date:**
SUBMITTER INFORMATION	
Name:	**Company:**
Email:	**Phone:**

DATA SUBMISSION TYPE
(to be filled out by the submitting entity)

Type of data change submission (select all that apply):

- ☐ Lines/Transformers (additions/removals)
- ☐ TSR (Unit specific)
- ☐ Impedance
- ☐ TSR (Fleet)
- ☐ Ratings
- ☐ Annual Energy
- ☐ Bus Load Allocation
- ☐ Annual Peak Load
- ☐ Conventional Generator Inclusion
- ☐ Non-Annual Peak Load Forecast (seasonal)
- ☐ Renewable Generation Inclusion
- ☐ Generator Dispatch Updates
- ☐ Capacitor Banks/Reactors
- ☐ Other - Explain:

OBJECTIVE OF LATE DATA REQUEST
(to be filled out by the submitting entity)

Explain the reason for the late data.

Describe the benefits that will be realized by including updated data in the requested ITP cycle instead of following the standard process of including in the next applicable ITP.

IMPACT ASSESSMENT SUMMARY

(to be filled out by SPP)

Impacted Areas

☐ Scope Impacts
Explain:

☐ Estimated Schedule Impacts
Explain:

☐ Estimated Cost Impacts
Explain:

☐ Other
Explain:

SPP Recommendation:

IMPACT ASSESSMENT
(to be filled out by SPP)

Impacted Processes/Milestones

☐ Scope or Schedule	☐ Siting Plan / Generator Outlet Facilities (GOFs)
☐ Base Reliability Powerflow Models	☐ Contingency File
☐ Generation Review	☐ Constraint Assessment
☐ Load Review	☐ Market Powerflow Models (MPM)
☐ Market Economic Models (MEM)	☐ Needs Assessment
☐ Renewable Policy Review	☐ Solution Development
☐ Resource Plan – Phases 1 & 2	☐ Other, explain:

TEAM SPECIFIC IMPACT ASSESSMENT
(to be filled out by SPP)

Each relavant SPP department must document any estimated impacts to scope, schedule, costs, or other relevant processes that are associated with this late data request.

Transmission Planning Impacts

Modeling Impacts

Compliance Impacts

Transmission Service Impacts

Generation Interconnection Impacts

Interregional Planning Impacts

Legal/Regulatory Impacts

Other

MARKET POWERFLOW MODEL STATUS UPDATE

JOSHUA PILGRIM

ESWG AUGUST 2022

MARKET POWERFLOW MODEL

- Market powerflow models (MPM) are an AC version of a specific one-hour snapshot of the market economic model (MEM)
- These models represent a realistic flow scenario for the SPP footprint, as opposed to the worst-case look provided by the base reliability models, as well as featuring different futures
- These models are used by multiple departments and for multiple sections of the ITP process
  - Needs assessment
  - TPL
  - Stability
  - Deliverability

BACKGROUND

- MPM models were struck from the 2021 ITP assessment as part of the further evaluation rebaseline
- They were also struck from the 2022 ITP entirely
- Current schedule for the 2023 ITP as presented and approved by MOPC assumes that they will be struck
- SPP staff and working groups committed to conducting additional analysis to determine if these models could be removed or handled differently

PROS AND CONS OF MPMS

- More viewpoints of the grid
- Used by other departments
- Helps guide NTCs in the ITP
- Validates the MEM and economic benefits of the portfolio
- Gives information on differences between futures

- Time-consuming model build
- Rarely drives NTCs by themselves
- Prone to causing schedule delays
- Current timeslot for building the models is congested

2022 APPROACH TO MPMS

- Removed from the needs assessment milestone
- Stability assessment was struck from the process
- Y1 model created for deliverability studies
- TPL Sensitivity Models were developed outside of the ITP

POTENTIAL COMPROMISES

- Detach MPMs from the needs assessment, removing them from the scheduling bottleneck
- Build only the MPMs required for our current processes:
  - Y1
  - Y2 Light/Summer, Y5 Summer
  - Y10 Light/Summer, Future 1 and Future 2
- Explore other options for creating sensitivity models for the grid

NEXT STEPS

- MPMs are being evaluated under the SCRIPT effort for the C3 Common Model Set Guidance Recommendation
- Determine if alternative methods of creating sensitivity models are viable

DISCUSSION

- Did losing the MPM models for 2022 cause any issues for stakeholders?
- Were the TPL sensitivity models satisfactory to use?

SPP Southwest Power Pool

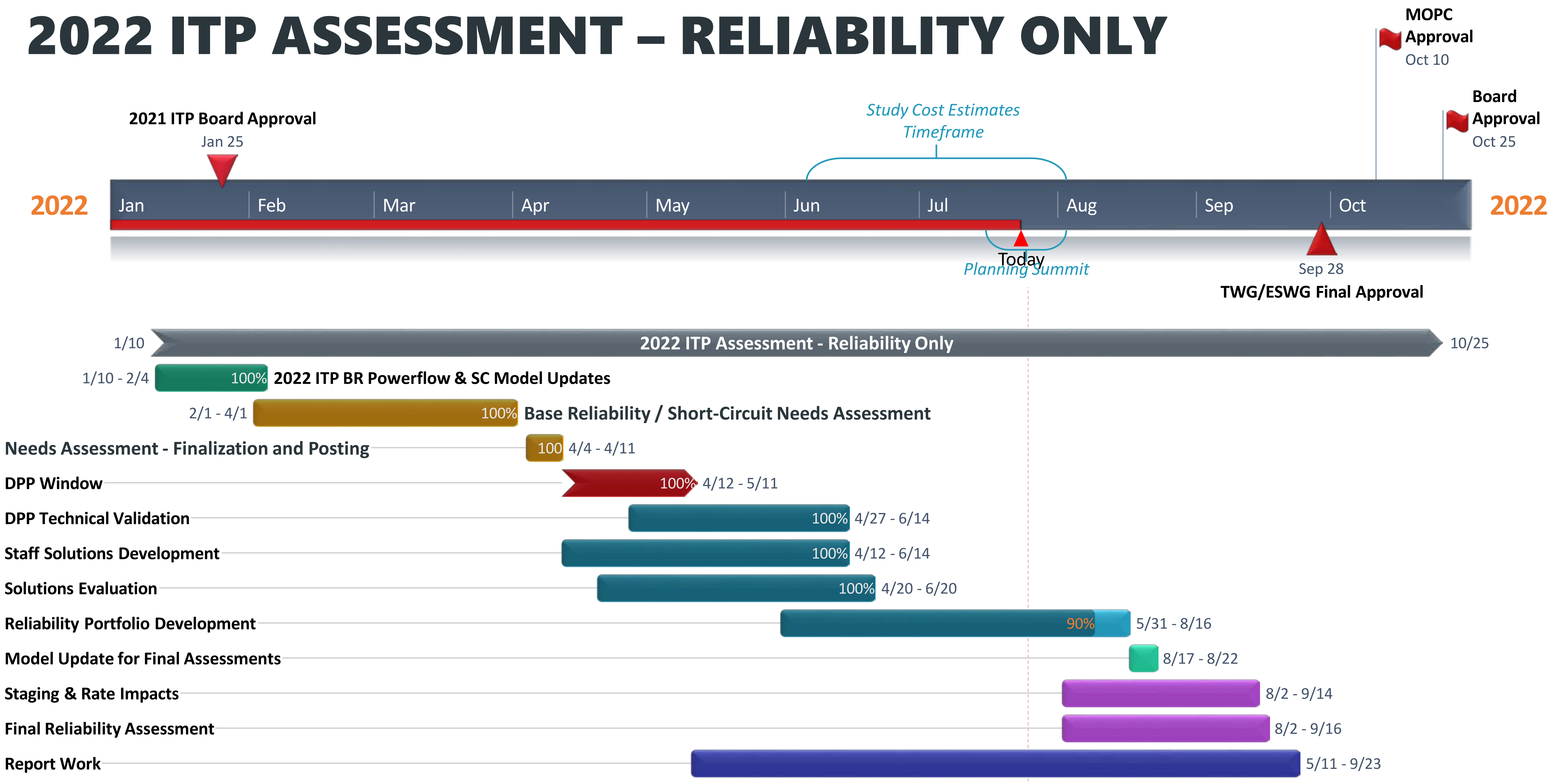
2022 **ITP**

SCHEDULE UPDATE

DARA SOLOMON

AUGUST 2022

2022 ITP ASSESSMENT – RELIABILITY ONLY



RELIABILITY PORTFOLIO DEVELOPMENT

- Start: 5/31/2022
- End: 8/16/2022

- Member Review Time:
  - TBD

- Staff Leader: Maurisa Hughes (mghughes@spp.org)

- Working Group Approval: TWG

STUDY COST ESTIMATES

- Start: June 9, 2022
- End: August 5, 2022

Batch	Day of Week	Date	Event
1	Thursday	6/9/2022	Study Cost Window opens/Batch 1 of requests is sent to T.O.s
	Friday	7/8/2022	Batch 1 estimates are due from T.O.s in TRAC
2	Thursday	6/23/2022	Batch 2 of requests is sent to T.O.s
	Friday	7/22/2022	Batch 2 estimates are due from T.O.s in TRAC
3	Thursday	7/7/2022	Batch 3 of requests is sent to T.O.s
	Friday	8/5/2022	Batch 3 estimates are due from T.O.s in TRAC

- Staff Leader: John O'Dell (jodell@spp.org)

PLANNING SUMMIT (COMPLETE)

- Start: July 20 2022
- End: July 21 2022

- Staff Leader: Tammy Bright (tbright@spp.org)

MODELING UPDATES FOR FINAL ASSESSMENTS

- Start: 8/17/2022
- End: 8/22/2022

- Staff Leader: David Duhart (dduhart@spp.org)

PROJECT STAGING

- Start: 8/2/2022
- End: 8/30/2022

- Member Review Time:
  - TBD

- Staff Leader: Josh Pilgrim (jpilgrim@spp.org)
- Working Group Approval: TWG

FINAL RELIABILITY ASSESSMENT

- Start: 8/17/2022
- End: 9/6/2022

- Member Review Time:
  - TBD

- Staff Leader: Maurisa Hughes (mghughes@spp.org)
- Working Group Approval: TWG

RATE IMPACTS/ATRR

- Start: 9/1/2022
- End: 9/14/2022

- Staff Leader: Susanna Padilla (spadilla@spp.org)/Krishada Watson (kwatson@spp.org)
- Working Group Approval: TWG

FINAL REPORT

- Start: 5/11/2022
- End: 9/22/2022

- Member Review Time:
  - Final Report (posting 9/23/22): 9/23/2022 – 9/28/2022 (5 days)

- Staff Leader: Tammy Bright (tbright@spp.org)

TWG/ESWG FINAL APPROVALS

- Start: 9/21/2022
- End: 9/28/2022

- Member Review Time:
  - Final Approval (posting 9/21/22): 9/22/2022 – 9/28/2022 (5 days)

- Staff Leaders:
  - TWG – Sherri Maxey (smaxey@spp.org)
  - ESWG – Joshua Norton (jnorton@spp.org)

MOPC AND SPP BOARD

- MOPC: 10/10-11/2022
- SPP Board: 10/25/2022

CONTACT INFO

Dara Solomon, SPP Staff

dsolomon@spp.org

SPP Southwest Power Pool

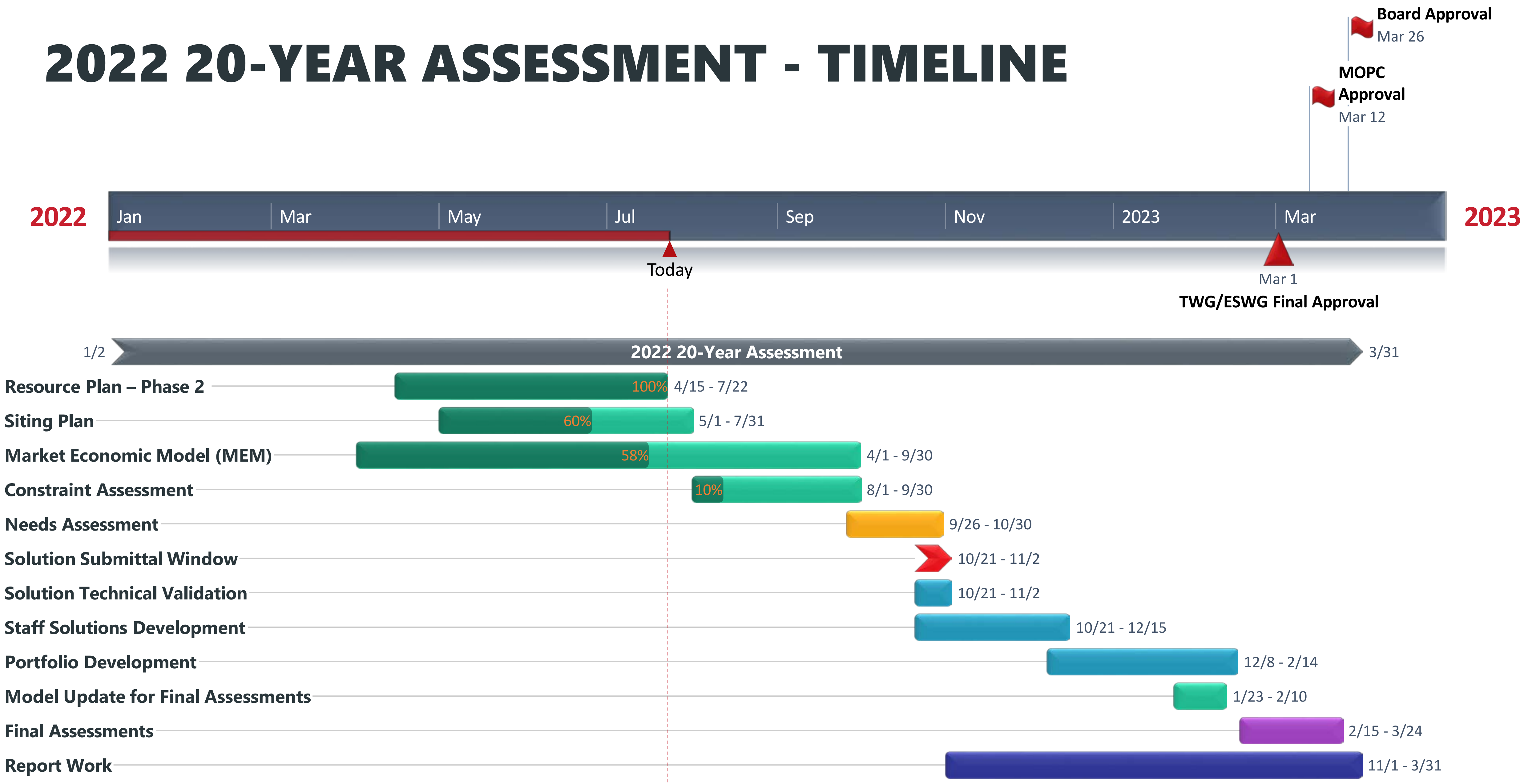
20-YEAR ASSESSMENT

SCHEDULE UPDATE

DARA SOLOMON

AUGUST 2022

2022 20-YEAR ASSESSMENT - TIMELINE



RESOURCE PLAN – PHASE 2 (COMPLETE)

- Start: 4/15/2022
- End: 7/22/2022
- Staff Leader: Matt Jackson(mwjackson@spp.org)/Krishada Watson (kwatson@spp.org)
- Working Group Approval: ESWG

SITING PLAN

- Start: 5/01/2022
- End: 7/31/2022

- Member Review Time:
  - TBD

- Staff Leader: Joshua Norton (jnorton@spp.org)
- Working Group Approval: ESWG

MARKET ECONOMIC MODEL (MEM) BUILD

- Start: 4/01/2022
- End: 9/30/2022

- Member Review Time:
  - TBD

- Staff Leader: Brooke Keene (bkeene@spp.org)
- Working Group Approval: ESWG

CONSTRAINT ASSESSMENT

- Start: 8/01/2022
- End: 9/30/2022

- Member Review Time:
  - TBD

- Staff Leader: Joshua Pilgrim (jpilgrim@spp.org)
- Working Group Approval: ESWG

CONTACT INFO

Dara Solomon, SPP Staff

dsolomon@spp.org

SPP Southwest Power Pool

2023 **ITP**

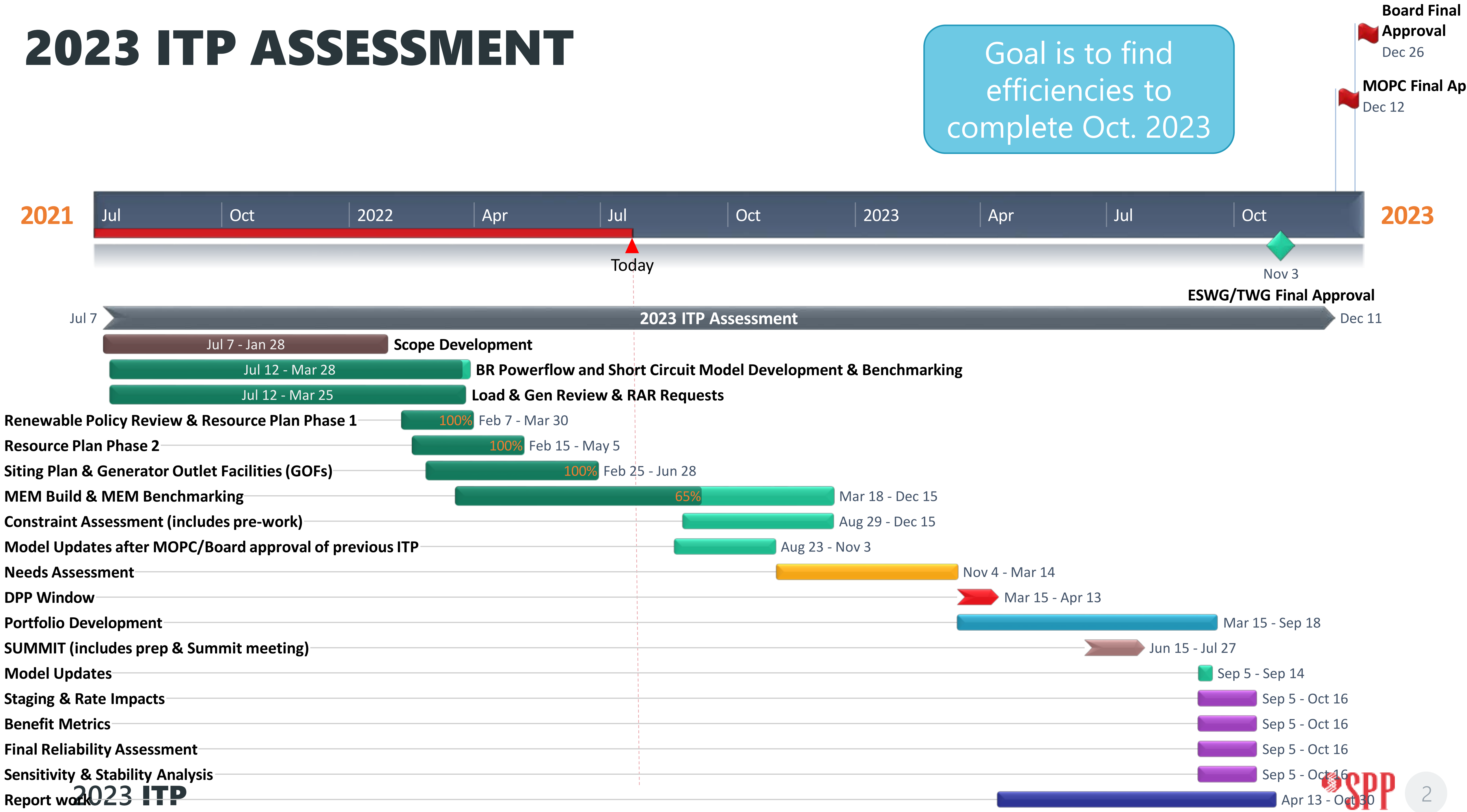
SCHEDULE UPDATE

DARA SOLOMON

AUGUST 2022

2023 ITP ASSESSMENT

Goal is to find efficiencies to complete Oct. 2023



BASE RELIABILITY POWERFLOW & SHORT CIRCUIT MODELS

- Start: 7/06/2020
- Initial Final Approval: 3/28/2022 (BR & Short-Circuit)
- BR Powerflow & SC – Initial Final Approval: 3/30-31/2022 (TWG)
- BR Power & SC – Final Final Approval: Nov. 2022 (TWG)

- Member Review Time:
  - *Pass 0 – Trial 1 (Posting: 7/12/2021): 7/12/2021 – 7/23/2021 (5 days)*
  - *Pass 1 – Trial 1 (Posting: 9/10/2021): 9/13/2021 – 10/1/2021 (15 days)*
  - *Pass 1 – Trial 2 (Posting: 10/29/2021): 10/29/2021 – 11/26/2021 (3 days)*
  - *Final Submission Deadline: 11/29/2021**
  - *Pass 2 – BR Powerflow (Posting: 1/28/2022): 1/28/2022 – 2/18/2022 (15 days)*
  - *Pass 2 – SC (Posting: 1/31/2022): 1/31/2022 – 2/18/2022 (14 days)*
  - *Pre-Initial Final Initial ITP (Posting: 3/4/2022): 3/4/2022 – 3/11/2022 (5 days)*
  - *Initial Final BR Powerflow TWG Approval (Posting: 3/18/2021): 3/21/2022 – 3/28/2022 (5 days)*
  - *Initial Final Short-Circuit TWG Approval (Posting: 3/18/2021): 3/21/2022 – 3/28/2022 (5 days)*
  - *Initial Final BR Powerflow TWG Approval requested via email: 3/28/2022*

- Staff Leader: Hugh Benfer (hbenfer@spp.org)
- Working Group Approval: TWG

* Data Submitters – Final Submission of Generator Additions, Retirements, Pmin & Pmax, Loads, and Interchange Corrections through MOD & EDST

GENERATOR OUTLET FACILITIES (GOFS) (COMPLETE)

- Start: 2/07/2022
- End: 6/28/2022
- Member Review Time:
  - *TWG Review (posting: 4/25): 4/26/2022 – 5/03/2022 (5 days)*
  - TWG Review (posting: 5/31): 6/01/2022 – 6/07/2022 (5 days)
  - GOFs Review for Approval (posting: 6/10): 6/13/2022 – 6/17/2022 (5 days)
  - GOFs Request for motion to approval via email: 6/20/2022
- Staff Leader: Spencer Magby (smagby@spp.org)
- Working Group Approval: TWG

MARKET ECONOMIC MODEL (MEM) BUILD

- Start: 3/18/2022
- End: 12/15/2022

- Member Review Time:
  - MEM Pass 1 – Year 2 for Review (Posting: 6/3/2022): 6/3/2022 – 6/8/2022 (5 days)
  - MEM Pass 1 – Year 2 for Approval (Posting: 6/21/2022): 6/21/2022 – 6/27/2022 (5 days)
    - Email vote for approval: 6/25/2022 – 7/1/2022
  - MEM – Years 5/10: for Review (Posting: 10/4/22): 10/4/2022 – 10/11/2022)

- Staff Leader: Charlton Hill (chill@spp.org)
- Working Group Approval: ESWG

MARKET ECONOMIC BENCHMARKING

- Start: 7/01/2022
- End: 9/07/2022 (Members' Final Approval)
- Member Review Time:
  - Pass 1: 7/25/2022 – 7/25/2022 (5 days)
  - Pass 2: Post for ESWG Final Review: 8/24/2022 (5 days)
  - Pass 2: ESWG Request for Approval : 9/7/2022

- Staff Leader: Charlton Hill (chill@spp.org)
- Working Group Approval: ESWG

CONSTRAINT ASSESSMENT

- Start: 8/29/2022
- End: 12/15/2022

- Member Review Time:
  - TBD

- Staff Leader: Maurisa Hughes (mghughes@spp.org)
- Working Group Approval: ESWG

NEEDS ASSESSMENT

- Start: 11/04/2022
- End: 3/14/2023

- Member Review Time:
  - Needs Assessment scheduled to post 3/14/2023

- Staff Leaders:
  - Economic & Policy Needs: Spencer Magby (smagby@spp.org)
  - Reliability Needs: Greg Lampley (glampley@spp.org)
  - Short-Circuit Needs: Nathan Bean (nbean@spp.org)

DETAILED PROJECT PROPOSAL (DPP) WINDOW

- Start: 3/15/2023 12:00 a.m.
- End: 4/13/2023 11:59 p.m.

- Member Review Time:
  - Transmission-planning response window (30 calendar days)

- Staff Leader: Tammy Bright (tbright@spp.org)

DPP TECHNICAL VALIDATION

- Start: 3/30/2023
- End: 5/16/2023

- Staff Leader: Krishada Watson (kwatson@spp.org)

SOLUTIONS DEVELOPMENT

- Start: 3/15/2023
- End: 5/16/2023

- Staff Leader: Drake Hill (dhill@spp.org)

SOLUTIONS EVALUATION

- Start: 3/20/2023
- End: 5/22/2023

- Staff Leaders:
  - Reliability: Josh Pilgrim (jpilgrim@spp.org)
  - Economic & Policy: Ahmed Alazzawi (aalazzawi@spp.org)
  - Short Circuit: Nathan Bean (nbean@spp.org)

PORTFOLIO DEVELOPMENT (INCLUDING OPTIMIZATION AND CONSOLIDATION)

- Start: 5/5/2023
- End: 9/08/2023

- Member Review Time:
  - TBD

- Staff Leaders:
  - Reliability: Greg Lampley (glampley@spp.org)
  - Economic & Policy: Maurisa Hughes (mghughes@spp.org)
  - Consolidation: Antonio Barber (abarber@spp.org)

- Working Group Approval: ESWG/TWG

STUDY COST ESTIMATES

- Start: May 2023 (specific date TBD)
- End: July 2023 (specific date TBD)

- Staff Leader: John O’Dell (jodell@spp.org)

PLANNING SUMMIT

- Start: June 2023 (specific date TBD)
- End: July 2023 (specific date TBD)

- Staff Leader: Tammy Bright (tbright@spp.org)

MODELING UPDATES FOR FINAL ASSESSMENTS

- Start: 9/05/2023
- End: 9/08/2023

- Staff Leader: Hugh Benfer (hbenfer@spp.org)
- Working Group Approval: TWG

PROJECT STAGING

- Start: 9/09/2023
- End: 9/21/2023

- Member Review Time:
  - TBD

- Staff Leader: Krishada Watson (kwatson@spp.org)
- Working Group Approval: TWG/ESWG

FINAL RELIABILITY ASSESSMENT

- Start: 9/05/2023
- End: 10/16/2023

- Member Review Time:
  - TBD

- Staff Leader: Joshua Pilgrim (jpilgrim@spp.org)
- Working Group Approval: TWG

SENSITIVITY ANALYSIS

- Start: 9/05/2023
- End: 10/16/2023

- Member Review Time:
  - TBD

- Staff Leader: Spencer Magby (smagby@spp.org)
- Working Group Approval: ESWG

STABILITY ANALYSIS

- Start: 9/05/2023
- End: 10/16/2023

- Member Review Time:
  - TBD

- Staff Leader: Greg Lampley (glampley@spp.org)
- Working Group Approval: TWG

RATE IMPACTS/ATRR

- Start: 9/22/2023
- End: 10/16/2023

- Member Review Time:
  - TBD

- Staff Leader: Susanna Padilla (spadilla@spp.org)
- Working Group Approval: ESWG/TWG

FINAL REPORT

- Start: 4/13/2023
- End: 10/30/2023

- Member Review Time:
  - TBD

- Staff Leader: Tammy Bright (tbright@spp.org)
- Working Group Approval: ESWG/TWG

TWG/ESWG FINAL APPROVALS

- Start: TBD
- End: TBD

- Member Review Time:
  - *Note: Staff is reviewing for time-savings to pull in 2023 ITP to complete in October 2023*

- Staff Leaders:
  - TWG – Sherri Maxey (smaxey@spp.org)
  - ESWG – Joshua Norton (jnorton@spp.org)

MOPC AND SPP BOARD

- MOPC & SPP Board: TBD

- *Note: Staff is reviewing for time-savings to pull in 2023 ITP to complete in October 2023*

CONTACT INFO

Dara Solomon, SPP Staff
dsolomon@spp.org

Southwest Power Pool

ITP

WIND AND SOLAR CAPACITY FACTOR BENCHMARKING

BEN MITCHELL

BENCHMARKING OBJECTIVES AND CONSIDERATIONS

Objectives

- Benchmark wind and solar capacity factors
  - NREL toolkit capacity factors as an input
  - Output capacity factors from PROMOD simulation
  - Operational capacity factors
- QA updated profile automation

Considerations

- 5 Solar Facilities
- 24 Wind Facilities
- 2019, 2020, and 2021 Operational Capacity Factors (potential, no curtailments included)
- NREL Solar Integration National Dataset (SIND) and WIND Toolkit outputs
  - Solar Integration National Dataset Toolkit
  - Wind Integration National Dataset Toolkit
- ITP Adjustments (hub height)
- PROMOD Outputs (calculated based on hours in simulation)

NREL TOOLKIT

- Widely used across the industry
- More than 126,000 sites from 2007-2013 are utilized
- 2012 profiles
- WIND Toolkit assumes 100 meter hub heights

Profile Specifics

- Input longitude and latitude for each site
- Search radius for wind: 75 miles
- Search radius for solar: 35 miles
- Averages top 3 sites within the smallest radius to calculate capacity factor and create hourly profile

This 10-year old dataset is acceptable to use because while weather patterns have changed, they have changed in a consistent manner. The changes are not significant enough to warrant a change in data source at this time.

CURRENT PROCESS

- Calculate annual energy as an input into PROMOD based on solar capacity factors output by SIND toolkit
- Calculate annual energy as an input into PROMOD based on wind capacity factors output by WIND toolkit
  - Reduce capacity factor by 5% for units that have an 80m hub height

Annual Energy = Capacity Factor * Maximum Capacity * Hours in Study Year (8760/8784)

BENCHMARKING SPECIFICS

Unit Selection

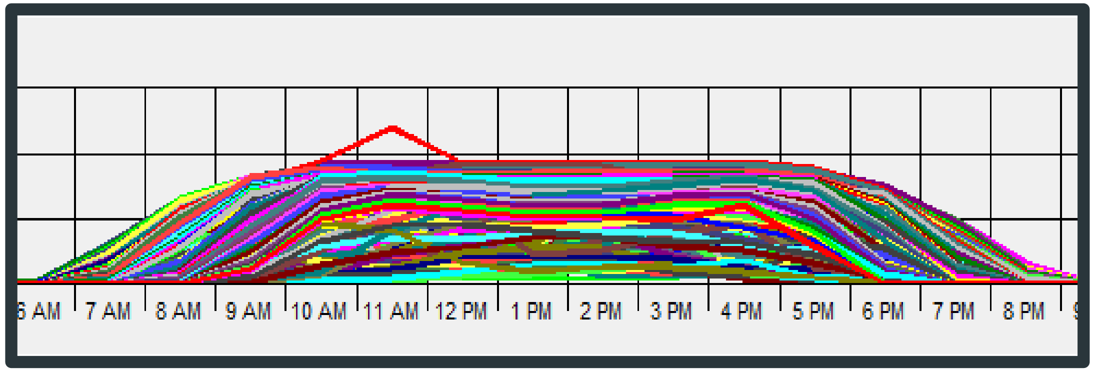
- 80 meter and 100 meter hub heights
- Distributed across SPP region
- Facilities with 3 full years of operational data

Simulated economic model with copper plate (blank) event file

Capacity Factor Data

- Wind and solar potential from Operations – prior to curtailments
  - Calculated capacity factor based on hours of data available per year
- NREL toolkit output capacity factors
- Considered modifications for hub heights in NREL capacity factors to obtain input capacity factor
- Calculated capacity factor based on output energy from simulation considering hours in year (2024 is a leap year)

AUTOMATION ENHANCEMENT



One hour of year forcing to Maximum Capacity

- NREL Solar profiles rarely (never) reach maximum capacity
  - *"Internal plant losses are assumed and the toolkit output reflects the DC nameplate (plant side of the inverter) rather than AC nameplate (grid side)" – NREL contact*
- In previous versions of PROMOD, without the profile reaching maximum capacity any hour, PROMOD would scale up all hours such that the maximum capacity was reached
  - Increasing annual energy, increasing capacity factor
  - Do not scale option is now available
- The workaround was to force a single hour within the automation to its maximum capacity
  - That functionality has been removed from automation, as it is now unnecessary

80M WIND RESULTS

Generator Name	Max Capacity	Operational Capacity Factor			Operational Average	NREL	Modified NREL	Simulation Output	Difference
		2019	2020	2021					
Wind Farm #1 (KS)	99	0.49	0.52	0.43	0.48	0.47	0.42	0.45	-3%
Wind Farm #2 (NM)	80	0.46	0.39	0.39	0.41	0.44	0.39	0.42	0.3%
Wind Farm #3 (IA)	10.5	0.36	0.39	0.37	0.37	0.46	0.41	0.43	5%
Wind Farm #4 (OK)	100	0.39	0.37	0.40	0.39	0.48	0.43	0.46	7%
Wind Farm #5 (TX)	78.2	0.46	0.48	0.47	0.47	0.42	0.37	0.40	-8%
Wind Farm #6 (OK)	120	0.33	0.33	0.26	0.31	0.45	0.40	0.47	16%
Wind Farm #7 (KS)	249.3	0.34	0.36	0.35	0.35	0.50	0.45	0.47	12%
Wind Farm #8 (NE)	60	0.39	0.37	0.40	0.39	0.47	0.42	0.44	6%
Wind Farm #9 (MN)	44.6	0.36	0.41	0.40	0.39	0.50	0.45	0.47	8%
Wind Farm #10 (KS)	244	0.49	0.49	0.48	0.49	0.47	0.42	0.44	-5%
Wind Farm #11 (KS)	200	0.47	0.48	0.45	0.46	0.45	0.40	0.42	-5%
Wind Farm #12 (NE)	155	0.42	0.47	0.42	0.43	0.46	0.41	0.43	0.0%
Average Difference									2.87%

Capacity factors have 3% higher potential in our economic simulations when compared to 3 years of historical operational data.

100M WIND RESULTS

Generator Name	Max Capacity	Operational Capacity Factor			Operational Average	Simulation Input	Simulation Output	
		2019	2020	2021		NREL		Difference
Wind Farm #13 (MN)	75	0.49	0.50	0.48	0.49	0.47	0.50	1%
Wind Farm #14 (KS)	200	0.46	0.44	0.46	0.46	0.46	0.48	3%
Wind Farm #15 (NE)	203	0.43	0.49	0.46	0.46	0.48	0.50	4%
Wind Farm #16 (OK)	198	0.47	0.47	0.47	0.47	0.47	0.50	3%
Wind Farm #17 (ND)	150	0.46	0.50	0.46	0.47	0.48	0.51	3%
Wind Farm #18 (OK)	74	0.52	0.49	0.52	0.51	0.48	0.51	0%
Wind Farm #19 (OK)	100	0.30	0.30	0.26	0.29	0.48	0.51	22%
Wind Farm #20 (NM)	50	0.50	0.50	0.46	0.49	0.43	0.46	-3%
Wind Farm #21 (OK)	149	0.45	0.45	0.45	0.45	0.48	0.51	5%
Wind Farm #22 (MO)	200	0.42	0.40	0.43	0.42	0.43	0.45	4%
Wind Farm #23 (OK)	300	0.37	0.38	0.39	0.38	0.46	0.49	11%
Wind Farm #24 (KS)	250	0.41	0.44	0.41	0.42	0.43	0.45	2%
Average Difference								4.64%

Capacity factors have 5% higher potential in our economic simulations when compared to 3 years of historical operational data.

SOLAR OBSERVATIONS

Generator Name	Max Capacity	Operational Capacity Factor			Operational Average	Simulation Input	Simulation Output	
		2019	2020	2021		NREL		Difference
Solar Facility #1 (NM)	25	0.30	0.30	0.30	0.30	0.24	0.24	-6%
Solar Facility #2 (NM)	90.8	0.31	0.32	0.30	0.31	0.24	0.25	-7%
Solar Facility #3 (NM)	2	0.35	0.51	0.33	0.40	0.24	0.25	-15%
Solar Facility #4 (NM)	70	0.31	0.35	0.32	0.33	0.24	0.25	-8%
Solar Facility #5 (NM)	50.2	0.22	0.25	0.24	0.24	0.24	0.25	1%
Average Difference								-6.9%

Capacity factors have 7% less potential in our economic simulations when compared to 3 years of historical operational data.

SOLAR CAPACITY FACTOR MODIFICATIONS

- Performed 3 sensitivities to address solar facilities not reaching maximum capacity in PROMOD simulations
  - 7% increase in solar capacity factors
  - 10% increase in solar capacity factors
  - 15% increase in solar capacity factors
- Compared hours in range between sensitivities and operational hourly data
- Similar behavior observed from other solar facilities

Roswell Solar (Maximum Capacity: 70MW)

Range	Percentage of Hours in Range			No Modification to Capacity Factor	Increase in Capacity Factor		
	2019	2020	2021		7%	10%	15%
0-10 MW	57%	55%	56%	57%	56%	56%	55%
10-20 MW	5%	4%	5%	5%	4%	4%	3%
20-40 MW	7%	5%	7%	16%	8%	7%	6%
40-60 MW	13%	12%	12%	22%	20%	14%	9%
above 60 MW	18%	24%	19%	0%	12%	19%	26%

Annual Energy (MWh)

Operations			PROMOD Simulation			
2019* (8748 hours)	2020* (8781 hours)	2021* (8637 hours)	Original Annual Energy	7%	10%	15%
190,315	214,861	191,682	146,043	189,084	207,531	238,275

*Operational data contained missing records

RECOMMENDATION

- Staff recommends adding additional 10% to NREL toolkit output solar capacity factors to better align with operational capacity factors and hourly profiles
  - To be implemented in 2023 ITP and future studies
- No changes are recommended for wind capacity factors

SCOPE AND STUDY EXECUTION ACTION ITEMS

SHERRI MAXEY

ESWG AUGUST 2022

OVERVIEW

- Staff's Approach
- Action Items identified – Updates shown in red; completed items in green
- Data source

STAFF’S APPROACH

- Purpose: Identify 20-Year Assessment scope and study execution items to be addressed with stakeholders
- Action: Take chronological approach by ITP study milestone
- Goal: Bring back 1-2 months prior to start of milestone work for stakeholder discussion and decision

ACTION ITEMS

ID	Description	Milestone(s)	Status Update
1	Load growth distribution and approach to non-conforming load (partial overlap with item 2)	Powerflow Models / Load Review	*Completed*
2	Implementing future drivers in generation and load review, and market economic model (MEM) Supply side items: ➢ Emissions target and gas retirements (F3/F4), modeling and monitoring ➢ Electric storage additions - transmission, energy or capacity asset, or all of the above? ✓ Distributed resource forecasts and modeling ✓ Fuel forecasts extrapolation and adjustments Demand side items: ✓ Load shape changes (will complete in MEM) ✓ General electrification (*e.g.*, 20YR - F3/F4) ✓ Electric vehicle growth and distribution ✓ Demand response ✓ Energy efficiency	Generation and Load Review / Resource Plan (RP2) / MEM	*Completed*
3	Renewable policy extrapolation	Renewable Policy Review	*Completed*

ACTION ITEMS - CONTINUED

ID	Description	Milestone(s)	Status Update
4	Renewable pricing and PTC assumptions/expirations for new and existing units	Gen Review / RP2 / Siting	*Completed – related language added to 2023 ITP Scope*
5	Wind methodology for aging wind fleet (repowering assumptions)	Gen Review	*Completed*
6	Possible use of resource planning software in 20-Year Assessment; or should we adjust the traditional resource additions?	RP2	*Completed – will be using resource planning software*
7	Resource Plan strategy for renewables: • Renewable and storage ownership • ELCC implementation (renewable accreditation)	RP2	*Completed*
8	Identification of additional batteries beyond F1 and F2 scoped amounts (requires Scope change); including hybrid issues	RP2	*Completed*
9	External region resource plan and siting approaches	RP2	*Completed – considered complete once Item #13 was approved (using MTEP 21)*

ACTION ITEMS - CONTINUED

ID	Description	Milestone(s)	Status Update
10	Review 12% cap on renewables for reserve margin requirements	RP2	*Completed*
11	Determine resource addition strategy	Siting / Generator Outlet Facilities (GOFs) / Constraint Assessment	*Completed*
12	EPRI transmission capacity hosting tool/SPP initiative for siting	Siting / GOFs / Constraint Assessment	*Completed*
13	MTEP Futures compatibility (2022 ITP & 20YA)	External (Load & Gen Review / RP2 / Siting)	*Completed*
14	Hybrid Solar/Renewable and Battery Modeling and GI Surplus Capacity	Siting / MEM	*Completed*
15	Generator outlet facilities (GOFs) decision on inclusion in 20-Year Assessment	GOFs	*Completed*
16	Constraint Assessment on each future; come up with EHV portfolio; monitor everything 100 kV and above? Bring methodology back for review.	Constraint Assessment	

ACTION ITEMS - CONTINUED

ID	Description	Milestone(s)	Status Update
17	20-Year objective function for developing portfolios by future • Approaches to non-SPP APC savings benefits (*e.g.*, SPP-Other, SPP economy export APC savings benefits to non-SPP regions) • Approach to seams issues and solutions	Portfolio Development	
18	HV and EHV needs versus HV and EHV solution tradeoffs	Portfolio Development	
19	Identification of sensitivities	Sensitivity Analysis	

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20-YEAR ASSESSMENT

20YA F3&4 SITING

JOSHUA NORTON

AUGUST 2022

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

SouthwestPowerPool

SPPorg

southwest-power-pool

20-YEAR ASSESSMENT SITING SUMMARY

- Posted to Globalscape on July 28
- F3&4 plan builds off of the F2 siting plan which has been approved
  - Remaining 12 GW of wind was sited at top 15% ranked sites in the region by ratio of transfer capability for a total of 62GW in F3/4
  - Remaining 38GW of solar was allocated to areas by load ratio share. Each area's top ranked sites received ratio of transfer capability. F3/4 solar total = 65GW

RECOMMENDATION

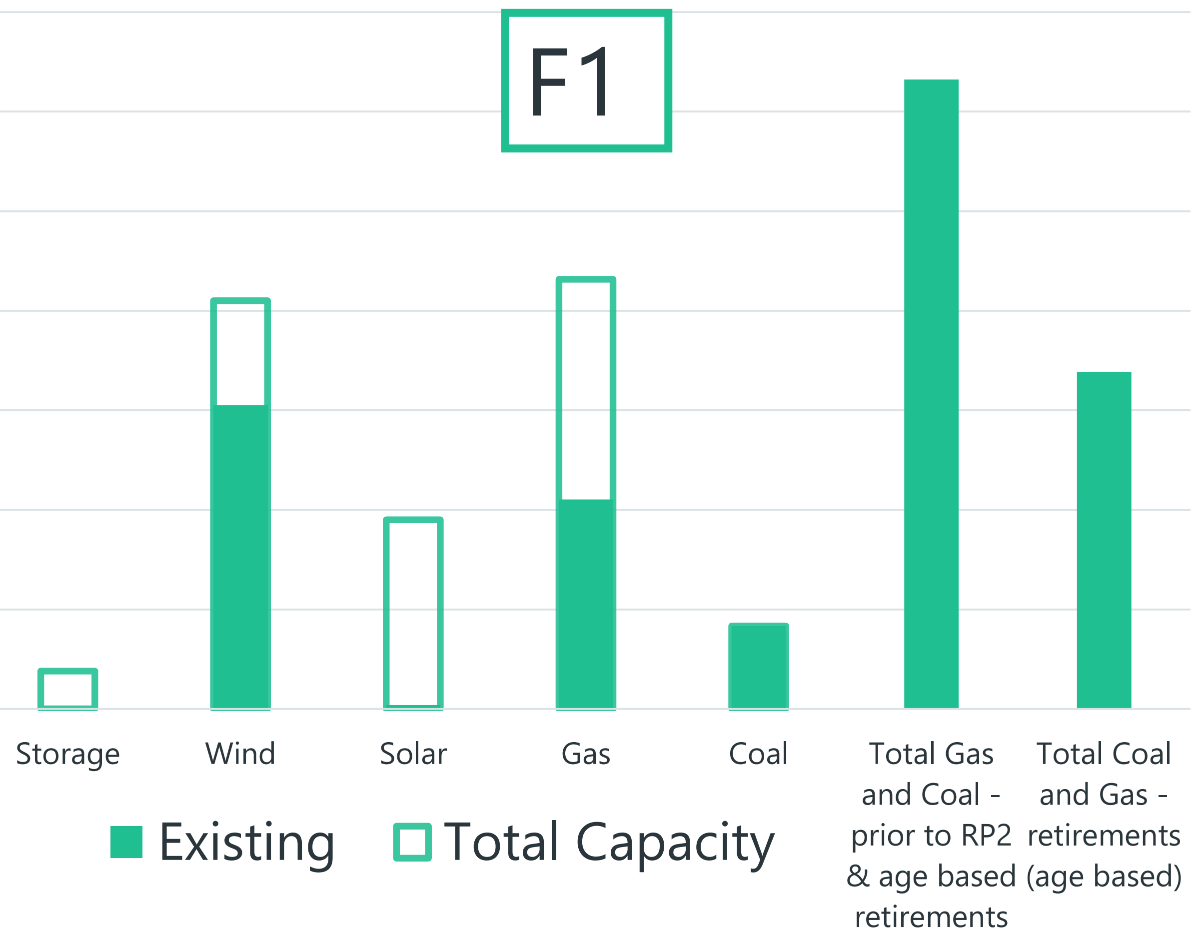
- SPP staff recommends ESWG approve the 20YA F3&4 siting plan

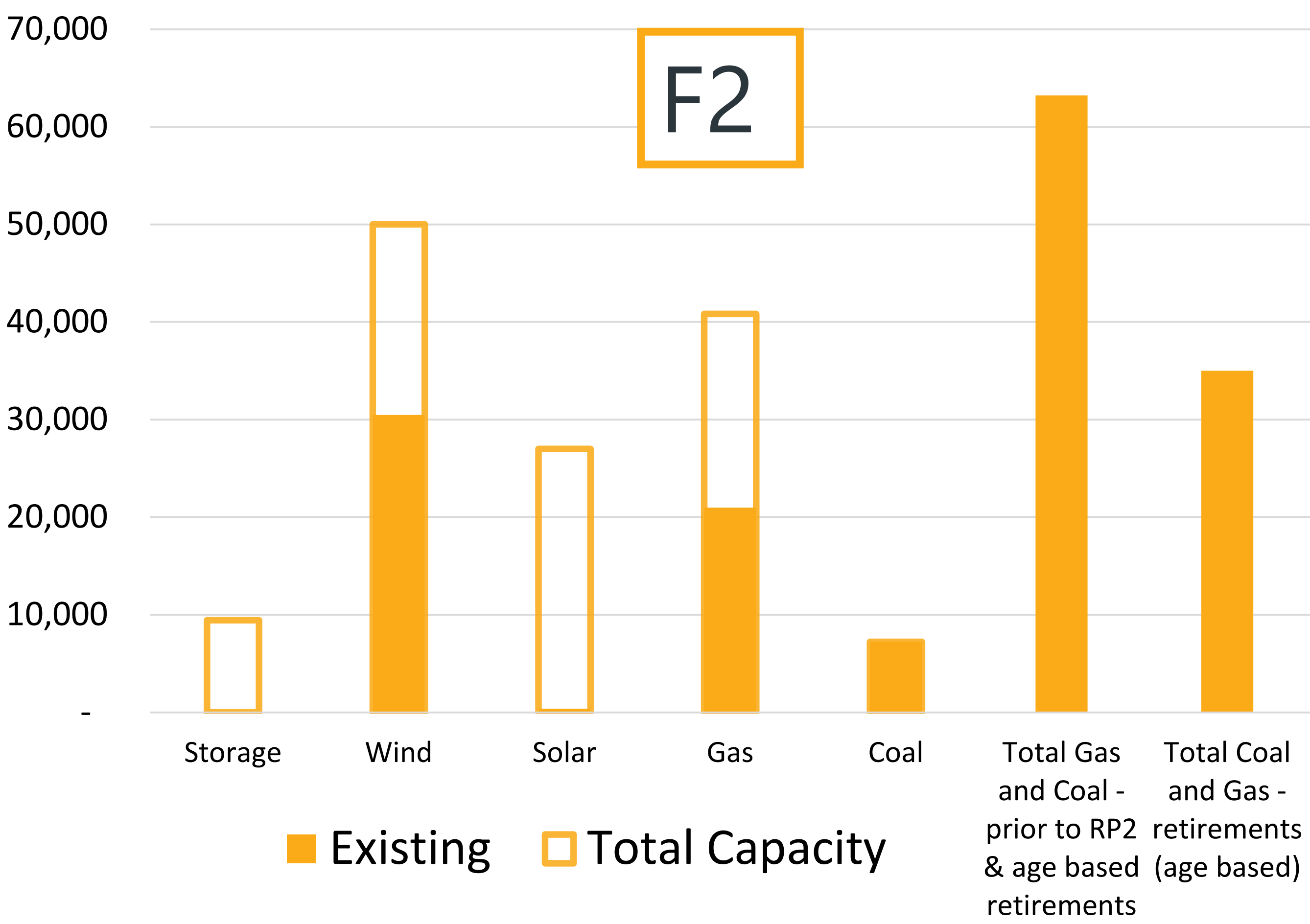
MARKET ECONOMIC MODELS (MEMS) UPDATE

BROOKE KEENE

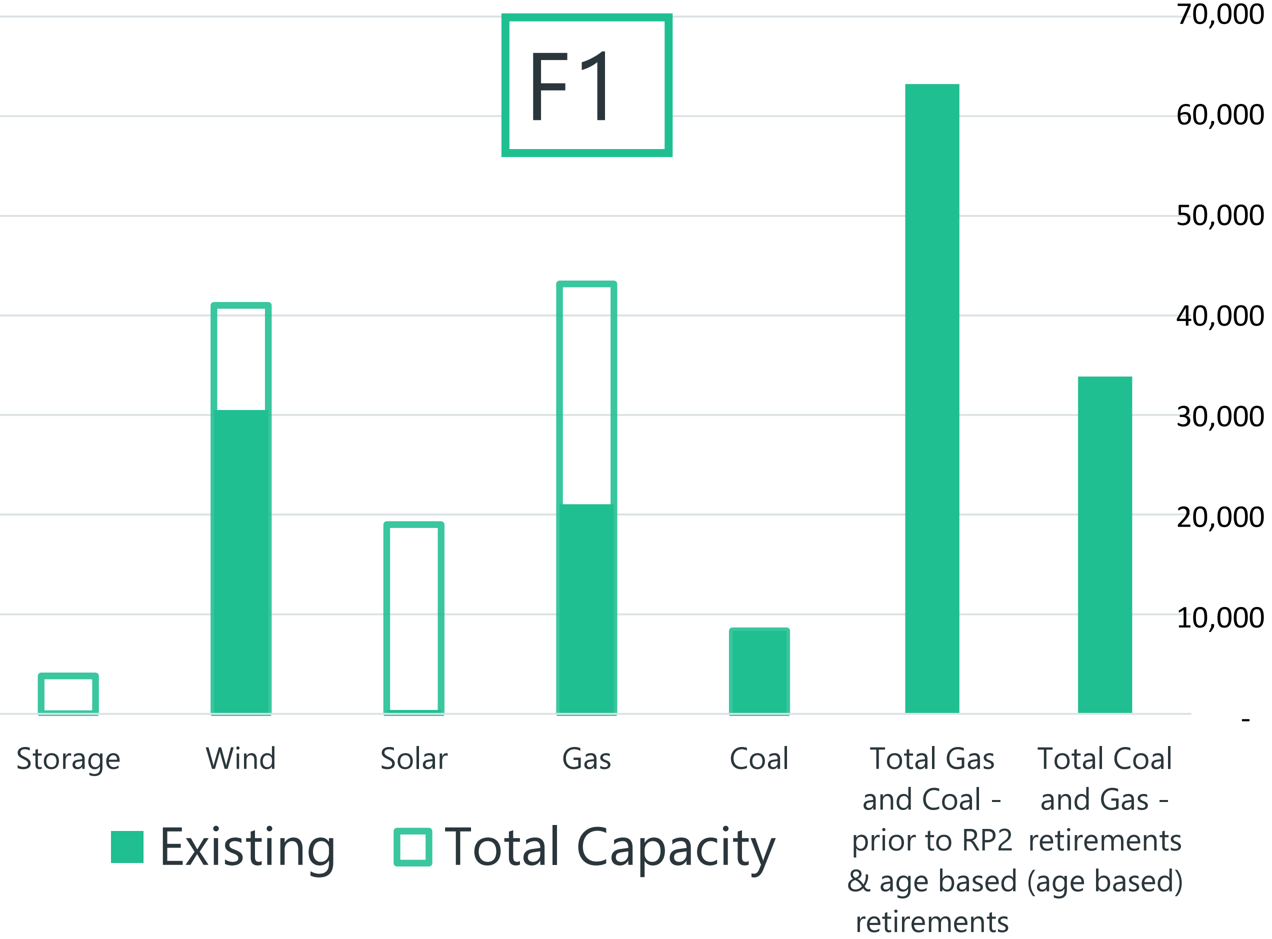
ESWG AUGUST 2022

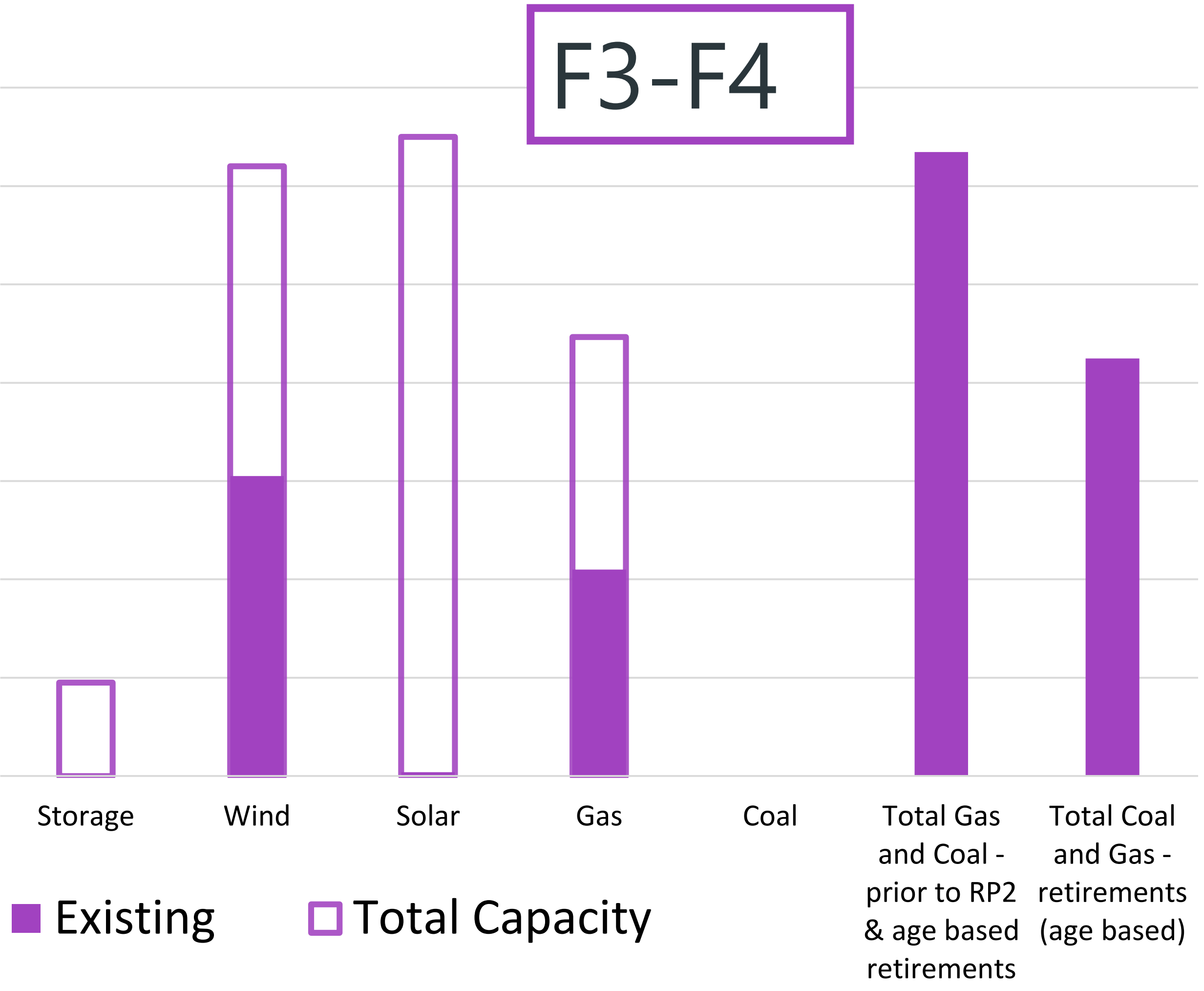
F1/F2 TOTAL CAPACITIES



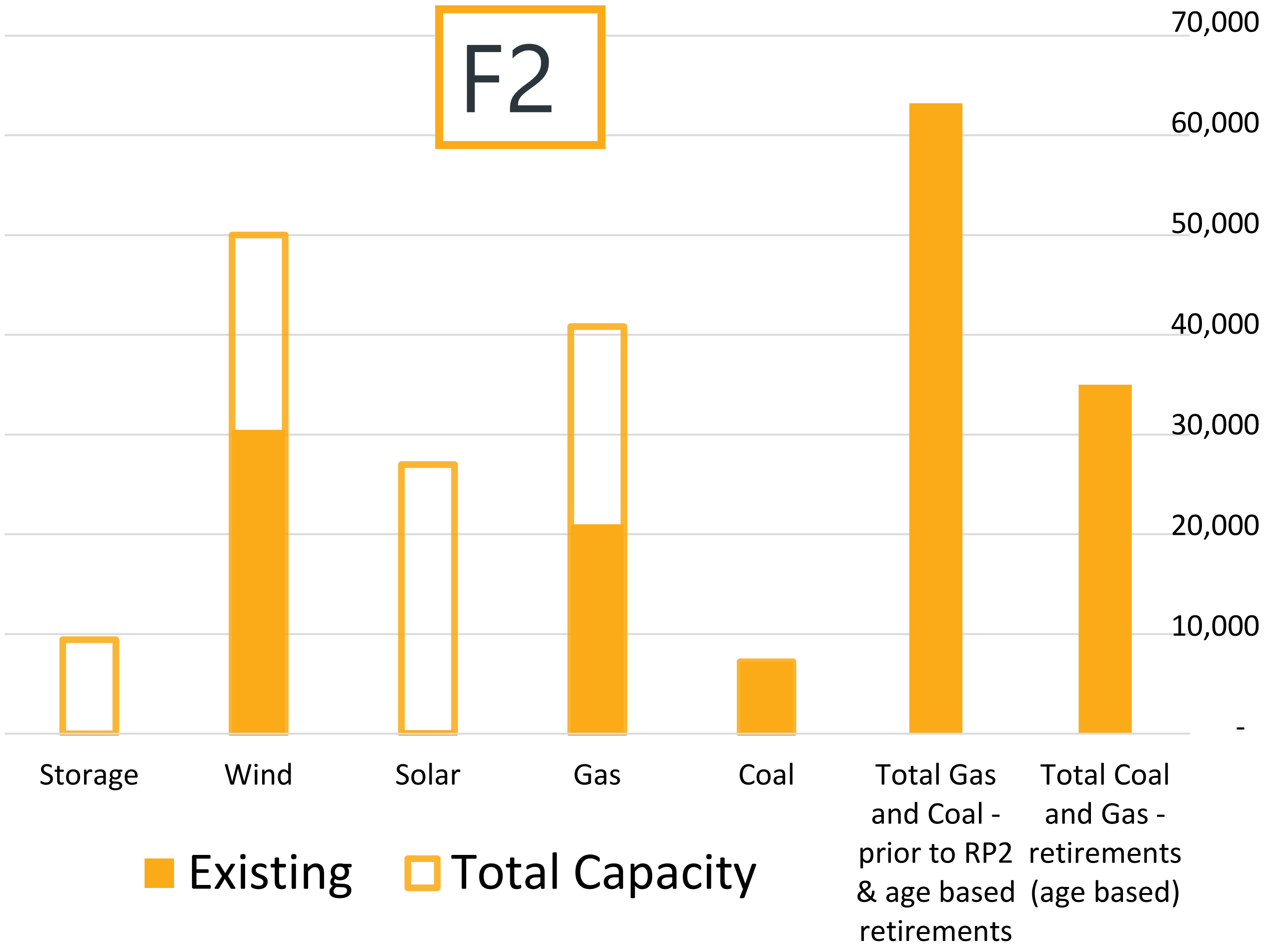


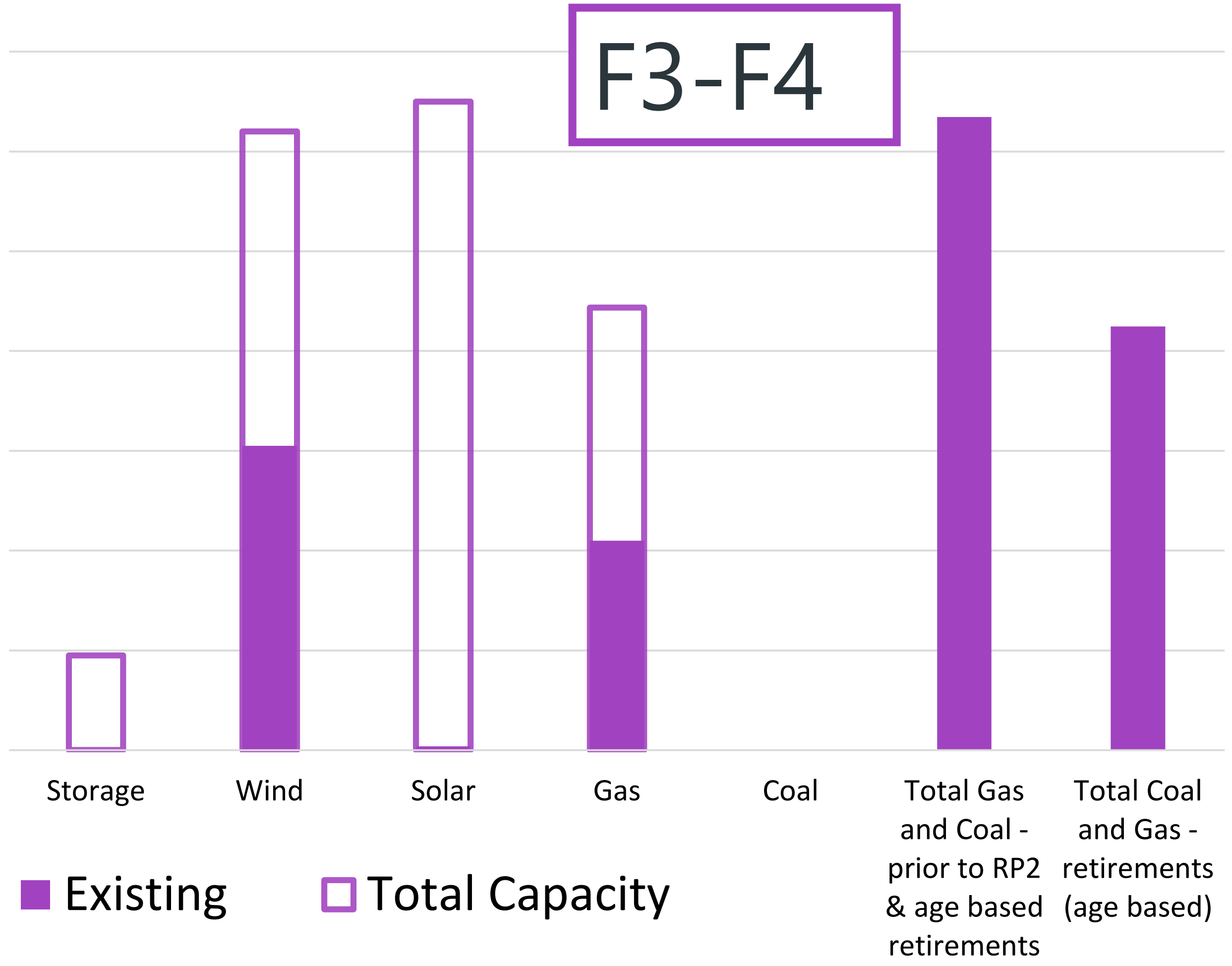
F1/F3-F4 TOTAL CAPACITIES



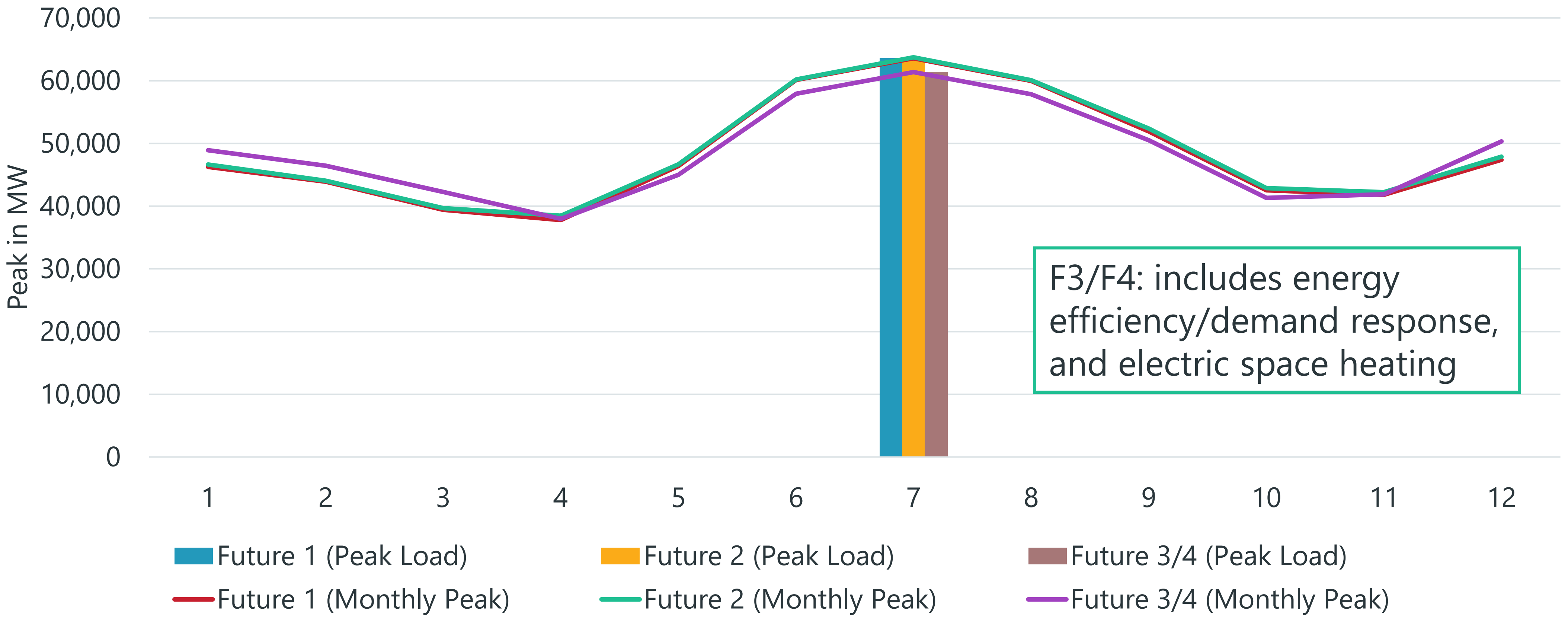


F2/F3-F4 TOTAL CAPACITIES (MW)

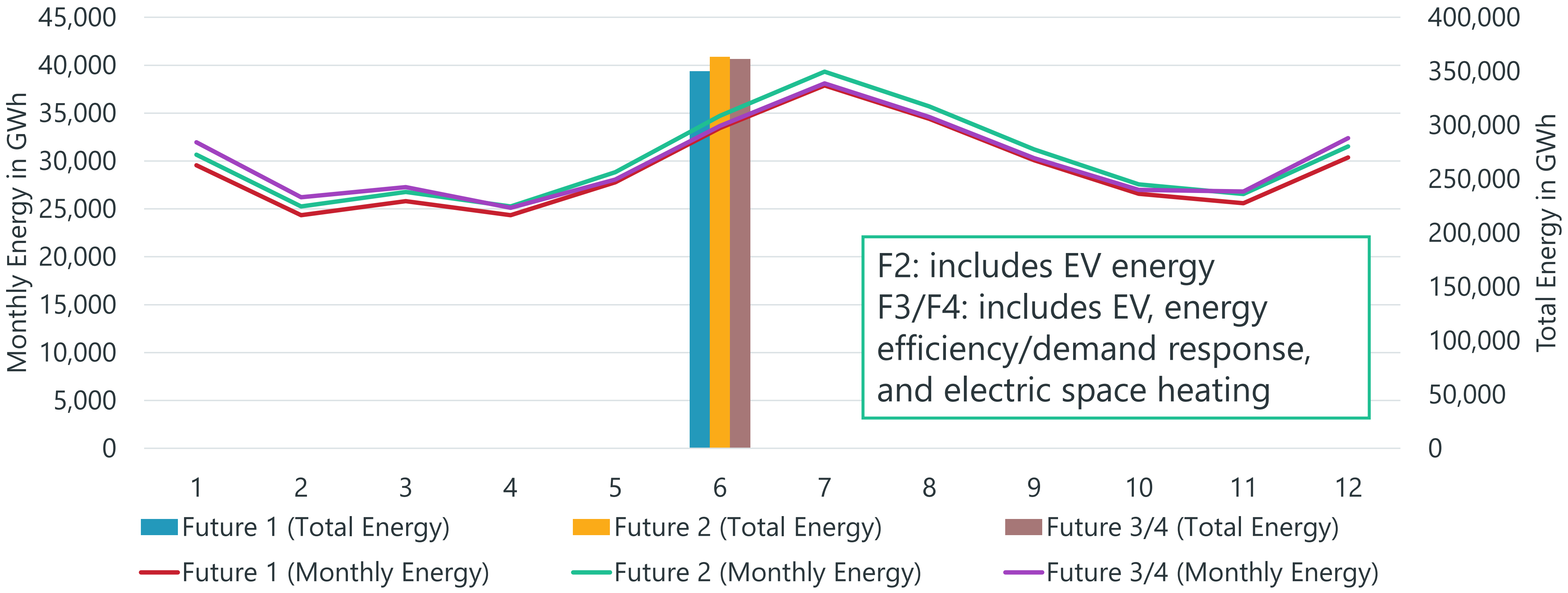




20-YA MONTHLY AND ANNUAL PEAK BY FUTURE

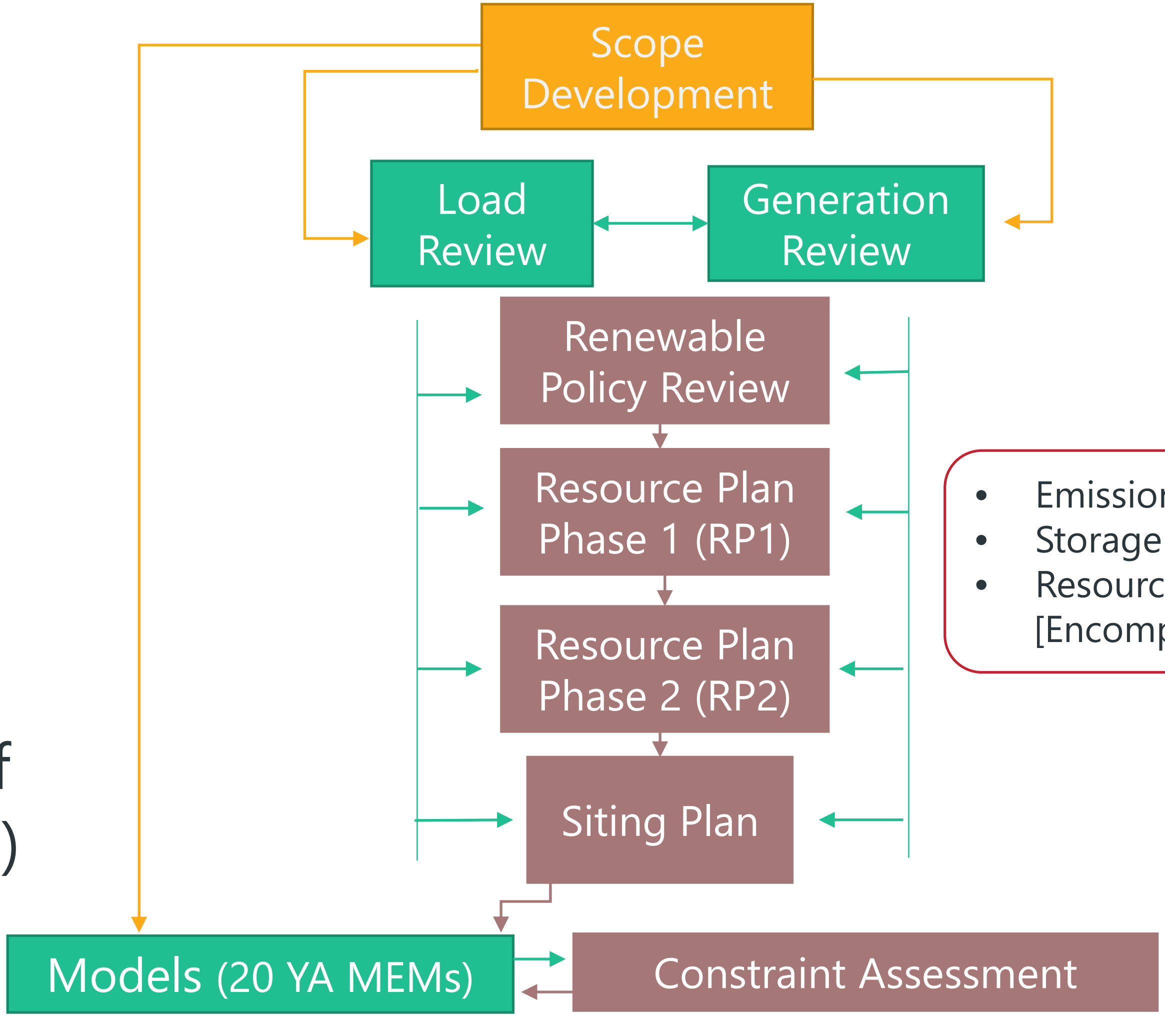


20-YA MONTHLY AND TOTAL ENERGY BY FUTURE



FACILITATION OF 20YA MEMS

- Post Pass 1 – end of August (as early as possible)
- Benchmark/Constraint Assessment – month of September
- Post Final 20YA MEMs with event files for approval – end of September (as early as possible)



- Emissions Targets
- Storage dispatch
- Resource Adequacy [Encompass analysis]

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2024 **ITP**

SCOPE & FUTURES DEVELOPMENT

KIRK HALL

ESWG - AUGUST 2022

TODAY'S GOAL

- Futures/Scope development unofficially kicked off with SPC presentation and transmission planning summit discussions
- Discuss futures development for 2024 ITP
  - Challenges/Improvement opportunities & how to incorporate them
  - Resource planning software

DISCUSSED AT 2022 PLANNING SUMMIT

Compiling publically available Integrated Resource Plans (IRPs) for SPP utilities	• Specifically reviewing retirements, renewable addition amounts/locations, emissions reduction targets, electrification predictions (EV, DR, EE, etc.), etc. • Identifying trends to help develop SPP Futures
Determining how to implement IRPs into SPP Futures	• What portion, if not all, could SPP implement for the purposes of the ITP? • Single IRP Future with an IRP influenced Future • Two IRP influenced futures with differing portions of IRPs incorporated
Creating a template IRP for utilities that do not have one existing	• Template IRP would be vetted by stakeholders • Would include age based retirement projections
How will we handle IRPs that are finalized once the study has began/models finalized?	• Firm cut off date; no 10.3 exceptions for IRPs that are published after deadline
How do we use IRPs that require updates based upon SPP policies	• Allow stakeholders to consider updates to certain IRP assumptions based upon recent SPP policy changes affecting ELCC, reserve margin, etc.

IRP COMPILATION & REVIEW

Compiled publically available IRPs for SPP utilities

- Specifically reviewed
  - Load forecast
  - Generator retirements
  - Renewable additions
  - Emission reduction targets
  - Electrification predictions (EVs)
  - Demand response
  - Energy Efficiency

IRP IMPLEMENTATION CHALLENGES

How to implement IRPs?

- All IRPs are not created equal
  - Planning horizons (ranged from 5 to 30 years)
  - Filing frequency (annual, 3 years, or 5 years)
  - Importance/necessity of strictly following IRP (regulatory compliance?)
  - Depth of report (16 pages to 900+ pages)
- Qualitative data
- Incremental additions of renewables & other goals

NEED FOR QUANTITATIVE DATA

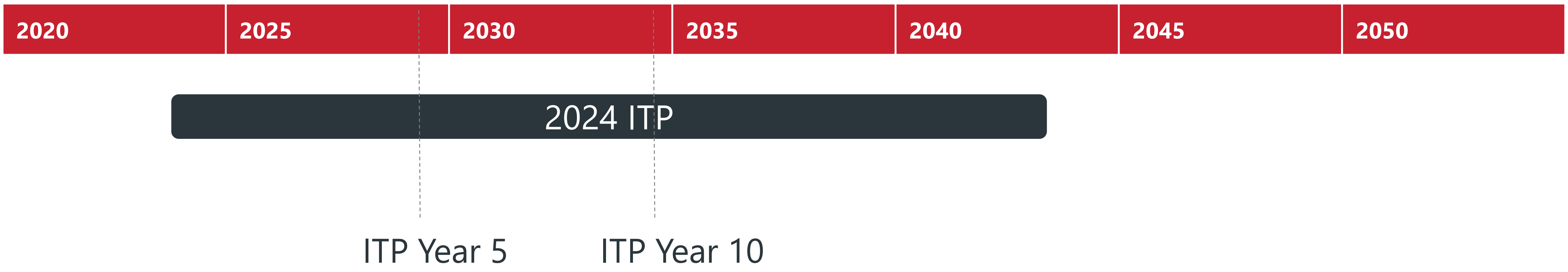
- Many IRPs give high level, executive summary-type data that is difficult to accurately incorporate into the ITP
- Qualitative data cannot be incorporated into the ITP – need more quantitative data

Qualitative → Not so helpful ☹	Quantitative → Helpful ☺
The Company plans on adding more wind and solar energy to its portfolio for greener energy future for all of posterity	The Company plans on adding 300 MW of solar and 150 MW of wind by 2030
The adoption of EVs will have a significant impact on our load and must be considered	• We expect to have 300,000 electric vehicles our territory by 2030 • This will add an estimated 241 MW to summer peak demand
Demand response programs help to reduce high summer peaking loads	Our demand response programs will reduce the summer peaking load by 25 MW

2024 ITP INCORPORATION EXAMPLE

<u>IRP Scenario</u>

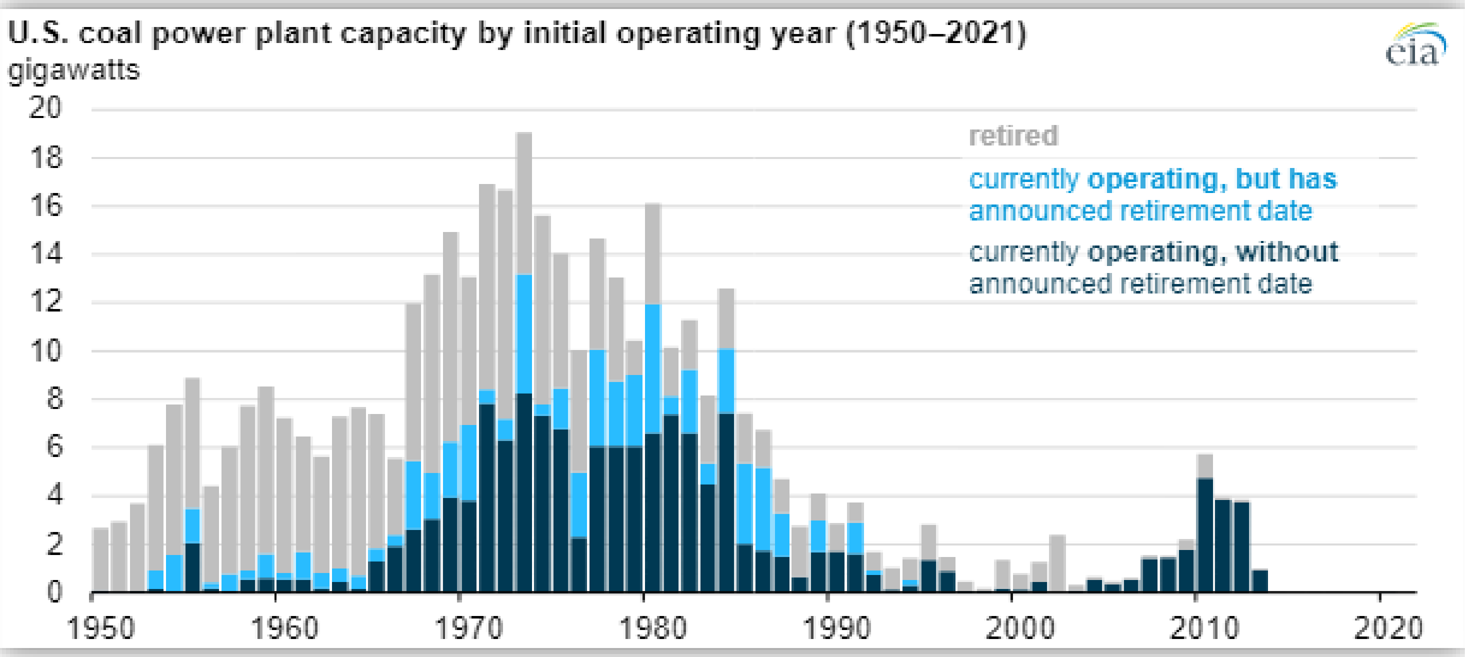
- 1100 MW of wind + 500 MW of solar + 150 MW storage by 2030
- 3000 MW of wind + 3800 MW of solar + 800 MW storage by 2050



When and how much are these renewables added to ITP?

RECONSIDERING USE OF AGE-BASED RETIREMENTS

- Age-based retirements have been assumed in most ITP studies
  - Age limits set on coal and gas
  - Stakeholder waivers
- Generator replacement process
  - How do utilities plan to utilize this?
  - What is the new resource?
    - Wind
    - Solar
    - Hybrid
    - Fuel conversion
    - New technology



https://www.eia.gov/todayinenergy/detail.php?id=50658

PROPOSED FACILITATION

Template

- Template will request specific quantitative and qualitative data that aligns with IRPs and will be used in ITP study
  - Quantitative: wind, solar, and storage additions in Y5? Y10?

Retirements

- Facilitate through the Generation Review Workbook
- Submit dates consistent with IRP

Qualitative Data in IRPs

- Standardize across entire SPP footprint
  - Load modifications (EVs, Demand Response, Energy Efficiency, etc.)
  - Emission reduction targets
- Developed based on IRP feedback
- Updates based upon recently approved policies (Reserve Margin increase)

Utilities without IRPs

- Standard template will be created based on information submitted
- Will be reviewed and approved by ESWG

RESOURCE PLANNING

ITP Manual states that we will develop a resource plan such that we meet our 12% reserve margin on a pricing zone level after age based retirements are considered

Historically, we set our renewable/storage amounts on the front end, then meet reserve margin with conventional capacity in RP2

Accreditation is determined based on Effective Load Carrying Capability (ELCC) amounts, but there hasn't been a definitive amounts or planned retirements to generate ELCC values

Options

- Use software (*e.g.*, EnCompass/Strategist) to determine generation mix after IRPs are incorporated
- Use software to determine generation mix, then use IRPs to place generation and add incremental to the software's suggestion
- Status quo - add conventional generation without resource planning software after IRPs are considered
  - Risk: energy deficient in summer months

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CPPTF SCRIPT C3 COMMON MODEL SET GUIDANCE

TRANSMISSION WORKING GROUP

AUGUST 2022

SCRIPT C3 COMMON MODEL SET GUIDANCE

C3 COMMON MODEL SET GUIDANCE TOPICS

- Overview
- Workflow, Deliverables, & Timelines
- Sub-Recommendations Requiring TWG Support
- Next Steps

C3 COMMON MODEL SET SUB-RECOMMENDATIONS OVERVIEW

RECOMMENDATION	NAME	PRIMARY	SECONDARY
C3.1	Common Base Model Set Configuration	MDAG	TWG, ESWG, GIUF, TSUF
C3.2	Common Model Set Dispatch Assumptions	CPPTF	TWG, MDAG, ESWG, GIUF, TSUF
C3.3	MPM Model Development	ESWG	TWG
C3.4	Base Model Set Automation	Staff	CPPTF, TWG, ESWG, MDAG
C3.5	Base Model Benchmarking Consolidation	MDAG	TWG

CPPTF Approved SCRIPT C3 Common Model Set Guidance Document

RECOMMENDATION WORKFLOW

CPPTF provides guidance document to Org Group

Org Group reviews guidance document

Organization Groups perform any neccessary guidance document follow up with CPPTF

Org Group develops, coordinates with secondary groups, and approves sub-recommendation

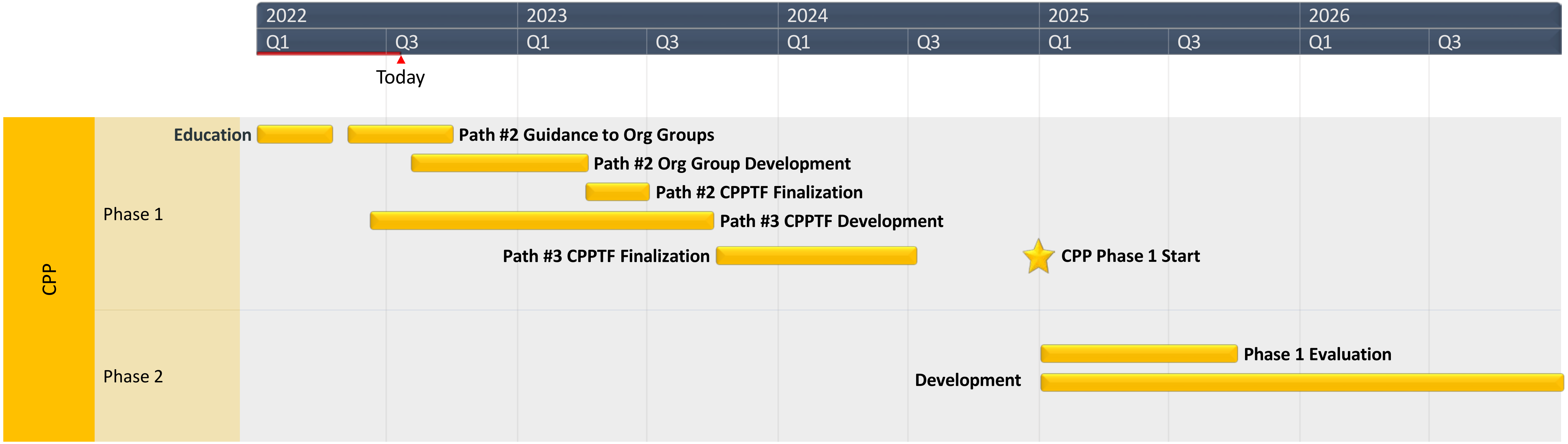
CPPTF reviews, as applicable provides feedback, and approves sub-recommendations

Coordinate changes to Org Group as necessary, and seek Board approval and/or MOPC endorsement

SUB-RECOMMENDATION DELIVERABLES

- A list of risks and potential mitigations identified during the Organizational Group's discussion for the specific recommendation
- Process timeline estimation, including recommendation lead time, policy drafting, process design, testing, implementation goals, and estimation of the production cycle duration.
- Applicable redlines to governing language for any governing document changes, including Revisions Requests (RR)

DRAFT CPP TIMELINE



C3.1 SUB-RECOMMENDATION

NAME	ASSOCIATED SCRIPT C3 REQUIREMENT	CPPTF IDENTIFIED IMPROVEMENTS
Common Base Model Set Configuration	• The base reliability models should meet NERC TPL and MOD planning standards such as TPL-001, MOD-030 and MOD-032. • The new base reliability models will be utilized for the Eastern Interconnection Reliability Assessment Group Multi-Regional Model Development Working Group (ERAG MMWG) submission. • The new base reliability models will be the starting base model assumptions utilized to build out customer service and transmission assessment scopes and requirements.	• Combine MDAG and ITP BR reliability model series • Optimal timing for annual model development and external data consideration • Base reliability model "initial-final" to "approved final" shelf-life and late data submission process improvement • Generator Interconnection model maintenance reduction

C3.2 SUB-RECOMMENDATION

NAME	ASSOCIATED SCRIPT C3 REQUIREMENT	CPPTF IDENTIFIED IMPROVEMENTS
Common Model Set Dispatch Assumptions	• The base reliability models should meet NERC TPL and MOD planning standards such as TPL-001, MOD-030, and MOD-032. • The base reliability models should include additional operational and market-based "real-world" generation output, transfer flow, and load assumption considerations beyond only firm service commitments.	• Develop consistent dispatching methodology for studies similar in scope and purpose • Identify frequently performed process for reviewing renewable dispatch assumptions compared to historical outputs for various planning models. • CPP dispatch recommendation to TBD

C3.3 SUB-RECOMMENDATION

NAME	ASSOCIATED SCRIPT C3 REQUIREMENT	CPPTF IDENTIFIED IMPROVEMENTS
MPM Model Development Recommendation	• The value of Market Powerflow Models (MPM) for use in the regional planning assessment should be evaluated and adjusted as necessary. • Historically, full inclusion of the MPM set in the ITP assessment has produced little to no transmission system issues and resulting upgrades, largely due to the invalidation/re-classification language specified in ITP manual section 4.2 and future generation included to meet system expectations and reserve margin requirements.	• CPPTF recommends improving scope and approach for creating the MPM model while making the model development a more manageable process

C3.4 SUB-RECOMMENDATION

NAME	ASSOCIATED SCRIPT C3 REQUIREMENT	CPPTF IDENTIFIED IMPROVEMENTS
Base Model Set Automation	• Developing a more manageable data set for planning and operational asset translations, reliability, and economic model development translations for data. The model development data updates are optimized based on efficiency and the value provided, including rolling project life cycle reliability and economic database	• Enhance automation as part of SCRIPT C2 Engineering data collection, review, and correlation recommendation • Reduce redundant modeling data submission processes to the best extent possible

C3.5 SUB-RECOMMENDATION

NAME	ASSOCIATED SCRIPT C3 REQUIREMENT	CPPTF IDENTIFIED IMPROVEMENTS
Base Model Benchmarking Consolidation	• Combining ITP and NERC MOD-033 model benchmarking to the best extent possible	• Consolidate reliability model benchmarking efforts efforts • Improve timing of reliability model benchmarking and model development

NEXT STEPS

- Staff to create initial C3.1 & C3.5 straw proposal for August MDAG meeting discussion
- MDAG to review and provide feedback for initial straw proposals, develop high-level coordination plan with secondary groups, and communicate any initial concerns to CPPTF
- Staff to continue introducing guidance documents to applicable stakeholder groups

QA

SPP Southwest Power Pool

SOUTHWEST POWER POOL, INC.
ECONOMIC STUDIES WORKING GROUP

Action Items Status Report
August 4, 2022

Action Item		Date Originated	Status	Comments
190	Utilize the results from RCAR III to determine the ratio of APC benefit to Transmission Outages benefit to be applied in the ITP assessments.	10/12/17	On Hold	Working with SPP operations on additional APC benefit with outages included. Mar: Ops is planning to perform after RCAR III and Value of Transmission study. Sept 29: Estimated start date is 2022 Q2 **Aug 4:** Estimated to complete 2022 EOY
201	Review the interchange methodology	07/01/19	In Progress	Goal: To complete for the 2021 ITP Assessment Mar 2021: 2021 portion considered complete. Outstanding long-term items: • Transactions between simulated and non-simulated regions • Benchmarking of pseudo-ties Feb: This item is included in the Planning Roadmap for prioritization May: Discuss testing results June 30: Review updated results **Aug 4:** On ESWG Aug. Consent Agenda
210	Create list of 20YA items to review	01/07/21	In Progress	June: Continue review of list and discussion of items Feb: Siting plan items were approved Mar: Emissions target analysis being discussed **Aug:** Update presented at Aug. ESWG; remaining items are constraint assessment, portfolio development and identification of sensitivities
211	Revisit the SPP Other bucket and how we use those resources in Resource Plan Phase II Accreditation	05/19/21	On hold	July: Review process in upcoming meeting Sept 29: Resource Accreditation is being discussed as part of 2023 ITP Scope. Feb: To be discussed as part of 2024 ITP Scope development ~June 2022

Action Item		Date Originated	Status	Comments
212	Review ELCC Accreditation	11/03/21	In Progress	Feb: To be discussed as part of 2024 ITP Scope development ~June 2022 May: Begin discussions
213	Discuss incorporation of Utility Integrated Resource Plans in the ITP	11/03/21	In Progress	Feb: To be discussed as part of 2024 ITP Scope development ~June 2022 May: Begin discussions **Aug:** Will be discussed at Aug. ESWG
214	Review the retirement exception process	11/03/21	In Progress	Feb: To be discussed as part of 2024 ITP Scope development ~June 2022 May: Begin discussions
215	Review the RAR process	11/03/21	In Progress	Feb: To be discussed as part of 2024 ITP Scope development ~June 2022 May: Begin discussions **Aug:** RR498 will be presented at Aug. ESWG
216	Address PROMOD battery modeling issues	03/30/22	In Progress	Mar 30: Action Item added.
217	Review modeling issues surrounding hybrid and co-located resources in economic models	05/05/22	In Progress	May 5: Action Item added

MOPC Action Item		Date Originated	Status	Comments
314	As part of rebaselining ITP studies, staff to work with the ESWG and TWG to review Attachment O, the ITP Manual, and current ITP scope documents to look for further process improvements to ensure timely completion of current and future ITP assessments.	01/10/22	In Progress	Goal: Bring updates TWG/ESWG focused on reviewing of ITP governing documents and further process improvements Scheduled completion is October 2022. **Aug:** Update presented at ESWG, along with RR for Section 10.3 and discussion of MPMs