

## E&C

SWPA - Battlefield 161 kV

MISO Method

ZONE	MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
INDN					
OMPA					0.2%
KACY					
LAFB					
LEPA					0.0%
CLECO					
SWPA	7.5%		7.2%	2.3%	
AEP		12.3%		4.2%	9.8%
GRDA				1.2%	
OKGE				1.3%	2.3%
WFEC					0.2%
SPS					3.0%
MIDW					
SUNF					0.0%
WESTAR		3.5%		1.3%	1.2%
WEPL					
MIPU		1.8%			0.2%
KACP		1.8%			1.3%
EMDE	8.2%	12.3%		5.9%	7.7%
SPRM	84.2%	68.4%	92.8%	83.9%	71.9%
SPPIPP					2.2%
<b>TOTAL</b>	<b>100.0%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

5 Million

MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
				\$ 0.01
				\$ 0.00
\$ 0.34		\$ 0.32	\$ 0.10	
	\$ 0.55		\$ 0.19	\$ 0.44
			\$ 0.05	
			\$ 0.06	\$ 0.10
				\$ 0.01
				\$ 0.14
				\$ 0.00
	\$ 0.16		\$ 0.06	\$ 0.06
	\$ 0.08			\$ 0.01
	\$ 0.08			\$ 0.06
\$ 0.37	\$ 0.55		\$ 0.26	\$ 0.35
\$ 3.79	\$ 3.08	\$ 4.18	\$ 3.77	\$ 3.24
				\$ 0.10
\$ 4.50	\$ 4.50	\$ 4.50	\$ 4.50	\$ 4.50

## ATTR

5 Million

0.7052985 ATTR

MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
				\$ 0.00
				\$ 0.00
\$ 0.05		\$ 0.05	\$ 0.02	
	\$ 0.09		\$ 0.03	\$ 0.07
			\$ 0.01	
			\$ 0.01	\$ 0.02
				\$ 0.00
				\$ 0.02
				\$ 0.00
	\$ 0.02		\$ 0.01	\$ 0.01
	\$ 0.01			\$ 0.00
	\$ 0.01			\$ 0.01
\$ 0.06	\$ 0.09		\$ 0.04	\$ 0.05
\$ 0.59	\$ 0.48	\$ 0.65	\$ 0.59	\$ 0.51
				\$ 0.02
\$ 0.71	\$ 0.71	\$ 0.71	\$ 0.71	\$ 0.71

Monett 345-161 kV XFer

ZONE	MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
INDN	1.8%		1.4%		
OMPA				4.4%	0.2%
KACY					
LAFB					
LEPA					0.0%
CLECO					0.8%
SWPA	3.8%		13.3%	2.9%	
AEP	2.2%	14.9%	1.6%		15.1%
GRDA	7.7%		10.4%	22.9%	
OKGE	3.8%	0.5%	1.1%	7.7%	6.4%
WFEC				2.6%	0.4%
SPS		2.4%			1.1%
MIDW				1.3%	
SUNF					
WESTAR	4.7%	9.6%	3.5%	30.2%	14.0%
WEPL		0.5%			0.0%
MIPU	2.4%	6.2%	1.0%	3.8%	0.5%
KACP	4.4%	2.9%	1.8%		0.3%
EMDE	56.4%	44.2%	51.0%	17.8%	10.8%
SPRM	12.7%	18.8%	15.0%	6.4%	47.7%
SPPIPP					2.7%
<b>TOTAL</b>	<b>100.0%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

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MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
\$ 0.21		\$ 0.17		
			\$ 0.53	\$ 0.03
				\$ 0.00
				\$ 0.10
\$ 0.46		\$ 1.59	\$ 0.35	
\$ 0.27	\$ 1.79	\$ 0.19		\$ 1.81
\$ 0.93		\$ 1.24	\$ 2.75	
\$ 0.46	\$ 0.06	\$ 0.14	\$ 0.92	\$ 0.77
			\$ 0.31	\$ 0.05
	\$ 0.29			\$ 0.13
			\$ 0.15	
\$ 0.56	\$ 1.15	\$ 0.42	\$ 3.63	\$ 1.68
	\$ 0.06			\$ 0.00
\$ 0.29	\$ 0.75	\$ 0.12	\$ 0.46	\$ 0.06
\$ 0.53	\$ 0.35	\$ 0.22		\$ 0.04
\$ 6.77	\$ 5.31	\$ 6.12	\$ 2.13	\$ 1.29
\$ 1.52	\$ 2.25	\$ 1.80	\$ 0.77	\$ 5.72
				\$ 0.32
\$ 12.00	\$ 12.00	\$ 12.00	\$ 12.00	\$ 12.00

12

2.196396 ATTR

MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
\$ 0.04		\$ 0.03		
			\$ 0.10	\$ 0.00
				\$ 0.00
				\$ 0.02
\$ 0.08		\$ 0.29	\$ 0.06	
\$ 0.05	\$ 0.33	\$ 0.03		\$ 0.33
\$ 0.17		\$ 0.23	\$ 0.50	
\$ 0.08	\$ 0.01	\$ 0.03	\$ 0.17	\$ 0.14
			\$ 0.06	\$ 0.01
	\$ 0.05			\$ 0.02
			\$ 0.03	
\$ 0.10	\$ 0.21	\$ 0.08	\$ 0.66	\$ 0.31
	\$ 0.01			\$ 0.00
\$ 0.05	\$ 0.14	\$ 0.02	\$ 0.08	\$ 0.01
\$ 0.10	\$ 0.06	\$ 0.04		\$ 0.01
\$ 1.24	\$ 0.97	\$ 1.12	\$ 0.39	\$ 0.24
\$ 0.28	\$ 0.41	\$ 0.33	\$ 0.14	\$ 1.05
				\$ 0.06
\$ 2.20	\$ 2.20	\$ 2.20	\$ 2.20	\$ 2.20

Iatan - Nashua 345 kV

ZONE	MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
INDN				1.1%	
OMPA				2.9%	0.1%
KACY			0.2%		0.0%
Lafa					0.0%
LEPA					0.0%
CLECO				1.6%	0.5%
SWPA				3.0%	0.0%
AEP				1.2%	
GRDA		0.3%			
OKGE	1.5%				
WFEC				4.4%	0.1%
SPS	0.8%	0.8%			1.5%
MIDW				6.6%	
SUNF	0.7%			1.0%	1.3%
WESTAR	15.6%	13.5%	17.5%	5.3%	
WEPL	0.9%			1.3%	0.0%
MIPU	39.6%	84.3%	33.8%	8.9%	2.5%
KACP	40.3%	0.9%	48.5%	3.4%	92.0%
EMDE	0.6%			43.7%	1.2%
SPRM		0.2%		15.5%	0.1%
SPPIPP					0.7%
<b>TOTAL</b>	<b>100.0%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

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MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
			\$ 0.30	
			\$ 0.84	\$ 0.04
		\$ 0.07		\$ 0.00
				\$ 0.00
				\$ 0.00
			\$ 0.46	\$ 0.14
			\$ 0.86	\$ 0.00
			\$ 0.34	
	\$ 0.10			
\$ 0.44				
			\$ 1.26	\$ 0.02
\$ 0.22	\$ 0.22			\$ 0.43
			\$ 1.88	
\$ 0.20			\$ 0.30	\$ 0.38
\$ 4.46	\$ 3.83	\$ 4.99	\$ 1.52	
\$ 0.25			\$ 0.36	\$ 0.00
\$ 11.29	\$ 24.03	\$ 9.63	\$ 2.54	\$ 0.70
\$ 11.48	\$ 0.26	\$ 13.81	\$ 0.98	\$ 26.22
\$ 0.17			\$ 12.47	\$ 0.34
	\$ 0.06		\$ 4.41	\$ 0.02
				\$ 0.21
\$ 28.50	\$ 28.50	\$ 28.50	\$ 28.50	\$ 28.50

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6.3507405 ATRR

MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
			\$ 0.07	
			\$ 0.19	\$ 0.01
		\$ 0.02		\$ 0.00
				\$ 0.00
				\$ 0.00
			\$ 0.10	\$ 0.03
			\$ 0.19	\$ 0.00
			\$ 0.08	
	\$ 0.02			
\$ 0.10				
			\$ 0.28	\$ 0.01
\$ 0.05	\$ 0.05			\$ 0.10
			\$ 0.42	
\$ 0.04			\$ 0.07	\$ 0.08
\$ 0.99	\$ 0.85	\$ 1.11	\$ 0.34	
\$ 0.06			\$ 0.08	\$ 0.00
\$ 2.51	\$ 5.35	\$ 2.14	\$ 0.56	\$ 0.16
\$ 2.56	\$ 0.06	\$ 3.08	\$ 0.22	\$ 5.84
\$ 0.04			\$ 2.78	\$ 0.07
	\$ 0.01		\$ 0.98	\$ 0.00
				\$ 0.05
\$ 6.35	\$ 6.35	\$ 6.35	\$ 6.35	\$ 6.35

Rose Hill - Sooner - Cleveland 345 kV

ZONE	MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
INDN					0.1%
OMPA			0.05%	5.7%	19.0%
KACY					0.5%
Lafa					0.2%
LEPA					0.0%
CLECO	0.4%		0.1%	1.4%	
SWPA	0.2%		0.8%	8.0%	
AEP	2.8%		8.0%	9.1%	13.5%
GRDA	11.9%	0.8%	8.7%	6.9%	
OKGE	58.0%	95.7%	53.4%	8.9%	
WFEC	2.0%		2.1%	9.9%	7.5%
SPS	2.1%		2.5%		12.0%
MIDW		0.1%	0.2%	1.7%	
SUNF	1.0%		4.0%		
WESTAR	18.6%		16.3%	28.6%	23.8%
WEPL	1.3%	2.8%	1.2%	1.9%	
MIPU	0.3%	0.5%	0.2%	4.1%	2.0%
KACP	1.3%		2.2%		
EMDE			0.1%	11.8%	3.2%
SPRM			0.0%	2.1%	2.0%
SPPIPP					16.1%
<b>TOTAL</b>	<b>100.0%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

74

MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
			\$ 0.06	
		\$ 0.03	\$ 4.20	\$ 13.99
				\$ 0.39
				\$ 0.14
				\$ 0.01
\$ 0.33		\$ 0.09	\$ 0.99	
\$ 0.15		\$ 0.61	\$ 5.87	
\$ 2.04		\$ 5.87	\$ 6.65	\$ 9.90
\$ 8.76	\$ 0.59	\$ 6.41	\$ 5.07	
\$ 42.61	\$ 70.33	\$ 39.28	\$ 6.51	
\$ 1.49		\$ 1.54	\$ 7.28	\$ 5.53
\$ 1.54		\$ 1.81		\$ 8.80
	\$ 0.10	\$ 0.18	\$ 1.28	
\$ 0.77		\$ 2.96		
\$ 13.65		\$ 11.99	\$ 21.03	\$ 17.52
\$ 0.98	\$ 2.08	\$ 0.89	\$ 1.37	
\$ 0.20	\$ 0.40	\$ 0.13	\$ 2.99	\$ 1.49
\$ 0.98		\$ 1.63		
		\$ 0.04	\$ 8.69	\$ 2.34
		\$ 0.03	\$ 1.56	\$ 1.50
				\$ 11.84
\$ 73.50	\$ 73.50	\$ 73.50	\$ 73.50	\$ 73.50

74

16.429676 ATRR

MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
			\$ 0.94	\$ 3.13
		\$ 0.01		\$ 0.09
				\$ 0.03
				\$ 0.00
\$ 0.07		\$ 0.02	\$ 0.22	
\$ 0.03		\$ 0.14	\$ 1.31	
\$ 0.46		\$ 1.31	\$ 1.49	\$ 2.21
\$ 1.96	\$ 0.13	\$ 1.43	\$ 1.13	
\$ 9.53	\$ 15.72	\$ 8.78	\$ 1.45	
\$ 0.33		\$ 0.34	\$ 1.63	\$ 1.24
\$ 0.34		\$ 0.40		\$ 1.97
	\$ 0.02	\$ 0.04	\$ 0.29	
\$ 0.17		\$ 0.66		
\$ 3.05		\$ 2.68	\$ 4.70	\$ 3.92
\$ 0.22	\$ 0.46	\$ 0.20	\$ 0.31	
\$ 0.04	\$ 0.09	\$ 0.03	\$ 0.67	\$ 0.33
\$ 0.22		\$ 0.37		
		\$ 0.01	\$ 1.94	\$ 0.52
		\$ 0.01	\$ 0.35	\$ 0.34
				\$ 2.65
\$ 16.43	\$ 16.43	\$ 16.43	\$ 16.43	\$ 16.43

Tuco - Tolk - Potter 345 kV

ZONE	MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
INDN					
OMPA		0.3%			8.1%
KACY					0.2%
LAF A					
LEPA					
CLECO		0.2%			8.6%
SWPA	0.5%	0.7%			0.5%
AEP	6.0%		4.4%	1.2%	5.6%
GRDA	0.3%				
OKGE	7.7%	2.3%	4.4%		16.6%
WFEC	1.4%		0.4%		
SPS	72.0%	91.3%	80.5%	98.8%	42.2%
MIDW		1.0%			
SUNF	7.2%	2.2%	7.1%		
WESTAR	3.0%		2.1%		
WEPL	1.2%	1.7%	1.0%		0.0%
MIPU		0.3%			
KACP	0.7%				4.6%
EMDE					12.3%
SPRM					1.3%
SPPIPP					
<b>TOTAL</b>	<b>100.0%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

67

MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
	\$ 0.22			\$ 5.42
				\$ 0.13
	\$ 0.11			\$ 5.71
\$ 0.32	\$ 0.44			\$ 0.34
\$ 4.03		\$ 2.94	\$ 0.83	\$ 3.76
\$ 0.20				
\$ 5.16	\$ 1.56	\$ 2.96		\$ 11.06
\$ 0.90		\$ 0.25		
\$ 48.06	\$ 60.97	\$ 53.75	\$ 65.92	\$ 28.16
	\$ 0.67			
\$ 4.80	\$ 1.45	\$ 4.77		
\$ 2.03		\$ 1.43		
\$ 0.82	\$ 1.11	\$ 0.66		\$ 0.03
	\$ 0.22			
\$ 0.44				\$ 3.09
				\$ 8.20
				\$ 0.85
<b>\$ 66.75</b>	<b>\$ 66.75</b>	<b>\$ 66.75</b>	<b>\$ 66.75</b>	<b>\$ 66.75</b>

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11.149453 ATRR

MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
	\$ 0.04			\$ 0.91
				\$ 0.02
	\$ 0.02			\$ 0.95
\$ 0.05	\$ 0.07			\$ 0.06
\$ 0.67		\$ 0.49	\$ 0.14	\$ 0.63
\$ 0.03				
\$ 0.86	\$ 0.26	\$ 0.49		\$ 1.85
\$ 0.15		\$ 0.04		
\$ 8.03	\$ 10.18	\$ 8.98	\$ 11.01	\$ 4.70
	\$ 0.11			
\$ 0.80	\$ 0.24	\$ 0.80		
\$ 0.34		\$ 0.24		
\$ 0.14	\$ 0.19	\$ 0.11		\$ 0.01
	\$ 0.04			
\$ 0.07				\$ 0.52
				\$ 1.37
				\$ 0.14
<b>\$ 11.15</b>	<b>\$ 11.15</b>	<b>\$ 11.15</b>	<b>\$ 11.15</b>	<b>\$ 11.15</b>

Fairport - Sibley 345 kV

ZONE	MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
INDN				1.5%	
OMPA					0.1%
KACY			0.1%		
LAF A					
LEPA					0.0%
CLECO				1.3%	
SWPA	0.6%			4.2%	0.0%
AEP		5.3%			0.1%
GRDA		0.7%			
OKGE	2.6%			5.4%	
WFEC	0.6%			5.0%	0.1%
SPS	3.2%	4.7%			0.1%
MIDW		2.7%		3.9%	
SUNF	7.9%	5.3%	5.8%		0.4%
WESTAR	9.5%		11.1%	22.1%	
WEPL	0.9%			1.7%	
MIPU	22.0%	38.0%	21.3%	40.4%	3.1%
KACP	52.1%	42.7%	61.7%	1.9%	94.0%
EMDE	0.5%			9.0%	1.2%
SPRM		0.7%		3.6%	0.0%
SPPIPP					0.8%
<b>TOTAL</b>	<b>100.0%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

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MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
			\$ 0.72	
				\$ 0.05
		\$ 0.04		
				\$ 0.00
			\$ 0.65	
\$ 0.29			\$ 2.03	\$ 0.02
	\$ 2.56			\$ 0.04
	\$ 0.32			
\$ 1.27			\$ 2.60	
\$ 0.30			\$ 2.42	\$ 0.03
\$ 1.54	\$ 2.24			\$ 0.02
	\$ 1.28		\$ 1.89	
\$ 3.81	\$ 2.56	\$ 2.80		\$ 0.21
\$ 4.57		\$ 5.34	\$ 10.60	
\$ 0.44			\$ 0.81	
\$ 10.55	\$ 18.24	\$ 10.22	\$ 19.37	\$ 1.51
\$ 25.01	\$ 20.48	\$ 29.60	\$ 0.89	\$ 45.11
\$ 0.22			\$ 4.30	\$ 0.60
	\$ 0.32		\$ 1.71	\$ 0.02
				\$ 0.38
<b>\$ 48.00</b>	<b>\$ 48.00</b>	<b>\$ 48.00</b>	<b>\$ 48.00</b>	<b>\$ 48.00</b>

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8.391984 ATRR

MW-Mile	Losses	LODF-mi	PTDF*MW	Economic
			\$ 0.13	
				\$ 0.01
		\$ 0.01		
				\$ 0.00
			\$ 0.11	
\$ 0.05			\$ 0.36	\$ 0.00
	\$ 0.45			\$ 0.01
	\$ 0.06			
\$ 0.22			\$ 0.46	
\$ 0.05			\$ 0.42	\$ 0.01
\$ 0.27	\$ 0.39			\$ 0.00
	\$ 0.22		\$ 0.33	
\$ 0.67	\$ 0.45	\$ 0.49		\$ 0.04
\$ 0.80		\$ 0.93	\$ 1.85	
\$ 0.08			\$ 0.14	
\$ 1.84	\$ 3.19	\$ 1.79	\$ 3.39	\$ 0.26
\$ 4.37	\$ 3.58	\$ 5.18	\$ 0.16	\$ 7.89
\$ 0.04			\$ 0.75	\$ 0.10
	\$ 0.06		\$ 0.30	\$ 0.00
				\$ 0.07
<b>\$ 8.39</b>	<b>\$ 8.39</b>	<b>\$ 8.39</b>	<b>\$ 8.39</b>	<b>\$ 8.39</b>

\$ 233	\$ 233	\$ 233	\$ 233	\$ 233.25
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\$ 45	\$ 45	\$ 45	\$ 45	\$ 45
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**Helping our members work together  
to keep the lights on...  
today & in the future**



Economic Portfolio – Follow Up

**SPP's follow-up to the CAWG on the Economic  
Portfolio and other related issues**

## SPP Follow-up

**This presentation will cover:**

- **Follow-up responses to questions fielded to SPP from the March, 2007 CAWG meeting**
- **A continuation of the discussion on the Economic Portfolio concept with comparison to a production cost model**
- **A discussion on benefit metrics as used in the SPP for allocation of economic benefit**

## Reliability Follow-up Questions

## Follow-up Questions

The CAWG asked that SPP Staff report back on the following:

- What current flowgates are being mitigated by the 2006-2016 SPP Transmission Expansion Plan (STEP)?
- How would Demand Side Management (DSM) affect the current reliability plan?
- How would SPP handle Enhanced Regional Planning (ERP) in respect to the STEP?
- How would a Carbon Tax affect the current production cost modeling method?

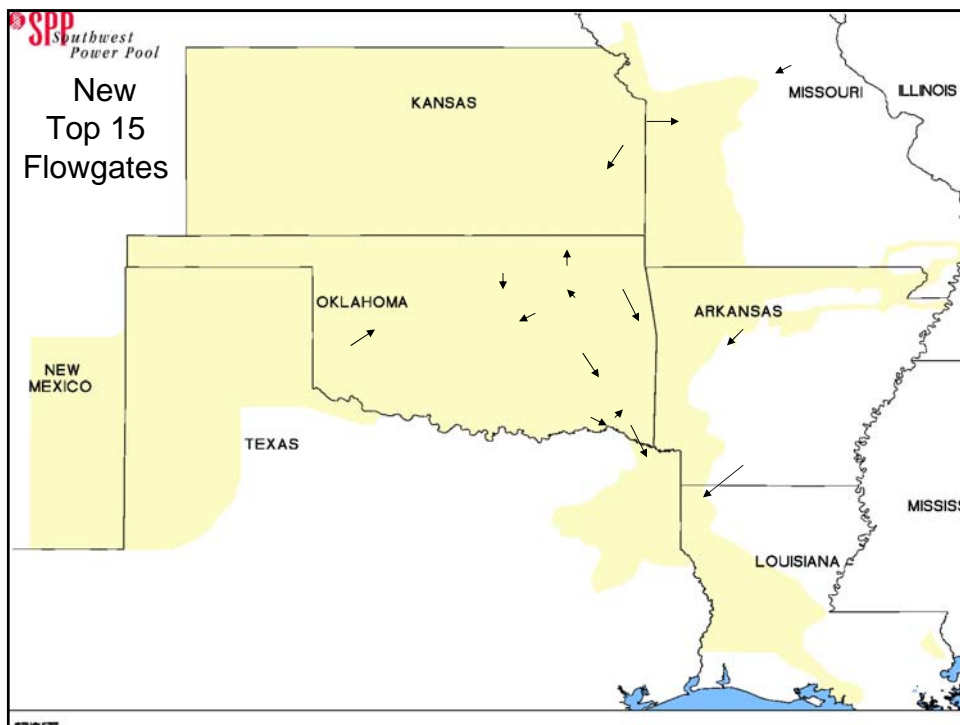
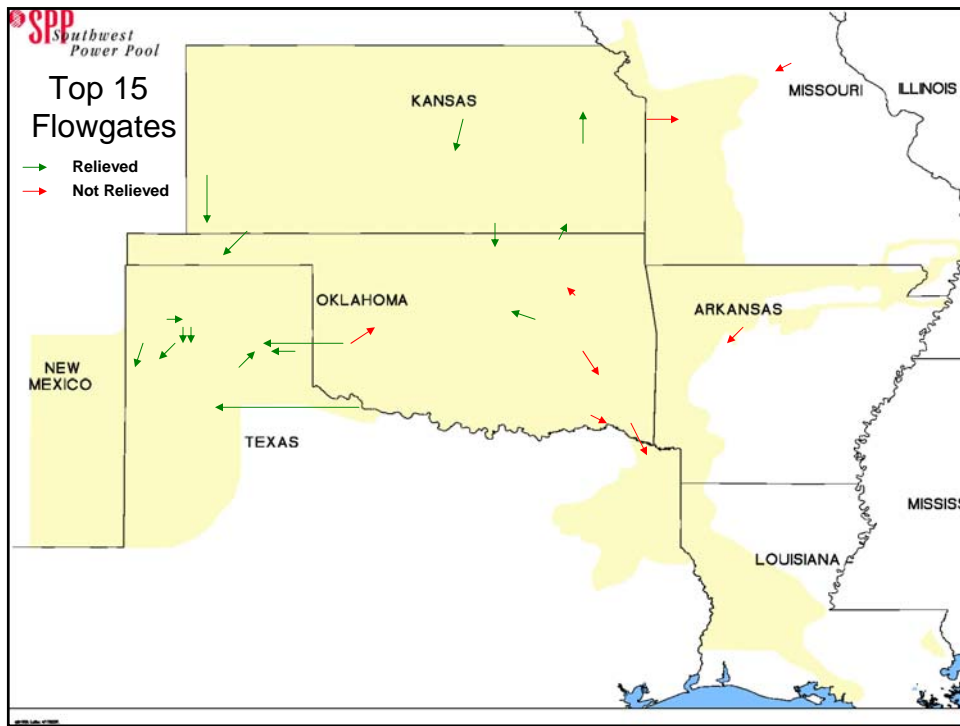
The following slides will attempt to answer these questions

## Flowgates in SPP

**SPP performed analysis on the 2006-2016 SPP STEP to determine how the top flowgates would be affected**

**Staff focused on the top 15 flowgates with the highest TLR curtailments**

**7 of the top 15 flowgates are relieved by the 2006-2016 STEP**



## Demand Side Management (DSM)

**DSM** manages the consumption of energy to optimize available generation resources

**SPP** very different geographically than areas in the northeast that have very dense high population areas

Staff to initially consider DSM option in top 3 population areas in SPP footprint

- Oklahoma City
- Kansas City
- Tulsa

## Demand Side Management (DSM)

**DSM** will potentially impact the following number of projects:

**Oklahoma City –**

- 7 Projects with impact around OK City

**Kansas City –**

- 20 Projects with impact around KC

**Tulsa –**

- 6 Projects with impact around Tulsa



## Enhanced Regional Planning (ERP)

**SPP to potentially consider ERP as a solution to reliability problems identified in the STEP**

**Initially, staff to use engineering judgment to determine what areas would be appropriate for ERP**

**Staff would consider the benefit of a ~500MW plant for initial screens, then use the ERP checklist presented to the CAWG in March 2007 to determine feasibility**

## Load Forecast Error Sensitivity

**SPP load forecasting for the last 5 years has deviated from actual demand by up to 4.5%**

**A forecast deviation of 3% may advance or delay the need for a project by as much as a year in the STEP**

**SPP staff to consider using load level forecast sensitivities in economic planning**

- High Load Forecast
- Nominal Load Forecast
- Low Load Forecast

## Economic Portfolio Follow-up

## Allocation Methodology

ZONE	Impact on System			PTDF*MW	Economic
	MW-Mile	Losses	LODF-mi		
INDN	0.1%		0.1%	0.4%	0.0%
OMPA		0.1%	0.0%	2.7%	9.0%
KACY			0.0%		0.2%
LAFI					0.1%
LEPA					0.0%
CLECO	0.2%	0.0%	0.0%	1.0%	2.2%
SWPA	0.6%	0.2%	1.1%	4.3%	0.1%
AEP	2.6%	1.9%	4.1%	3.8%	7.2%
GRDA	4.8%	0.5%	3.7%	3.6%	
OKGE	23.9%	35.4%	20.6%	4.6%	4.4%
WFEC	1.2%		0.9%	5.3%	2.8%
SPS	19.2%	23.6%	20.7%	24.3%	15.1%
MIDW		0.8%	0.1%	2.3%	
SUNF	3.7%	1.5%	4.3%	0.1%	0.3%
WESTAR	11.7%	2.4%	11.1%	16.7%	9.4%
WEPL	1.1%	1.5%	0.7%	1.2%	0.0%
MIPU	9.9%	19.5%	8.8%	10.4%	1.7%
KACP	16.2%	8.2%	19.1%	0.8%	31.5%
EMDE	3.0%	2.3%	2.5%	13.1%	5.2%
SPRM	1.9%	2.1%	2.2%	5.2%	4.5%
SPPIPP					6.3%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

- Allocations shown in ATRR
- Economic Allocations assigned as defined by EMMTF report as:

$$\sum_{\text{All Hours}} \sum_{\text{GenUnits for each Participant}} [(\Delta MW \times \text{Nodal price}_F) - \Delta \text{Production cost}]$$

- Allocations shown for entire hypothetical portfolio

## Carbon Tax Sensitivity

**Carbon Tax is a tax on energy sources which emit carbon dioxide into the atmosphere**

**Typical emissions of plants per 1,000MW by fuel source**

- Coal-fired: 996 metric tons
- Oil-fired: 809 metric tons
- Gas-fired: 476 metric tons

**Traditional values for a carbon tax range between \$20-\$30 per ton of carbon**

## Carbon Tax Sensitivity

**A typical coal fired plant will see around \$20-30 / MWh added to the operation costs due to carbon tax (as much as doubling the operating cost)**

**The implementation of carbon tax will have a huge impact on economic modeling in SPP**

**Renewables and Nuclear Powered plants will be far more cost effective and beneficial to production cost savings**

**SPP to model Carbon Tax as a sensitivity to its current modeling methods**

## Conservative Nature of Economic Models in SPP

SPP models utilize a hurdle rate (per MWh) for commitment and dispatch of units

- SPP Control Area: \$4-5 commit, \$2 dispatch
- Non-SPP Control Area: \$6-8 commit, \$2-5 dispatch

Control Areas required to cover, at a minimum, 80% of the area's internal firm demand

Load benefits are not currently being considered as a benefit allocation metric

Currently models are not considering benefit from unit recommitment, only redispatch

Interchange limits between areas presently are hard coded. Major transmission upgrades typically see large impacts on export/import ability. This is not currently being captured.

## Economic Benefit Metrics

**Current EMMTF Endorsed SPP Method:**

$$\sum_{\substack{\text{All} \\ \text{Hours}}} \sum_{\substack{\text{GenUnits} \\ \text{foreachParticipant}}} [(\Delta MW \times \text{Nodal price}_f) - \Delta \text{Production Cost}]$$

**Proposed Adjusted Production Cost Method:**

$$\sum_{\substack{\text{All} \\ \text{Hours}}} \sum_{\substack{\text{All} \\ \text{Areas}}} [-\Delta \text{Variable Production Cost} + \Delta \text{Revenue Sales} - \Delta \text{Expense Purchases}]$$

**Proposed Method:**

$$= \sum_{\substack{\text{All} \\ \text{Hours}}} \sum_{\substack{\text{All} \\ \text{Areas}}} [\Delta \text{Generator Profits} - \Delta \text{Demand Costs}]$$

**Questions?**



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