Southwest Power Pool

Economic Studies Working Group

February 22, 2018

OG&E Offices - Leadership Square, North Tower, 14th floor

• SUMMARY OF ACTIONS TAKEN •

1. Load and Generation Review
    a. Approved staff's approach to the edits made after approval in the load and generation workbooks
    b. Approved the baseline generation resource retirements for use in the BR and BA models
    c. Approved the additional age based retirements for Futures 1 and 2 in the BA models
2. Approved the Renewable Policy Review as posted to GlobalScape
3. Approved the 20 Year Assessment Manual
4. Approved RR 255 (Updates BP 7060 to add triggers to stop annual escalation of baseline cost estimates)

Southwest Power Pool

Southwest Power Pool

ECONOMIC STUDIES WORKING GROUP

February 22, 2018

OG&E Offices - Leadership Square, North Tower, 14th floor

• 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 18 in-person participants and 59 web conference participants, representing 17 of 17 ESWG members. (Attachment 1 – February 22, 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 – February 22th, 2017 ESWG Agenda).

Kurt Stradley (LES) made a motion; seconded by Jon Iverson (OPPD) to adopt the agenda as amended. 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 – November 15th, 2017
b. Meeting Minutes – December 14th, 2017
c. Meeting Minutes – January 11th, 2018
d. Meeting Minutes – January 22nd, 2018

The Consent Agenda was approved unanimously.

Agenda Item 4a – 2019 ITP Schedule

Juliano Freitas (SPP) informed the group of the 2019 ITP schedule status and projected hours. Juliano reviewed SPP/Stakeholder accountability and informed the group of the need for email/conference call approvals for future milestones. (Attachment 4a – 2019 ITP Schedule)

Agenda Item 4b – SPS Tolk 1 & 2 Seasonal Dispatch

Bennie Weeks (SPS) reviewed a presentation on seasonal dispatch for Tolk units. The group discussed water rights for the Aquifer; Bennie informed the group no one has rights to the Aquifer. Bennie informed the group they are at 80% industrial load and the depletion impact is small. The group expressed concerns of this being a reliability need. Bennie informed the group of Tolk units being available with a 3-

day notice. Kirk Hall (SPP) informed ESWG of TWG's decision to approve Tolk for seasonal operation. The Tolk units will be offline in the off-peak season. In addition, a revision request will be written for the ITP manual. (Attachment 4b – SPS Tolk 1 & 2 Seasonal Dispatch)

Agenda Item 4c – Generation and Load Review Adjustments

Nikki Roberts (SPP) provided an update on Load and Generation Review adjustments and Generation Resource Retirements. She explained that staff made adjustments to the approved workbooks due to necessary PROMOD implementation changes and discrepancies found within the data. A summary of all changes was provided to the group. Tim Owens (NPPD) requested an exception to the retirement date of the Sheldon unit for future 2. The group discussed the request, and decided to follow the current scope, which does not allow exceptions in future 2. (Attachment 4c - 2019 ITP Load and Generation Review Adjustments)

Leon Howell (OGE) made a motion; seconded by John Olsen (Westar) to approve staff's recommendation. The motion was approved, with one abstention.

"NPPD abstained from the vote to approve Staff's Generation and Load Review Adjustments. The primary reason for the abstention is our objection to Staff's recommendation to not allow an exception to the 60+ year age-based retirement assumption in Future 2 for our Sheldon unit 2, that was part of the overall recommendation included in the motion. NPPD believes it provided sufficient documentation to Staff over the entire Generation and Load review process to justify the exception. In our opinion, granting the exception would have provided more realistic and consistent assumptions for the development of resource plans in the 2019 ITP assessment. – Tim Owens (NPPD)"

Agenda Item 4d – Renewable Policy Review

Amber Greb (SPP) reviewed a presentation on 2019 ITP Renewable Policy Review. Due to ABB data in the Renewable Policy Review, the results are only available for members with a non-disclosure agreement with ABB. (Attachment 4d - ITP Renewable Policy Review)

Kurt Stradley (LES) made a motion; seconded by Tim Owens (NPPD) to approve the Renewable Policy Review as posted to GlobalScape. The motion was approved, with one abstention.

"OPPD abstained on the Renewable Policy Review approval item due to the material posted to GlobalScape not being available to all ESWG members. - Jon Iverson (OPPD)"

Agenda Item 4e – External Resource Planning

Nikki Roberts (SPP) reviewed a presentation on 2019 ITP External Resource Planning. Nikki reviewed the process for using MTEP 18 data. She reminded the ESWG of the ITP Manual language and explained that staff is currently working to determine if the MTEP model are "appropriate" for use in the ITP study. Staff will bring their findings to the March meeting for discussion and approval. (Attachment 4e – 2019 ITP Resource Planning)

Agenda Item 4f – Renewable Pricing Revision Request

Chris Jamieson (SPP) reviewed a presentation on Renewable Pricing Revision Request. The revision request would change the renewable resource variable O&M costs to $0/MWh. Chris informed the group of deadline to have RR approved. Chris provided reasoning for staff recommendation of $0/MWh, versus straw poll choosing $8/MWH. The discussion ended with the agreement to have stakeholders review RR and provide comments through RMS. The ESWG began discussing the appropriateness of the $35 curtailment price. For the sake of time and to keep the discussion on the current topic, staff was issued an action item to bring this back to the March meeting. (Attachment 4f – 2019 ITP Resource Planning)

Action Item- ESWG directed staff to research curtailment price methodology for renewables

Agenda Item 4g – Siting

Liz Gephardt (SPP) provided an update on sitting plan. Liz reviewed expectations for the siting repository. Liz created a fictional example to review during the meeting to help drive the conversation. (Attachment 4g – 2019 ITP Siting Plan)

Agenda Item 5 – 20 Year Assessment Manual

Juliano Freitas (SPP) provided an overview of the 20-year assessment manual. The group questioned if NTC's would come from 20-year assessment. Juliano replied informing the group this is informational only however; the assessment would create a "library" of potential projects, which could be used in the next ITP. Jason Davis (SPP) reminded the group of the Board's ability to approve any project that comes from this study. (Attachment 4g - 20 Year Assessment)

Tim Owens (NPPD) made a motion; seconded by Kurt Stradley (LES) to approve the 20 Year Assessment Manual. The motion was approved unanimously.

Agenda Item 6 – RR 255

John O'Dell (SPP) presented on RR 255 Adding Triggers to Stop Annual Escalation of Baseline Estimates. John reviewed the language in the RR (Attachment 6 - RR 255)

Kurt Stradley (LES) made a motion; seconded by Jeremy Stevenson (NPPD) to approve RR 255. The motion was approved unanimously.

Closing Items

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

List of action items from the meeting:

1. ESWG directed staff to research curtailment price methodology for renewables

The meeting was adjourned at 1:02 PM

Respectfully Submitted,

Amber Greb

ESWG Secretary

Name	Email	Webex/In P
Aaron Shipley	ashipley@spp.org	Webex
Al Tamimi	atamimi@sunflower.net	Webex
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Steve Hohman	shohman@oppd.com	Webex
Tim Hall	Southern Power	In Person
Tim Owens (NPPD)	tjowens@nppd.com	Webex
Tyler Baxter	tyler.baxter@cbpower.coop	Webex

ECONOMIC STUDIES WORKING GROUP MEETING

February 22nd, 2017

OG&E Office, Leadership Square, North Tower 14th Floor – Oklahoma City, OK

• 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 Agenda[1] .... Alan Myers (1 minute)

2. Review of Past Action Items[1] .... Amber Greb (20 minutes)

3. Consent Agenda[1] .... Alan Myers (1 minute)
   a. Meeting Minutes – November 15th, 2017
   b. Meeting Minutes – December 14th, 2017
   c. Meeting Minutes – January 11th, 2018
   d. Meeting Minutes – January 22nd, 2018

4. 2019 ITP Items .... SPP Staff (180 minutes)
   a. Schedule .... Juliano Freitas (20 minutes)
   b. SPS Tolk 1 & 2 Seasonal Dispatch .... Bennie Weeks/SPP Staff (25 minutes)
   c. Generation and Load Review Adjustments[1] (Approval Item) .... Nikki Roberts (25 minutes)
   d. Renewable Policy Review[1] (Approval Item) .... Amber Greb (30 minutes)
   e. External Resource Planning[1] .... Nikki Roberts (20 minutes)
   f. Renewable Pricing Revision Request[1] .... Chris Jamieson (45 minutes)
   g. Siting[1] .... Liz Gephardt (15 minutes)

5. 20 Year Assessment Manual[1](Approval Item) .... Juliano Freitas (30 minutes)

6. RR 255[1](Approval Item) .... John O'Dell (15 minutes)

7. March ESWG Agenda Items .... Amber Greb (10 minutes)

8. Closing Items .... All (5 minutes)
   a. Summary of Action Items (Amber Greb)
   b. Future Meetings

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[1] Background Material Included

i. March 15th, 2018: 41st Floor AEP Office, Dallas, TX
ii. April 25th, 2018: KCP&L in the One Kansas City Place building, Kansas City, MO
iii. May 16th, 2018: Xcel Energy, 3rd Floor, 3C Conference Room, Denver, CO
iv. June 14, 2018: 41st floor AEP Office, Dallas Texas

Southwest Power Pool, Inc.

ECONOMIC STUDIES WORKING GROUP

Pending Action Items Status Report

February 22, 2017

	Action Item	Date Originated	Status	Comments
151	SPP staff to look into optional software tools for use in ITP studies.	May 20th, 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.
173	SPP staff to develop a process for annual update of the economic model with vendor data.	June 16th, 2016	In Progress SPP Staff	
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 15th, 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 29th, 2017	In Progress ESWG	Staff intends to finalize in May 2018
186	Formalize the economic model data guidelines and submission process	July 20th, 2017	In Progress SPP staff	~~Replaces action item 160~~Include the load updates for resource planning
187	Address the objections raised to the approved renewable VOM modeling detailed in the ITP manual	July 20th, 2017	In Progress SPP staff/ESWG	RR in Progress
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 4th, 2017	In Progress SPP staff/ESWG	
190	SPP staff to perform a full transmission outage analysis before the next RCAR	October 12th, 2017	SPP Staff	
192	SPP Staff to draft a Revision Request to update the ITP Manual	December 14th, 2017	In Progress, SPP Staff	RR in Progress

	language to reflect a $0 or $8/MWH solar and wind VOM price.			
193	Discuss separate load forecasts for resource planning purposes, and how to incorporate into the ITP process	January 22nd, 2018	SPP Staff	

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SPP Southwest Power Pool
HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.

2019 ITP Schedule

Juliano Freitas

February 22, 2018

SPP and Stakeholder Accountability

- SPP and stakeholders will introduce steps to focus on accountability for timelines and milestones that consist of mechanisms designed to promote the timely exchanges of data, reviews, and approvals within the transmission planning process.
- Project Schedule
- Point of Contact
- Schedule Impacts and Mitigation
- MOPC Report

SPP

General Information

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

SPP

Scope Development (Complete)

- Start: 7/3/2017
- End: 1/3/2018 (Member's Final Approval)
  - MOPC Approval: 1/16/2018
- Member Review Time:
  - 12/15/2017 – 12/27/2017 (8 days)
- Staff Leader: Amber Greb (agreb@spp.org)
- Working Group Approvals: ESWG and TWG

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)
- Staff Leader: Moses Rotich (mrotich@spp.org)
- Working Group Approval: TWG

SPP

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 Approval
- Staff Leader: Zack Bearden (zbearden@spp.org)
- Working Group Approval: TWG

Load Review (Complete)

- Start: 7/17/2017
- End: 1/18/2018 (Member's Final Approval)
- Member Review Time:
  - Load Pass 1: 9/1/2017 – 10/2/17 (21 days)
  - Load Pass 2: 11/3/2017 – 12/1/2017 (20 days)
  - Powerflow Pass 1 – Trial 1: 9/22/2017 – 10/6/2017 (10 days)
  - Powerflow Pass 1 – Trial 2: 10/13/2017 – 10/20/2017 (5 days)
  - Powerflow Pass 2: 11/7/2017 – 11/20/2017 (9 days)
  - Powerflow Pass 3: 12/5/2017 – 12/22/2017 (13 days)
  - Final Posting and Review: 1/12/2018 (7 days)
- Staff Leader: Nikki Roberts (nroberts@spp.org)
- Working Group Approval: TWG and ESWG

Generation Review (Complete)

- Start: 7/17/2017
- End: 1/18/2018 (Member's Final Approval)
- Member Review Time:
  - Load Pass 1: 9/1/2017 – 10/2/17 (21 days)
  - Load Pass 2: 11/3/2017 – 12/1/2017 (20 days)
  - Powerflow Pass 1 – Trial 1: 9/22/2017 – 10/6/2017 (10 days)
  - Powerflow Pass 1 – Trial 2: 10/13/2017 – 10/20/2017 (5 days)
  - Powerflow Pass 2: 11/7/2017 – 11/20/2017 (9 days)
  - Powerflow Pass 3: 12/5/2017 – 12/22/2017 (13 days)
  - Final Posting and Review: 1/12/2018 (7 days)
- Staff Leader: Nikki Roberts (nroberts@spp.org)
- Working Group Approval: TWG and ESWG

Renewable Policy Review

- Start: 1/15/2018
- End: 2/6/2018 (Member's Final Approval)
- Member Review Time:
  - 1/30/2018 – 2/6/2018 (6 days)
- Staff Leader: Amber Greb (agreb@spp.org)
- Working Group Approval: ESWG

Renewable Resource Plan – Phase I

- Start: 1/22/2017
- End: 3/6/2018 (Member's Final Approval)
- Member Review Time:
  - 2/27/2018 – 3/6/2018 (6 days)
- Staff Leader: Amber Greb (agreb@spp.org)
- Working Group Approval: ESWG

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

SPP

Siting Plan

- Start: 12/1/2017
- End: 7/2/2018 (Member's Final Approval)
- Member Review Time:
  - Site Prioritization: 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

SPP

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: 8/8/2018 – 8/14/2018 (5 days)
  - Post 3: 9/17/2018 – 9/21/2018 (5 days)
- Staff Leader: Clayton Mayfield (cmayfield@spp.org)
- Working Group Approval: ESWG

SPP

Benchmarking

- Start: 4/4/2018
- End: 6/14/2018 (Member's Final Approval)
- Member Review Time:
  - Pass 1: 5/9/2018 – 5/16/2018 (5 days)
  - Pass 2: 6/7/2018 – 6/14/2018 (6 days)
- Staff Leader: Clayton Mayfield (cmayfield@spp.org)
- Working Group Approval: ESWG

Model Topology Updates

- Start: Pass 1 Powerflow Model
- End: 3/1/2018 (General topology changes)
- End: 8/6/2018 (New NTC's 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

SPP

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: Chris Jamieson (cjamieson@spp.org)
- Working Group Approval: TWG

SPP

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)

SPP

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)

SPP

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: James Bailey (jbailey@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)

SPS Tolk Station Future Operations

February 2018

ESWG – Bennie Weeks

Tolk Power Plant Facts

- Two coal-powered steam turbine units
  - Located in southern part of service territory
  - Close proximity to S.E. New Mexico load
- Net capacity approximately 532 MW each
- Ogallala Aquifer is source for water cooling exclusively
- Majority of groundwater in the Panhandle is used to support irrigated agriculture (estimated 95% of the usage)
- Aquifer has declined 15.25 feet since 2007 with an estimated average saturated thickness of 49 feet in early 2017

Issues Due to Declining Aquifer

- Declining saturated thickness reduces the aggregate wellfield productivity
  - Diminishes ability for the aquifer to supply sufficient water to support peak generation demands
  - Saturated thickness will no longer support high capacity wells even though there is still water in the formation

- 40 foot depth generally regarded the range at which it becomes economically infeasible to access the remaining groundwater

Conclusion

- Business as Usual operation projections show an economic depletion range between years 2022-2024

- Developed multiple operating scenarios/sensitivities with the goal to keep the Tolk capacity for as long as possible

- Reduced life to 2032 (both units) with reduced operations

- **2nd**, 5th and 10th year ITP
  - **Zero operation in off-peak months and fully available summer months**

- Synchronous condensers will be installed for transmission stability


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2019 ITP Load and Generation Review Adjustments

Nikki Roberts

February 22, 2018

Objective

- Inform the group about adjustments made to the approved Load and Generation Review
- Provide information about load updates and generation resource retirements
- Seek approval of Load and Generation Review adjustments, and generation resource retirements

Load and Gen Review Update

- Final workbooks posted on 1/24/2018 for review and approval, omitting approval of the generation resource retirement dates
  - Load and Generation Review approved by ESWG on 1/26/2018
  - Load and Generation Review approved by TWG on 1/30/2018
- SPP staff has made adjustments to the approved workbooks due to necessary PROMOD implementation changes and discrepancies found within the data
- Load and Generation Review workbooks with adjustments posted on 2/12/2018
  - Includes generator resource retirement updates
  - Separate workbook with summary of changes made to Load and Generation Review workbooks also included in posting

Load Updates

- Load updates submitted between 12/22 and 1/19 incorporated into the 1/24 Load Review posting
- Load updates submitted in MOD until 2/1 will be incorporated into pass 5 of the 2019 ITP powerflow models
- Moving forward with Resource Planning Milestones without incorporating the Pass 5 load changes into the Load Review
- Pass 5 load updates will be incorporated in the Economic models during the Benchmarking milestone

Generation Retirements

- Discrepancies between retirements in Generation Review and the 2019 ITP Base Reliability powerflow models
  - Intent of new ITP process is to implement a Holistic Planning Model among the SPP Planning department
- To address these discrepancies, SPP staff posted the generation resource retirements for stakeholder review and feedback on 1/29/2018
  - Posting included additional age based retirements for Futures 1 and 2 in the BA models, as is consistent with the 2019 ITP Scope

Recommendation

- SPP staff recommends the ESWG approve staff's approach to the edits made after approval in the load and generation review workbooks.
- SPP staff recommends the ESWG approve the baseline generation resource retirements for use in the BR and BA models.
- SPP staff recommends the ESWG approve the additional age based retirements for Futures 1 and 2 in the BA models.

Appendix

Load and Gen Review Adjustments Summary

Workbook	Tab	Changes	Highlight Color
Load Review	Entire Workbook	Corrected Spelling of Demand Group	Purple w/ White Text
		Corrected interpolation of Peak Load (MW) between years 2030 and 2038	Maroon w/ White Text
	Annual Loss Factor	Corrected loss factor	Purple w/ White Text
	Monthly Peak & Energy	Renamed "Type" to reflect PROMOD implementation. No impact to Stakeholder Edits.	Purple w/ White Text
Generation Review	Entire Workbook	Deleted Moorhead, Denison IA, and Lake Park due to being duplicate units that have different names	Not reflected with color. Deleted from workbook
	Econ Model Gen	Created Short Name for units labeled with "TBD"	Purple w/ White Text
		Created Unit ID for units labeled with "TBD"	Purple w/ White Text
		Renamed Combined Cycle to Combined (Cycle Existing)	Purple w/ White Text
		Renamed the "2019 ITP Economic Models" headers to include "Y2", "Y5", "Y10" vs study years	Purple w/ White Text
		Created fake ID's for units that share the same bus in powerflow that has only one generator	Purple w/ White Text
		Updated unit bus names to reflect pass 4 powerflow	Purple w/ White Text
	Ownership	Updated generator ownership name to reflect PROMOD area structure	Purple w/ White Text
		Created one instance of generator to owner and filled in 0% ownership in non translated years	Purple w/ White Text
	Hydro Unit Ownership	Renamed Generator Owner name to match PROMOD area structure	Purple w/ White Text
		Corrected hydro ownership precentages	Maroon w/ White Text
	Seasonal Operation	Corrected Seasonal Operation	Maroon w/ White Text and Purple w/ White Text
	Fuel Forecast Usage	Deleted SPP Comments	Purple w/ White Text
	Effluents (% Removed)	Updated Generator Effluent type to match true Effluent as reflected in the Effluents tab	Purple w/ White Text

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Renewable Policy Review

Amber Greb

February 22nd, 2018

Objective

- Answer stakeholder questions or concerns with the process
- Approve the Renewable Policy Review mandates and goals
- Discuss next steps

SPP

Renewable Policy Standards

State	RPS Type	Generation Type	Capacity- or Energy-Based	Year 2 %	Year 5 %	Year 10 %
Kansas	Goal	Both	Capacity	20	20	20
Minnesota	Mandate	Both	Energy	20	20	25
Missouri	Mandate	Both	Energy	15	15	15
Montana	Mandate	Both	Energy	15	15	15
North Dakota	Goal	Both	Energy	10	10	10
New Mexico	Mandate	Wind	Energy	15	15	15
New Mexico	Mandate	Solar	Energy	4	4	4
South Dakota	Goal	Both	Energy	10	10	10
Texas	Mandate	Both	Capacity	5	5	5

- States not included in the table are presumed to have no requirement

SPP

Process

- After load is finalized, Renewable Policy Standards (RPS) are assessed for utilities within the SPP footprint
- The RPS percentages were approved with the ITP manual
- The powerflow model and geographical information system data were used to calculate each utility's load obligation, by state
- The RPS percentages were applied to the utilities load obligation to calculate the mandates and goals

SPP

Recommendation

- ESWG to approve the Renewable Policy Review as posted to GlobalScape

Next Steps

- Resource Plan Phase 1
  - Checks to ensure that mandates and goals can be met with existing and planned resources
  - The ESWG will approve the renewable capacity and energy additions for phase 1 of the resource plan (via conference call) early March.


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2019 ITP External Resource Planning

Nikki Roberts

February 22, 2018

Objective

- Update group on evaluation of the MTEP18 for use in the External Resource Plan
- Discuss next steps

ITP Manual: External Resource Expansion Plan

- "An appropriate resource plan from the most current external entity's study will be used for their region in the ITP assessment, if readily available and appropriate. These resource plans are future-specific."
- If deemed inappropriate/incomparable:
  - "renewable additions shall be determined by SPP and the ESWG in each study"
  - "conventional additions to address shortfalls shall be added to external regions with a resource mix that is as close as possible to the SPP conventional resource addition mix for that future"

SPP

2019 ITP External Resource Plan

- SPP staff is reviewing the appropriateness of utilizing the MTEP18 resource plan for external entities, as is consistent with the ITP Manual Sections 2.2.2.1.1 and 2.2.2.1.2
  - Evaluating the Continued Fleet Change Future for Future 1
  - Evaluating the Distributed and Emerging Technology Future for Future 2

Appropriateness of Future Specifics

- Potential Outcome 1:
  - Determine the MTEP18 resource plan is appropriate for use in the 2019 ITP
    - Incorporate the resource plan into the economic models
    - No schedule impact
- Potential Outcome 2:
  - Determine the MTEP18 resource plan is not appropriate for use in the 2019 ITP
    - Develop resource plan based on the ITP manual
    - Renewable resource additions impact study efforts and schedule

Next Steps

- SPP staff continuing to evaluate MTEP18 for appropriateness
- SPP staff will present recommendation at the March ESWG meeting

Revision Request Form

SPP STAFF TO COMPLETE THIS SECTION	
RR #:	**Date:**
RR Title: ITP Manual Renewable Pricing VOM	
System Changes ☒ No ☐ Yes **Process Changes?** ☒ No ☐ Yes **Impact Analysis Required?** ☒ No ☐ Yes	

SUBMITTER INFORMATION	
Name: Chris Jamieson on behalf of the ESWG	**Company:** Southwest Power Pool
Email: cjamieson@spp.org	**Phone:** 501-614-3231
Only Qualified Entities may submit Revision Requests. ***Please select at least one applicable option below, as it applies to the named submitter(s).***	
☐ **SPP Staff** ☐ **SPP Market Participant** ☐ **SPP Member** ☒ **An entity designated by a Qualified Entity to submit a Revision Request "on their behalf"**	☐ **SPP Market Monitor** ☐ **Staff of government authority with jurisdiction over SPP/SPP member** ☐ **Rostered individual of SPP Committee, Task Force or Working Group** ☐ **Transmission Customers or other entities that are parties to transactions under the Tariff**

REVISION REQUEST DETAILS

Requested Resolution Timing: ☒ **Normal** ☐ **Expedited** ☐ **Urgent Action**

Reason for Expedited/Urgent Resolution:

Type of Revision (select all that apply):

☒ Correction

☐ Clarification

☐ Design Enhancement

☐ New Protocol, Business Practice, Criteria, Tariff

☐ NERC Standard Impact *(Specifically state if revision relates to/or impacts NERC Standards, list standard(s))*

☐ FERC Mandate *(List order number(s))*

REVISION REQUEST RISK DRIVERS

Are there existing risks to one or more SPP Members or the BES driving the need for this RR? ☐ Yes ☒ No

If yes, provided details to explain the risk and timelines associated:

☐ Compliance (Tariff, NERC, Other)

☐ Reliability/Operations

☐ Financial

SPP Documents Requiring Revision:
Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).

☐ **Market Protocols**	**Section(s):**	**Protocol Version:**
☐ **Operating Criteria**	**Section(s):**	**Criteria Date:**
☐ **Planning Criteria**	**Section(s):**	**Criteria Date:**
☐ **Tariff (OATT)**	**Section(s):**	
☐ **Business Practice**	**Business Practice Number:**	

☒ **Integrated Transmission Planning (ITP) Manual**	**Section(s):** 2.2.1.10 Renewable Pricing
☐ **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):**

OBJECTIVE OF REVISION

Objectives of Revision Request:
Describe the problem/issue this revision request will resolve.

The revision request is proposed as part of ESWG action item 187, which was to address objections raised to the approved renewable variable operations and maintenance cost (VOM) modeling detailed in the ITP manual.

The following objections were raised by SPP stakeholders concerning the approved renewable VOM modeling methodology detailed in the ITP manual:

- May cause data gathering issues and inconsistencies
- May not be representative of renewable operating cost by definition
- May not be representative of real-time operations and power purchase agreement settlements
- May result in unequal treatment between transmission customer owned renewable generation resources and transmission customer purchases from merchant owned renewable generation resources
- May result in unequal treatment between transmission customer purchases from merchant owned renewable generation resources and transmission customer purchases from merchant owned conventional resources

The following observations were discussed with the ESWG when determining whether to move forward with a revision request.

- The approved VOM modeling methodology will impact the Adjusted Production Cost (APC) benefit of incremental transmission investment identified by the ITP study that is intended to provide for reliable and economic delivery of energy that maximizes benefits to the end-use customers
- The approved VOM modeling methodology may not adequately represent “take or pay” power purchase agreements and result in increasing costs to end-use customers by limiting the identification of incremental transmission investments needed to reduce economic curtailment or congestion costs associated with transmission customer purchased renewable generation resources
- The approved VOM modeling methodology may adequately represent power purchase agreements that are not “take or pay”
- The proposed $0/MWhr VOM is consistent with current industry practices

Describe the benefits that will be realized from this revision.

The revision request is intended as an interim measure to address the objections until such time as the ESWG may thoroughly vet a modeling methodology that more appropriately captures purchase power agreement (PPA) pricing in the Adjusted Production Cost benefit metric. The revision request removes the power purchase agreement pricing from the VOM methodology language in the ITP Manual and replaces it with a VOM cost of $0/MWhr for all wind and solar units, which is intended to reflect the low operating cost of these resources. The $0/MWhr VOM for wind and solar renewable resources is supported by the 2017 Lazard-Levelized Cost of Energy Analysis and the Energy Information Administration’s Annual Energy Outlook 2017 assumptions, which are used by SPP staff in developing generator prototypes for the ITP Resource Plan. Additionally, removing the power purchase agreement pricing from the VOM methodology and using a VOM of $0/MWhr may better capture benefits of incremental transmission investment when reducing economic curtailment or congestion costs associated with transmission customer purchases from renewable generation resources under “take or pay” power purchase agreements.

REVISIONS TO SPP DOCUMENTS

In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

Integrated Transmission Planning (ITP) Manual

2.2.1.10 Renewable Pricing

The economic modeling of wind and solar resources include two primary parameters that impact pricing: curtailment price and VOM.

Wind and solar resources include an hourly profile. The curtailment price for wind and solar is the price at which the resource will curtail. If the LMP at the generation bus is greater than or equal to the curtailment price, the unit will generate energy in accordance with the hourly profile. If the locational marginal price (LMP) at the generation bus is less than the curtailment price, the unit generation will be curtailed. As a result, the curtailment prices impact the dispatch of wind and solar units in the economic models but do not impact the operating cost of the units.

To model a curtailment price for wind units that will reflect market operation, including projected production tax credit (PTC) impacts, the following criteria will be used for wind curtailment price modeling:

- Wind units will have $0/MWh curtailment price if any of the following are true[1]:
  - The unit is placed in service over 10 years prior to the study year.
  - Construction on the unit has not started prior to January 1, 2020.
  - An entity associated with the unit has provided feedback that the investment tax credit (ITC), rather than PTC, is applicable.
- Otherwise, wind units will have a negative $35/MWh curtailment price to reflect the "grossed-up" value of a PTC[2].

To model a curtailment price for solar units that will reflect market operation, the curtailment price will be set at $0/MWh.

The VOM for wind and solar resources defines the unit operating cost per MWh of energy generated. This operating cost is included in production cost calculations. The VOM parameter does not impact dispatch, curtailment, or LMPs in the economic model simulations.

~~To reflect PPA pricing as part of the VOM, the following criteria will be used for VOM modeling:~~

- ~~The SPP annual data request process for generation shall include reporting of the wind and solar units which have fixed-contract prices, such as PPAs. SPP will request appropriate documentation of units reported. If documentation is provided, the VOM shall be based on approximate wind and solar fixed-contract pricing, derived from publicly available data. A weighted average of the most recent five- to 10-year period shall be used.~~

For all wind and solar units~~ in which appropriate documentation is not provided to SPP~~, the VOM shall be $~~8~~0/MWh to reflect the low operating cost of renewable resources.

[1] Reflecting that the PTC is not a factor in its operation
[2] Reflecting income tax compensation

~~For wind or solar units identified through the resource expansion plan, the VOM of the new unit shall be equal to the VOM of the majority of existing wind or solar units in the model. Example: If 80 percent of existing wind units have the fixed-contract price for VOM, new wind units would use the fixed-contract price for VOM.~~


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2019 ITP Siting Plan

Liz Gephardt

February 22, 2018

Objective

- Update group on the status of Siting Plan
- Inform upcoming stakeholder touch points

Overview and Current Status

- Load pocket analysis
  - Objective: Identify any necessary resource and siting plan changes for top load pocket(s) based on load density, historical congestion, and SPP Annual State of the Market Report
  - In progress, nearing completion

Overview and Current Status

- Repository development
  - Objective: Detail and organize list of all potential sites for wind, solar, and conventional units
  - In progress, nearing completion
  - Upcoming review (see next slide)

Stakeholder Repository Review

- SPP staff to post repository late February for stakeholder review and feedback through early March
- Objective of review is to have enough information on potential generation sites to develop and implement ranking criteria for each technology type
- Stakeholders to
  - Identify additional sites and attributes
  - Adjust site attributes
  - Make necessary adjustments or add considerations pertinent to selection of generation sites

SPP

High-level Schedule

December 2017-March 2018

- Load pocket analysis
- Repository development

January 2018

- Stakeholder feedback on load pocket analysis

February 2018

- Stakeholder review and feedback on repository

April 2018

- Site prioritization (ESWG review and approval)

May 2018

- Renewable siting plan (ESWG review and approval)

June 2018

- Conventional siting plan (ESWG review and approval)


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20 Year Assessment

Juliano Freitas

February 22nd, 2018

Objective

- Inform SPP Members of the main milestones to be approached during the 20 Year Assessment
- Approve the 20 Year Assessment Manual

20 Year Assessment Overview

- The objective of the 20-Year Assessment is to develop a long-range EHV (300 kV and above) transmission road map for the SPP region.
- The assessment will result in the identification of projects that economically deliver energy within the SPP region while addressing a reasonable range of future industry uncertainty.
- The resulting library of projects will provide a source of candidate projects that will inform shorter-term planning assessments for the purpose of injecting longer-term vision into those assessments.

SPP

Study Process

- The SPC and ESWG will define and develop study scenarios
- The input assumptions will be refined through the various stakeholder groups (ESWG, TWG, MDWG, MOPC, and RSC)
- The ESWG will oversee the development of the economic models that incorporate the inputs
- A list of TWG approved constraints to be used in the economic model dispatch will be developed.

SPP

Study Process

- An economic assessment will be performed to analyze congested facilities on the SPP transmission system
- This will be done using a security constrained unit commitment (SCUC) and security constrained economic dispatch (SCED) model over 8,760 consecutive hours
- EHV solutions (300 kV+) will be developed and tested to assess their ability to meet the needs of the different scenarios

Data Input

- Market Structure
  - IM and CBA will be baseline assumptions for the analysis
- Scenarios
  - Five scenarios
  - Will consider evolving changes in technology, load growth patterns, fuel price trends, public policy, and others factors
- Resource Plan
  - A generation resource plan will be developed for use in the study for each scenario
  - This resource plan will include both renewable and conventional generation

Data Input

- System Topology
  - The base reliability model set will serve as an input into the economic model to develop a market-based economic dispatch for the system
- Siting
  - The development of siting locations will follow the process as set forth in the Integrated Transmission Plan Siting Manual
- DC Ties
  - Methodology to model DC ties and lines will be created during the scope development

SPP

Data Input

- Fuel and Emissions Prices
  - The latest vendor data set will be used as a guide along with feedback from participants and staff for setting fuel and emissions prices
- Hurdle Rates
  - The latest vendor data set will be used as a guide along with feedback from participants and staff for setting hurdle rates for imports and exports between SPP and other entities

Analysis

- Constraint Assessment
  - The initial constraint list will be the ~~then-~~current SPP section of the Book of Flowgates
  - Constraints studies will be run over 8,760 hours (1 year)
  - This analysis will use the economic model(s) for each scenario
  - Contingencies 100 kV and above in SPP and first-tier
  - Monitored elements 100 kV and above in SPP and first-tier

Analysis

- Economic Assessment
  - System congestion will be identified in each of the 8,760 hours
  - A list of binding constraints will be developed for each scenario and ranked based upon the congestion score associated with each constraint
  - Up to 25 unique constraints, with greater than $50,000 in annual congestion score, based upon this ranking will be identified as economic needs

Analysis

- Public Policy Assessment
  - Shortfall in the achievement of the renewable requirements of each scenario due to curtailment will be identified
  - Renewable resources that experience an annual energy output of less than the statutory/regulatory Mandate or Goal will be identified as public policy needs

Solutions Development

- Cost Estimates
  - The cost estimates used for projects that are tested in the initial project development phase will be conceptual estimates
- Sensitivities
  - Natural gas price at a 95% confidence level (2 standard deviations)
  - Demand levels at a 67% confidence level (1 standard deviation)
- Benefit Metrics
  - APC will be the only benefit metric to be calculated per project list

SPP

Recommendation

- ESWG to approve the 20 Year Assessment Manual

20-Year Assessment Manual

SPP Staff

Revision History

Date	Author	Change Description
5/8/17	SPP Staff	Initial Draft
5/15/17	SPP Staff	Edits per 5/12/17 Net Conference Feedback
10/12/17	SPP Staff	Edits per 10/5/17 Net Conference Feedback

Table of Contents

Introduction

The 20-Year Assessment is conducted in accordance with the SPP Open Access Transmission Tariff (OATT) Attachment O and under the guidance of the SPP Strategic Planning Committee (SPC).

Objective

The objective of the 20-Year Assessment is to develop a long-range EHV (300 kV and above) transmission road map for the SPP region. The assessment will result in the identification of projects that economically deliver energy within the SPP region while addressing a reasonable range of future industry uncertainty. The resulting library of projects will provide a source of candidate projects that will inform shorter-term planning assessments for the purpose of injecting longer-term vision into those assessments.

Working Group Involvement

The Economic Studies Working Group (ESWG) identifies and maintains the economic data, data sources, models, economic planning methodology and processes, and adjusted production cost (APC) to be used in the evaluation of economic expansion needs in the SPP region.
The Transmission Working Group (TWG) oversees and maintains the study processes for constraint assessment, topology, load and generation review to be used in the 20 year model.
The Model Development Working Group (MDWG) identifies and maintains the generation review to be used in the 20 year model.
The Strategic Planning Committee (SPC) will be responsible for the scenarios and policy decisions.
The Seems Steering Committee (SSC) will evaluate the seams impact.
The 20-Year Assessment recommended plan will be reviewed and may be endorsed by ESWG, TWG, MOPC, RSC and BOARD.

Economic Studies Working Group (ESWG)

The ESWG will be responsible for review of the data and results for the following items:

- Renewable policy review
- Scope
- Scenarios
- Benefit metrics
- Sensitivities
- Economic model review and assumptions
- Resource plan review
- Load forecasts
- Generation review
- Economic analysis

- Public Policy analysis
- 20-Year Assessment Report

Transmission Working Group (TWG)

The TWG will be responsible for review of the data and results for the following items:

- Scope
- Transmission topology inputs to the models
- Load forecasts
- Generation review
- Constraint assessment
- 20-Year Assessment Report

Model Development Working Group (MDWG)

The MDWG will be responsible for review of the data for the following item:

- Generation review

Seams Steering Committee (SSC)

The SSC will be responsible for the review of the following:

- Seams impacts

Markets and Operations Policy Committee (MOPC)

The MOPC will make a recommendation to the Board of Directors regarding approval decisions of the following items:

- 20-Year Assessment Report

Strategic Planning Committee (SPC)

The SPC will provide input for the following items:

- Scenarios development
- Policy decisions

Board of Directors (Board)

The Board will make approval decisions for the following items:

- 20-Year Assessment Report

Regional State Committee (RSC)

The RSC will review the following items:

- 20-Year Assessment Report

Stakeholder Reviews

The following is a list of reviews provided by stakeholders during the 20-Year assessment.

Load Forecast Review

Projected peak load per area for year the study will be submitted by the modeling contacts for the development of a peak model. Energy per area will be obtained from publically available sources and reviewed and updated by stakeholders. Stakeholders will review and submit revisions to the projected peak load and energy per area where applicable. Peak load and energy will also be identified for load serving entities within SPP RTO areas.

Renewable Policy Review

The Renewable Policy Review will follow the process outlined in the Integrated Transmission Planning Manual[1]. If any significant changes to renewable mandates or goals occur during a 20-Year Assessment, stakeholders can bring them to the ESWG for review and potential approval for use in the assessment. If exemptions to the mandates or goals are allowed (e.g. the applicable technology is cost prohibitive or municipals are exempt), those exemptions will be considered as SPP staff is notified during the renewable policy review.

Generation Review

The ESWG, TWG, and MDWG will review the data for all generators added to the model as part of the 20-Year study. This will include conventional and renewable generation. The ESWG will be responsible for reviewing and approving economic data.

Proposed resources and facilities will be included and designated to a utility if it meets the resource inclusion criteria approved by the ESWG. Non-designated resources will be included based on commercial operation statuses and results of a transmission owner and generator interconnection customer survey of interconnection agreements with an on-schedule status.

Economic Model Review

The ESWG will be provided with model data indicating generators and the parameters used in the economic model. Parameters such as maximum capacity, run status, O&M costs, etc. will be provided for review.

Constraint Assessment Review

A list of constraints will be developed to be used in the economic dispatch, as detailed in the Constraint Review Section below. The constraints will be provided to the TWG for review; they will approve the final list of constraints to use, as well as the associated constraint ratings.

Scenarios

---

[1] Integrated Transmission Planning Manual

The SPC will begin the process by defining the high-level, strategic characteristics of potential study scenarios. Utilizing these characteristics, the ESWG will develop a maximum of five scenarios to be utilized in the development of potential transmission plans for SPC's consideration. The ESWG's scenario development will include pertinent study details including but not limited to generation fleet trends, load growth assumptions, fuel price trends and assumptions, recommendations regarding environmental policies, and penetration of new technologies. SPC will be responsible for the final approval of the scenarios for use in the 20-year Assessment.

Study Process

1. The SPC and ESWG will define and develop study scenarios.
2. The input assumptions will be refined through the various stakeholder groups (ESWG, TWG, MDWG, MOPC, and RSC).
3. The ESWG will oversee the development of the economic models that incorporate the inputs developed in step #1 above. This will include review of input data.
4. A list of TWG-approved constraints to be used in the economic model dispatch will be developed. All constraints will be for 100 kV and above facility outages within SPP and first-tier neighbor systems.
5. An economic assessment will be performed to analyze congested facilities on the SPP transmission system. This will be done using a security constrained unit commitment (SCUC) and security constrained economic dispatch (SCED) model over 8,760 consecutive hours.
    a. Economic and policy needs will be identified across scenarios.
6. EHV solutions (300 kV+) will be developed and tested to assess their ability to meet the needs of the different scenarios.
    a. A project list will be developed for each scenario that meets each scenario's economic and policy needs in a cost-effective way.

Data Inputs

The analysis for the 20-Year Assessment will consist of engineering models used to facilitate the development of long-range transmission plans. The models will be economic models based on market based dispatch. These models require input assumptions as to generation resources, parameters, and locations (detailed in the following sections). The output of these models will allow SPP staff to determine the appropriate transmission needs from a regional perspective.

The major assumptions needed to construct the models are: market structure, load forecasts, fuel pricing and availability, transmission topology, resource forecasts, and parameters. Additional assumptions necessary to construct appropriate models will be addressed at the discretion of the stakeholders. Once the model(s) is constructed based on these assumptions, a security constrained unit commitment (SCUC) and security constrained economic dispatch (SCED) analysis will be performed.

Market Structure

SPP implemented its Integrated Marketplace and Consolidated Balancing Authority (CBA) in March 2014. The Integrated Marketplace and CBA will be baseline assumptions for the analysis.

Scenarios

The study will be conducted on a set of up to five scenarios. These scenarios will consider evolving changes in technology, load growth patterns, fuel price trends, and public policy, among others, that may influence the transmission system and energy industry as a whole. By accounting for multiple scenarios, SPP can assess transmission needs over various uncertainties.

Resource Plan

A generation resource plan will be developed for use in the study for each scenario. This resource plan will include both renewable and conventional generation in accordance with the approved study scenarios. Additionally, new renewable and conventional generation resources will be sited as detailed below.

Additional renewables will be included in the plans, as needed, to meet the renewable Mandates and Goals projections as supplied by the Renewable Policy Review. In addition to meeting renewable Mandates and Goals, each pricing zone must meet the current resource adequacy requirement based on the SPP reserve margin requirement in effect at the commencement of the resource planning milestone of the study. The siting of new generation in the resource plan will target the current reserve margin requirement for each zone. Capacity needs will be identified for each scenario.

Renewable generation, for the purposes of this study, includes but is not limited to hydro, wind, solar, and bio-fuel. Designated renewable resources will be identified through the Generation Review and will feed into the Resource Plan. Additional renewables identified by the resource planning software or as needed to match approved scenario assumptions may also be included.

Generator designations will be reviewed by stakeholders and posted on SPP's secure website, viewable to those with access to the website[2] and corresponding ITP assessment folder. Joint ownership of unit additions may be used to avoid excessive additions of new resources to individual pricing zones.

SPP first-tier neighbors will be provided the opportunity to provide feedback and input into the generation resource plan for their area.

An alternative to using software to develop the resource plan is to use spreadsheets to create CC/CT ratios instead of resource planning software. The spreadsheets will also include tier-1 resources.

Renewable Policy Review

The Renewable Policy Review will follow the process outlined in the Integrated Transmission Planning Manual[3]. If any significant changes to renewable mandates or goals occur during a 20-Year Assessment, stakeholders can bring them to the ESWG for review and potential approval for use in the assessment. If exemptions to the Mandates or Goals are allowed (e.g. the applicable technology is cost prohibitive or municipals are exempt), those exemptions will be considered as SPP staff is notified during the renewable policy review.

System Topology

The base reliability model set will serve as an input into the economic (production) modeling program to develop a market-based economic dispatch for the system.

The topology used to account for the transmission system, excluding generation, will be the current transmission system and the following transmission upgrades: SPP upgrades that have been approved for construction, SPP Transmission Owner's Zonal Reliability Upgrades, Sponsored Upgrades endorsed by the SPP Board, and first-tier entities' planned upgrades.

Generation Parameters

The generation parameters (e.g., startup cost, operating costs, min/max operating levels, etc.) will be updated by the ESWG as part of the generation review and economic model review.

Renewables

Renewable generation, primarily wind and solar, operate as energy resources that will require the development of hourly generation profiles for individual plants based on historical data or modeled time-series wind speed datasets. The economic dispatch model will attempt to realistically model renewable generation curtailment, based on expected market conditions and reliability requirements. A curtailment price consistent with the variable O&M cost will be used to simulate the behavior of the wind and solar generation within the SCED.

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[2] Access to the website can be requested through SPP RMS

[3] Integrated Transmission Planning Manual

Siting

The development of siting locations will follow the process as set forth in the Integrated Transmission Plan Resource Siting Manual[4].

DC Ties and Lines

DC ties and lines connect SPP to WECC, ERCOT, and Eastern Interconnect systems. Methodology to model DC ties and lines will be created during the scope development.

Fuel Prices

Fuel forecasts will be utilized in the resource planning and production cost modeling. The latest vendor data set will be used as a guide along with feedback from participants and staff for setting fuel prices for coal, oil, uranium, and natural gas, including transportation costs at the onset of the study.

Emission Prices

The latest vendor data set will be used as a guide along with feedback from participants and staff for setting base emission price forecasts for SO_2, NO_X, and CO_2 for the study years at the onset of the study.

Hurdle Rates

Hurdle rates will be utilized in the economic model between SPP and neighboring systems to help keep imports and exports at reasonable exchange levels. The latest vendor data set will be used as a guide along with feedback from participants and staff for setting hurdle rates for imports and exports between SPP and other entities for the base scenario and will be reviewed and approved by the ESWG.

Benchmarking

After all assumptions and data are included in the economic model, it will be benchmarked against operational system behavior. This benchmarking will be used to assess the reasonability of the simulations.

Simulation results from the economic model will be compared with operational statistics and measurements from the SPP real-time data, NERC data, and the Energy Information Administration (EIA) data.

The ESWG will review the benchmarking data as part of the model review process. Specific benchmarks will include some or all of the following: capacity factor by unit type, generation by unit category, maintenance outages, renewable generation profiles, operating and spinning reserve levels, coal transportation costs, system Locational Marginal Prices (LMPs), flowgate loading, production costs, generation dispatch order, and zonal purchases and sales.

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[4] ITP Resource Siting Manual

Analysis

Define Constraints

To identify which constraints are applicable in 20XX, SPP staff will review the existing flowgates to determine additions or deletions from the list of constraints (event file) for the economic model. Staff will perform additional analysis using software to identify the top constraints by flowgate congestion costs on the system for 8,760 hours. These additional constraints will be reviewed and approved by TWG. The following items will be considered in the analysis:

- The initial constraint list will be the then-current SPP section of the Book of Flowgates
- Constraints studies will be run over 8,760 hours (1 year)
- This analysis will use the 20XX economic model(s) for each scenario
- Contingencies 100 kV and above in SPP and first-tier
- Monitored elements 100 kV and above in SPP and first-tier

Unless other information is available, each constraint's rating will be selected based upon the applicable Rating A (normal rating) or Rating B (emergency rating) in the power flow model.

Needs Assessments

The policy and economic needs of the system will be identified in each scenario in order to develop a transmission project list for each scenario. Each analysis will be performed in parallel to determine all needs across the system in 20XX.

Economic Assessment

The economic needs of the system will be identified in each scenario in order to develop a needs list for the development of the project list for each scenario. All of the system needs will be identified through the use of a SCUC and SCED simulation that accounts for 8,760 hours representing each hour of the year 20XX.

The SCED will determine nodal LMPs while dispatching the generation economically. The LMPs, among other cost components, reflect the congestion occurring on the power grid's binding constraints. System congestion will be identified in each of the 8,760 hours. A list of binding constraints will be developed for each scenario and ranked based upon the congestion score associated with each constraint. Up to 25 unique constraints, with greater than $50,000 in annual congestion score, based upon this ranking will be identified as economic needs.

Policy Assessment

The policy needs of the system will also be identified for each scenario in order to develop a needs list for the development of the project list for each scenario. All of the system needs will be identified through the use of a SCUC and SCED simulation that accounts for 8,760 hours representing each hour of the year 20XX. Renewable generation may experience the effects of congestion and be curtailed by the SCED. Shortfall in the achievement of the renewable requirements of each scenario due to this curtailment will be identified. Renewable resources that experience an annual energy output of less than the statutory/regulatory Mandate or Goal will be identified as policy needs. The required energy is based on maximum capacity, capacity factor, and generation profile.

Solution Development

Develop 300 kV+ Solutions

The solution set will be limited to 300 kV and higher voltage facilities. Needs that warrant lower voltage solutions will be noted and will be addressed in the ITP process, assuming they continue to show up as problems in that process.

In order to create the 20-Year transmission plan, a pool of possible solutions will be tested to mitigate the economic and policy needs identified. This pool of solutions will come from DPPs, transmission service studies, generator interconnection studies, previous ITP studies, and any other solutions proposed by SPP staff and stakeholders. Solutions developed could meet more than one need (i.e., economic and/or policy needs) and will be classified as project types based on the criteria outlined in the sub-sections below. Staff will develop a project list for each scenario.

Adjusted Production Cost (APC) will be calculated for the final project list for each scenario. After a final recommended project list has been identified, a one-year financial analysis will be conducted for each scenario and sensitivities will be run to assess how versatile the final project lists are in handling a range of uncertainties.

Benefit and impact calculations will be made on a regional, zonal, and state basis. State values will be extrapolated from the zonal costs and benefits. For those zones that are only in one state, their full portion of both costs and benefits will be allocated to the state. For zones crossing state borders, their portion of both costs and benefits will be allocated to each state based on their percentage of load that is in each state.

Net benefits and B/C ratios will be calculated based on NPV benefit and NPV cost and will be reported based on present dollars (20XX).

Economic Project Solutions

Economic projects will be developed and evaluated based upon how well they mitigate congestion. Any economic project with a one-year B/C ratio greater than the approved ESWG threshold of XX will be included for further evaluation.

Public Policy Project Solutions

Public policy projects will be developed and evaluated based upon how well they mitigate curtailment of renewable energy required by the regulatory/statutory mandates and goals as defined by the 20-Year Assessment renewable policy review. A B/C ratio will be calculated for public policy projects in order to determine the most economical project to mitigate the identified needs. Any public policy project that helps to mitigate curtailment of renewable requirements will be included for further evaluation. The threshold used to select economic projects will not be considered for public policy projects. The public policy projects are eligible if they mitigate the identified curtailments.

Cost Estimates

The cost estimates used for projects that are tested in the initial project development phase will be conceptual estimates. The conceptual estimates will be developed by SPP staff and utilize standardized estimates and multipliers that are based on historical data.

Sensitivities

Sensitivities, if needed, will be conducted on the project lists for each scenario using the Scenario 1 Model to assess how versatile the plan is in handling a range of uncertainties. Economic analysis will be performed for the sensitivities such as:

- Natural gas price at a 95% confidence level (2 standard deviations)
- Demand levels at a 67% confidence level (1 standard deviation)

The sensitivities will be used to measure the viability of the proposed transmission plan that is produced through the 20-Year Assessment. These sensitivities will not be used to develop the transmission projects or filter out projects. A sensitivity on renewable output will be added at +/- 10 percent sensitivity on capacity factors to demonstrate the robustness of the capacity factors.

Benefit Metrics

APC will be the only benefit metric to be calculated per project list.

Timeline

A detailed schedule for the 20-Year Assessment will be developed by staff in conjunction with appropriate working groups to identify the required milestones and corresponding timeframes.

The assessment schedule will be maintained by SPP staff and shared with study participants through working group meetings and via posting to the Transmission Planning page on spp.org.

Deliverables

Final Report

The results from the 20-Year Assessment will be compiled into a report detailing the findings and project lists for each scenario. The report will include a project list identifying each upgrade.

Changes in Process and Assumptions

Modifications to the 20-Year Assessment Manual will be submitted through the SPP Revision Request (RR). The RR process is a key component of SPP's stakeholder processes and allows stakeholder input into decision making. It will place guidelines around the approval and implementation of study scope changes. The Revision Requests will be made via SPP's Request Management System (RMS) which will allow for the tracking and reporting of scope revision submissions. Leveraging of the RR process will appropriately address member concerns while reducing the considerable amount of time it has taken in past studies to finalize the study scope due to numerous revisions submitted by stakeholders.

Standardized Manual items will retain flexibility by granting the appropriate working group the ability to provide guidance on items recommended for revising. An example of this flexibility may be with the scope item Fuel Prices. Standardized language may include the mechanism for setting fuel prices. Per the scope, the selected index would always be used for pricing information, however, the actual price of natural gas may change year-over-year. As the natural gas fuel prices change, the recommended prices would become a part of the assumptions while the standardized scope item would remain unchanged. If a stakeholder recommends the use of another source for pricing information, that recommendation would be submitted through the RR process for proper stakeholder vetting and approval.

SPP Southwest Power Pool

Revision Request Recommendation Report

RR #: 255	Date: 2/6/2018
RR Title: Revision of BP 7060 adding triggers to stop annual escalation of baseline estimates	

SUBMITTER INFORMATION	
Submitter Name: John O’Dell on behalf of PCWG	**Company:** SPP
Email: jodell@spp.org	**Phone:** 501-688-8285

EXECUTIVE SUMMARY AND RECOMMENDATION FOR MOPC AND BOD ACTION

To be completed prior to submission to MOPC/BOD

OBJECTIVE OF REVISION

Objectives of Revision Request:
Triggers to stop annual escalation of baseline costs are not defined in BP 7060.

This revision will describe when it is appropriate to stop escalation of baseline estimates due to one the following triggers:

- DTO providing SPP a letter of commercial operation
- ~~Upgrade reaching need date listed in the Notice to Construct (NTC)~~
- DTO providing notification that the upgrade is in-service
- DTO providing notification that the upgrade is complete

This revision will provide clarity on cessation of application of annual escalation for each upgrade in the Quarterly Project Tracking process for members who are responsible for submission of estimates and final costs for these upgrades. Stakeholders requested clarification of annual escalation in regard to application of +/- 20% variance for out-of-bandwidth projects as described in BP 7060.

SPP STAFF ASSESSMENT

Staff supports this update to Business Practice 7060

IMPACT

Will the revision result in system changes ☒ **No** ☐ **Yes**

Summarize changes:

Will the revision result in process changes? ☒ **No** ☐ **Yes**

Summarize changes: **Clarification for existing process.**

Is an Impact Assessment required? ☒ **No** ☐ **Yes**

If no, explain:

<table>
<tr><td colspan="2">Estimated Cost: $</td><td>Estimated Duration: months</td></tr>
<tr><td colspan="3">Primary Working Group Score/Priority:</td></tr>
<tr><td colspan="3">SPP DOCUMENTS IMPACTED</td></tr>
<tr><td>☐ Market Protocols</td><td>Protocol Section(s):</td><td>Protocol Version:</td></tr>
<tr><td>☐ Operating Criteria</td><td>Criteria Section(s):</td><td>Criteria Date:</td></tr>
<tr><td>☐ Planning Criteria</td><td>Criteria Section(s):</td><td>Criteria Date:</td></tr>
<tr><td>☐ Tariff</td><td colspan="2">Tariff Section(s):</td></tr>
<tr><td>☒ Business Practice</td><td colspan="2">Business Practice Number: 7060 Section 8.6</td></tr>
<tr><td>☐ Integrated Planning Model (ITP Manual)</td><td colspan="2">Section(s):</td></tr>
<tr><td>☐ Revision Request Process</td><td colspan="2">Section(s):</td></tr>
<tr><td>☐ Minimum Transmission Design Standards for Competitive Upgrades (MTDS)</td><td colspan="2">Section(s):</td></tr>
<tr><td>☐ Reliability Coordinator and Balancing Authority Data Specifications (RDS)</td><td colspan="2">Section(s):</td></tr>
<tr><td>☐ SPP Communications Protocols</td><td colspan="2">Section(s):</td></tr>
<tr><td colspan="3">WORKING GROUP REVIEWS AND RECOMMENDATIONS
List Primary and any Secondary/Impacted WG Recommendations as appropriate</td></tr>
<tr><td>Primary Working Group: BPWG</td><td colspan="2">Date: 12/12/2017
Action Taken: No action taken due to lack of Quorum
Date: 1/11/2018
Action Taken: Approved (unanimous)
Abstained: 0
Opposed: 0</td></tr>
<tr><td>Secondary Working Group: PCWG</td><td colspan="2">Date: 12/7/2017
Action Taken: Approved submission of comment to correct language in initial RR submission. (unanimous)
Abstained: 0
Opposed: 0</td></tr>
<tr><td colspan="3">Reasons for Opposition:</td></tr>
<tr><td>Secondary Working Group: CTPTF</td><td colspan="2">Date: 1/4/2018
Action Taken: Endorsed (unanimous)
Abstained: 0
Opposed: 0</td></tr>
<tr><td colspan="3">Reasons for Opposition:</td></tr>
<tr><td>Secondary Working Group: CAWG</td><td colspan="2">Date: 1/12/2018
Action Taken: None. Presented as informational. Staff will bring this RR back to CAWG in February 2018 as a voting item.</td></tr>
</table>

Reasons for Opposition:	
Secondary Working Group: RTWG	**Date: 1/25/2018** **Action Taken: Approved (unanimous)** **Abstained: 0** **Opposed: 0**
Reasons for Opposition:	
Secondary Working Group: CAWG	**Date: 2/13/2018** **Action Taken:**
Reasons for Opposition:	
Secondary Working Group: TWG	**Date: 2/21/2018** **Action Taken:** **Abstained:** **Opposed:**
Reasons for Opposition:	
Secondary Working Group: ESWG	**Date: 2/22/2018** **Action Taken:** **Abstained:** **Opposed:**
Reasons for Opposition:	
Secondary Working Group: ORWG	**Date: 3/1/2018** **Action Taken:** **Abstained:** **Opposed:**
Reasons for Opposition:	
MOPC	**Date:** **Action Taken:** **Abstained:** **Opposed:**
Reasons for Opposition:	

BOD/Member Committee	Date: Action Taken: Abstained: Opposed:
Reasons for Opposition:	
COMMENTS	
Comment Author: John O'Dell on behalf of PCWG	
Date Comments Submitted: 12/8/2017	
Description of Comments: Correction of language submitted in initial RR submission	
Status: Corrections accepted	
Comment Author:	
Date Comments Submitted:	
Description of Comments:	
Status:	
PROPOSED REVISION(S) TO SPP DOCUMENTS	

SPP Business Practices

7060, Section 8.6

8.6. Baseline Cost Escalation

The established baseline is the version of a cost estimate that can only be changed through formal change control procedures and is used as a basis for comparison.

All cost estimates established as baselines will be escalated annually. SPP will escalate any cost estimate for an Upgrade that is considered a baseline estimate at the escalation rate assumed in the source study that originated the need for the Upgrade. The new escalated baseline cost estimate will be used for comparison with any updated cost estimate submitted in the same calendar year to measure cost estimate variance.

Absent the DTO informing SPP completion of an upgrade will not meet the need date in an NTC, baseline cost escalation for an upgrade will cease upon one of the following:

- Upgrade reaching need date listed in NTC
- DTO providing letter of commercial operation
- DTO providing SCERT update listing the upgrade as "in-service" or "complete"

The established baseline is the version of a cost estimate that can only be changed through formal change control procedures and is used as a basis for comparison.

All cost estimates established as baselines will be escalated annually. SPP will escalate any cost estimate for an

Upgrade that is considered a baseline estimate at the escalation rate assumed in the source study that originated the need for the Upgrade. The new escalated baseline cost estimate will be used for comparison with any updated cost estimate submitted in the same calendar year to measure cost estimate variance.

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- ~~Upgrade reaching need date listed in NTC~~
- ~~DTO providing l~~Letter of commercial operation
- ~~DTO providing~~ SCERT update listing the upgrade as "~~i~~In-service"
- SCERT update listing the upgrade as ~~or~~ "complete"


SPP Southwest Power Pool
HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.

Southwest Power Pool

RR 255

Adding Triggers to Stop Annual Escalation of Baseline Estimates

ESWG 2/22/2018

Project Cost Working Group (PCWG)

- The PCWG was established to create a group with stakeholder input, oversight, and accountability that can provide a transparent review of transmission cost variances
  - To ensure cost estimate variances are addressed in a timely manner, the PCWG will evaluate projects exceeding allowable variance levels
- PCWG recommends action to MOPC and Board on Projects over $20 million and above 100 kV where costs are +/- 20% of baseline cost estimates
- Baseline cost is the number to which new cost estimates are compared to determine whether or not project costs are out of bandwidth (+/- 20%)
- In order to provide accurate comparison, inflation rates assumed in studies are applied to baseline costs of upgrades once each year
- Inflation is not added to Upgrades where the TO has provided information stating the upgrade is "in-service" or "completed"

SPP

Business Practice 7060 – Section 8.6

The established baseline is the version of a cost estimate that can only be changed through formal change control procedures and is used as a basis for comparison

All cost estimates established as baselines will be escalated annually. SPP will escalate any cost estimate for an Upgrade that is considered a baseline estimate at the escalation rate assumed in the source study that originated the need for the Upgrade. The new escalated baseline cost estimate will be used for comparison with any updated cost estimate submitted in the same calendar year to measure cost estimate variance.

Baseline cost escalation for an upgrade will cease upon the DTO providing SPP one of the following:

- Letter of commercial operation
- SCERT update listing the upgrade as "In-service"
- SCERT update listing the upgrade as "Complete"

Reasons for change

- PCWG wishes to include clarification for triggers that stop annual baseline escalation in Section 8.6 of BP 7060
- Current triggers that stop annual escalation of baseline costs are not defined in BP 7060
- Additional language proposed in this RR reflects current practice for stopping annual baseline escalation

Next Steps

- Presentation of this RR to secondary working groups
- Review of RR by BPWG (Primary WG)
- Approval of final RR by MOPC, targeting April 2018

Staff Recommendation

SPP staff recommends that ESWG approve RR 255