



**Southwest Power Pool
Economic Studies Working Group
April 25, 2018**

Kansas City Power & Light office in the One Kansas City Place bldg. - South Auditorium

• SUMMARY OF ACTIONS TAKEN •

1. Approved the Siting Prioritization standard ranking methodology for all technologies as posted with the proposed methodology for exceptions.



**Southwest Power Pool
ECONOMIC STUDIES WORKING GROUP**

April 25, 2018

Kansas City Power & Light office in the One Kansas City Place bldg. - South Auditorium

• MINUTES •

Agenda Item 1 – Administrative Items

Agenda Item 1a - Call to Order, Introductions

Chair Alan Myers (ITC) called the meeting of the Economic Studies Working Group (ESWG) to order at 8:00 a.m., welcomed those in attendance, and asked for introductions.

There were 25 in-person participants and 47 web conference participants, representing 16 of 17 ESWG members. (Attachment 1 – April 25, 2018 Attendance List)

Agenda Item 1b – Receipt of Proxies

Alan Myers (ITC) asked for any proxy statements; no proxies were identified.

Agenda Item 1c – Review of Agenda

Chair Alan Myers (ITC) presented the agenda for review and asked for any additions or corrections. (Attachment 2 – April 25, 2018 ESWG Agenda).

**Kurt Stradley (LES) made a motion; seconded by Bethany King (Empire) to adopt the agenda.
The motion was approved unanimously.**

Agenda Item 2 – Consent Agenda

The consent agenda included the following items:

- a. Meeting Minutes – March 15th, 2018 (Attachment 3 - 20180315 ESWG Minutes)

The Consent Agenda was approved unanimously.

Agenda Item 3 – Review of Past Action Items

Amber Greb (SPP) reviewed the list of past action items and asked for any comments or questions. The group discussed action item 151 and the impacts of software changes. Tim Owens (NPPD) provided an update from MOPC review of RR276. The group requested an education session on VOM and APC in a future meeting. (Attachment 4 – Past Action Items)

Action Item: Educate ESWG on VOM changes with APC calculations. Demonstrate how PPA's are reflected in the APC calculation.

Agenda Item 4 – ITP Items

Agenda Item 4a – Schedule

Juliano Freitas (SPP) reviewed a presentation on 2019 ITP schedule. Juliano reviewed on-going and up-coming milestones through benchmarking. (Attachment 5 – 2019 ITP Schedule)

Agenda Item 4b – External Resource Plan

Chris Jamieson reviewed a presentation on external resource plan. Chris reminded the group of the April 6th email approval of using the MTEP18 data for MISO and TVA for resource planning and gave an update of the on-going work with AECL. (Attachment 6 – 2019 ITP External Resource Planning)

Agenda Item 4c –Resource Planning 2

Amber Greb (SPP) gave the ESWG an update on Phase 2 of the Resource Plan. The group reviewed the wind and solar additions and the remaining shortfall that will be filled with conventional resources in each pricing zone. Amber reminded the group that solar resources are allocated based on load ratio share and will be considered firm resources in the economic model, but proxy wind resources will not be considered firm, ownership will not be assigned in the economic model, and the benefits from wind units will not directly impact the APC of the pricing zones. Staff will use the resource planning tool, Strategist, to determine the most economic conventional (CCs, CTs and Reciprocating Engines) units to add as proxy generation. (Attachment 7 - Resource Planning 2)

Agenda Item 4d – Siting Prioritization

Liz Gephardt (SPP) reviewed the process for siting solar, wind, and conventional generation. She discussed the load pocket analysis results, the order in which generation types will be sited, and the methodology for prioritizing the sites available within each generation type. Steve Gaw (Wind Coalition) expressed concerns with placing so much weight on interconnection costs in the wind site ranking, thus not considering the trend implying larger amounts of generation being requested in certain areas of the system. SPP staff expressed that the wind siting goal is to select sites from the queue that are the most likely, and although there is a trend for requests in some of these areas, the trend doesn't show these requests being built. SPP also stated that if this methodology doesn't result in an answer that the group thinks is accurate and/or expected, there is room to revisit how this is done in future ITP studies. Exceptions to the standard prioritization methodologies applies to utility solar, wind, and conventional resources. Adjustments to distributed solar should simply be submitted to staff for consideration.

Staff will be sending out a public version of the siting maps that can be viewed by those without an NDA. (Attachment 8 – Siting Prioritization)

Kurt Stradley (LES) made a motion; seconded by Anita Sharma (AEP) to approve the standard ranking methodology for all technologies as posted with the proposed methodology for exceptions. The motion passed unanimously.

Agenda Item 4e – Powerflow Changes

Eddie Watson (SPP) reviewed stakeholder submitted model changes received after the February 1, 2018 deadline as well as SPP 2017-AG1 changes identified for inclusion in the 2019 ITP powerflow models. He discussed how these changes were evaluated per section 9.3 of the ITP manual, and the results of that evaluation. Eddie explained the implementation schedule of incorporating any changes to the different models. Staff will post the updated ITP Models and associated idevs when these evaluation are complete (Attachment 9 – 2019 ITP Model Updates)

Agenda Item 5 – Mountain West

Due to the recent changes in the negotiations with Mountain West, all pending work on this project is on hold until further notice. This item was not discussed as originally intended.

Agenda Item 6 – 2019 ITP Methodology Approvals Summary

Juliano Freitas (SPP) presented an overview of 2019 ITP Methodology Approvals Summary. He gave a recap of all the decision that the ESWG has made since the beginning of the 2019 ITP study. Stakeholders requested a simple version listing approvals. Amber Greb (SPP) will send out prior to the May meeting. (Attachment 10 – 2019 ITP Approvals Summary)

Agenda Item 7 – May ESWG Agenda Items

Amber Greb (SPP) showed a draft of the May meeting agenda and requested items to be included. Stakeholders are welcome to send updates in the coming week.

Closing Items

List of action items from the meeting:



1. Educate ESWG on VOM changes with APC calculations. Demonstrate how PPA's are reflected in the APC calculation.
2. Lessons learned meeting before each scope development

The meeting was adjourned at 3:00 PM

Respectfully Submitted,

Amber Greb

ESWG Secretary

Name	Email/Company	Attendance
Adam McKinney	MOPSC	In-Person
Alan Myers	ITC	In-Person
Amber Greb	SPP	In-Person
Anita Sharma	AEP	In-Person
Bethany King	EDE	In-Person
Brad Schwartz	Hunt	In-Person
Charles Shue	ITC GP	In-Person
Chris Jamieson	SPP	In-Person
Don Frerking (KCP&L)	KCPL	In-Person
Jim Jacoby	AEP	In-Person
Jody Holland	SCMCN	In-Person
John Olsen	Westar	In-Person
Jon Iverson	OPPD	In-Person
Juliano Freitas	SPP	In-Person
Kurt Stradley	LES	In-Person
Kyle Combs	B&McD	In-Person
Natasha Henderson	GSEC	In-Person
Rodney Massman	MOPSC	In-Person
Ryan Yokley	SUNC	In-Person
Shawnee Clayborn-Pinto	PUCT	In-Person
Steve Gaw	Wind Coalition	In-Person
Steve Hohman	OPPD	In-Person
Tim Owens	NPPD	In-Person
Tyler Fletcher	B&McD	In-Person
Wayne Penrod	SUNC	In-Person
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Bennie Weeks	bennie.weeks@xcelenergy.com	Webex
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Jason Shook (GDS/ETEC)	jason.shook@gdsassociates.com	Webex
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Leon Howell	howelllc@oge.com	Webex
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matthew stoltz	mstoltz@bepc.com	Webex
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Yohan Sutjandra (TEA)	ysutjandra@teainc.org	Webex
Zack Bearden (SPP)	zbearden@spp.org	Webex



ECONOMIC STUDIES WORKING GROUP MEETING

April 25th, 2018

KCP&L in the One Kansas City Place building - Kansas City, MO

• A G E N D A •

1. Administrative Items
 - a. Call to Order, Introductions..... Alan Myers (5 minutes)
 - b. Receipt of Proxies Amber Greb (1 minute)
 - c. Review of Agenda¹ Alan Myers (1 minute)
 - d. Antitrust Reminder Amber Greb (1 minute)
2. Consent Agenda¹..... Alan Myers (1 minute)
 - a. Meeting Minutes – March 15th, 2018
3. Review of Past Action Items¹ Amber Greb (25 minutes)
 - a. MOPC action on RR276
 - b. VOM next Steps
4. 2019 ITP Items SPP Staff (195 minutes)
 - a. Schedule¹ Juliano Freitas (15 minutes)
 - b. External Resource Plan¹ Chris Jamieson (30 minutes)
 - c. Resource Planning Phase 2¹ Amber Greb (60 minutes)
 - d. Siting Prioritization¹ (Approval Item) Liz Gephardt (60 minutes)
 - e. Powerflow Changes¹ Eddie Watson (30 minutes)
5. Mountain West Update SPP Staff (60 minutes)
 - a. Tariff Changes
 - b. ITP Manual Changes
 - c. Schedule
6. 2019 ITP Methodology Approvals Summary¹..... Juliano Freitas (75 minutes)
7. May ESWG Agenda Items¹ Amber Greb (10 minutes)

¹ Background Material Included

Antitrust: SPP strictly prohibits use of participation in SPP activities as a forum for engaging in practices or communications that violate the antitrust laws. Please avoid discussion of topics or behavior that would result in anti-competitive behavior, including but not limited to, agreements between or among competitors regarding prices, bid and offer practices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that might unreasonably restrain competition.

- 8. Closing Items All (5 minutes)
 - a. Summary of Action Items (Amber Greb)
 - b. Future Meetings
 - i. May 16th-17th, 2018: Xcel Energy, 3rd Floor, 3C Conference Room, Denver, CO
 - ii. June 14th, 2018: 41st floor AEP Office, Dallas Texas
 - iii. July 26th, 2018: 2CC Milan-ITC Office, 27175 Energy Way, Novi, Michigan
 - iv. August 15-16th, 2018: Doubletree-Grand Ballrm A, 27 North 27th St., Billings, MT
 - v. September 13th, 2018: 41st floor AEP Office, Dallas Texas
 - vi. October 11th, 2018: 41st floor AEP Office, Dallas Texas
 - vii. November 14-15th, 2018: SPP Offices, Little Rock, AR
 - viii. December 3rd, 2018: 41st floor AEP Office, Dallas Texas

Antitrust: SPP strictly prohibits use of participation in SPP activities as a forum for engaging in practices or communications that violate the antitrust laws. Please avoid discussion of topics or behavior that would result in anti-competitive behavior, including but not limited to, agreements between or among competitors regarding prices, bid and offer practices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that might unreasonably restrain competition.

Southwest Power Pool
Economic Studies Working Group
March 15, 2018
41st Floor AEP Offices, Suite 4103 – Dallas, TX

• SUMMARY OF ACTIONS TAKEN •

1. Approved RR 276 with the current language and an \$8/MWH VOM
2. Approved a motion that sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone
3. Approved a motion to keep the assumption that future proxy wind will not have transmission service, based on current trends, and will not be included in a load serving entity's rates
4. Approved a motion to apply the implementation of the following assumptions to all existing resources:
 - a. Sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone
 - b. All generation without firm transmission service to load should be subject to generator LMP price
5. Approved a motion to assume that proxy conventional and solar generation will obtain transmission service and through those arrangements will be included in a load serving entity's rates
6. Approved implementation of the curtailment price methodology for the 2019 ITP Assessment
7. Approved a recommendation for no additional ITP manual changes to renewable pricing for the 2019 ITP Assessment due to the potential risks to the schedule
8. Approved the policy additions for Phase 1 of the resource plan as posted with the discussed changes: Zero shortfalls for MRES and Zero shortfalls for KEPCO
9. Approved a motion to close out action item 173



Southwest Power Pool
ECONOMIC STUDIES WORKING GROUP
March 15, 2018
41st Floor AEP Offices, Suite 4103 – Dallas, TX
• MINUTES •

Agenda Item 1 – Administrative Items

Agenda Item 1a - Call to Order, Introductions

Chair Alan Myers (ITC) called the meeting of the Economic Studies Working Group (ESWG) to order at 8:00 a.m., welcomed those in attendance, and asked for introductions.

There were 21 in-person participants and 46 web conference participants, representing 16 of 17 ESWG members. (Attachment 1 – March 15, 2018 Attendance List)

Agenda Item 1b – Receipt of Proxies

Alan Myers (ITC) asked for any proxy statements; four proxies were identified.

- Leon Howell (OGE) named Zac Hager (OGE) as his proxy.
- Natasha Henderson (GSEC) named Evan Racine-Johnson (GSEC) as her proxy.
- Jody Holland (SCMCN) named Eric Burkey (SCMCN) as his proxy.
- Al Tamimi (SUNC) named Ryan Yokley (SUNC) as his proxy.

(Attachment 1a – Proxy Statements)

Agenda Item 1c – Review of Agenda

Chair Alan Myers (ITC) presented the agenda for review and asked for any additions or corrections. (Attachment 2 – March 15, 2018 ESWG Agenda).

Jeremy Severson (Basin) made a motion; seconded by Kurt Stradley (LES) to adopt the agenda. The motion was approved unanimously.

Agenda Item 2 – Review of Past Action Items

Amber Greb (SPP) reviewed the list of past action items and asked for any comments or questions. (Attachment 3 – Past Action Items)

Agenda Item 3 – Consent Agenda

The consent agenda included the following items:

- a. Meeting Minutes – February 22nd, 2018

The Consent Agenda was approved unanimously.

Agenda Item 4 – ITP Items

Agenda Item 4a – Renewable Pricing Revision Request

Chris Jamieson (SPP) discussed the Renewable Pricing Revision Request to finalize VOM price. He informed the group of additional comments that were received outside of comment period. Chris provided the group with an overview of all comments received. The members discussed their preference for zero or eight dollars with stakeholders speaking up for both values. The conversation continued until the group made a motion. (Attachment 4a – RR 276 Renewable Pricing VO&M)

John Olsen (Westar) made a motion; seconded by Anita Sharma (AEP) to approve RR 276 with the current language and a \$0/MWH VOM recommendation. The motion failed, 9 to 7.

Evan Racine-Johnson (GSEC) made a motion; seconded by Jon Iverson (OPPD) to approve RR 276 with the current language and an \$8/MWH VOM recommendation. The motion was approved, with two abstentions, Bethany King (EMDE) and Jon Olsen (Westar).

John Olsen (Westar) - "I abstained on the \$8/VOM vote for the \$0/VOM is the appropriate value for wind generation. It is consistent with current market rules concerning short-run marginal costs and how other units are modeled in the economic dispatch model. I did not vote against the \$8/VOM value because if it too failed, the current process in the ITP manual would be the approach used, which is less desirable than the \$8/VOM."

Action Item: Staff to write Recommendation Report for MOPC

Agenda Item 4b – Rate-Payer Benefits and the APC Calculation

Chris Jamieson reviewed a presentation on Rate-Payer Benefits and APC Calculation. The words "rate base" were replaced by "rates" throughout the posted presentation, as it is a more precise phrase. Chris went over the assumptions and recommendations with stakeholders. (Attachment 4b – Rate-Payer Benefits and the APC Calculation)

Anita Sharma (AEP) made a motion; seconded by John Olsen (Westar) to approve assumption 1, sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone. The motion was approved, with one "No" vote, Evan Racine-Johnson (GSEC).

"GSEC voted No for the following reasons: GSEC should not pay for transmission built for energy-only resources of other IOUs. Those with energy-only resources that want transmission built, should request firm transmission and pay for the transmission accordingly, rather than requiring it to be subsidized by those that do not benefit."

Tim Owens (NPPD) made a motion; seconded by Bennie Weeks (Xcel/SPS) to keep the assumption that future proxy wind will not have transmission service, based on current trends, and will not be included in a load serving entity's rates. The motion was approved unanimously. This motion is confirming a previously approved motion.

Tim Owens (NPPD) made a motion; seconded by Bennie Weeks (Xcel/SPS) to apply the implementation of the following assumptions to all existing resources:

- **Sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone**
- **All generation without firm transmission service to load should be subject to generator LMP price**

The motion was approved, with one "No" vote, Evan Racine-Johnson (GSEC) and two abstentions, Anita Sharma (AEP) and John Olsen (Westar).

John Olsen (Westar) "Abstained on the vote for Assumption #2. The exact approach for how this will be implemented was not clear. I agree with the concept, but would like to see how it will be implemented before approving. There may be multiple ways to meet the words, which may not be consistent with my expectation of the intent."

"GSEC voted No, since this motion is predicated on the previous motion to which GSEC objects."

Bennie Weeks (Xcel/SPS) made a motion; seconded by Gayle Nansel (WAPA) to assume that proxy conventional and solar generation will obtain transmission service and through those arrangements will be included in a load serving entity's rates. The motion was approved with two abstentions, Evan Racine-Johnson (GSEC) and Tim Owens (NPPD).

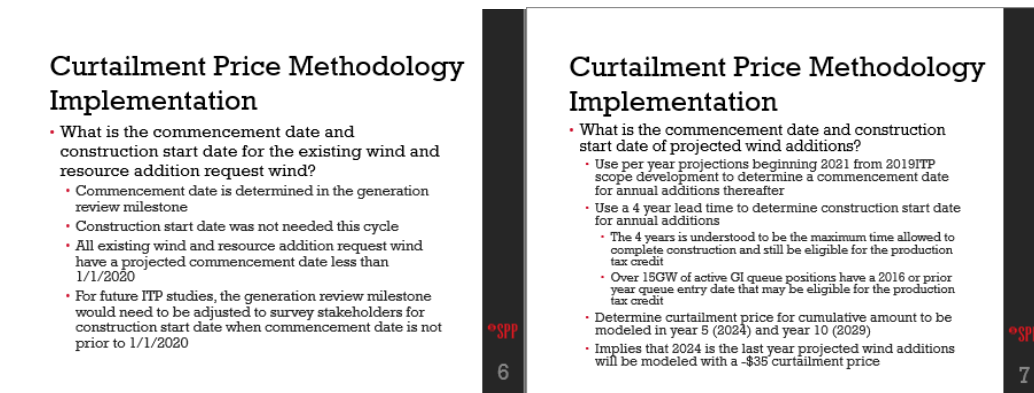
"NPPD abstained from this vote, based on our earlier objection to the way in which proxy renewable resources, including wind & solar, are being allocated to load zones as part of the resource plan"

development. We do not object to the recommended assumption regarding conventional proxy resources.”
Tim Owens (NPPD)

Agenda Item 4c – Renewable Curtailment Price

Agenda Item 4ci – Implementation

Chris Jamieson (SPP) reviewed presentation on the 2019 ITP Renewable Curtailment Price implementation. Chris reviewed the curtailment price methodology implementation; see slides (6-7) below. Chris discussed using the commencement date and construction start date as implementation decision points for determining whether the production tax credit is a factor in operation of a wind resource. (Attachment 4ci -Renewable Curtailment Price Implementation)



Curtailment Price Methodology Implementation

- What is the commencement date and construction start date for the existing wind and resource addition request wind?
- Commencement date is determined in the generation review milestone
- Construction start date was not needed this cycle
- All existing wind and resource addition request wind have a projected commencement date less than 1/1/2020
- For future ITP studies, the generation review milestone would need to be adjusted to survey stakeholders for construction start date when commencement date is not prior to 1/1/2020

Curtailment Price Methodology Implementation

- What is the commencement date and construction start date of projected wind additions?
- Use per year projections beginning 2021 from 2019 ITP scope development to determine a commencement date for annual additions thereafter
- Use a 4 year lead time to determine construction start date for annual additions
 - The 4 years is understood to be the maximum time allowed to complete construction and still be eligible for the production tax credit
 - Over 15GW of active GI queue positions have a 2016 or prior year queue entry date that may be eligible for the production tax credit
- Determine curtailment price for cumulative amount to be modeled in year 5 (2024) and year 10 (2029)
- Implies that 2024 is the last year projected wind additions will be modeled with a -\$35 curtailment price

Jon Iverson (OPPD) made a motion; seconded by Kurt Stradley (LES) to approve the implementation of the curtailment price methodology (as show above) for the 2019 ITP. The motion was approved, with one abstention, Evan Racine-Johnson (GSEC).

“GSEC Abstained for the following reason. We understand that the ITP process had some unique challenges due to its being in a state of transition. GSEC concurs that the ITP process should not be delayed, but in that case implementation time should be factored in accordingly in case (inevitable) revisions are desired by Members. In the next iteration, the Oklahoma PTC should be considered at a minimum.”

Agenda Item 4cii – Renewable Curtailment Price Action Item

Chris Jamieson (SPP) reviewed a presentation on the Renewable Curtailment Price Action Item. The group discuss adjusting the manual to incorporate this topic in the scope. It was suggested that the ITP manual should describe a calculation methodology and the assumptions of the calculation would be set in the scope document. (Attachment 4cii - Renewable Curtailment Price Action Item)

Kurt Stradley (LES) made a motion; seconded by Gayle Nansel (WAPA) to approve staff’s recommendation for no additional ITP manual changes to renewable pricing for the 2019 ITP due to the potential risks to the schedule. The motion was approved, with one abstention, Evan Racine-Johnson (GSEC).

Any GSEC Abstention votes that were made subsequent to item 4cii, on related ad-hoc approval items, were for a similar reason to above; i.e. we understand the time constraints and possible impacts to the ITP Schedule.

Action Item: Staff to begin working on an RR for the next cycle (2020)

Agenda Item 5 – 2019 ITP Items

Agenda Item 5a – Schedule

Juliano Freitas (SPP) informed the group of the 2019 ITP schedule status and projected hours. Juliano reviewed the schedule up to the Benchmarking milestone. (Attachment 5a – 2019 ITP Schedule)

Agenda Item 5b – Resource Plan for Policy Requirements



Amber Greb (SPP) presented the Resource Plan for Policy Requirements. Amber reviewed the results and discussed stakeholder's changes. MRES stated that resources in MISO were meeting their renewable requirements. Westar stated that the KEPCO requirements were being covered by Westar resources (This was verified by KEPCO after the meeting) (Attachment 5b – 2019 ITP Resource Plan Phase I)

Jeremy Severson (Basin) made a motion; seconded by Evan Racine-Johnson (GSEC) to approve the policy additions for Phase 1 of the resource plan as posted with the discussed changes: Zero shortfalls for MRES and Zero shortfalls for KEPCO. The motion passed unanimously.

Agenda Item 5c – 2019 ITP External Resource Planning

Nikki Roberts (SPP) reviewed the 2019 ITP External Resource Plan and provided high-level details of MTEP18 evaluation process and findings. Due to our non-disclosure agreement with MISO, some details were not included in the presentation and will be posted to GlobalScape after the meeting. An email vote will be requested seven days after posting. (Attachment 5c - 2019 ITP External Resource Planning)

Agenda Item 5c – Siting

Liz Gephardt (SPP) provided an update on siting plan. Liz provided a high-level schedule for future touch points with the group. (Attachment 4g – 2019 ITP Siting Plan)

Agenda Item 5d – AI 173 Economic Model using vendor data

Clayton Mayfield (SPP) spoke about ESWG Action Item 173. The action item states “Staff to develop a process for annual update of the economic model with vendor data.” Clayton updated the ESWG implementation of action item. (Attachment 5d - AI 173 Economic Model using vendor data)

Jeremy Severson (Basin) made a motion; seconded by John Olsen (Westar) to close Action Item 173. The motion was approved unanimously.

Agenda Item 5e – Resource Planning Phase 2

Amber Greb (SPP) reviewed presentation Resource Planning Phase II. Amber provided an overview of the milestone and reviewed resource-planning decision Tree. She reminded the group of upcoming review dates. (Attachment 5e - Resource Planning Phase 2)

Agenda Item 5f – Economic Model Build

Clayton Mayfield (SPP) provided an update on Economic Model Build and informed the group of schedule and expectations. (Attachment 5e - Resource Planning Phase 2)

Closing Items

Chair Alan Myers (ITC) requested other items meriting discussion.

List of action items from the meeting:

1. Write Recommendation Report for MOPC
2. Staff to begin working on an RR for the next cycle (2020) - (Renewable Curtailment Price Action Item)

The meeting was adjourned at 2:28 PM

Respectfully Submitted,

Amber Greb

ESWG Secretary

Southwest Power Pool, Inc.
ECONOMIC STUDIES WORKING GROUP
Pending Action Items Status Report

March 15, 2017

	Action Item	Date Originated	Status	Comments
151	SPP staff to look into optional software tools for use in ITP studies.	May 20 th , 2015	In Progress SPP Staff	February, 2017: Presentation on EGEAS. Hold on investigation of alternatives until EGEAS and ABB's new Capacity Expansion tool are able to be fully tested and compared.
183	SPP staff to perform transmission outage analysis in the first part of 2017 to determine the appropriate APC benefit percentage to utilize for the mitigation of transmission outages benefit metric.	September 15 th , 2016	In Progress SPP Staff	ESWG Approved the methodology and staff to begin analysis
185	ESWG to continue working on and finalize the Resource Siting Manual	June 29 th , 2017	In Progress ESWG	Staff intends to finalize in September 2018
186	Formalize the economic model data guidelines and submission process	July 20 th , 2017	In Progress SPP staff	Include the load updates for resource planning
187	Address the objections raised to the approved renewable VOM modeling detailed in the ITP manual	July 20 th , 2017	In Progress SPP staff/ESWG	
189	Discuss mitigation options for concerns with who pays for and who benefits from transmission coming from the ITP process and how it may circumvent the GI and Aggregate study processes	October 4 th , 2017	In Progress SPP staff/ESWG Complete	<u>Completed with the approval of the other bucket for APC</u>
190	SPP staff to perform a full transmission outage analysis before the next RCAR	October 12 th , 2017	SPP Staff	
192	SPP Staff to draft a Revision Request to update the ITP Manual language to reflect a \$0 or \$8/MWH solar and wind VOM price.	December 14 th , 2017	In Progress, SPP Staff <u>Complete</u>	RR in Progress, approved with an \$8/MWH VOM, going to MOPC in April. MOPC approved \$0/MW/hr
193	Discuss separate load forecasts for resource planning purposes, and	January 22 nd , 2018	SPP Staff	



HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.

2019 ITP Schedule

Juliano Freitas

April 25, 2018

General Information

- Projected Amount of Hours: 28,000
- Number of Milestones: 53
- Working Groups Involved: ESWG, TWG and MDWG
- Finishing Date: October 2019

Powerflow Model

- Start: 7/17/2017
- End: 3/1/2018 (Final Approval)
- Member Review Time:
 - Pass 0 – Trial 1: 7/21/2017 – 8/4/2017 (10 days)
 - Pass 0 – Trial 2: 8/11/2017 – 8/25/2017 (10 days)
 - Pass 0 – Trial 3: 9/1/2017 – 9/15/2017 (10 days)
 - Pass 1 – Trial 1: 9/22/2017 – 10/6/2017 (10 days)
 - Pass 1 – Trial 2: 10/13/2017 – 10/20/2017 (5 days)
 - Pass 2: 11/7/2017 – 11/20/2017 (9 days)
 - Pass 3: 12/5/2017 – 12/22/2017 (13 days)
 - Pass 4: 1/19/2018 – 2/1/2018 (10 days)
 - Pass 5: 2/23/2018 – 3/1/2018 (5 days)
 - ITP Final Approval with Model Updates in August 2018
- Staff Leader: Moses Rotich (mrotich@spp.org)
- Working Group Approval: TWG

Short Circuit Model

- Start: 11/20/2017
- End: 3/9/2018
- Member Review Time:
 - Pass 1: 12/8/2017 – 12/29/2017 (15 days)
 - Pass 2: 1/25/2018 – 2/1/2018 (5 days)
 - Pass 3: 3/1/2018 – 3/9/2018 for MDWG Approval
 - **ITP Final Approval with Model Updates in August 2018**
- Staff Leader: Zack Bearden (zbearden@spp.org)
- Working Group Approval: TWG

Renewable & Conventional Resource Plan – Phase II

- Start: 2/6/2018
- End: 5/23/2018 (Member's Final Approval)
- Member Review Time:
 - 5/15/2018 – 5/23/2018 (7 days)
- Staff Leader: Amber Greb (agreb@spp.org)
- Working Group Approval: ESWG

Siting Plan

- Start: 12/1/2017
- End: 7/2/2018 (Member's Final Approval)
- Potential schedule updates contingent on Site Prioritization approval 4/25
- Member Review Time:
 - Site Repository: 2/22/2018 – 3/8/2018 (5 days)
 - Site Prioritization: 4/9/2018 – 4/13/2018 (5 days)
 - Site Prioritization: 4/20/2018 – 4/27/2018 (6 days)
 - Site Assignment Renewable: 5/18/2018 – 5/24/2018 (5 days)
 - Site Assignment Renewable: 5/31/2018 – 6/7/2018 (6 days)
 - Site Assignment Conventional: 6/12/2018 – 6/18/2018 (5 days)
 - Site Assignment Conventional: 6/25/2018 – 7/2/2018 (6 days)
- Staff Leader: Liz Gephardt (lgephardt@spp.org)
- Working Group Approval: ESWG

Generator Outlet Facilities

- Start: 4/30/2018
- End: 7/25/2018 (Member's Final Approval)
- Member Review Time:
 - 7/18/2018 – 7/25/2018 (6 days)
- Staff Leader: Kirk Hall (khall@spp.org)
- Working Group Approval: TWG

Economic Model Building

- Start: 7/3/2017
- End: 9/28/2018 (Member's Final Approval)
- Member Review Time:
 - Post 1: 2/12/2018 – 2/23/2018 (10 days)
 - Post 2: 6/9/2018 – 6/22/2018 (10 days)
 - Post 3: 9/17/2018 – 9/21/2018 (5 days)
- Staff Leader: Clayton Mayfield
(cmayfield@spp.org)
- Working Group Approval: ESWG

Benchmarking

- Start: 4/30/2018
- End: 7/12/2018 (Member's Final Approval)
- Member Review Time:
 - Pass 1: 6/7/2018 – 6/14/2018 (5 days)
 - Pass 2: 7/5/2018 – 7/12/2018 (5 days)
- Staff Leader: Nikki Roberts (nroberts@spp.org)
- Working Group Approval: ESWG

Model Topology Updates

- Start: Pass 1 Powerflow Model (7/17/2017)
- End: 3/1/2018 (General topology changes)
- End: 8/6/2018 (New NTCs and withdrawals approved by the Board and NTC re-evaluations)
- Member Review Time:
 - Topology Lockdown: 3/1/2018
 - NTC/Re-Evals: 8/6/2018
- Staff Leader: David Duhart (dduhart@spp.org)
- Working Group Approval: TWG

Constraint Assessment

- Start: 8/2/2018
- End: 9/27/2018 (Member's Final Approval)
- Member Review Time:
 - 8/31/2018 – 9/6/2018 (5 days)
 - 9/17/2018 – 9/21/2018 (5 days)
- Staff Leader: Clayton Mayfield
(cmayfield@spp.org)
- Working Group Approval: TWG

Economic model conversion to powerflow

- Start: 8/2/2018
- End: 10/10/2018 (Member's Final Approval)
- Member Review Time:
 - 10/3/2018 – 10/9/2018 (5 days)
- Staff Leader: Zack Bearden (zbearden@spp.org)
- Working Group Approval: TWG

Base Reliability Needs Assessment

- Start: 8/2/2018
- End: 11/5/2018
- Staff Leader: Jason Speer (jspeer@spp.org)

BA Reliability Needs Assessment

- Start: 9/27/2018
- End: 1/7/2019
- Staff Leader: Jason Speer (jspeer@spp.org)

Economic Needs Assessment

- Start: 11/1/2018
- End: 1/7/2019
- Staff Leader: Nikki Roberts (nroberts@spp.org)

Policy Needs Assessment

- Start: 11/1/2018
- End: 1/7/2019
- Staff Leader: Nikki Roberts (nroberts@spp.org)

Operational Needs Assessment

- Start: 11/1/2018
- End: 1/7/2019
- Staff Leader: Will Tootle (wtootle@spp.org)

Short Circuit Needs Assessment

- Start: 11/1/2018
- End: 1/7/2019
- Staff Leader: Jason Terhune (jterhune@spp.org)

DPP Window

- Start: 1/8/2019
- End: 2/6/2019
- Member Review Time:
 - Transmission-planning response window (30 calendar days)
- Staff Leader: Ellen Bailey (ebailey@spp.org)

Staff Solutions Development

- Start: 1/8/2019
- End: 3/20/2019
- Staff Leaders:
 - Reliability: Kelsey Allen (kallen@spp.org)
 - Economic: Nikki Roberts (nroberts@spp.org)
 - Policy: Nikki Roberts (nroberts@spp.org)
 - Operational: Will Tootle (wtootle@spp.org)
 - Short Circuit: Jason Terhune (jterhune@spp.org)

DPP Evaluations

- Start: 1/8/2019
- End: 3/20/2019
- Staff Leaders:
 - Reliability: Kelsey Allen (kallen@spp.org)
 - Economic: Liz Gephardt (lgephardt@spp.org)
 - Policy: Nikki Roberts (nroberts@spp.org)
 - Operational: Will Tootle (wtootle@spp.org)
 - Short Circuit: Jason Terhune (jterhune@spp.org)

Initial Reliability Portfolio Development

- Start: 2/7/2019
- End: 3/20/2019
- Staff Leader: Kelsey Allen (kallen@spp.org)

Project Grouping – Phase 1 (Conceptual Cost Estimate)

- Start: 1/18/2019
- End: 4/23/2019
- Staff Leader: Clayton Mayfield (cmayfield@spp.org)

Study Cost Estimates – Round 1

- Start: 4/24/2019
- End: 5/16/2019
- Member Response Time:
 - 4/24/2019 – 5/16/2019 (16 days)
- Staff Leader: John O'Dell (jodell@spp.org)

Project Grouping – Phase 2 (Study Cost Estimate – Re-rank)

- Start: 5/15/2019
- End: 5/16/2019
- Staff Leader: Clayton Mayfield (cmayfield@spp.org)

Planning Summit

- Start: 5/17/2019
- End: 6/4/2019
- Member Review Time:
 - Summit Materials (7 days prior to meeting)
- Staff Leader: Ellen Bailey (ebailey@spp.org)

Project Grouping – Phase 3

(Conceptual + Study Cost Estimates using Summit Feedback)

- Start: 6/5/2019
- End: 6/19/2019
- Staff Leader: Clayton Mayfield (cmayfield@spp.org)

Study Cost Estimates – Round 2

- Start: 6/20/2019
- End: 6/26/2019
- Member Response Time:
 - 6/20/2019 – 6/26/2018 (5 days)
- Staff Leader: John O'Dell (jodell@spp.org)

Final Reliability Portfolios Development

- Start: 6/26/2019
- End: 8/5/2019
- Staff Leader: Kelsey Allen (kallen@spp.org)

Project Grouping – Phase 4

(Study Cost Estimate II – Final Re-rank)

- Start: 6/27/2019
- End: 7/8/2019
- Staff Leader: Clayton Mayfield (cmayfield@spp.org)

Project Grouping – Final Determination

- Start: 6/28/2019
- End: 7/8/2019
- Staff Leader: Clayton Mayfield (cmayfield@spp.org)

Optimization

- Start: 7/9/2019
- End: 7/17/2019
- Staff Leader: James Bailey (jbailey@spp.org)

Portfolio Consolidation

- Start: 7/18/2019
- End: 8/2/2019
- Staff Leader: Liz Gephardt (lgephardt@spp.org)

Staging

- Start: 8/5/2019
- End: 8/15/2019
- Staff Leader: Kirk Hall (khall@spp.org)

Benefit Metrics Calculation

- Start: 8/2/2019
- End: 8/26/2019
- Staff Leader: Antonio Barber (abarber@spp.org)

Stability Analysis

- Start: 8/5/2019
- End: 8/26/2019
- Staff Leader: Chris Jamieson (cjamieson@spp.org)

Sensitivity Analysis

- Start: 8/5/2019
- End: 8/26/2019
- Member Review Time:
 - 8/19/2019 – 8/23/2019 (5 days)
- Staff Leader: Clayton Mayfield (cmayfield@spp.org)

Final Reliability Assessment

- Start: 8/5/2019
- End: 8/27/2019
- Staff Leader: Dee Edmondson
(dedmondson@spp.org)

Rate Impacts/ATRR

- Start: 8/15/2019
- End: 8/28/2019
- Staff Leader: Antonio Barber (abarber@spp.org)

Final Report

- Start: 8/1/2019
- End: 9/18/2019
- Staff Leader: Ellen Bailey (ebailey@spp.org)

TWG/ESWG Final Approvals

- Start: 9/26/2019
- End: 10/3/2019
- Member Review Time:
 - 9/26/2019 – 10/3/2019 (5 days)
- Staff Leaders:
 - TWG – Kirk Hall (khall@spp.org)
 - ESWG – Amber Greb (agreb@spp.org)

MOPC and SPP Board

- Start: 9/6/2019
- End: 10/29/2019
- Member Review Time:
 - MOPC: 10/7/2019 – 10/15/2019 (7 days)
 - SPP Board: 10/22/2019 – 10/29/2019 (5 days)



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2019 ITP Methodology Approvals Summary

Juliano Freitas

April 25th, 2018

Objective

- Bring to ESWG Member's attention the main motions related to the 2019 ITP methodologies approved by the group since July 2017
- Review ITP Manual language that has a high impact on study results

Approvals

- **Model Build (8/16/2017)**
 - Discussion: Two data sources have been used in previous ITP studies, EIA Annual Energy Outlook (AEO) Report and Lazard Levelized Cost of Energy Analysis. These sources were used to create a chart comparing prices for prototypes for the following unit types: combined cycles, combustion turbines, coal generators, nuclear units, wind units, and solar
 - Approval: Use Lazard high cost CC prototypes and low cost CT prototypes and adding large scale reciprocating engines as a prototype option, and eliminating nuclear and coal as options

Approvals

- **Resource Planning (9/13/2017)**
 - Discussion: Four options were included; a high cost and low cost gas reciprocating engine based on Lazard data, and a high cost and low cost option developed by stakeholders. The group felt that it was important to use publicly available data for our prototype options
 - Approval: Inclusion of a reciprocating engine prototype using an average of the Lazard (high and low cost) data, with a 50 MW installation increment

Approvals

- **Renewable Accreditation (9/13/2017)**
 - Approval: Use a 20% capacity accreditation on new wind, with a cap for renewables of 12% of the load
 - Approval: Use a 70% capacity accreditation on new utility scale solar, with a cap for renewables of 12% of the total load

Approvals

- **Must Run (9/13/2017)**
 - Approval: Assign must-run designations to co-generation and nuclear units only, unless an exception is requested with pass 2 of the Gen Review (by November 17th, 2017), and approved by the ESWG

Approvals

- Futures (10/4/2017)
 - Approval: 18+ GW (year 2), 25GW (year 5) and 26GW (year 10) of wind generation in Future 1. 29GW (year 5) and 32GW (year 10) of wind generation in Future 2
 - Approval: 0.25+ GW (year 2), 3GW (Year 5) and 5GW (year 10) of Solar generation in Future 1. 4GW (Year 5) and 7GW (Year 10) in Future 2
 - Approval: Emerging Technologies Future as Future 2

Approvals

- Consolidation (10/12/2017)
 - Approval: Review projects on an individual basis for final portfolio consolidation

Approvals

- **RAR (11/8/2017)**
 - Discussion: The first option was to only include resources that meet the resource inclusion criteria as outlined in the ITP manual. The second option was to develop levels of inclusion based on the answers provided in the RAR and waiver request forms
 - Approval: Implementation plan for Resource Addition Requests and Waivers
- **Operational Needs (11/8/2017)**
 - Approval: Economic Operational Needs Solution Evaluation and Reliability Operational Needs Solution Evaluation language for the 2019 ITP Scope

Approvals

- Sensitivities (11/8/2017)
 - Discussion: Utilize 1 standard deviation, does not utilize LFU methodology
 - Approval: Methodology to be used for demand sensitivities in the 2019 ITP Study
 - Discussion: Utilize 2 standard deviation, 95% confidence level
 - Approval: Methodology to be used for natural gas sensitivities in the 2019 ITP
 - Approval: Motion to pass on performing additional wind and solar sensitivities

Approvals

- **Stability Assessment (11/15/2017)**
 - Discussion: After the portfolio is finalized, perform a voltage stability analysis to assess the voltage performance of the planned system
 - 2015 ITP10 Wind transfers W->E
 - 2017 ITP10 Generation transfers N->S, S->N, W->E
 - Approval: Motion to approve the option 1 for voltage stability assessment

Approvals

- Portfolio Consolidation (12/14/2017)

				Example 1		Example 2	
No.	Scenario 3 (Non-Competing Projects) Considerations	Possible Points	Threshold	138 kV Rebuild	Score	New 345 kV line	Score
1	40-yr (1-year) APC B/C in Selected Future	50	1.0 (0.9)	1.9	0.0	1.9	44.4
	40-yr (1-year) APC B/C in Opposite Future		0.8 (0.7)	0.75		0.9	
	40-yr (1-year) APC Net Benefit in Selected Future (\$M)		N/A	9.3		67.5	
	40-yr (1-year) APC Net Benefit in Opposite Future (\$M)		N/A	-2.6		-7.5	
2	Congestion Relieved in Selected Future (by need(s), all years)	10	N/A	80%	8.0	100%	10.0
	Congestion Relieved in Opposite Future (by need(s), all years)	10	N/A	30%	3.0	40%	4.0
3	Operational Congestion Costs or Reconfiguration (\$M/yr or hrs/yr)	10	>0	\$4.5	4.5	\$8.0	8.0
4	New EHV	7.5	Y/N	N	0.0	Y	7.5
5	Mitigate Non-Thermal Issues	7.5	Y/N	N	0.0	Y	7.5
6	Long Term Viability (Eg 2013 ITP20)	5	Y/N	N	0.0	N	0.0
Total Score (70 Pass)					15.5		81.4

Approvals

- **Portfolio Consolidation (12/14/2017)**
 - Approval: consolidation methodology Option 2 as presented, including the consideration-specific minimum thresholds, points possible, calculation of points awarded, and scenario 3 total score threshold, with the addition of ARR project considerations for consideration 6. Project narratives may support or oppose the results of this systematic approach; in cases where a narrative opposes these results, associated materials will be brought to the ESWG and TWG for review and feedback

Approvals

- **Resource Plan (1/11/2018)**
 - Approval: Motion to remove sales revenue of wind generation that does not have long-term firm transmission service from the APC benefit calculations as a benefit calculation mitigation of wind resources without firm transmission service
- **Renewable Resource Plan (1/11/2018)**
 - Approval: Motion that load serving entities who either own or have a signed PPA for renewable resources will get credit for those resources when meeting their Renewable Policy Standards

Approvals

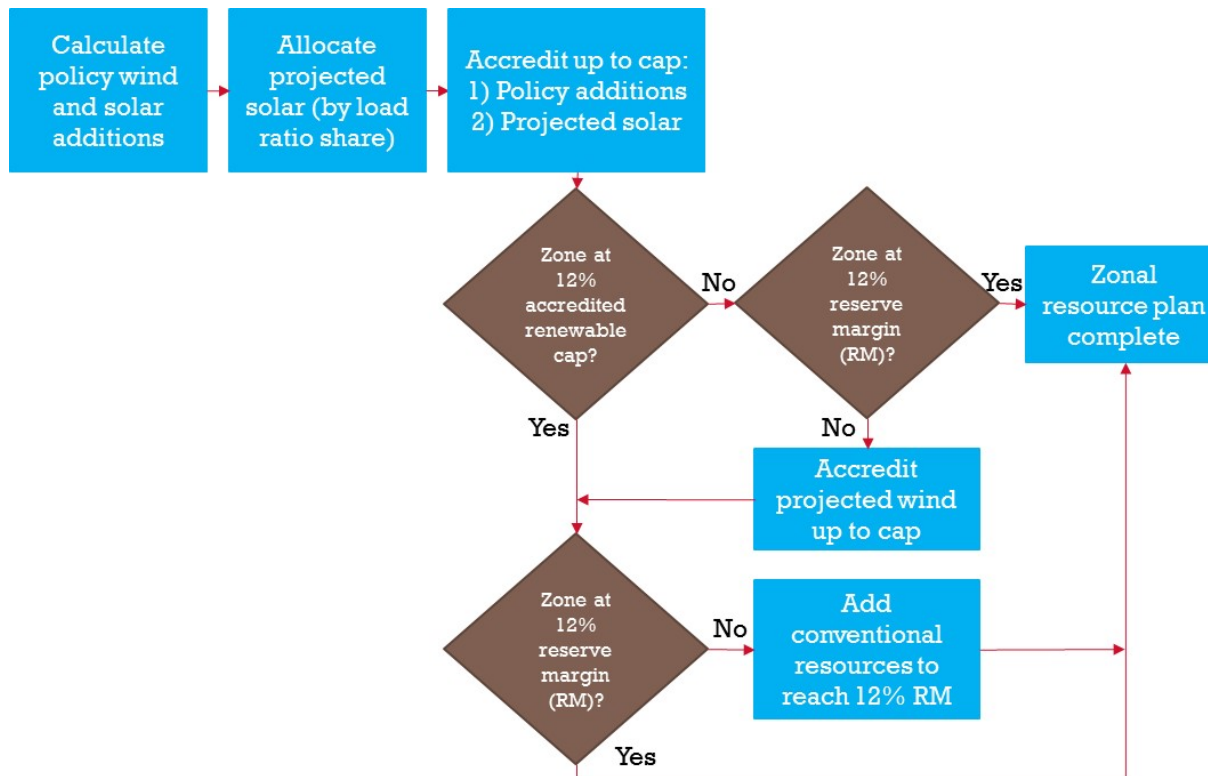
- **Futures (1/11/2018)**
 - **Discussion: Apply EV energy amounts to existing demand group structure with valley fill load shape adjustment**
 - **Less granular approach**
 - **Loads driving needs will be investigated during needs assessment and portfolio development**
 - **Approval: Accept SPP staff's recommendation for Future 2 EV energy penetration methodology**

Approvals

- Resource Plan (1/22/2018)
 - Discussion: This approval is related to the fact that some companies have a different load forecast for resource planning
 - Approval: Motion for SPP to send out a data request for Load forecast for resource planning to accommodate controllable curtailable resources, without impact to the schedule

Approvals

- Resource Plan (1/22/2018)



Approvals

- Approval: Motion to use a split representative of the active GI Queue of wind and solar resources for policy additions.
- Approve the allocation of projected solar additions based on load ratio share
- Approve implementation of the approved scope language for renewable generation accreditation, including:
- Allocation of projected wind additions to maximize accreditation to deficient zones, up to zonal renewable cap for new resources
 - Order of accreditation
 - Existing
 - Policy wind/solar
 - Projected solar
 - Projected wind
 - Conventional

Approvals

- Modeling (1/22/2018)

New and existing sites

- Develop automation to retrieve energy profiles from raw 2012 NREL wind and solar data
- Develop automation to create energy profile per site by performing data analysis on multiple profiles in proximity to site
- Approval: Motion to use of 2012 NREL solar data, and the proposed methodology for the development of profiles for wind and solar sites

Approvals

- **APC/New Resources (3/15/2018)**
 - Discussion: Assumption #1: Sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone
 - Sales from generators not included in the rates of a load serving entity should be excluded from the regional APC calculation
 - Approval: Motion to approve assumption 1, sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone

Approvals

- **APC/New Resources (3/15/2018)**
 - Approval: To keep the assumption that future proxy wind will not have transmission service, based on current trends, and will not be included in a load serving entity's rates
 - Approval: Motion to apply the implementation of the following assumptions to all existing resources:
 - a. Sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone
 - b. All generation without firm transmission service to load should be subject to generator LMP price
 - Approval: Motion to assume that proxy conventional and solar generation will obtain transmission service and through those arrangements will be included in a load serving entity's rates

Approvals

- **Curtailement Price (3/15/2018)**
 - Approval: Implementation of the curtailment price methodology (as shown below) for the 2019 ITP

Curtailement Price Methodology Implementation

- What is the commencement date and construction start date for the existing wind and resource addition request wind?
 - Commencement date is determined in the generation review milestone
 - Construction start date was not needed this cycle
 - All existing wind and resource addition request wind have a projected commencement date less than 1/1/2020
 - For future ITP studies, the generation review milestone would need to be adjusted to survey stakeholders for construction start date when commencement date is not prior to 1/1/2020

Curtailement Price Methodology Implementation

- What is the commencement date and construction start date of projected wind additions?
 - Use per year projections beginning 2021 from 2019 ITP scope development to determine a commencement date for annual additions thereafter
 - Use a 4 year lead time to determine construction start date for annual additions
 - The 4 years is understood to be the maximum time allowed to complete construction and still be eligible for the production tax credit
 - Over 15GW of active GI queue positions have a 2016 or prior year queue entry date that may be eligible for the production tax credit
 - Determine curtailment price for cumulative amount to be modeled in year 5 (2024) and year 10 (2029)
 - Implies that 2024 is the last year projected wind additions will be modeled with a -\$35 curtailment price

Approvals

- **Curtailement Price (3/15/2018)**
 - Discussion: This discussion was related to possibly changing the wind curtailment price from -\$35 and \$0
 - Approval: Recommendation for no additional ITP manual changes to renewable pricing for the 2019 ITP due to the potential risks to the schedule

ITP Manual

- Wind and Solar VOM Price (4/10/2018)
 - MOPC Approval: RR 276 to apply \$0/MWh for all wind and solar units

ITP Manual

- **Contingency Screening**
 - After the initial economic simulation dispatch results have been created, the resulting contingencies will be limited to the following types of planning events identified in the NERC Standard TPL-001 for the 100 kV-and-above transmission system:
 - P1.2 and P1.3 single-branch contingencies on the 100 kV and above system exceeding 50 percent loading in the peak and off-peak hours under system intact conditions for the translated areas.
 - P1.2 and P1.3 single-branch contingencies on the 200 kV and above system exceeding 25 percent loading in the peak and off-peak hours under system intact conditions for the SPP footprint.
 - Contingencies included in the SPP permanent and temporary flowgates, including P7 events.
 - Other P1, P2, P4 and P5 events as potential contingencies.

ITP Manual

- **Economic Solutions Evaluation**
 - All solutions will be evaluated based on their one-year benefit-to-cost ratio (B/C) and 40-year net present value (NPV) B/C, using conceptual cost estimates.
 - If a solution mitigates congestion for an economic need and has at least a 0.5 one-year B/C or a 1.0 40-year NPV B/C, it will be included for further consideration during portfolio development.
 - For the 40-year NPV B/C, the average SPP net plant carrying charge and an in-service date of year 5 will be applied. Regardless of the type of need the solution was submitted to address

ITP Manual

- **Economic Portfolio Development**
 - Solutions mitigating economic needs are ranked by their cost effectiveness, net APC benefit and qualitative benefits for each need or set of needs and categorized into one or more of the following groupings:
 - **Cost effective:** Solutions with the lowest cost with respect to the congestion relief they provide on individual flowgates will be selected.
 - **Highest net APC benefit:** Solutions with the highest difference between one-year APC benefit and one-year project cost will be selected.
 - **Multi-variable:** Top-ranking projects in the other two groupings, as well as qualitative benefits that the other groupings may not capture, will be considered when selecting projects.

ITP Manual

- **Economic Portfolio Development**

- In addition to economic performance, consideration of the following information may be given to the top-ranking solutions:
 - One-year project cost, APC benefit, and B/C.
 - 40-year NPV cost, APC benefit, and B/C.
 - Congestion relief that a project provides for the economic needs of that future and year.
 - Project overlap, or when two or more projects that relieve the same congestion are in a single portfolio.
 - The potential for a project to mitigate multiple economic needs.
 - Any potential routing or environmental concerns with projects.
 - Any long-term concerns about the viability of projects.
 - Seam and non-seam project overlap.
 - Individual project robustness, which includes, event file modification.
 - The potential for a project to mitigate reliability, operational, and public policy needs, which covers current market congestion.
 - The potential for a project to address non-thermal issues.
 - The need for new infrastructure versus leveraging existing infrastructure.
 - Larger-scale solutions that provide more robustness and additional qualitative benefits.
 - Additional consideration may result in changes in top-ranking solutions, including elimination of solutions.

ITP Manual

- **Economic Portfolio Development**
 - The top-ranking economic projects will be tested in a new set of base models that include the corresponding reliability, policy, and operational economic portfolios. The economic projects will be tested individually within each group to assure only those with at least a 0.9 one-year B/C or 1.0 40-year NPV B/C move forward.

ITP Manual

- **Public Policy Portfolio Development**
 - Solutions mitigating public policy needs will be ranked by need based on their APC benefit in relation to their conceptual cost. Once study-level cost estimates are available, the ranking will be adjusted for that limited set of top-ranking solutions based on the updated cost. The highest-ranked project for each need will be selected for a grouping and tested individually within the policy grouping to ensure there is no redundancy of need mitigation within the set of projects



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2019 ITP External Resource Planning

Nikki Roberts

April 25, 2018

Objective

- Provide update for AECI resource plan
- Discuss next steps

External Resource Plan Background

- ESWG approved using the MTEP18 data for MISO and TVA on April 6 via email vote
- The recommendation posted by SPP staff for AECI did not properly reflect the intention to coordinate with AECI to determine the proper resource plan additions/assumptions for both futures in the 2019 ITP, and therefore a recommendation for AECI has not yet been approved

AECI Resource Plan Update

- SPP staff is currently working with AECI to develop a resource plan that more appropriately represents AECI. Currently discussing:
 - No retirements or renewable resource additions in Future 1
 - Aged based retirements and renewable resource additions in Future 2
 - Any conventional generation will be added for capacity using the CC/CT ratio once determined, as is consistent with the Scope

Next Steps

- SPP staff to continue working with AECI to develop an appropriate resource plan and post results as soon as available.
- SPP staff will seek approval either via email vote, or at the May ESWG meeting.



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ITP Resource Planning Phase II

Amber Greb

April 25th, 2018

Objective

- Review inputs
- Provide preliminary zonal shortfalls
- Allocation of projected wind and solar
- Go over next steps

Inputs

- Renewables

Incremental Additions	2021	Future 1: Reference Case		Future 2: Emerging Technologies	
		2024	2029	2024	2029
Solar (MW)	0	2,767	4,767	4,067	7,267
Wind (MW)	0	5,868	6,868	9,868	12,868

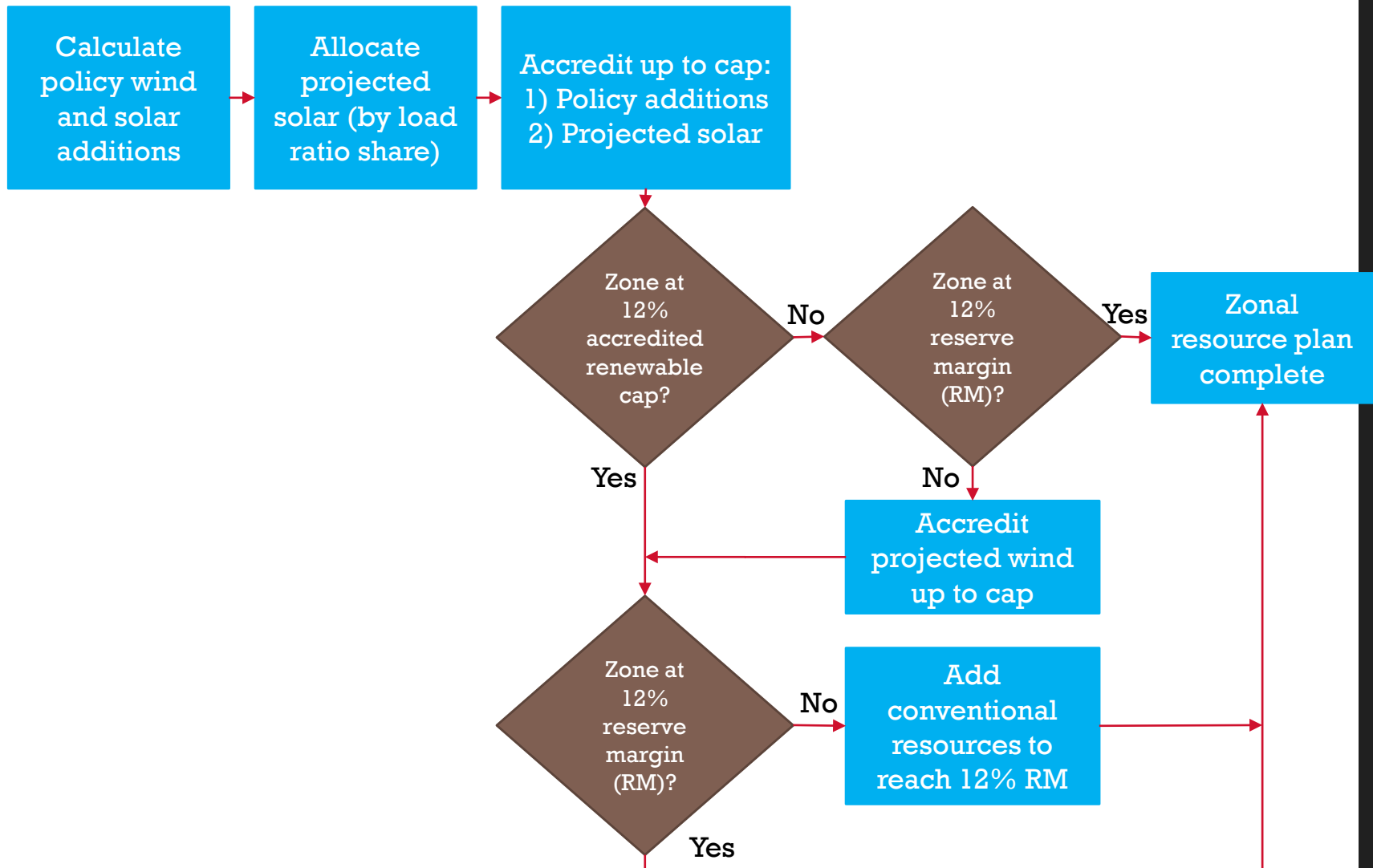
Inputs

Accumulative Conventional Capacity Change								
Zone	F1 2024	%	F1 2029	%	F2 2024	%	F2 2029	%
AEPW	(917)	-8.2%	(1,654)	-14.8%	(1,611)	-14.4%	(2,441)	-21.9%
EMDE	0	0.0%	(92)	-5.9%	0	0.0%	(92)	-5.9%
GMO	(8)	-0.5%	(8)	-0.5%	(8)	-0.5%	(8)	-0.5%
GRDA	0	0.0%	0	0.0%	0	0.0%	0	0.0%
KACY	0	0.0%	(73)	-10.9%	0	0.0%	(73)	-10.9%
KCPL	0	0.0%	(51)	-1.1%	0	0.0%	(615)	-13.8%
LES	0	0.0%	0	0.0%	0	0.0%	0	0.0%
MIDW	0	0.0%	(2)	-0.6%	0	0.0%	(2)	-0.6%
MKEC	(160)	-27.3%	(320)	-54.4%	(160)	-27.3%	(320)	-54.4%
NPPD	10	0.3%	(4)	-0.1%	(204)	-5.5%	(367)	-9.9%
OKGE	(534)	-7.6%	(1,005)	-14.3%	(534)	-7.6%	(1,005)	-14.3%
OPPD	(291)	-11.3%	(291)	-11.3%	(439)	-17.0%	(614)	-23.8%
SPRM	0	0.0%	(184)	-22.7%	0	0.0%	(184)	-22.7%
SPS	(327)	-5.0%	(941)	-14.4%	(327)	-5.0%	(941)	-14.4%
SUNC	0	0.0%	0	0.0%	0	0.0%	0	0.0%
SWPA	0	0.0%	0	0.0%	0	0.0%	0	0.0%
UMZ	(17)	-0.2%	(373)	-5.4%	(17)	-0.2%	(373)	-5.4%
WERE	(11)	-0.2%	(84)	-1.4%	(11)	-0.2%	(84)	-1.4%
WFEC	(50)	-3.1%	(182)	-11.2%	(50)	-3.1%	(182)	-11.2%

Inputs

Accumulative Peak Load Change				
Zone	2024	%	2029	%
AEPW	107	1.0%	525	5.0%
EMDE	13	1.1%	37	3.2%
GMO	(67)	-3.7%	(58)	-3.2%
GRDA	113	9.6%	114	9.7%
KACY	5	1.0%	13	2.4%
KCPL	(232)	-6.2%	(242)	-6.5%
LES	16	2.1%	40	5.1%
MIDW	9	2.1%	33	7.6%
MKEC	(16)	-2.2%	(3)	-0.4%
NPPD	59	1.5%	152	3.9%
OKGE	122	1.8%	317	4.7%
OPPD	(20)	-0.8%	(25)	-1.0%
SPRM	(1)	-0.2%	(4)	-0.6%
SPS	167	2.4%	491	7.2%
SUNC	7	1.2%	27	4.6%
SWPA	15	2.2%	45	6.7%
UMZ	185	3.7%	486	9.7%
WERE	149	2.6%	370	6.5%
WFEC	49	2.6%	141	7.5%

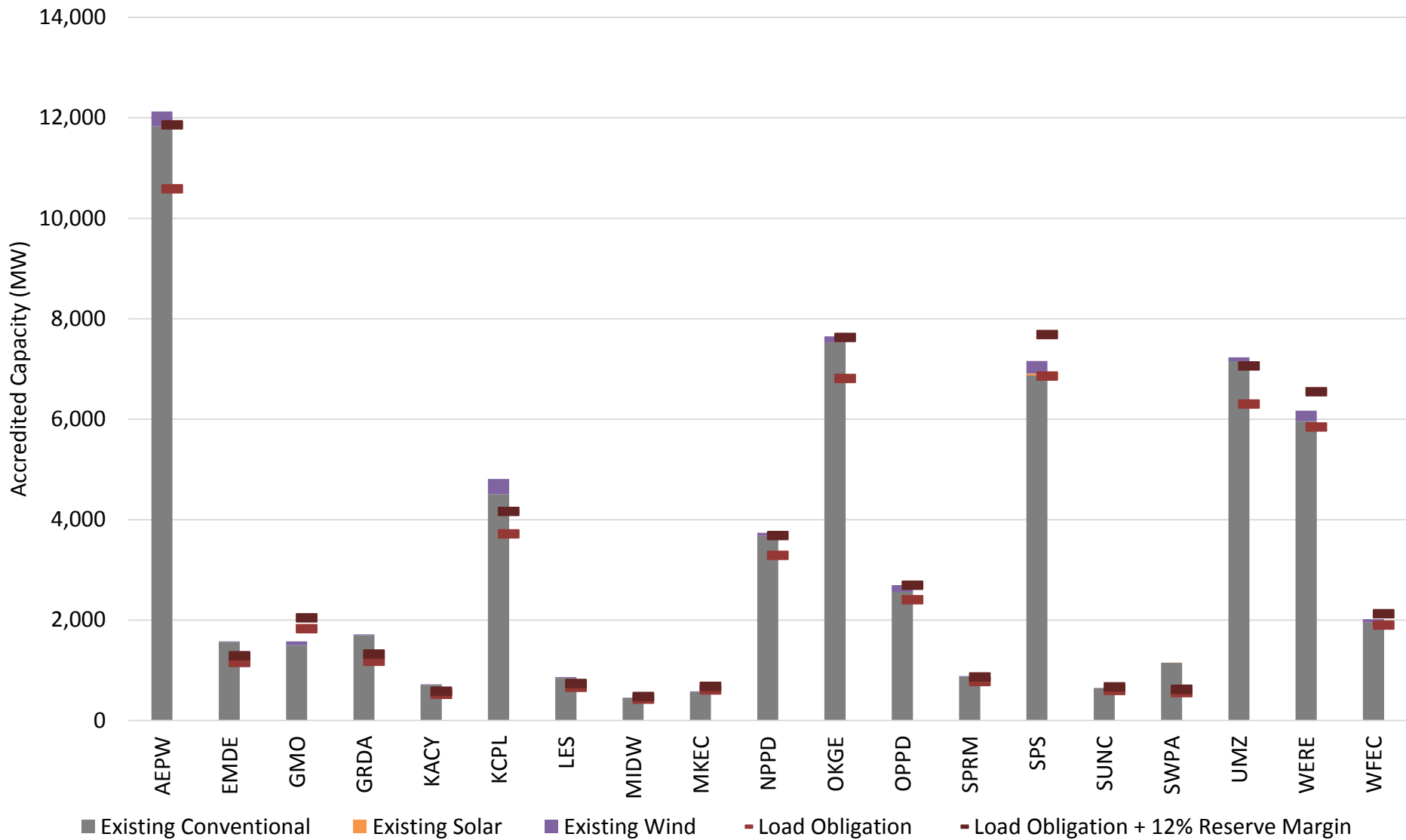
Resource Planning Decision Tree



Important Notes

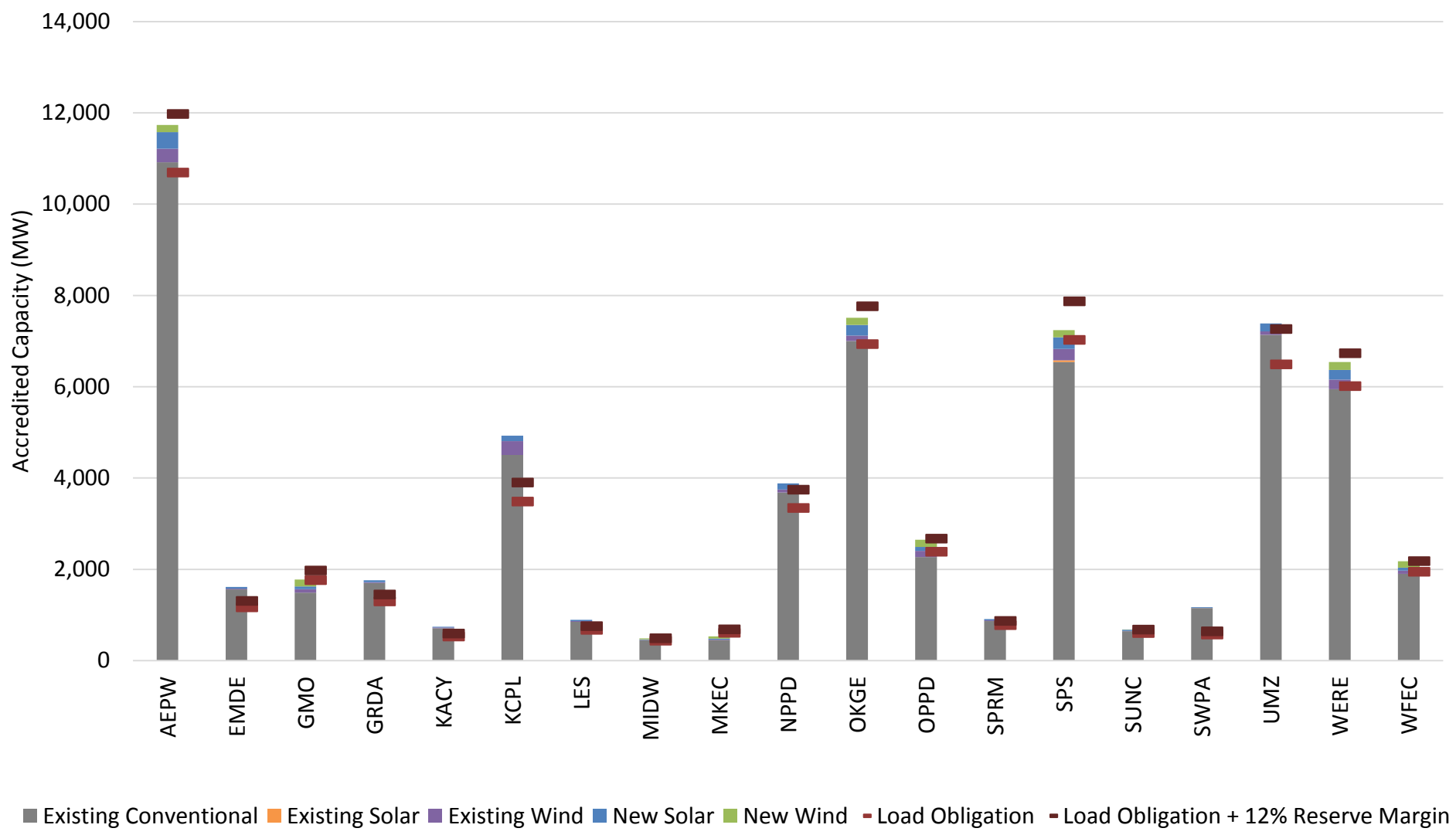
- Wind was utilized to meet zonal reserve margins
- Projected wind will not be assigned ownership to zones in the economic model
- Projected wind will not directly impact zonal APC calculations
- Load Obligation includes Purchase Power Agreements (PPAs) where the seller carries the load and reserves

Future 1 Resource Adequacy By Zone - 2021



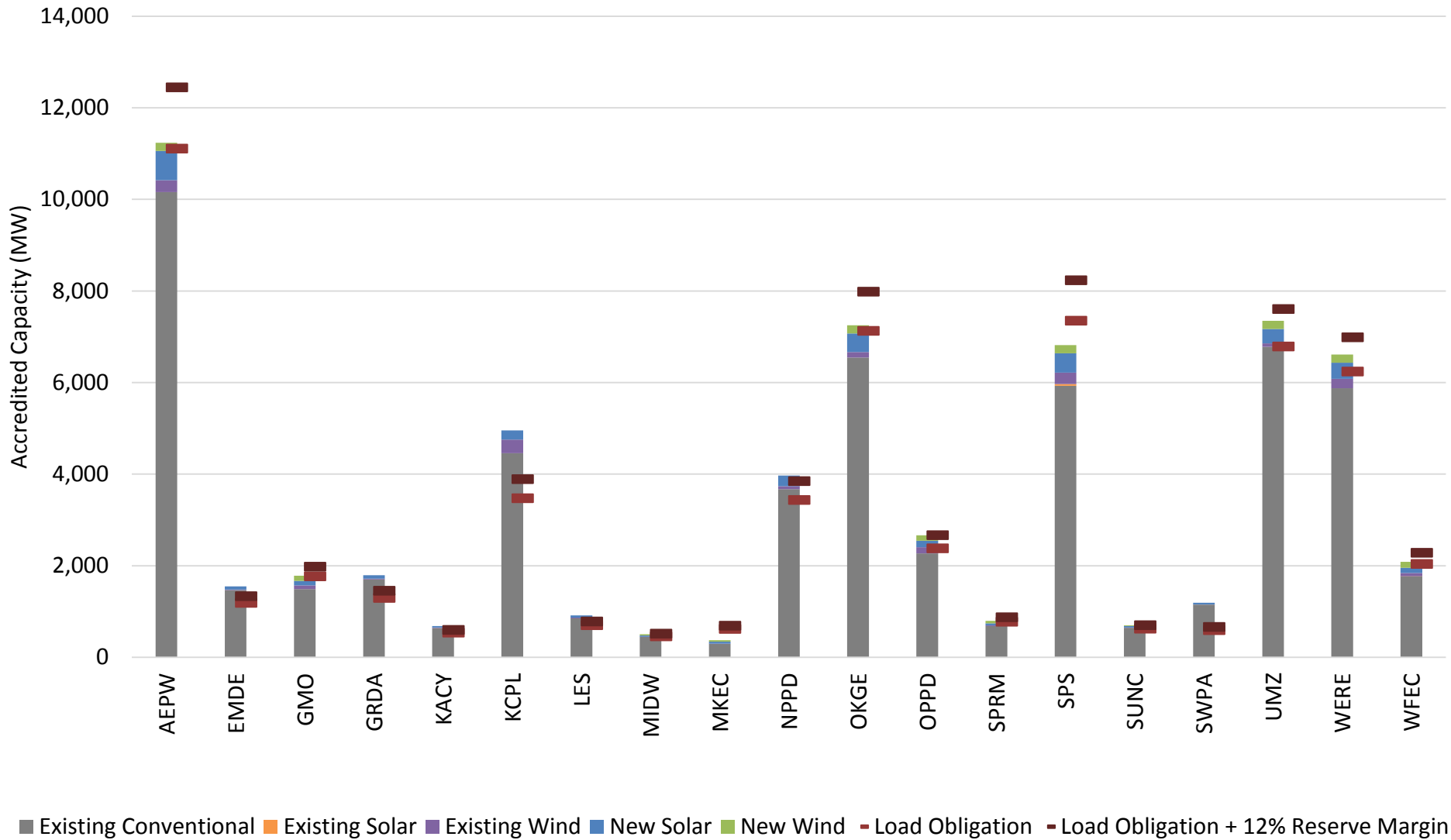
*Load obligation shown includes losses

Future 1 Resource Adequacy By Zone - 2024



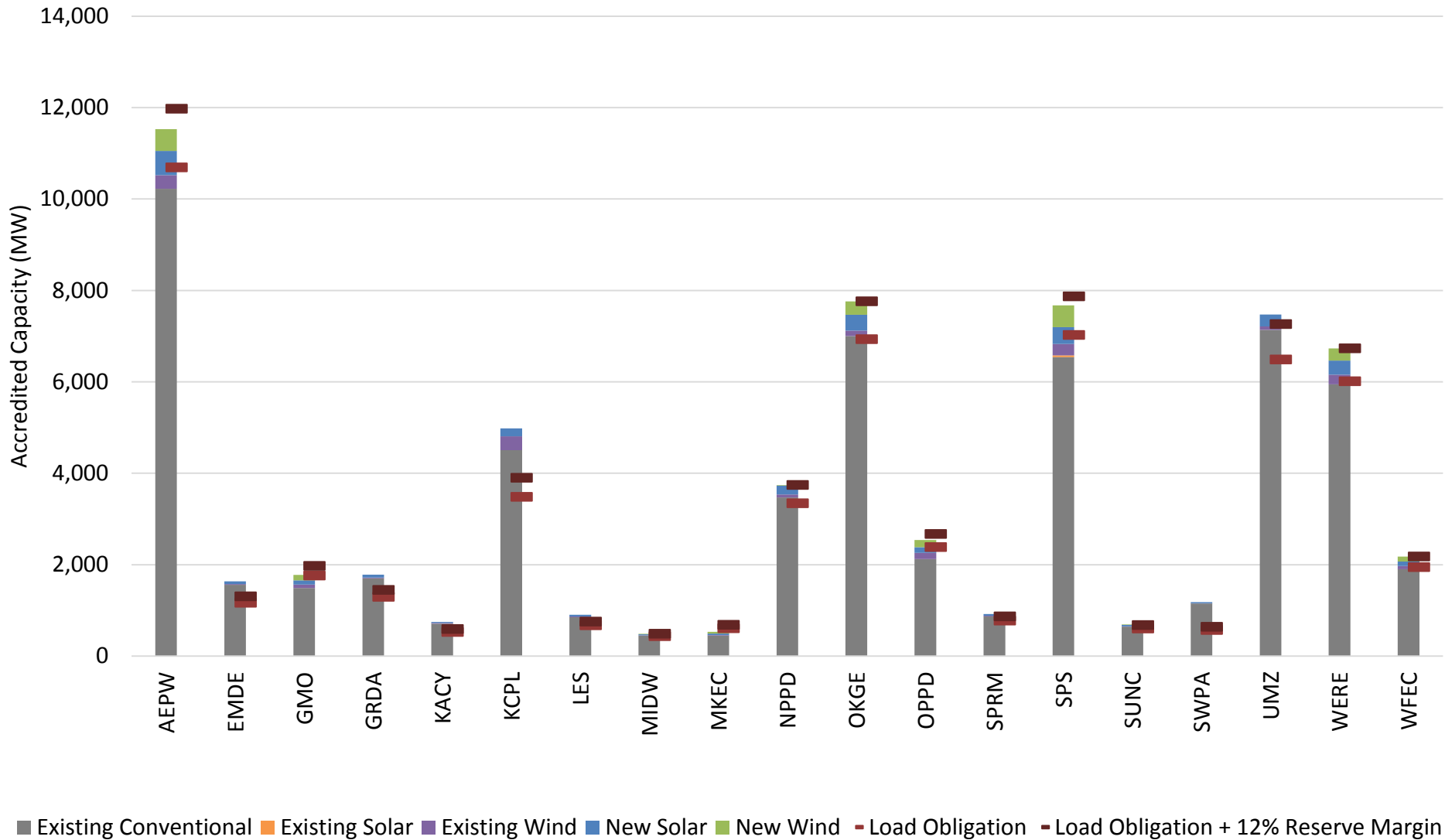
*Load obligation shown includes losses

Future 1 Resource Adequacy By Zone - 2029



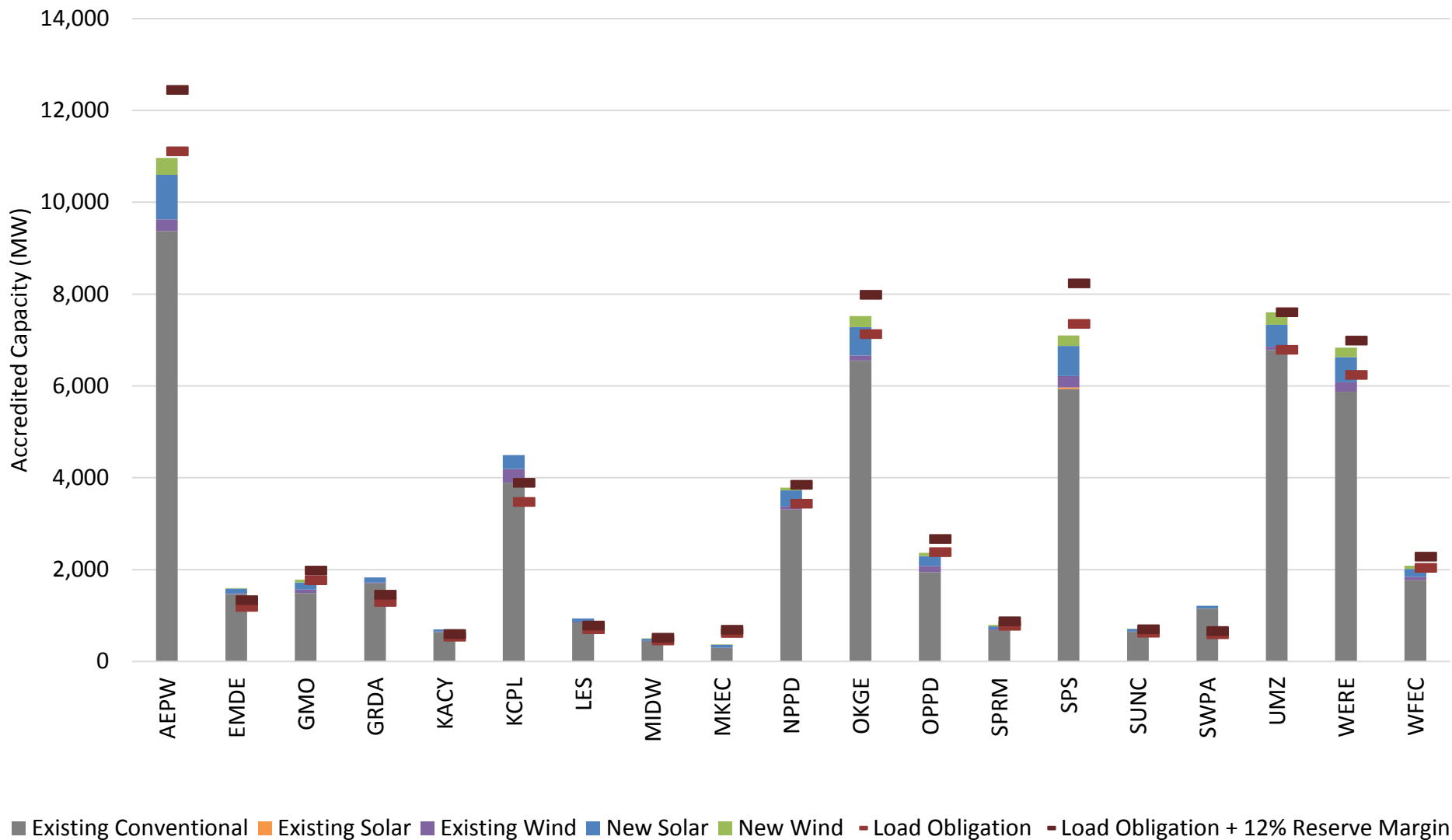
*Load obligation shown includes losses

Future 2 Resource Adequacy By Zone - 2024



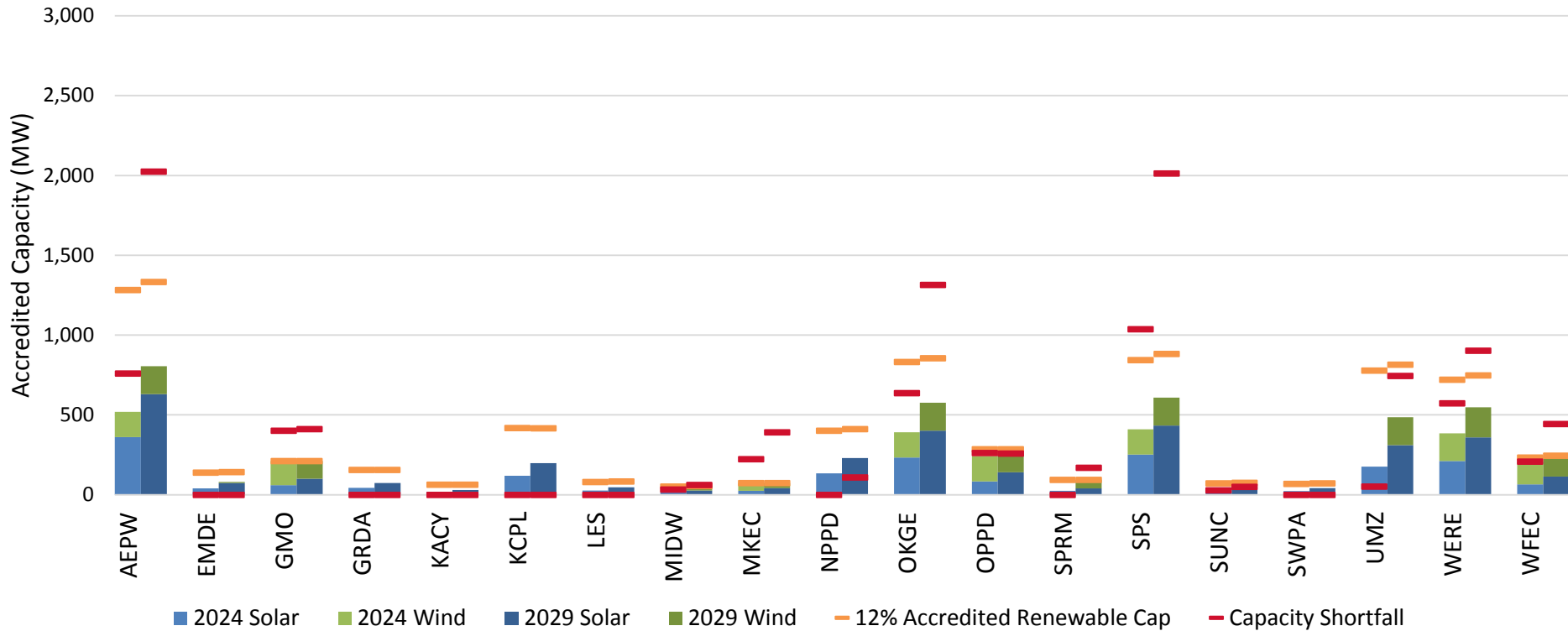
*Load obligation shown includes losses

Future 2 Resource Adequacy By Zone - 2029

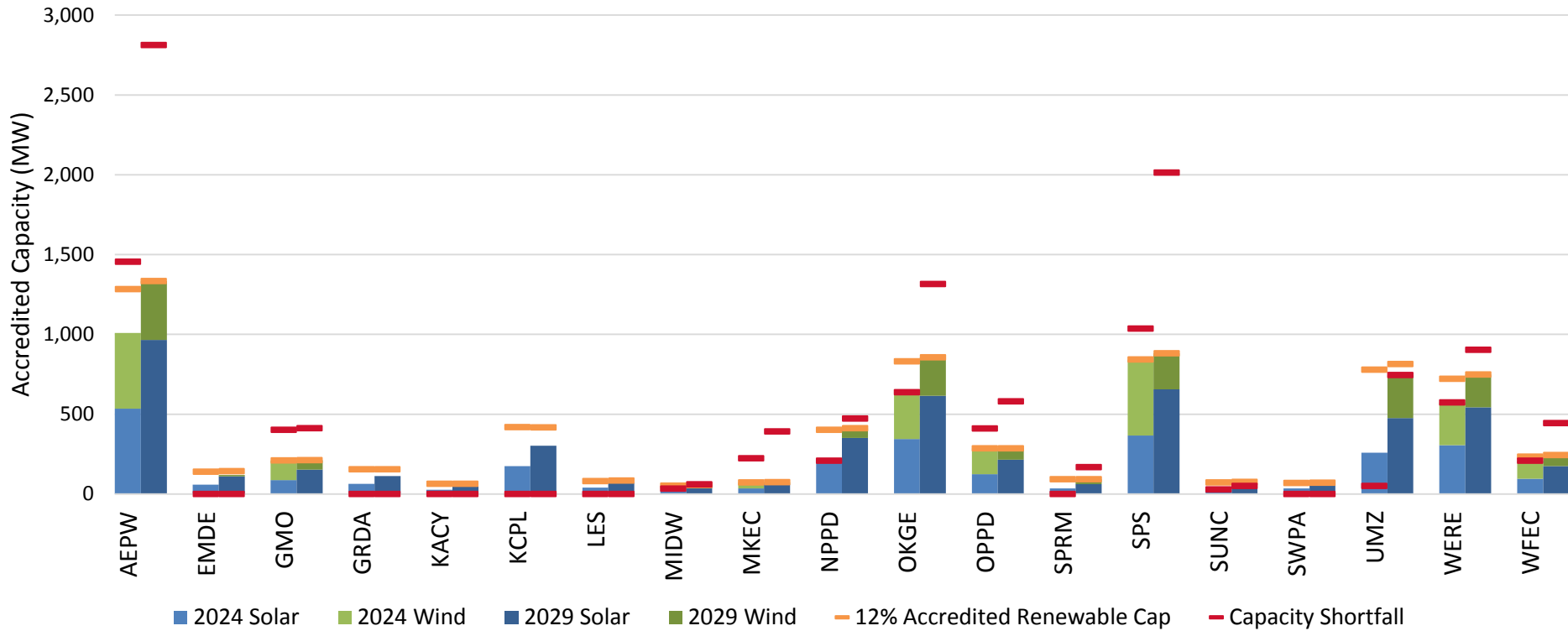


*Load obligation shown includes losses

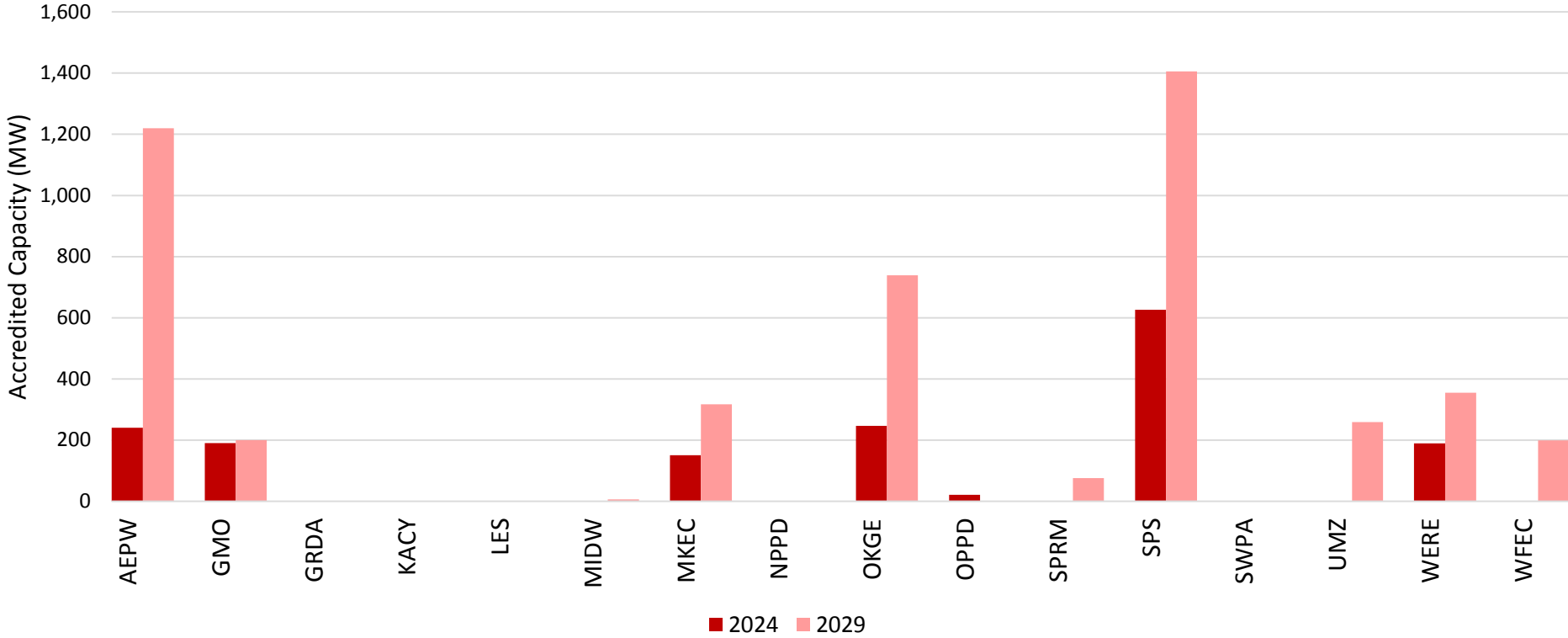
Future 1 Accredited Wind & Solar Additions



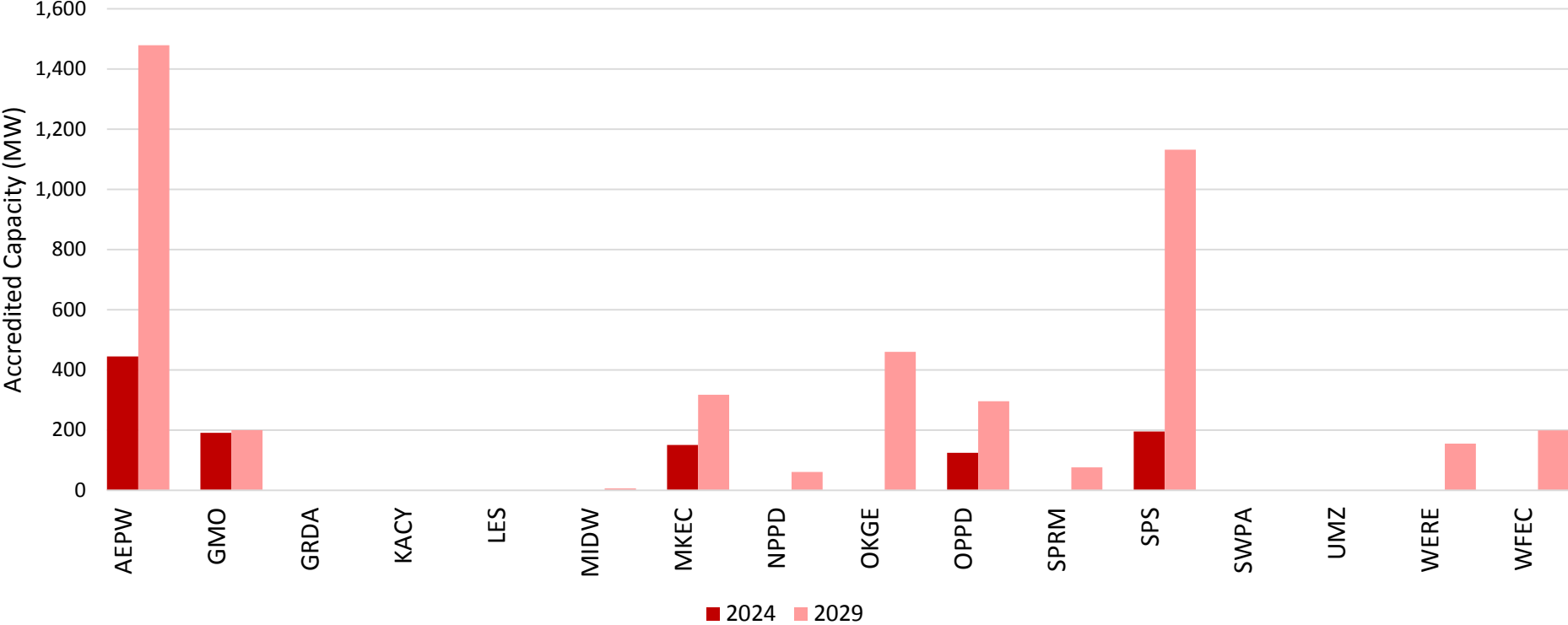
Future 2 Accredited Wind & Solar Additions



Future 1 Capacity Shortfalls by Zone



Future 2 Capacity Shortfalls by Zone



Next Steps

- Determine CC, CT and Reciprocating Engines additions through Strategist
- Allocate additions to zones
- Feeds into Siting Plan

Appendix

Future 1 2021 Accredited Capacity (MW)												
Zone	Existing Conventional	Existing Solar	Existing Wind	Existing DC Ties & PPAs	New Solar	New Wind	Total Existing + New	Summer Peak Demand	PPA Obligations	Summer Load Obligation	Summer Load Obligation + 12% Reserve Margin	Capacity Shortfall Post-Renewable Allocation
AEPW	11,170	0	298	659	0	0	12,127	10,596	(11)	10,585	11,855	0
EMDE	1,563	0	13	0	0	0	1,575	1,156	(3)	1,153	1,291	0
GMO	1,498	0	78	0	0	0	1,576	1,825	0	1,825	2,044	467
GRDA	2,157	0	19	(458)	0	0	1,718	1,180	0	1,180	1,321	0
KACY	672	0	12	39	0	0	724	522	0	522	585	0
KCPL	4,453	0	301	55	0	0	4,808	3,727	(11)	3,716	4,162	0
LES	848	0	18	0	0	0	865	785	(128)	657	736	0
MIDW	296	0	2	155	0	0	453	437	(11)	425	476	23
MKEC	587	0	7	(11)	0	0	583	730	(124)	606	679	96
NPPD	3,699	0	64	(24)	0	0	3,739	3,903	(617)	3,286	3,680	0
OKGE	7,049	0	121	477	0	0	7,647	6,767	41	6,807	7,624	0
OPPD	2,581	0	135	(20)	0	0	2,696	2,507	(105)	2,402	2,690	0
SPRM	811	0	19	55	0	0	885	721	54	775	868	0
SPS	6,514	39	250	355	0	0	7,159	6,847	11	6,858	7,681	522
SUNC	646	0	2	0	0	0	648	601	(4)	597	668	20
SWPA	2,740	0	0	(1,593)	0	0	1,148	681	(125)	556	623	0
UMZ	6,876	0	77	277	0	0	7,230	5,001	1,300	6,301	7,057	0
WERE	5,951	0	209	9	0	0	6,168	5,726	118	5,844	6,545	377
WFEC	1,622	1	68	330	0	0	2,021	1,877	20	1,897	2,125	104

*Peak demand and load obligation shown includes losses

Future 1 2024 Accredited Capacity (MW)

Zone	Existing Conventional	Existing Solar	Existing Wind	Existing DC Ties & PPAs	New Solar	New Wind	Total Existing + New	Summer Peak Demand	PPA Obligations	Summer Load Obligation	Summer Load Obligation + 12% Reserve Margin	Capacity Shortfall Post-Renewable Allocation
AEPW	10,252	0	298	665	368	161	11,745	10,703	(11)	10,692	11,975	231
EMDE	1,563	0	13	0	40	0	1,615	1,169	(3)	1,166	1,306	0
GMO	1,490	0	78	0	61	150	1,780	1,758	0	1,758	1,969	189
GRDA	2,157	0	19	(458)	45	0	1,763	1,293	0	1,293	1,448	0
KACY	672	0	12	39	18	0	742	527	0	527	590	0
KCPL	4,453	0	301	55	120	0	4,929	3,495	(11)	3,484	3,902	0
LES	848	0	18	0	28	0	893	802	(128)	674	755	0
MIDW	296	0	2	155	15	18	486	446	(12)	434	486	0
MKEC	427	0	7	25	25	49	532	714	(105)	610	683	151
NPPD	3,709	0	64	(24)	136	0	3,885	3,962	(619)	3,343	3,744	0
OKGE	6,516	0	121	487	237	161	7,522	6,889	40	6,929	7,761	239
OPPD	2,290	0	135	(20)	86	161	2,652	2,487	(105)	2,382	2,667	16
SPRM	811	0	19	55	25	0	910	719	55	775	868	0
SPS	6,187	39	250	355	241	161	7,235	7,014	11	7,025	7,868	634
SUNC	646	0	2	0	21	7	677	608	(4)	604	677	0
SWPA	2,740	0	0	(1,593)	24	0	1,172	696	(126)	571	639	0
UMZ	6,859	0	77	277	179	0	7,391	5,186	1,300	6,486	7,264	0
WERE	5,940	0	209	9	202	161	6,521	5,875	135	6,010	6,731	210
WFEC	1,572	1	68	330	66	142	2,180	1,926	20	1,946	2,180	0

*Peak demand and load obligation shown includes losses

Future 1 2029 Accredited Capacity (MW)

Zone	Existing Conventional	Existing Solar	Existing Wind	Existing DC Ties & PPAs	New Solar	New Wind	Total Existing + New	Summer Peak Demand	PPA Obligations	Summer Load Obligation	Summer Load Obligation + 12% Reserve Margin	Capacity Shortfall Post-Renewable Allocation
AEPW	9,515	0	257	646	639	179	11,236	11,121	(11)	11,110	12,443	1,207
EMDE	1,471	0	8	0	69	0	1,547	1,193	(4)	1,189	1,331	0
GMO	1,490	0	78	0	102	110	1,781	1,767	0	1,767	1,979	199
GRDA	2,157	0	19	(458)	74	0	1,793	1,294	0	1,294	1,449	0
KACY	599	0	12	39	31	0	681	535	0	535	599	0
KCPL	4,402	0	301	55	200	0	4,958	3,485	(13)	3,472	3,889	0
LES	848	0	18	0	47	0	913	825	(128)	697	781	0
MIDW	294	0	2	155	27	28	506	470	(12)	458	513	6
MKEC	267	0	7	25	42	32	373	727	(110)	617	691	317
NPPD	3,696	0	64	(24)	233	0	3,969	4,054	(622)	3,432	3,844	0
OKGE	6,044	0	121	502	407	179	7,253	7,083	44	7,127	7,982	729
OPPD	2,290	0	135	(20)	143	115	2,663	2,482	(105)	2,377	2,663	0
SPRM	627	0	19	55	41	52	794	717	60	777	870	76
SPS	5,573	39	250	355	422	179	6,818	7,338	11	7,349	8,231	1,413
SUNC	646	0	2	0	36	14	699	628	(4)	624	699	0
SWPA	2,740	0	0	(1,593)	42	0	1,190	727	(134)	592	663	0
UMZ	6,503	0	77	277	315	179	7,351	5,487	1,300	6,787	7,602	251
WERE	5,867	0	209	9	350	179	6,613	6,096	143	6,239	6,988	374
WFEC	1,440	1	68	330	116	129	2,084	2,018	20	2,038	2,283	199

*Peak demand and load obligation shown includes losses

Future 2 2024 Accredited Capacity (MW)

Zone	Existing Conventional	Existing Solar	Existing Wind	Existing DC Ties & PPAs	New Solar	New Wind	Total Existing + New	Summer Peak Demand	PPA Obligations	Summer Load Obligation	Summer Load Obligation + 12% Reserve Margin	Capacity Shortfall Post-Renewable Allocation
AEPW	9,558	0	298	665	542	479	11,542	10,703	(11)	10,692	11,975	434
EMDE	1,563	0	13	0	59	0	1,634	1,169	(3)	1,166	1,306	0
GMO	1,490	0	78	0	89	122	1,780	1,758	0	1,758	1,969	189
GRDA	2,157	0	19	(458)	65	0	1,784	1,293	0	1,293	1,448	0
KACY	672	0	12	39	27	0	750	527	0	527	590	0
KCPL	4,453	0	301	55	177	0	4,985	3,495	(11)	3,484	3,902	0
LES	848	0	18	0	41	0	906	802	(128)	674	755	0
MIDW	296	0	2	155	23	10	486	446	(12)	434	486	0
MKEC	427	0	7	25	36	37	532	714	(105)	610	683	151
NPPD	3,495	0	64	(24)	200	9	3,744	3,962	(619)	3,343	3,744	0
OKGE	6,516	0	121	487	349	289	7,761	6,889	40	6,929	7,761	0
OPPD	2,142	0	135	(20)	126	160	2,543	2,487	(105)	2,382	2,667	125
SPRM	811	0	19	55	36	0	921	719	55	775	868	0
SPS	6,187	39	250	355	355	479	7,666	7,014	11	7,025	7,868	202
SUNC	646	0	2	0	31	0	679	608	(4)	604	677	0
SWPA	2,740	0	0	(1,593)	35	0	1,183	696	(126)	571	639	0
UMZ	6,859	0	77	277	262	0	7,475	5,186	1,300	6,486	7,264	0
WERE	5,940	0	209	9	297	276	6,731	5,875	135	6,010	6,731	0
WFEC	1,572	1	68	330	97	111	2,180	1,926	20	1,946	2,180	0

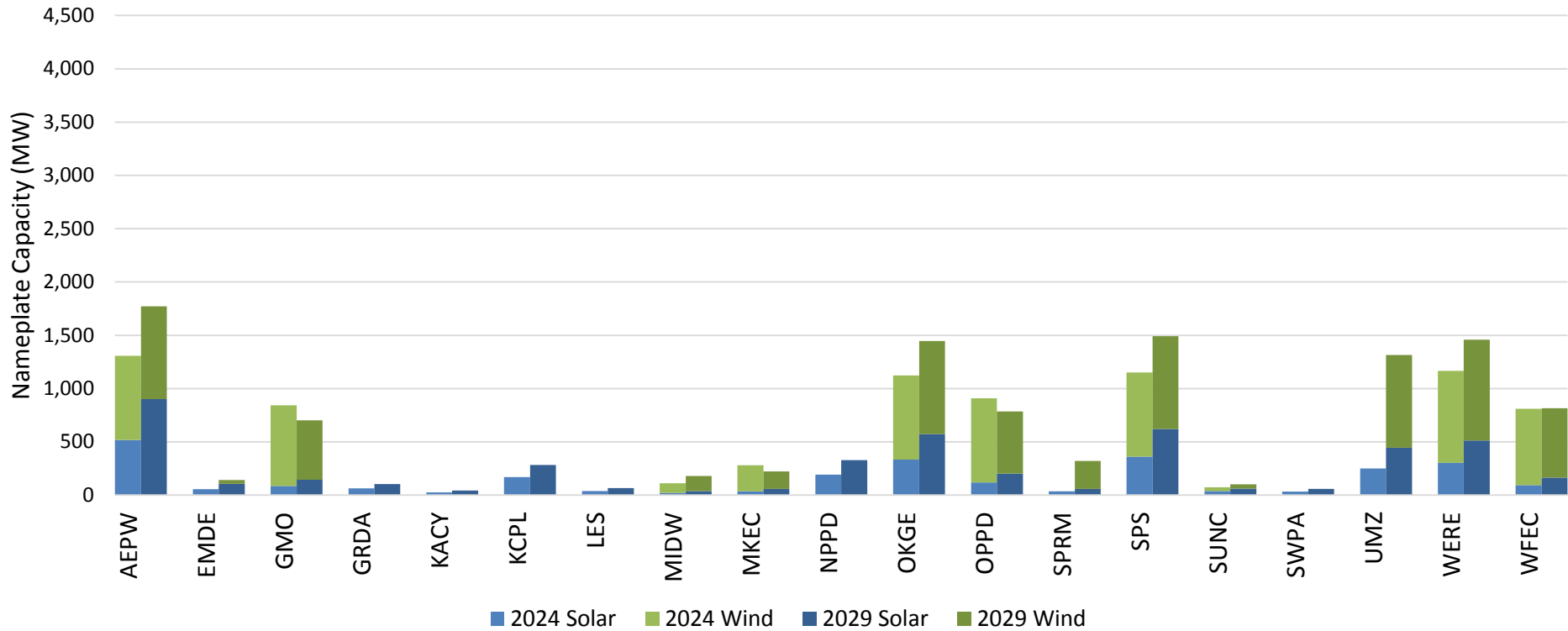
*Peak demand and load obligation shown includes losses

Future 2 2029 Accredited Capacity (MW)												
Zone	Existing Conventional	Existing Solar	Existing Wind	Existing DC Ties & PPAs	New Solar	New Wind	Total Existing + New	Summer Peak Demand	PPA Obligations	Summer Load Obligation	Summer Load Obligation + 12% Reserve Margin	Capacity Shortfall Post-Renewable Allocation
AEPW	8,728	0	257	646	975	359	10,964	11,121	(11)	11,110	12,443	1,479
EMDE	1,471	0	8	0	105	0	1,583	1,193	(4)	1,189	1,331	0
GMO	1,490	0	78	0	155	57	1,781	1,767	0	1,767	1,979	199
GRDA	2,157	0	19	(458)	113	0	1,832	1,294	0	1,294	1,449	0
KACY	599	0	12	39	47	0	697	535	0	535	599	0
KCPL	3,838	0	301	55	305	0	4,499	3,485	(13)	3,472	3,889	0
LES	848	0	18	0	72	0	938	825	(128)	697	781	0
MIDW	294	0	2	155	41	14	506	470	(12)	458	513	6
MKEC	267	0	7	25	64	10	373	727	(110)	617	691	317
NPPD	3,332	0	64	(24)	355	57	3,784	4,054	(622)	3,432	3,844	61
OKGE	6,044	0	121	502	621	235	7,523	7,083	44	7,127	7,982	460
OPPD	1,967	0	135	(20)	218	68	2,367	2,482	(105)	2,377	2,663	296
SPRM	627	0	19	55	63	30	794	717	60	777	870	76
SPS	5,573	39	250	355	643	239	7,100	7,338	11	7,349	8,231	1,131
SUNC	646	0	2	0	55	0	703	628	(4)	624	699	0
SWPA	2,740	0	0	(1,593)	64	0	1,211	727	(134)	592	663	0
UMZ	6,503	0	77	277	481	264	7,602	5,487	1,300	6,787	7,602	0
WERE	5,867	0	209	9	534	214	6,833	6,096	143	6,239	6,988	155
WFEC	1,440	1	68	330	177	68	2,084	2,018	20	2,038	2,283	199

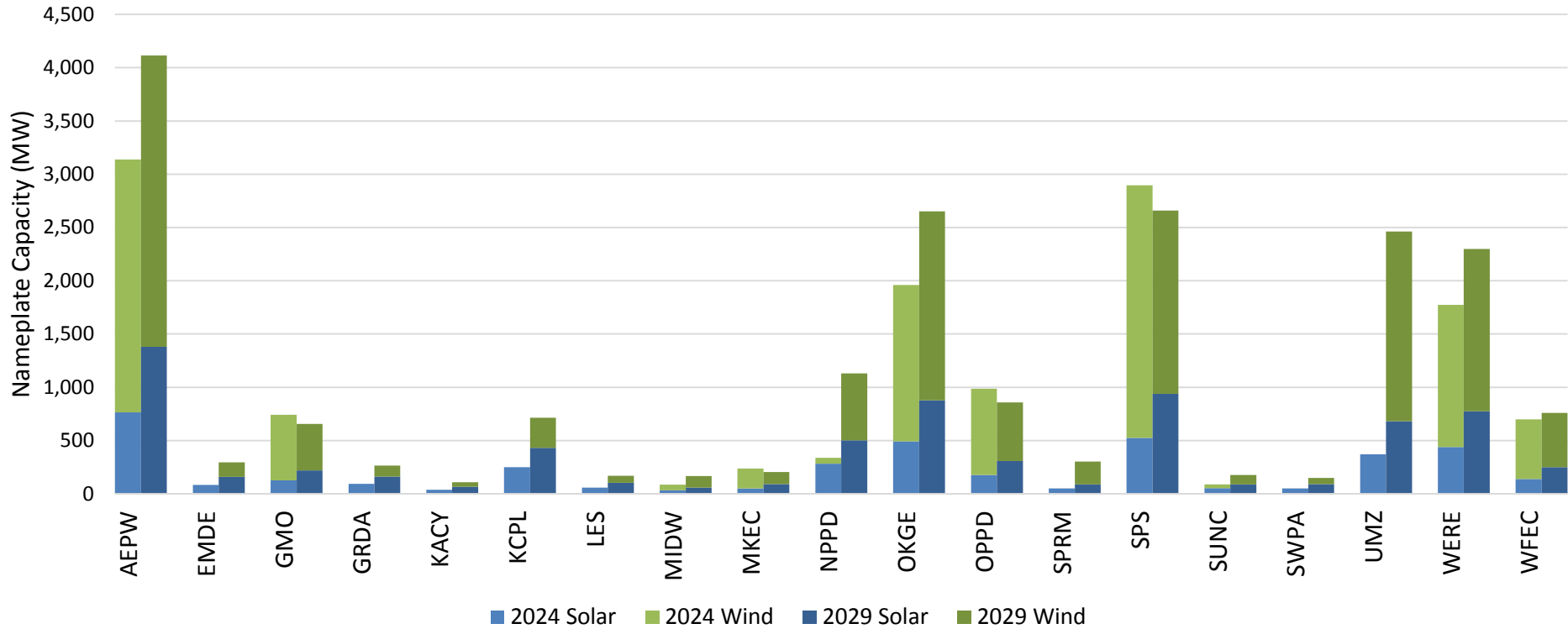


*Peak demand and load obligation shown includes losses

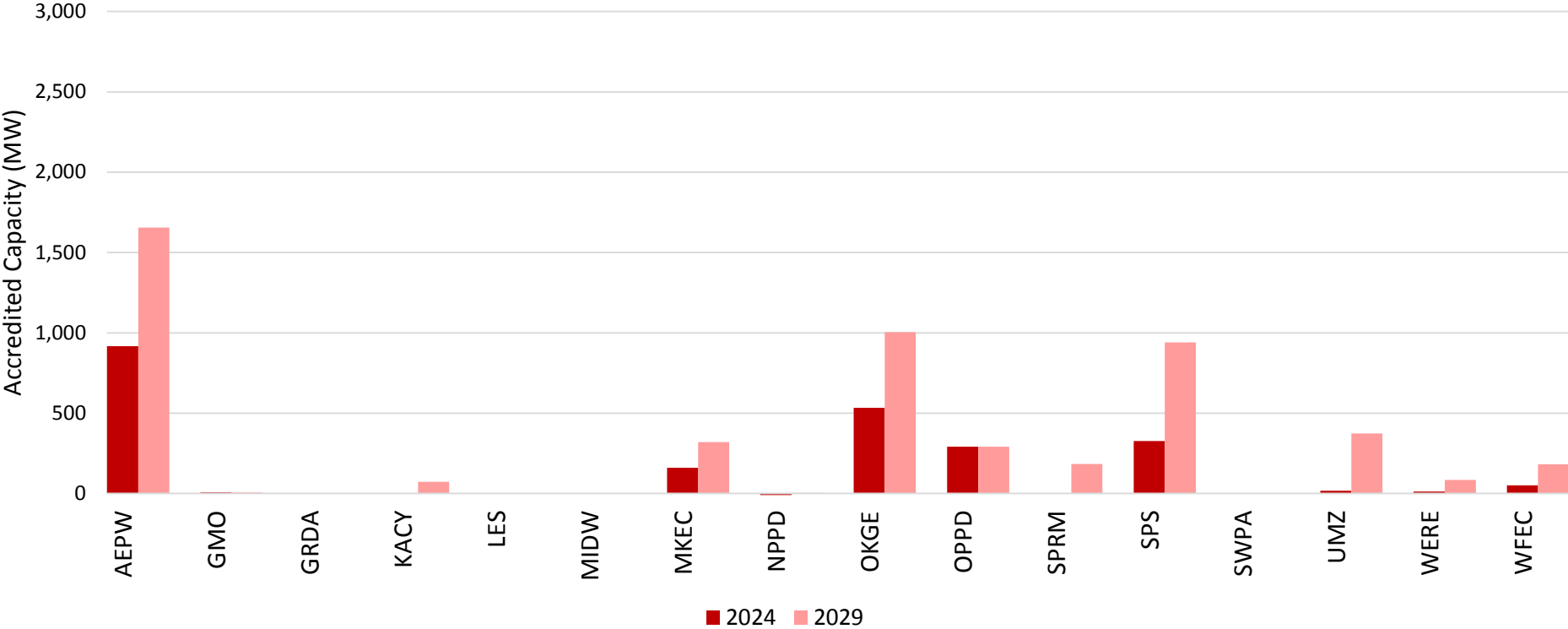
Future 1 Nameplate Wind & Solar Additions



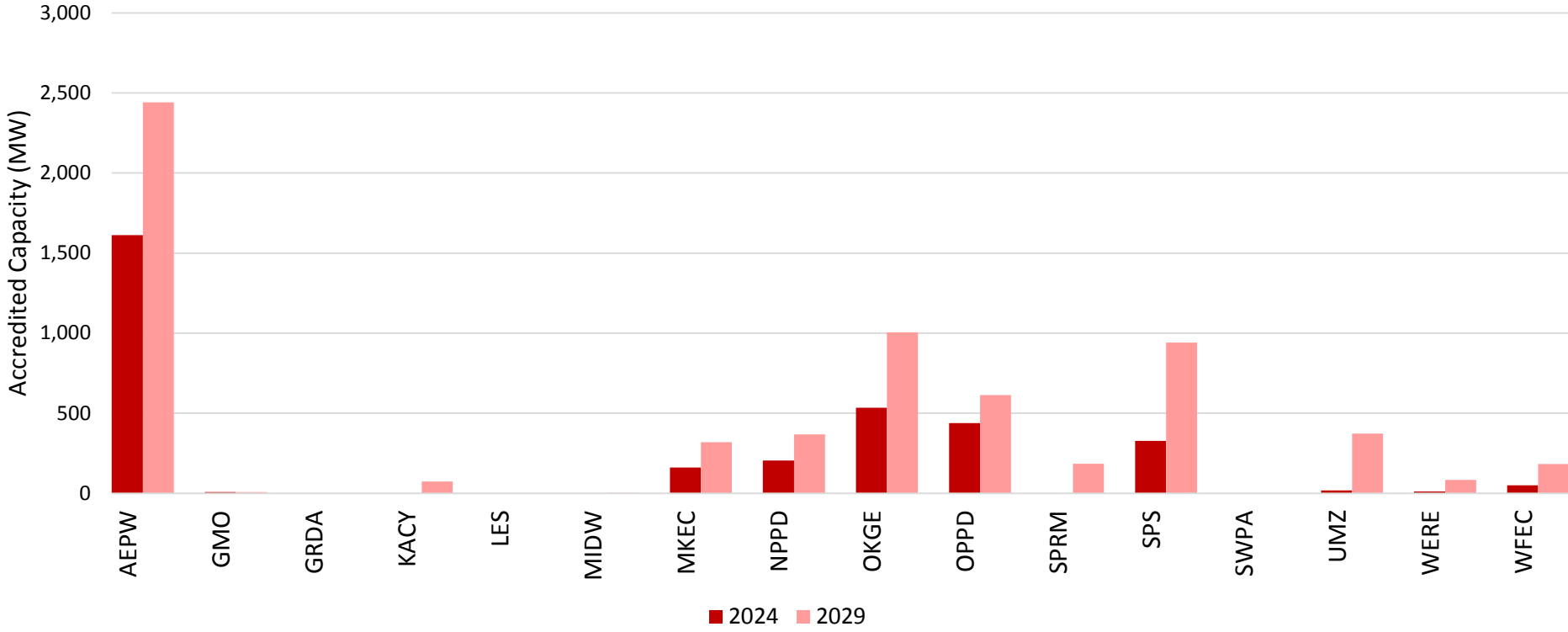
Future 2 Nameplate Wind & Solar Additions



Future 1 Generation Retirements



Future 2 Generation Retirements





HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.

2019 ITP Siting Plan

Liz Gephardt

April 25, 2018

Objective

- Inform group of load pocket analysis results
- Discuss recommendation for standard site prioritization
- Discuss recommendation for exceptions to standard methodology
- Approve standard site prioritization and exceptions

Load Pocket Analysis Results

- Top 3 load pockets identified by historical congestion and considering in-service dates of upcoming projects
 - Kansas City
 - Oklahoma City
 - South SPS
- Trend showing developers taking advantage of congestion
- Likely minimal to no changes to siting plan based on load pocket analysis and preliminary conventional resource plan results

Standard Site Prioritization

- Order of site selection:
 - Solar
 - Wind
 - Combined Cycle
 - Reciprocating Engine
 - Combustion Turbine

Standard Site Prioritization

- **Distributed solar**
 - Future 2 only
 - Top 10% load buses per demand group
 - Scoped amounts added on pro rata basis
 - Stakeholder feedback from 2017 ITP10

Standard Site Prioritization

- Utility solar ranking
 - Within zone or state of operation
 - Site source preference:
 - Active GI queue requests
 - Stakeholder repository feedback
 - Previous ITP sites
 - Other NREL conceptual sites
 - Within each site source:
 - Capacity factor
 - If only lower than average SPP capacity factors available, site some portion in higher capacity factor area
 - Generator outlet capability based on FCITC and scope of GOF

Standard Site Prioritization

- Wind
 - GI queue requests
 - Cost/MW for transmission owner interconnection facilities and network upgrades
 - Includes consideration of potentially directly-assigned upgrades needed, unknown third-party system impacts, and scope of GOF
 - Currently suspended IAs and/or GIA commercial operation date past not considered for siting
 - If cost data not available
 - Use generator outlet capability based on FCITC and scope of GOF
 - Identify/relate recurring issues within GI groupings

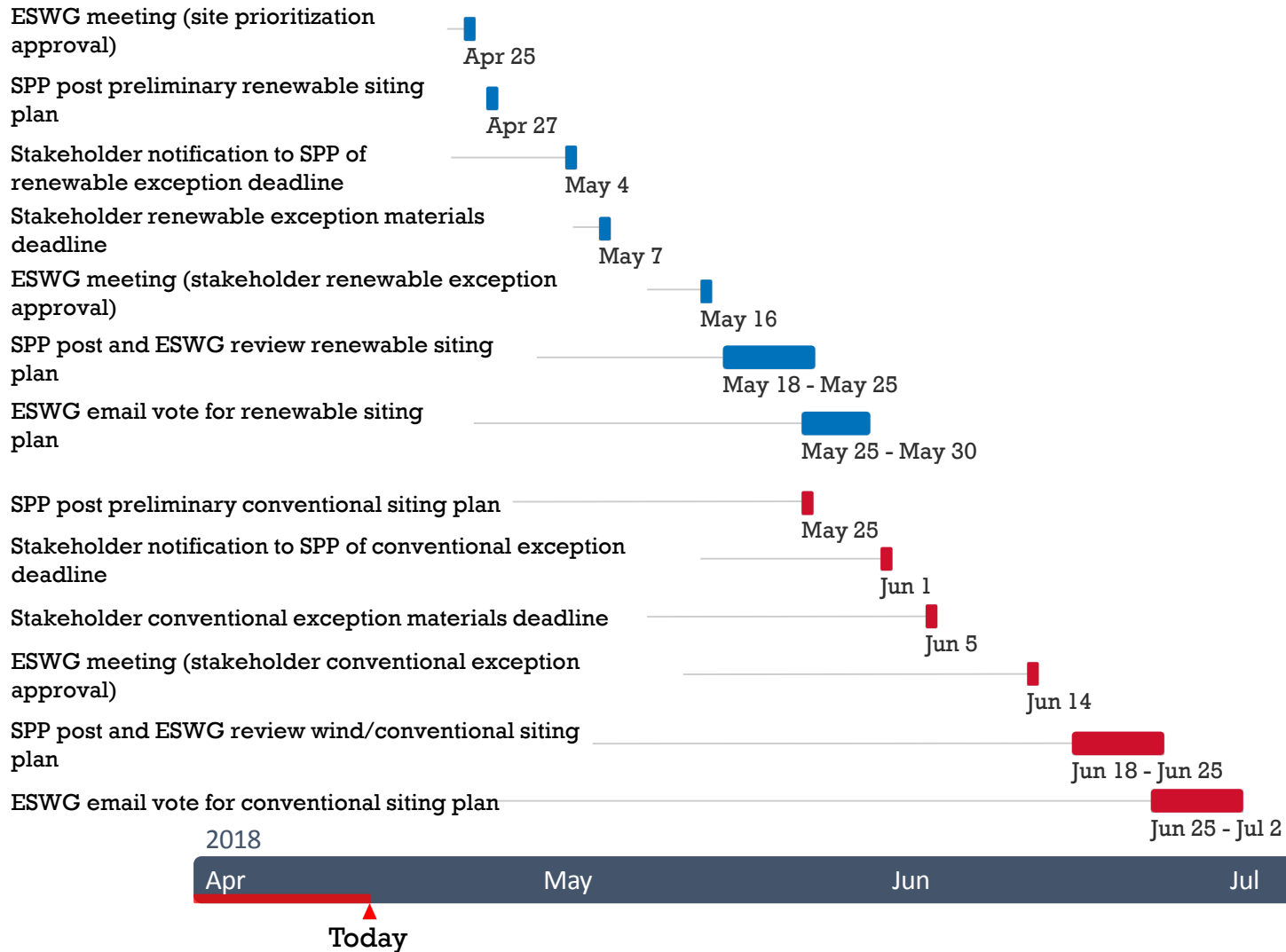
Standard Site Prioritization

- **Conventional**
 - Within zone of majority ownership
 - Adjacent zone if limited site availability or generator outlet capability
 - Stakeholder repository feedback
 - Unless limited by generator outlet capability and/or scope of GOF
 - Preference to existing and assumed retirement sites then ITP sites
 - Generator outlet capability based on FCITC and scope of GOF
 - Limit conventional capacity to 1,500 MW at any site

Exceptions

- SPP to post preliminary look at siting plans
 - Stakeholders to confirm sites of interest selected for siting
 - Stakeholders to present sites not selected for siting as exceptions
 - Initial siting plan list will not ensure inclusion
 - Any capacity approved as an exception by ESWG removed from lowest ranked sites
- Stakeholder materials on requested exceptions **must** include:
 - Generation interconnection status
 - PPA, firm service, or utility ownership information
 - Status of necessary regulatory filings and/or approvals
 - Procurement of financing
 - PTC safe harbor eligibility
 - Additional supporting information (public announcements, etc.)
- Schedule for standard methodology and exceptions on next slide

Schedule



Recommendation

SPP Staff recommends the ESWG approve the standard ranking methodology for all technologies as posted with the proposed methodology for exceptions.

2019 ITP Model Update Evaluations

Eddie Watson

April 25, 2018

Objective

- Provide information to ESWG regarding Stakeholder submitted model changes received after the February 1, 2018 deadline as well as SPP 2017-AG1 changes identified for inclusion in the 2019 ITP powerflow models
- Provide details on the changes evaluated per Section 9.3 of the ITP Manual, which were determined to have a need to be included in the 2019 ITP and 2018 MDWG models
- Identify schedule information for implementing the changes in the 2019 ITP and 2018 MDWG models
- Identify Stakeholder activities needed to implement the identified changes
- Request that Stakeholders review updated models and verify that their changes were appropriately implemented

Stakeholder Submitted Changes

- SPP received numerous idevs after the February 1, 2018 deadline for submitting 2019 ITP model updates for pass 5
 - These model updates were evaluated per Section 9.3 requirements and some applicable changes were added prior to February 22, 2018
- Approximately 300 idevs were received and evaluated after February 22, 2018
 - Among the 300 idevs, approximately 157 ITP model changes were identified, with 19 deemed critical, to perform the 2019 ITP Resource Siting milestone
 - These 19 idevs were incorporated in Pass 5a and approved by TWG on March 9, 2018
- All late idevs received were evaluated for inclusion in the MDWG models or ITP models or both
 - Many idevs for MDWG Models deemed not applicable to ITP Models
- SPP evaluated the balance of the ~157 idevs per Section 9.3 requirements and determined these updates could be included in the 2019 ITP models
- These changes were determined to not impact any previously completed or current milestones, and will not be added to the Resource Plans, Load and Generation model data or Economic benchmarking model data

Details of ~157 Changes Identified

- Idevs with changes received from multiple Stakeholders/Data Submitters in various SPP areas
- Idevs covered changes, which included
 - Load changes - removals, additions and changes (increases/decreases)
 - Generator changes - removals, additions, moves and data changes
 - Gaines resource was removed
 - Four S.OTTWA generators were moved to the correct kV bus
 - Limited changes to PGEN, PMAX, PMIN, etc. for various other generators
 - Transformer changes – removals, additions, taken out-of-service, and ratings changes
 - Bus changes – removals, name and codes changes
 - Branch changes - removals, additions and ratings changes

SPP Identified 2017-AG1 Changes

- SPP-2017-AG1 Aggregate Study (AG1) completed in November 2017
 - New Transmission Service granted in AG1 was not included in the 2019 ITP models because of an outdated process
- SPP Staff evaluated and determined impacts to the ITP process and ITP and MDWG model builds if AG1 study updates are included
- Implementation needed in 2018 MDWG / 2019 ITP Powerflow models, 2018 MDWG Dynamic Models, and 2019 Economic Models
 - Powerflow and Dynamics Model updates will be completed in 2 passes and the Economic model in 1 pass
- Incorporating applicable *TS Inputs information will comply with the SPP Tariff, Attachment O, Section III.3.f and Section III.5.a
 - SPP plans to also implement all the latest known TS Inputs received through January 1, 2018, as applicable

***TS Inputs include:**

1. SPP-20XX-AGX “Confirmed” and “Accepted” transactions
2. Confirmed AR Requests and AQ Requests
3. Approved Sponsored Upgrades
4. Non-renewed service
5. Un-designations
6. New and Modified NTCs

Implementation Schedule

- **Approximately 157 Model Changes from Remaining ideas**
 - SPP will post the applicable 2019 ITP Models by April 27, 2018
 - **Impacts**
 - 2019 ITP Base Reliability Model Build
 - 2019 Economic Model Build
- **2017-AG1 Study Related Changes**
 - Implementation efforts requires activities from both SPP and Stakeholders
- **Changes will be implemented in the applicable 2019 ITP and 2018 MDWG models beginning prior to or by April 30, 2018 and changes will be included in all models prior to the start of the ITP needs assessment, which is scheduled to begin September of 2018**
 - **2019 ITP and 2018 MDWG Powerflow Models**
 - April 30, 2018 through July 6, 2018
 - **2019 ITP and 2018 MDWG Dynamic Models**
 - July 2018 through August 2018
 - **2019 ITP Economic Models**
 - July 2018 through August 2018
- **Detailed schedules to be provided**
- **Impacts**
 - 2019 ITP Base Reliability Model Build
 - 2019 Economic Model Build
 - 2019 TPL-001-4 Stability study

Stakeholder Request

Implementation of ~157 Model Changes from Idevs

- All Stakeholders and Data Submitters are requested to review the updated models and verify that their changes were appropriately implemented

Implementation of 2017-AG1 Study Related Changes

- Stakeholders will be requested to perform the coordination process for transaction profiles and the addition of new generators
 - SPP will assist in adding additional resources, as needed
- All Stakeholders and Data Submitters are requested to provide needed data, as well as review data and updated models, to verify that their changes were appropriately implemented



HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.

2019 ITP Methodology Approvals Summary

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Objective

- Bring to ESWG Member's attention the main motions related to the 2019 ITP methodologies approved by the group since July 2017
- Review ITP Manual language that has a high impact on study results

Approvals

- **Model Build (8/16/2017)**
 - Discussion: Two data sources have been used in previous ITP studies, EIA Annual Energy Outlook (AEO) Report and Lazard Levelized Cost of Energy Analysis. These sources were used to create a chart comparing prices for prototypes for the following unit types: combined cycles, combustion turbines, coal generators, nuclear units, wind units, and solar
 - Approval: Use Lazard high cost CC prototypes and low cost CT prototypes and adding large scale reciprocating engines as a prototype option, and eliminating nuclear and coal as options

Approvals

- **Resource Planning (9/13/2017)**
 - Discussion: Four options were included; a high cost and low cost gas reciprocating engine based on Lazard data, and a high cost and low cost option developed by stakeholders. The group felt that it was important to use publicly available data for our prototype options
 - Approval: Inclusion of a reciprocating engine prototype using an average of the Lazard (high and low cost) data, with a 50 MW installation increment

Approvals

- **Renewable Accreditation (9/13/2017)**
 - Approval: Use a 20% capacity accreditation on new wind, with a cap for renewables of 12% of the load
 - Approval: Use a 70% capacity accreditation on new utility scale solar, with a cap for renewables of 12% of the total load

Approvals

- **Must Run (9/13/2017)**
 - Approval: Assign must-run designations to co-generation and nuclear units only, unless an exception is requested with pass 2 of the Gen Review (by November 17th, 2017), and approved by the ESWG

Approvals

- Futures (10/4/2017)
 - Approval: 18+ GW (year 2), 25GW (year 5) and 26GW (year 10) of wind generation in Future 1. 29GW (year 5) and 32GW (year 10) of wind generation in Future 2
 - Approval: 0.25+ GW (year 2), 3GW (Year 5) and 5GW (year 10) of Solar generation in Future 1. 4GW (Year 5) and 7GW (Year 10) in Future 2
 - Approval: Emerging Technologies Future as Future 2

Approvals

- Consolidation (10/12/2017)
 - Approval: Review projects on an individual basis for final portfolio consolidation

Approvals

- **RAR (11/8/2017)**
 - Discussion: The first option was to only include resources that meet the resource inclusion criteria as outlined in the ITP manual. The second option was to develop levels of inclusion based on the answers provided in the RAR and waiver request forms
 - Approval: Implementation plan for Resource Addition Requests and Waivers
- **Operational Needs (11/8/2017)**
 - Approval: Economic Operational Needs Solution Evaluation and Reliability Operational Needs Solution Evaluation language for the 2019 ITP Scope

Approvals

- Sensitivities (11/8/2017)
 - Discussion: Utilize 1 standard deviation, does not utilize LFU methodology
 - Approval: Methodology to be used for demand sensitivities in the 2019 ITP Study
 - Discussion: Utilize 2 standard deviation, 95% confidence level
 - Approval: Methodology to be used for natural gas sensitivities in the 2019 ITP
 - Approval: Motion to pass on performing additional wind and solar sensitivities

Approvals

- **Stability Assessment (11/15/2017)**
 - Discussion: After the portfolio is finalized, perform a voltage stability analysis to assess the voltage performance of the planned system
 - 2015 ITP10 Wind transfers W->E
 - 2017 ITP10 Generation transfers N->S, S->N, W->E
 - Approval: Motion to approve the option 1 for voltage stability assessment

Approvals

- Portfolio Consolidation (12/14/2017)

				Example 1		Example 2	
No.	Scenario 3 (Non-Competing Projects) Considerations	Possible Points	Threshold	138 kV Rebuild	Score	New 345 kV line	Score
1	40-yr (1-year) APC B/C in Selected Future	50	1.0 (0.9)	1.9	0.0	1.9	44.4
	40-yr (1-year) APC B/C in Opposite Future		0.8 (0.7)	0.75		0.9	
	40-yr (1-year) APC Net Benefit in Selected Future (\$M)		N/A	9.3		67.5	
	40-yr (1-year) APC Net Benefit in Opposite Future (\$M)		N/A	-2.6		-7.5	
2	Congestion Relieved in Selected Future (by need(s), all years)	10	N/A	80%	8.0	100%	10.0
	Congestion Relieved in Opposite Future (by need(s), all years)	10	N/A	30%	3.0	40%	4.0
3	Operational Congestion Costs or Reconfiguration (\$M/yr or hrs/yr)	10	>0	\$4.5	4.5	\$8.0	8.0
4	New EHV	7.5	Y/N	N	0.0	Y	7.5
5	Mitigate Non-Thermal Issues	7.5	Y/N	N	0.0	Y	7.5
6	Long Term Viability (Eg 2013 ITP20)	5	Y/N	N	0.0	N	0.0
Total Score (70 Pass)					15.5		81.4

Approvals

- **Portfolio Consolidation (12/14/2017)**
 - Approval: consolidation methodology Option 2 as presented, including the consideration-specific minimum thresholds, points possible, calculation of points awarded, and scenario 3 total score threshold, with the addition of ARR project considerations for consideration 6. Project narratives may support or oppose the results of this systematic approach; in cases where a narrative opposes these results, associated materials will be brought to the ESWG and TWG for review and feedback

Approvals

- **Resource Plan (1/11/2018)**
 - Approval: Motion to remove sales revenue of wind generation that does not have long-term firm transmission service from the APC benefit calculations as a benefit calculation mitigation of wind resources without firm transmission service
- **Renewable Resource Plan (1/11/2018)**
 - Approval: Motion that load serving entities who either own or have a signed PPA for renewable resources will get credit for those resources when meeting their Renewable Policy Standards

Approvals

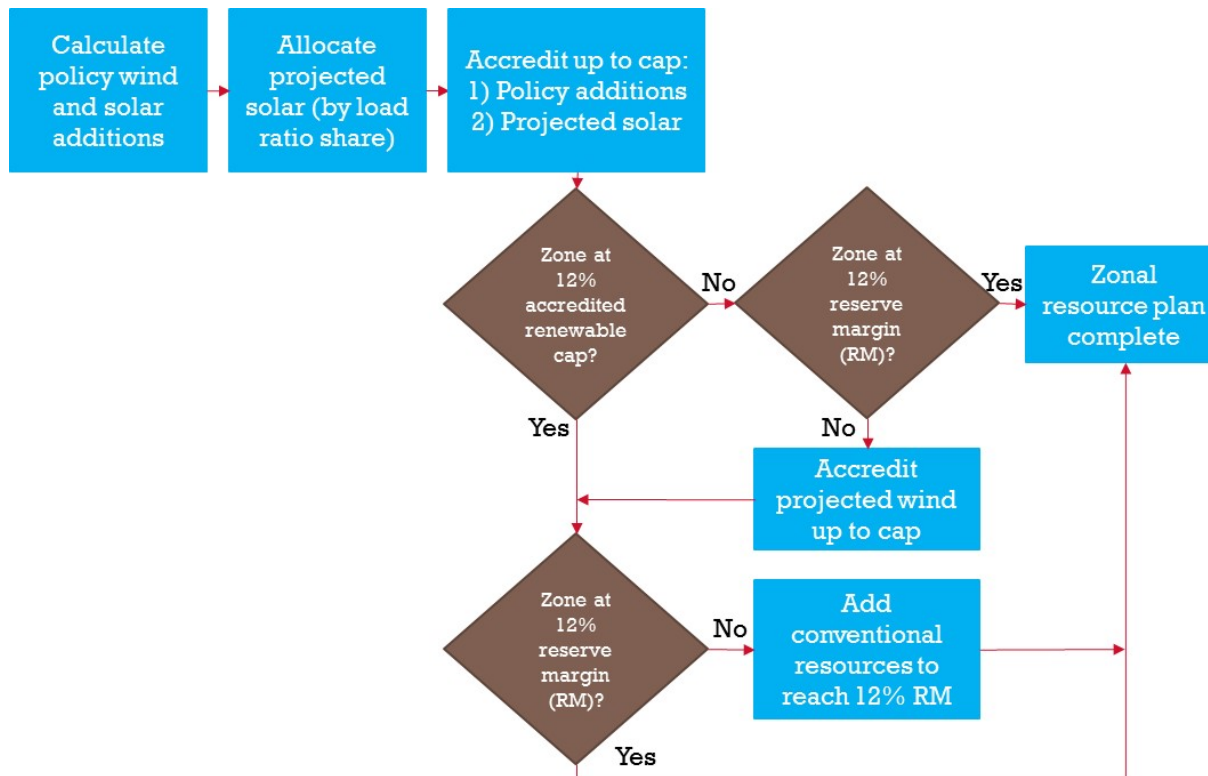
- **Futures (1/11/2018)**
 - **Discussion: Apply EV energy amounts to existing demand group structure with valley fill load shape adjustment**
 - Less granular approach
 - Loads driving needs will be investigated during needs assessment and portfolio development
 - **Approval: Accept SPP staff's recommendation for Future 2 EV energy penetration methodology**

Approvals

- Resource Plan (1/22/2018)
 - Discussion: This approval is related to the fact that some companies have a different load forecast for resource planning
 - Approval: Motion for SPP to send out a data request for Load forecast for resource planning to accommodate controllable curtailable resources, without impact to the schedule

Approvals

- Resource Plan (1/22/2018)



Approvals

- Approval: Motion to use a split representative of the active GI Queue of wind and solar resources for policy additions.
- Approve the allocation of projected solar additions based on load ratio share
- Approve implementation of the approved scope language for renewable generation accreditation, including:
- Allocation of projected wind additions to maximize accreditation to deficient zones, up to zonal renewable cap for new resources
 - Order of accreditation
 - Existing
 - Policy wind/solar
 - Projected solar
 - Projected wind
 - Conventional

Approvals

- Modeling (1/22/2018)

New and existing sites

- Develop automation to retrieve energy profiles from raw 2012 NREL wind and solar data
- Develop automation to create energy profile per site by performing data analysis on multiple profiles in proximity to site
- Approval: Motion to use of 2012 NREL solar data, and the proposed methodology for the development of profiles for wind and solar sites

Approvals

- **APC/New Resources (3/15/2018)**
 - Discussion: Assumption #1: Sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone
 - Sales from generators not included in the rates of a load serving entity should be excluded from the regional APC calculation
 - Approval: Motion to approve assumption 1, sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone

Approvals

- **APC/New Resources (3/15/2018)**
 - Approval: To keep the assumption that future proxy wind will not have transmission service, based on current trends, and will not be included in a load serving entity's rates
 - Approval: Motion to apply the implementation of the following assumptions to all existing resources:
 - a. Sales from generators that are included in the rates of a load serving entity should be included in the APC calculation of each zone
 - b. All generation without firm transmission service to load should be subject to generator LMP price
 - Approval: Motion to assume that proxy conventional and solar generation will obtain transmission service and through those arrangements will be included in a load serving entity's rates

Approvals

- **Curtailement Price (3/15/2018)**
 - Approval: Implementation of the curtailment price methodology (as shown below) for the 2019 ITP

Curtailement Price Methodology Implementation

- What is the commencement date and construction start date for the existing wind and resource addition request wind?
 - Commencement date is determined in the generation review milestone
 - Construction start date was not needed this cycle
 - All existing wind and resource addition request wind have a projected commencement date less than 1/1/2020
 - For future ITP studies, the generation review milestone would need to be adjusted to survey stakeholders for construction start date when commencement date is not prior to 1/1/2020

Curtailement Price Methodology Implementation

- What is the commencement date and construction start date of projected wind additions?
 - Use per year projections beginning 2021 from 2019 ITP scope development to determine a commencement date for annual additions thereafter
 - Use a 4 year lead time to determine construction start date for annual additions
 - The 4 years is understood to be the maximum time allowed to complete construction and still be eligible for the production tax credit
 - Over 15GW of active GI queue positions have a 2016 or prior year queue entry date that may be eligible for the production tax credit
 - Determine curtailment price for cumulative amount to be modeled in year 5 (2024) and year 10 (2029)
 - Implies that 2024 is the last year projected wind additions will be modeled with a -\$35 curtailment price

Approvals

- **Curtailement Price (3/15/2018)**
 - Discussion: This discussion was related to possibly changing the wind curtailment price from -\$35 and \$0
 - Approval: Recommendation for no additional ITP manual changes to renewable pricing for the 2019 ITP due to the potential risks to the schedule

ITP Manual

- Wind and Solar VOM Price (4/10/2018)
 - MOPC Approval: RR 276 to apply \$0/MWh for all wind and solar units

ITP Manual

- **Contingency Screening**
 - After the initial economic simulation dispatch results have been created, the resulting contingencies will be limited to the following types of planning events identified in the NERC Standard TPL-001 for the 100 kV-and-above transmission system:
 - P1.2 and P1.3 single-branch contingencies on the 100 kV and above system exceeding 50 percent loading in the peak and off-peak hours under system intact conditions for the translated areas.
 - P1.2 and P1.3 single-branch contingencies on the 200 kV and above system exceeding 25 percent loading in the peak and off-peak hours under system intact conditions for the SPP footprint.
 - Contingencies included in the SPP permanent and temporary flowgates, including P7 events.
 - Other P1, P2, P4 and P5 events as potential contingencies.

ITP Manual

- **Economic Solutions Evaluation**
 - All solutions will be evaluated based on their one-year benefit-to-cost ratio (B/C) and 40-year net present value (NPV) B/C, using conceptual cost estimates.
 - If a solution mitigates congestion for an economic need and has at least a 0.5 one-year B/C or a 1.0 40-year NPV B/C, it will be included for further consideration during portfolio development.
 - For the 40-year NPV B/C, the average SPP net plant carrying charge and an in-service date of year 5 will be applied. Regardless of the type of need the solution was submitted to address

ITP Manual

- **Economic Portfolio Development**

- Solutions mitigating economic needs are ranked by their cost effectiveness, net APC benefit and qualitative benefits for each need or set of needs and categorized into one or more of the following groupings:
 - **Cost effective:** Solutions with the lowest cost with respect to the congestion relief they provide on individual flowgates will be selected.
 - **Highest net APC benefit:** Solutions with the highest difference between one-year APC benefit and one-year project cost will be selected.
 - **Multi-variable:** Top-ranking projects in the other two groupings, as well as qualitative benefits that the other groupings may not capture, will be considered when selecting projects.

ITP Manual

- **Economic Portfolio Development**

- In addition to economic performance, consideration of the following information may be given to the top-ranking solutions:
 - One-year project cost, APC benefit, and B/C.
 - 40-year NPV cost, APC benefit, and B/C.
 - Congestion relief that a project provides for the economic needs of that future and year.
 - Project overlap, or when two or more projects that relieve the same congestion are in a single portfolio.
 - The potential for a project to mitigate multiple economic needs.
 - Any potential routing or environmental concerns with projects.
 - Any long-term concerns about the viability of projects.
 - Seam and non-seam project overlap.
 - Individual project robustness, which includes, event file modification.
 - The potential for a project to mitigate reliability, operational, and public policy needs, which covers current market congestion.
 - The potential for a project to address non-thermal issues.
 - The need for new infrastructure versus leveraging existing infrastructure.
 - Larger-scale solutions that provide more robustness and additional qualitative benefits.
 - Additional consideration may result in changes in top-ranking solutions, including elimination of solutions.

ITP Manual

- **Economic Portfolio Development**
 - The top-ranking economic projects will be tested in a new set of base models that include the corresponding reliability, policy, and operational economic portfolios. The economic projects will be tested individually within each group to assure only those with at least a 0.9 one-year B/C or 1.0 40-year NPV B/C move forward.

ITP Manual

- **Public Policy Portfolio Development**
 - Solutions mitigating public policy needs will be ranked by need based on their APC benefit in relation to their conceptual cost. Once study-level cost estimates are available, the ranking will be adjusted for that limited set of top-ranking solutions based on the updated cost. The highest-ranked project for each need will be selected for a grouping and tested individually within the policy grouping to ensure there is no redundancy of need mitigation within the set of projects