



**Southwest Power Pool**  
**ECONOMIC STUDIES WORKING GROUP**  
**October 4th, 2017**  
**Web Conference**

**• SUMMARY OF ACTIONS TAKEN •**

1. Approved Staff's recommendation (Option 5) on total Wind Generation for the both the reference case and for Future 2, with consideration of staffs proposed mitigation options to be discussed in the future.
2. Approved SPP Staff's medium proposal for solar levels in the reference case and in future 2.
3. Approved the emerging technologies option as the 2<sup>nd</sup> future.

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**October 4th, 2017**

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**• 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 8:00a.m., welcomed those in attendance, and asked for introductions.

There 57 web conference participants, representing 14 of 17 ESWG members. (Attachment 1 – October 4th, 2017 Attendance List)

**Agenda Item 1b – Receipt of Proxies**

Alan Myers (ITC) asked for any proxy statements; two proxies were identified. (Attachment 2 – Proxy Statements)

- Tim Owens (NPPD) proxy for Kurt Stradley (LES)
- Ryan Yokley (SUNC) proxy for Al Tamimi (SUNC)

**Agenda Item 1c – Review of Agenda**

Chair Alan Myers (ITC) presented the agenda for review and asked for any additions or corrections. (Attachment 2 – October 4th, 2017 ESWG Agenda).

**Natasha Henderson (GSEC) made a motion; seconded by Jeremy Severson (BEPC) to adopt the agenda. The motion was approved unanimously.**

**Agenda Item 2 – 2019 ITP Futures**

**Agenda Item 2a – Renewable Resource Expansion Plan**

Chris Jamieson (SPP Staff) opened discussions on the Renewable Resource Expansion Plan. Staff provided additional information for wind forecast projections, including NREL wind growth rates. Staff reminded the group that the intent of the Year 2 model is to limit uncertainty and try to represent operational conditions. Staff suggested to change all year 2 options to renewable levels that include in-service facilities, plus submitted resource addition and waiver requests, to be approved by the ESWG & TWG. Staff also addressed the concerns that the ESWG has brought up in determining the appropriate renewable forecasts. Chris assured the group that they are looking into mitigation options. The ESWG reviewed the renewable addition option once again. (Attachment 4 – Renewable Resource Expansion Plan) (Attachment 5 – Future Drivers Discussion)

**John Olsen (Westar) made a motion; seconded by Jody Holland (SCMCN) to approve Staff's recommendation (Option 5) on total Wind Generation for the both the reference case and for Future 2. A friendly amendment from Bennie Weeks (Xcel/SPS) to add "with consideration of staffs proposed mitigation options to be discussed in the future" to the end of the motion was not accepted.**

**Bennie Weeks (Xcel/SPS) made a motion; seconded by Leon Howell (OKGE) to amend the motion. With 13 votes received, the motion passed with 5 no votes and 2 abstentions. Jody Holland (SCMCN), John Olsen (Westar), Jon Iverson (OPPD), Randy Collier (CUS), and Alan Myers (ITC) voted no. Bethany King (EDE) and Ryan Yokley (SUNC) abstained.**

Alan asked for discussion on the new motion. Leon Howell wanted it noted that he believes the numbers in option 5 are way too high, and he would be more comfortable leaving them flat across all years. Bennie stated that she is now comfortable with the numbers with consideration of a mitigation plan.

**The ESWG voted on the amended motion to approve Staff's recommendation (Option 5) on total Wind Generation for the both the Reference Case and for Future 2, with consideration of staffs proposed mitigation options to be discussed in the future. The motion was approved with one no vote, Leon Howell (OKGE).**

**Natasha Henderson (GSEC) provided the following reasons for her yes vote: "GSEC voted yes to the ... motions in order to compromise on what should be included in the model for study purposes in order to allow ESWG to provide a recommendation to SPC, however, these numbers are far below the amount of wind we expect to be coming online in SPP between now and 2029."**

**Alan Myers (ITC) provided the following reasons for his yes vote: "ITC voted yes for option (5) wind expansion motion. While we support this option as a useful compromise for study purposes we do not believe it significantly underestimates the amount of wind generation expansion that will occur in SPP by 2029."**

Discussion then moved on to the solar renewable amounts to include in the model. The ESWG reviewed the options.

**Leon Howell ((OKGE) made a motion; seconded by John Olsen (Westar) to approve SPP Staff's medium proposal for solar levels in the reference case and in future 2. The motion was approved unanimously.**

ESWG members requested that staff send out the updated spreadsheet and motions. They were emailed to the exploder list after the meeting.

Staff brought up the chart detailing the options for the second future, emerging technologies versus the renewable future. Stakeholders asked if there would be a sensitivity test on natural gas prices, Amber Greb (SPP Staff) responded that there would be. There were questions around the increase in energy for the emerging technologies future, Alan told the group that the methodology would be approved at a later meeting.

**Natasha Henderson (GSEC) made a motion; seconded by Bennie Weeks (Xcel/SPS) to approve the emerging technologies option as the 2<sup>nd</sup> future. The motion was approved with 2 abstentions, Alan Myers (ITC) and Bethany King (EDE).**

### **Closing Items**

Chair Alan Myers (ITC) requested other items meriting discussion. Amber Greb (SPP Staff) asked the group to be thinking about dates for potential conference calls in November.

The meeting was adjourned at 10:50 PM.

Respectfully Submitted,

Amber Greb

ESWG Secretary

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Shalini Gupta  
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SPP Staff  
SPP Staff

1. Tim Owens (NPPD) proxy for Kurt Stradley (LES)

Amber and Alan –

Tim Owens has my proxy vote for the ESWG conference call today

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2. Ryan Yokley (SUNC) proxy for Al Tamimi (SUNC)

**From:** Tamimi, Al [<mailto:atamimi@sunflower.net>]

**Sent:** Wednesday, October 04, 2017 9:46 AM

**To:** Myers, Alan K. <[amyers@ltctransco.com](mailto:amyers@ltctransco.com)>

**Subject:** [EXT] Ryan Yokley Has My Proxy for todays ESWG meeting

**Caution - External Sender**

Contact the ITC Helpdesk with any questions or concerns.

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**Al Tamimi, Ph.D., P.E.**

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## ECONOMIC STUDIES WORKING GROUP

October 4<sup>th</sup>, 2017

Conference Call

• A G E N D A •

9:00am – 11:00am

1. Administrative Items
  - a. Call to Order, Introductions..... Alan Myers (5 minutes)
  - b. Receipt of Proxies ..... Amber Greb (1 minute)
  - c. Review of Agenda<sup>1</sup> ..... Alan Myers (1 minute)
2. 2019 ITP Futures<sup>1</sup> (Approval Item) ..... Amber Greb (2 hours)
  - a. Renewable Resource Expansion Plan<sup>1</sup> (Approval Item) ..... (Chris Jamieson)
3. Closing Items ..... All (5 minutes)
  - a. Summary of Action Items (Amber Greb)
  - b. Future Meetings
    - i. October 12<sup>th</sup>, 2017: 8<sup>th</sup> Floor AEP Offices, Dallas, TX
    - ii. November 8<sup>th</sup>-9<sup>th</sup>, 2017: SPP Corporate Offices, Little Rock, AR
    - iii. December 14<sup>th</sup>, 2017: 8<sup>th</sup> Floor AEP Offices, Dallas, TX
    - iv. January 11<sup>th</sup>, 2018: 8<sup>th</sup> or 41<sup>st</sup> Floor AEP Office, Dallas, TX

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<sup>1</sup> Background Material Included



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



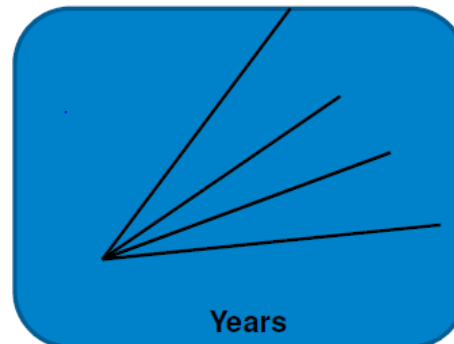
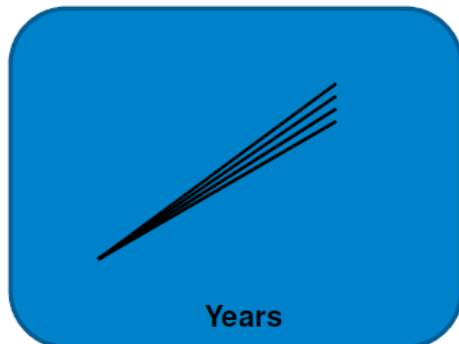
# Renewable Resource Expansion Plan

Chris Jamieson

October, 2017

# What is our objective?

- Should we study what we forecast/expect?
- Should we study what we want?
- Should we not study what we do not want?
- At whose expense and for what benefit?
- Economic analysis objective
  - Forecast inputs
  - Study economic operation of transmission system
  - Develop and evaluate economic transmission expansion options
  - If the transmission expansion benefits exceed the cost thereby resulting in lowering overall cost to SPP rate payers then recommend construction



# 2016 NREL ATB Standard Scenario Approach with Caveats

	Beginning 2018		Beginning 2021			Beginning 2024			Beginning 2029		
Standard Scenario Name	Nameplate Capacity (GW)	Nameplate Capacity (GW)	Annual Growth Rate	GW/year	Nameplate Capacity (GW)	Annual Growth Rate	GW/year	Nameplate Capacity (GW)	Annual Growth Rate	GW/year	
<b>Land-Based wind Growth Rates from NREL 2016 ATB Standard Scenarios approximated for SPP using state level information</b>											
PTCITCextension	18	23	9%	1.7	27	6%	1.3	30	2%	0.5	
HighNGPrice	18	24	11%	2.2	25	1%	0.3	27	1%	0.3	
LowCostRE	18	23	9%	1.9	23	0%	0.0	23	0%	-0.1	
<b>Centralscenario</b>	<b>18</b>	<b>23</b>	<b>9%</b>	<b>1.7</b>	<b>23</b>	<b>0%</b>	<b>0.0</b>	<b>23</b>	<b>0%</b>	<b>0.0</b>	
LowDemandGrowth	18	22	7%	1.4	22	0%	0.0	21	-1%	-0.2	
LowNGPrice	18	21	6%	1.2	21	0%	0.0	20	-1%	-0.3	
<b>Utility PV Growth Rates from NREL 2016 ATB Standard Scenarios approximated for SPP using state level information</b>											
PTCITCextension	0	1	44%	0.1	2	38%	0.3	4	16%	0.6	
HighNGPrice	0	1	38%	0.1	2	56%	0.5	6	23%	1.3	
LowCostRE	0	1	33%	0.1	3	76%	0.8	6	17%	1.1	
<b>Centralscenario</b>	<b>0</b>	<b>1</b>	<b>44%</b>	<b>0.1</b>	<b>2</b>	<b>42%</b>	<b>0.4</b>	<b>5</b>	<b>21%</b>	<b>1.0</b>	
LowDemandGrowth	0	0	16%	0.0	1	62%	0.4	2	10%	0.3	
LowNGPrice	0	1	53%	0.2	2	31%	0.3	3	10%	0.4	

SPP

# Economic Model Year 2 Resource Inclusion Recommendation

- Intent of the ITP manual is not to forecast additional resource expansion and/or retirement forecasts above and beyond what is identified in the gen review
- Include in-service resources upon approval of the gen review
- Include approved retirements/retrofits identified in the gen review
- Include resource addition and waiver requests judged by ESWG and TWG to have a high probability of going into service

# Wind Expansion Options

- Option 1 (Broad range of possible outcomes)
  - Reference Future
    - Acknowledges technical potential in SPP, GI queue, and interconnection cost threshold analysis
    - Acknowledges public announcements and trends
    - Includes both near-term and long-term growth based on independent forecasting analysis
    - Proactive in evaluating transmission expansion benefits and costs and managing risks associated with increased wind additions
    - May result in lower overall cost to SPP rate payers
    - May naturally result in some exports of economic energy
    - May overestimate wind additions and overbuild transmission system
    - May potentially mask transmission issues
    - May not account for lower demand and gas forecasts and PTC/ITC expirations
  - Second Future
    - Acknowledges technical potential in SPP and GI queue to a greater extent
    - May not acknowledge interconnection cost threshold analysis
    - Acknowledges public announcements and trends
    - Provides a stress test to the transmission system and transmission planning process to give SPP staff and stakeholders visibility into a possible future
    - May result in lower overall cost to SPP rate payers
    - May be more informational/exploratory and better suited for an ITP20 assessment
    - May result in more economic energy exports that result in greater adjusted production cost savings to non-SPP rate payers and therefore limit transmission expansion plan options that are beneficial to SPP rate payers
    - May overestimate wind additions and overbuild transmission system
    - May potentially mask transmission issues
    - May not account for lower demand and gas forecasts and PTC/ITC expirations

# Wind Expansion Options

- Option 2 and 5 (Broad range of possible outcomes)
  - Reference Future
    - Acknowledges technical potential in SPP, GI queue, and interconnection cost threshold analysis
    - Acknowledges public announcements and trends
    - Includes near-term growth (2 GW/year) and slower long-term growth consistent with mid range NREL 2016 ATB Standard Scenario projections and historical installation trends around PTC/ITC expiration
    - Proactive in evaluating transmission expansion benefits and costs and managing risks associated with increased wind additions
    - May naturally result in some exports of economic energy
    - May result in lower overall cost to SPP rate payers
    - May overestimate wind additions and overbuild transmission system
    - May potentially mask transmission issues
    - May not account for lower demand and gas forecasts
  - Second Future
    - Acknowledges technical potential in SPP, GI queue, and interconnection cost threshold analysis
    - Acknowledges public announcements and trends
    - Includes near-term growth (3 GW/year) and slower long-term growth consistent with high range NREL 2016 ATB Standard Scenario projections and historical installation trends around PTC/ITC expiration
    - Proactive in evaluating transmission expansion benefits and costs and managing risks associated with increased wind additions
    - May naturally result in some exports of economic energy
    - May result in lower overall cost to SPP rate payers
    - May overestimate wind additions and overbuild transmission system
    - May potentially mask transmission issues
    - May not account for lower demand and gas forecasts

# Wind Expansion Options

- Option 3 (Narrow range of possible outcomes)
  - Reference Future
    - Includes near-term growth (0.5 GW/year) and slower long-term growth consistent with low range NREL 2016 ATB Standard Scenario projections
    - May account for how low demand and gas forecasts effect wind expansion growth rates
    - May not adequately account for GI queue and interconnection cost threshold analysis
    - May not adequately account for public announcements and trends
    - May underestimate wind additions therefore exposing rate payers to excessive congestion costs and other risks associated with excessive transmission scarcity
    - May delay economic transmission expansion that lowers overall cost to SPP rate payers
    - May distort the conventional resource expansion and transmission build options
  - Second Future
    - Includes near-term growth (<2 GW/year) and slower long-term growth consistent with high range NREL 2016 ATB Standard Scenario projections
    - May account for effects on wind expansion growth rates due to low demand and gas forecasts
    - May not adequately account for GI queue and interconnection cost threshold analysis
    - May not adequately account for public announcements and trends
    - May underestimate wind additions therefore exposing rate payers to excessive congestion costs and other risks associated with excessive transmission scarcity
    - May delay economic transmission expansion that lowers overall cost to SPP rate payers
    - May distort the conventional resource expansion and transmission build options

# Wind Expansion Options

- Option 4
  - Reference Future
    - May not be the best option for identifying the incremental transmission costs associated with incremental wind additions
    - May not meet the objectives of the study effort
    - May unduly distort the conventional resource expansion and transmission build options



# Mitigation Options

- GOF assessment
- Modeling changes to remove revenue to merchant generation from APC benefits
- Increasing B/C thresholds

<u>Key Assumptions</u>	Drivers				
	Reference Case			Emerging Technologies	
	Year 2	Year 5	Year 10	Year 5	Year 10
Peak Demand Growth Rates	As Submitted in Load Forecast			As Submitted in Load Forecast	
Energy Demand Growth Rates	As Submitted in Load Forecast			Increase in Energy	
Natural Gas Prices	Current Industry Forecast			Current Industry Forecast	
Coal Prices	Current Industry Forecast			Current Industry Forecast	
Emissions Prices	Current Industry Forecast			Current Industry Forecast	
Fossil Fuel Retirements	Age-Based 60+, subject to stakeholder input			Age-based 60+	
Environmental Regulations	Current Regulations			Current Regulations	
Demand Response	As Submitted in Load Forecast			As Submitted in Load Forecast	
Distributed Generation (Solar)	As Submitted in Load Forecast			+300 MW	+500 MW
Energy Efficiency	As Submitted in Load Forecast			As Submitted in Load Forecast	
Export Lines	No			No	
New/Re-powered Renewables	Increased capacity Factor			Increased capacity Factor	
Storage	None			None	
<b>Total Renewable Capacity</b>					
Solar (GW)	~.25+	3	5	4	7
Wind (GW)	~18+	25	26	29	32

Renewable Future		Combination	
Year 5	Year 10	Year 5	Year 10
50/50	50/50	50/50	50/50
50/50	50/50		
10% increase	10% increase		
Vendor	Vendor	Vendor	Vendor
Vendor, CO <sub>2</sub> \$22 adder			
	Age-Based 50+		
	New Regulations		
Moderate		Moderate	
Moderate			
Moderate		Moderate	
Yes			
New and re-powered		New and re-powered	
No		No	