



**Southwest Power Pool
ECONOMIC STUDIES WORKING GROUP
September 28th, 2017**

Net Conference

• SUMMARY OF ACTIONS TAKEN •

1. None

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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 8:30 a.m., welcomed those on the conference, and asked for introductions.

There were 79 participants, representing 15 of 17 ESWG members. (Attachment 1 – September 28th, 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)

- Eric Burkey (SCMCN) proxy for Jody Holland (SCMCN) on September 28th
- Jeremy Harris (Westar) proxy for John Olsen (Westar) on September 28th

Agenda Item 1c – Review of Agenda

Chair Alan Myers (ITC) presented the agenda for review and asked for any additions or corrections. (Attachment 3 – September 28th, 2017 ESWG Agenda).

Kurt Stradley (LES) made a motion; seconded by Tim Owens (NPPD) to adopt the agenda. The motion was approved unanimously.

Agenda Item 2 – 2019 ITP Futures

Chris Jamieson (SPP Staff) opened discussions on the Renewable Resource Expansion Plan. He showed options for a high, moderate, and low level of wind expansion and explained the rationale and basis for each option. The ESWG continued the conversation about the appropriate amount of wind to include in the reference case. Many spoke in agreement of the wind coalition recommendation from the previous meeting, while others were very hesitant to add wind and end up building transmission based on the proxy generation. Bennie Weeks (Xcel/SPS) stated that the wind announcements that have been made are not certain and she still feels that we should not put any additional wind in the reference case. Natasha Henderson (GSEC) asked the group to think about what they truly feel is realistic, but stated that she would abstain from a vote for high wind unless we could caveat the motion to look at a mitigation for how costs would be allocated for projects that came from a high wind future. Tim Owens (NPPD) presented his alternative proposal for the renewable resource expansion plan. His numbers were largely based on what staff presented at the previous meeting. Many stakeholders spoke up in support of Tim's proposal. After Tim, Leon Howell (OGE) presented his alternative proposal for the renewable resource expansion plan. Leon suggested adding high wind may cover up real issues seen today. John (OPPD) agreed we should not have a future stressing the system with high wind amounts. Natasha Henderson (GSEC) concurred as well and advised the ESWG to think about how much wind is coming.

Juliano (SPP) mentioned using GOF as mitigation for APC/Benefit concerns for the reference case. Alan Myers (ICT) suggested ESWG take a vote to narrow down the wind options for the Reference case only. Options 2 and 5 were grouped together as one, everyone on the call was allotted two votes. Options 1 and 5 were the clear winners of the straw poll. After a short discussion on these two options, a second vote



was performed to narrow down further to one selection to take to SPC. Only voting members were able to vote, ESWG was unable to reach a consensus, with four votes for Option 1 and seven for Option 5.

The ESWG moved on to discuss the wind additions for the second future. Alan Myers called for a vote on the four options presented. Options 2 and 5 passed. As time expired, the group agreed to an additional conference call for further discussion before the SPC meeting. (Attachment 4 –Future Drivers Discussion)

Closing Items

Vice-Chair Tim Owens (NPPD) requested other items meriting discussion.

The meeting was adjourned at 11:34 AM.

Respectfully Submitted,

Amber Greb

ESWG Secretary

First Name	Last Name	Company
Aaron	Vander Vorst	Tradewind Energy, Inc.
Alan	Myers	ITC Holdings, Inc
Amber	Greb	SPP
Andrew	Berg	Missouri River Energy Services
Anita	Sharma	AEP
Antoine	Lucas	Southwest Power Pool
Antonio	Barber	SPP
Benjamin	Abing	ITC Holdings
Bennie	Weeks	Xcel Energy Services
Bethany	King	Empire District Electric Company
Betsy	Beck	American Wind Energy Association
Bill	Leung	Nebraska Power Review Board
Bradley	Schwarz	Hunt Transmission Services
Brian	Johnson	AEP
Brian	Rounds	AESL Consulting
Calvin	Daniels	WFEC
Charles	Shue	ITC Great Plains
Chris	Hagman	American Transmission Company
Chris	Lyons	Customized Energy Solutions
Chris	Cranford	SPP
Clayton	Mayfield	SPP
Don	Frerking	Kansas City Power & Light Company
Eddie	Watson	Southwest Power Pool
Eric	Rodriguez Reyes	Nextera Energy Transmission
Eric	Burkey	GridLiance
Evan	Racine-Johnson	Golden Spread Electric Cooperative, Inc.
Garrick	Nelson	Western Area Power Administration
Gimod	Olapurayil	ITC Great Plains LLC
Greg	McAuley	Oklahoma Gas & Electric
Hagen	Boehmer	SPP
J.P.	Maddock	Basin Electric Power Cooperative
Jamie	Hajek	NorthWestern Energy
Jarrold	Wolford	NTEC
Jason	Mazigian	Basin Electric Power Cooperative
Jason	Davis	SPP
Jason	Frasier	GE Energy Consulting
Jason	Shook	GDS Associates, Inc.
Jeremy	Harris	Westar Energy Inc
Jeremy	Severson	Basin Electric Power Cooperative
Jerry	Bradshaw	City Utilities of Springfield Missouri
Jim	Jacoby	American Electric Power
Joe	Fultz	Grand River Dam Authority
JOE	STASZOWSKI	ISO-NE
John	Olsen	Westar Energy, Inc.
John	Boshears	City Utilities of Springfield Missouri
Jon	Iverson	Omaha Public Power District
Josephine	Daggett	Western Area Power Administration-Upper Great Plains Region
Joshua	Tupper	Empire District Electric
Juliano	Freitas	SPP
Kelsey	Allen	Southwest Power Pool

Kenneth	Hale	City Utilities of Springfield, MO
Kevin	Foflygen	City Utilities of Springfield, MO
Kirk	Hall	Southwest Power Pool
Kurt	Stradley	Lincoln Electric System
Leon	Howell	OGE Energy Corp
Marisa	Choate	Southwest Power Pool
Matthew	Stoltz	Basin Electric Power Cooperative
Meena	Thomas	Public Utility Commission of Texas
Michael	Watt	Oklahoma Municipal Power Authority
Michael	Wegner	ITC Holdings
Natasha	Henderson	Golden Spread Electric Cooperative
Nikki	Roberts	Southwest Power Pool
Noumvi	Ghoms	Missouri Public Service Commission
Randy	Collier	City Utilities of Springfield
Robert	Safuto	Customized Energy Solutions
Ryan	Yokley	Sunflower Electric
Ryan	Baysinger	Kansas City Power & Light
Shalini	Gupta	Leidos Engineering LLC
Shawnee	Claiborn-Pinto	Public Utility Commission of Texas
Sherri	Maxey	Southwest Power Pool
Steve	Gaw	Wind Coalition
Steve	Hohman	OPPD
Steve	Rowley	BHE U.S. Transmission, LLC
Tim	Hall	Southern Power
Tim	Owens	Nebraska Public Power District
Travis	Hyde	OG&E
Yan	Du	LS Power Development
Yohan	Sutjandra	The Energy Authority
Zac	Hager	OG&E

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From: Holland, Jody
Sent: Thursday, September 28, 2017 10:15 AM
To: Alan Myers (amyers@itcgreatplains.com) <amyers@itcgreatplains.com>; Amber Greb <agreb@spp.org>
Cc: Burkey Eric <eburkey@gridliance.com>
Subject: **External Email** proxy

I've provided my proxy to Eric Burkey for the 9/28 call.

Jody Holland

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From: Olsen, John
Sent: Wednesday, September 27, 2017 3:19 PM
To: Amber Greb <agreb@spp.org>; Myers, Alan <amyers@itctransco.com>
Cc: Harris, Jerem <Jeremy.Harris@westarenergy.com>
Subject: **External Email** RE: ESWG 9/28/17 Net Conference - Renewable Assumptions

Amber,

I am still working the ESWG into my calendar. I will be on an airplane tomorrow during this phone call. I will cover this material with Jeremy Harris from Westar and give him my proxy for any voting items.

Thanks,

John Olsen

Ex. Director, System Operations & Transmission Development

ECONOMIC STUDIES WORKING GROUP

September 28th, 2017

Conference Call

• A G E N D A •

8:30am – 11:30am

1. Administrative Items
 - a. Call to Order, Introductions..... Alan Myers (5 minutes)
 - b. Receipt of Proxies Amber Greb (1 minute)
 - c. Review of Agenda¹ Alan Myers (1 minute)
2. 2019 ITP Futures¹..... Amber Greb (3 hours)
 - a. Renewable Resource Expansion Plan¹ (Chris Jamieson)
3. Closing Items All (5 minutes)
 - a. Summary of Action Items (Amber Greb)
 - b. Future Meetings
 - i. October 12th, 2017: 8th Floor AEP Offices, Dallas, TX
 - ii. November 8th-9th, 2017: SPP Corporate Offices, Little Rock, AR
 - iii. December 14th, 2017: 8th Floor AEP Offices, Dallas, TX
 - iv. January 11th, 2018: 8th or 41st Floor AEP Office, Dallas, TX

¹ Background Material Included

Drivers	Description/Notes	Reference Case
Reference Case	50/50 Load, Carbon at regulations, age based retirements, etc	
Electric vehicle market penetration Lower electric rates Continued renewable development	Increased usage of electric vehicles Duck Curve Effect	
Increased utility scale renewables Net Metering Structures	And possible energy storage development to serve EV load. (e.g., solar during the day, with higher loads due to EV charging at night) Reduced load. Does it incentivize rooftop?	
Stresses to the Reference Case:		
Accelerated Fleet Load Growth Flat load growth High Gas Prices	Demand and/or Energy growth	50/50
High Renewables	Scope and Location being a large transmission driver. Some percentage of the additional wind will be flowing out of SPP, possibly in a similar ratio to what we see today. As such, we think it is reasonable to make this a base assumption. Repowering Old Windfarms Higher capacity factors for new wind farms	Maybe
Economical Retirements Batteries	More aggressive retirement of old coal, gas units in urban centers and location of new flexible generation on outskirts of urban areas	Maybe
Transmission retirements Federal infrastructure bill?	Retireing underused lines?	
Must Runs Units Paris Accords Carbon Reductions		Self Commits?
Transmission De-rate variable Declining Capital costs for Wind	Most of the western side of SPP is at maximum capacity, there is 0 injection capability at many points. Pockets of stranded generation and high LMPs, significant curtailments are occurring and not being addressed. Recommendation: use a Transmission De-rate variable. This would be applied to the interchange allowed when performing the capacity expansion between regions and in the production cost modeling.	Yes

Significant capital costs to solar and battery storage

Higher reserve margins
Hydraulic fracking regulations

Mountain West
Confirm that load forecasts are including behind the meter

Significant increases in solar and battery recognized with a penetration factor variable to ensure they are included in the models

Because of the higher forced outage rates of natural gas units as already being seen in the market

Increased gas prices

How to reflect in modeling. DC ties flows/planning

Futures

Low Demand	Robust Economy	Emerging Technologies	Renewable Future	Clean Energy Future
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Yes

Yes

Maybe

Low High Demand Base + High

No Yes

Yes Yes 43GW in Y10

Yes Yes Yes Yes

No No X

Yes, higher than refernce
Yes

Yes

Yes

Yes

Key Assumptions	Reference Case
Demand Growth Rates	Flat
Energy Growth Rates	Flat
Natural Gas Prices	Vendor long-term forecast
Coal Prices	Vendor long-term forecast
Emissions Prices	Vendor long-term forecast
Retirements	Coal age-based; No nuclear retirements
Renewable Growth	Above RPS, Moderate +
Wind	Above RPS, Moderate +
Solar	Above RPS, Moderate +
Environmental Regulation	No new regulations
Demand Response	Moderate
Distributed Generation	Moderate
Energy Efficiency	Moderate
DC Lines	No
Maturity Cost Curves	Only for new generation
Storage	No

Drivers	
Emerging Technologies	Renewable Future
Electric Vehicles	Flat
Electric Vehicles	Flat
Vendor long-term forecast	High (Regulations)
Vendor long-term forecast	Vendor long-term forecast
Vendor long-term forecast, CO ₂ High	Vendor long-term forecast, CO ₂ High
Coal age-based, economic; No nuclear retirements	Coal age-based + policy regulations + economic; Nucle
Above RPS, Moderate +	High
Above RPS, Moderate +	High
Above RPS, Moderate +	High
New Regulations	New Regulations
High	Moderate
High	High
High	Moderate
No	Yes
New and re-built wind farms	New and re-built wind farms
Yes	Yes

ear - economic

Key Assumptions	Drivers				
	Reference Case			Emerging Technologies	
	Year 2	Year 5	Year 10	Year 5	Year 10
Peak Demand Growth Rates	50/50	50/50	50/50	50/50	50/50
Energy Demand Growth Rates	50/50	50/50	50/50	Increase in Energy	
Natural Gas Prices	Vendor	Vendor	Vendor	Vendor	Vendor
Coal Prices	Vendor	Vendor	Vendor	Vendor	Vendor
Emissions Prices	Vendor	Vendor	Vendor	Vendor	Vendor
Retirements	Age-Based 60+, subject to stakeholder input			Age-based 60+	
Fossil Fuel					
Nuclear	No	No	No	No	No
Environmental Regulations	No new regulations			No new regulations	
Demand Response	Moderate			Moderate	
Distributed Generation	Moderate			+300	+500
Energy Efficiency	Moderate			Moderate	
Export Lines	No			No	
Increased renewable CF's	New and re-powered			New and re-powered	
Storage	No			No	
Renewable Growth	Increased capacity Factor			Increased capacity Factor	
Solar - Low	1	2	4	3	6
Solar - Med	1	3	5	4	7
Solar - High	3	4	5	6	12
Wind - Low	20.5	21	22	24	25
Wind - Med	24	25	26	29	32
Wind - High	27	28	29	35	43
Option 1	23.8	26	31	35	43
Option 2	24	25	26	28	33
Option 3	20.5	21	22	24	25
Option 4	18	18	18		
Option 5	24	25	26	29	32

Option 1: Randy Collier (CUS), Jeremy Severson (Bepc), Calvin Daniels (WFEC), Anita Sharma (AEP), Kurt Stradley (LES), Tim Owens (NPPD), Michael Watt (Ompa), Jeremy Harris (Westar), Jon Iverson (OPPD), Bethany King (Empire) , Betsy ()

Option 3: Jeremy Severson (Bepc), Steve Gaw (Wind Coalition), Natasha Henderson (Gsec), Kurt Stradley (LES), Calvin Daniels (WFEC), Bethany King (Empire)

Option 4: – Bennie Weeks (Xcel), Leon Howell (OGE), Jeremy Harris (Westar)

Option 5: John Olsen, Leon Howell (OGE), Tim Owens (NPPD), Natasha Henderson (Gsec)

Renewable Future			
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 ₂ \$22 adder			
Age-Based 50+			
Economic?	Economic?		
New Regulations			
Moderate		Moderate	
Moderate			
Moderate		Moderate	
Yes			
New and re-powered		New and re-powered	
No		No	
Increased capacity Factor		Increased capacity Factor	
	3	6	
	4	9	
	6	12	
	24	25	
	28	29	
	35	43	
Ref	2nd		
	4	5	
		11	
		2	
	7	7	

State	RPS Type	Generati on 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