



**Regional State Committee / Southwest Power Pool, Inc.**

**COST ALLOCATION WORKING GROUP MEETING**

**March 26, 2008**

**Cox Convention Center, Meeting Room 9**

**Oklahoma City, OK**

**1201 Elm Street**

**• A G E N D A •**

11am – 5pm

CAWG Participant Number and Code -

Toll: 203-320-8823

Participant: 113358

- 1. Open Admin Duties (10 min) ..... Mike Proctor
- 2. Seams Agreements Fundamentals (60 min) ..... Carl Monroe

**LUNCH, 12:30**

- 3. Discussion of draft tariff language and issues associated with cost allocation for economic upgrades (60 min) ..... Pam Kozlowski
- 4. Portfolio Development (30 min) ..... Charles Cates

**BREAK, 15 min**

- 5. TDU Sponsored – Cost Allocation for Network Upgrades for Wind Resources (30 min) Gene Anderson
- 6. Policy change in connection with Base Plan funding available wind resources (75 min) ..Mike Proctor
- 7. Review of draft April 21<sup>st</sup> RSC Agenda (10 min) ..... Les Dillahunty



**Helping our members work together  
to keep the lights on...  
today & in the future**



Economic Portfolio and EHV  
Overlay/OEPTTF Tie-ins

**CAWG Meeting**

**March 26, 2008**

## OEPTTF Study History

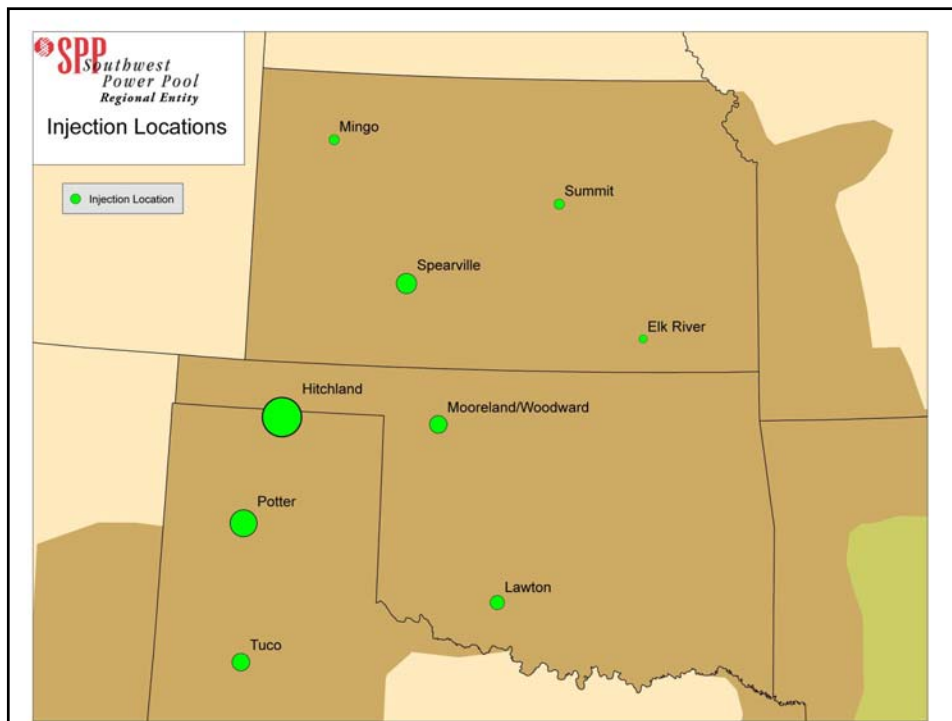
- NREL/DOE Vision Report projecting OK to lead nation in wind development by 2024 with more than 20,000 MW of wind development
- Wind assumptions/deliveries in original EHV Overlay Study driven by CREZs in Texas
- OK legislature created Oklahoma Electric Power Transmission Task Force (OEPTTF)
- Scope for SPP regional study approved late 2007 with major assumptions and scenarios prescribed by OEPTTF

## OEPTTF Total Wind Assumptions

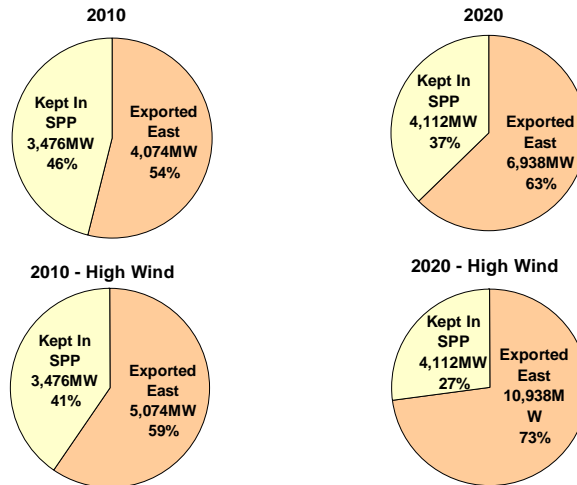
	Nominal Wind Level		High Wind Level	
	2010	2020	2010	2020
In-Service + On Schedule + 50% Suspension	4,050	4,050	4,050	4,050
Additional Wind	3,500	7,000	4,500	11,000
<b>Grand Total Wind</b>	<b>7,550</b>	<b>11,050</b>	<b>8,550</b>	<b>15,050</b>

## OEPTTF Wind Farm Developments

- **Base wind development consisting of:**
  - In-Service Wind +
  - On schedule +
  - 50% of IAs under Suspension
- **Moderate and high scenarios for OK**
  - Moderate 1,000 / 2,000 MW in 2010 / 2020
  - High 2,000 / 6,000 MW in 2010 / 2020
- **With reasonable moderate scenarios for KS & TX/NM**
  - 1,000 / 2,000 MW in 2010 / 2020 in KS
  - 1,500 / 3,000 MW in 2010 / 2020 in TX/NM



## OEPTTF Assumed Markets for Wind Based on Nameplate Capacity



## OEPTTF Transfer Analysis – Models

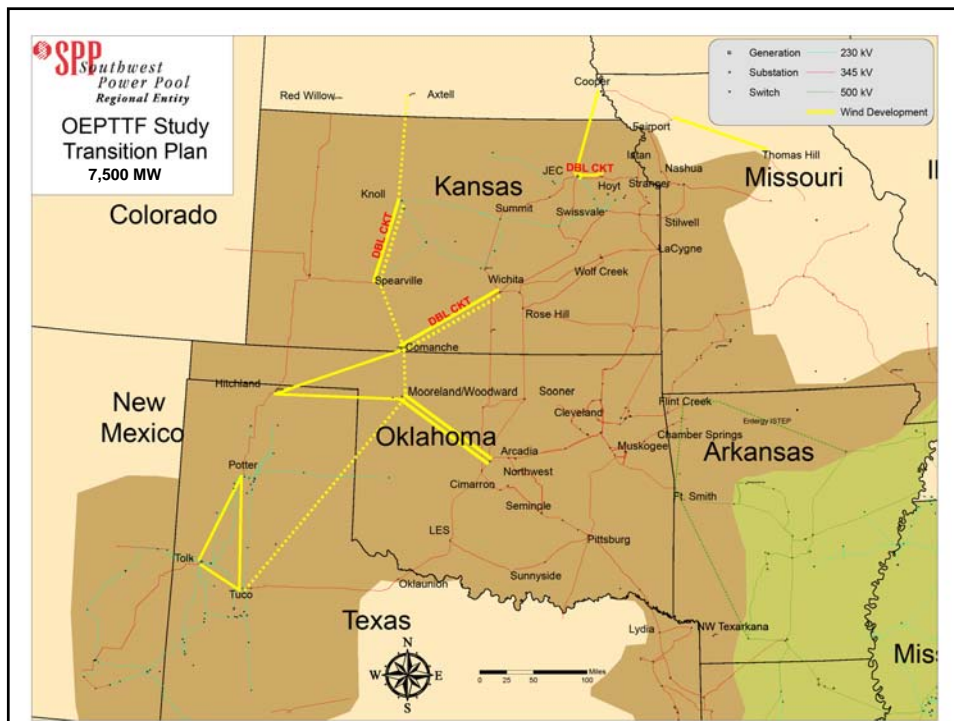
- **2007 Models**
- **Added 2007 STEP Projects**
- **Added SPP BOD Approved Projects**
- **Scaled load to create 2020 cases**
- **Added new wind injection locations for study**

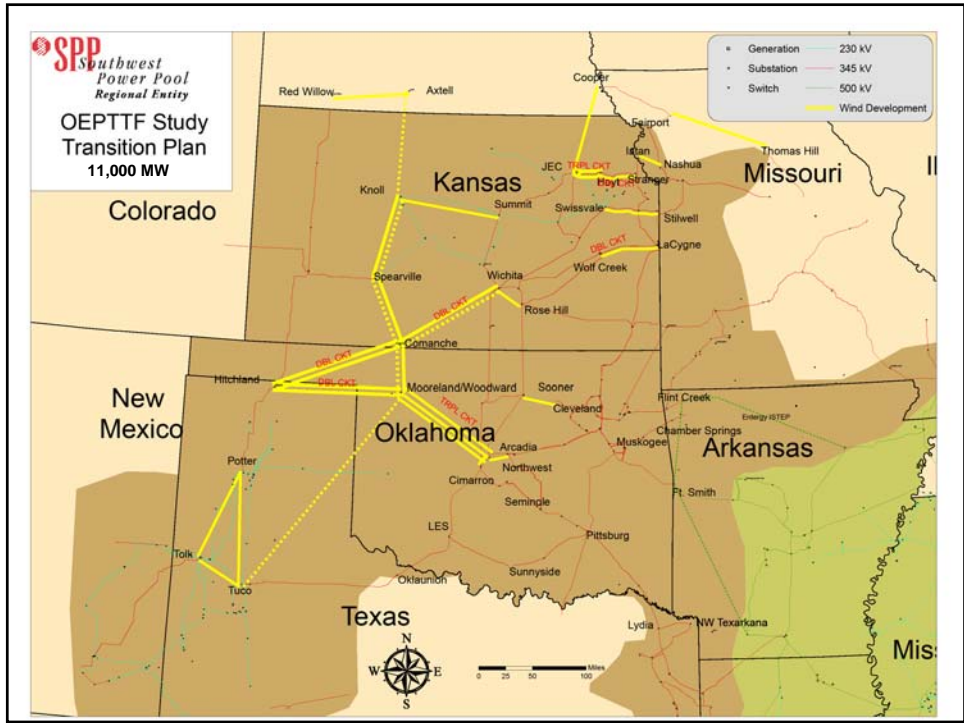
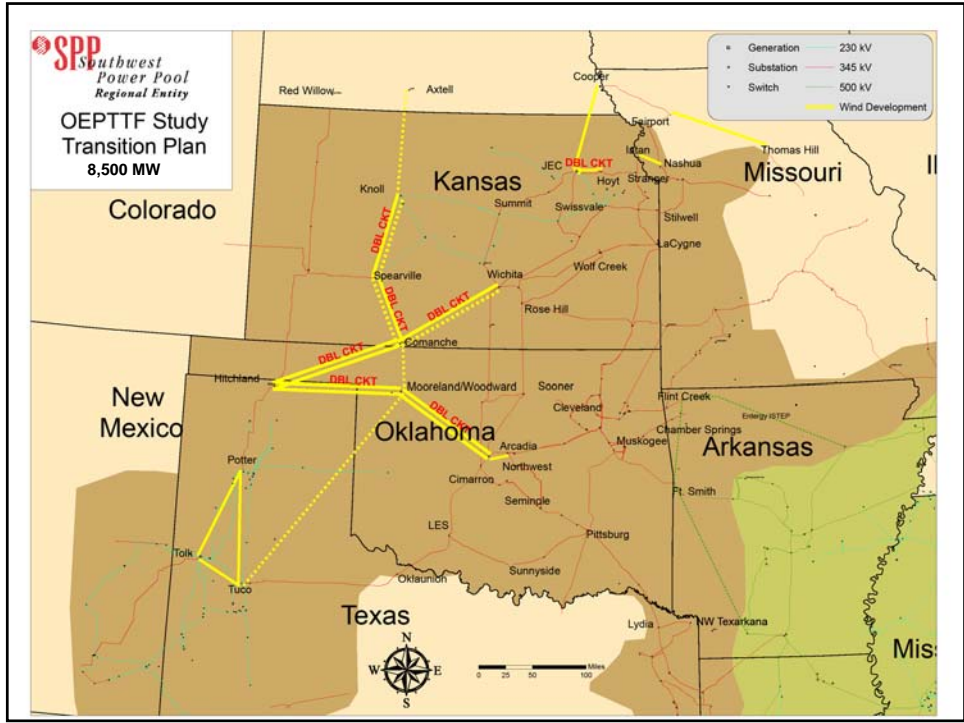
## OEPTTF Transfer Analysis – Process

- **Spring and Summer Cases Wind Transfers**
  - Spring = 100% Nameplate Capacity
  - Summer = 40% Nameplate Capacity
- **Single-contingency DC analysis using PTI MUST software**
- **Consider only lines 230 kV and above**
- **Consider only SPP and 1<sup>st</sup> Tier**

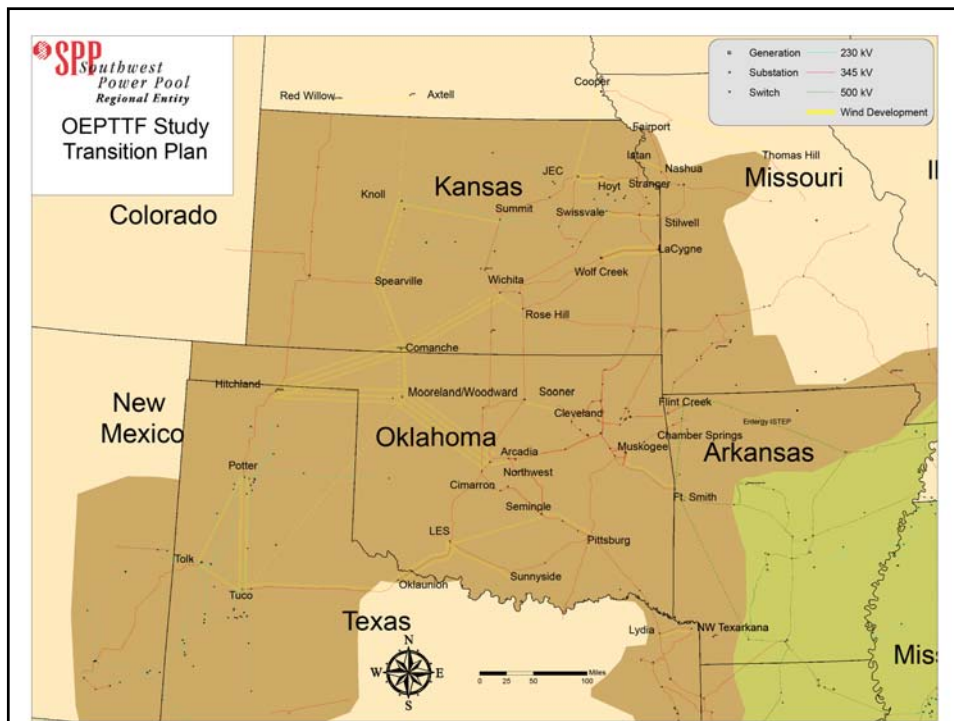
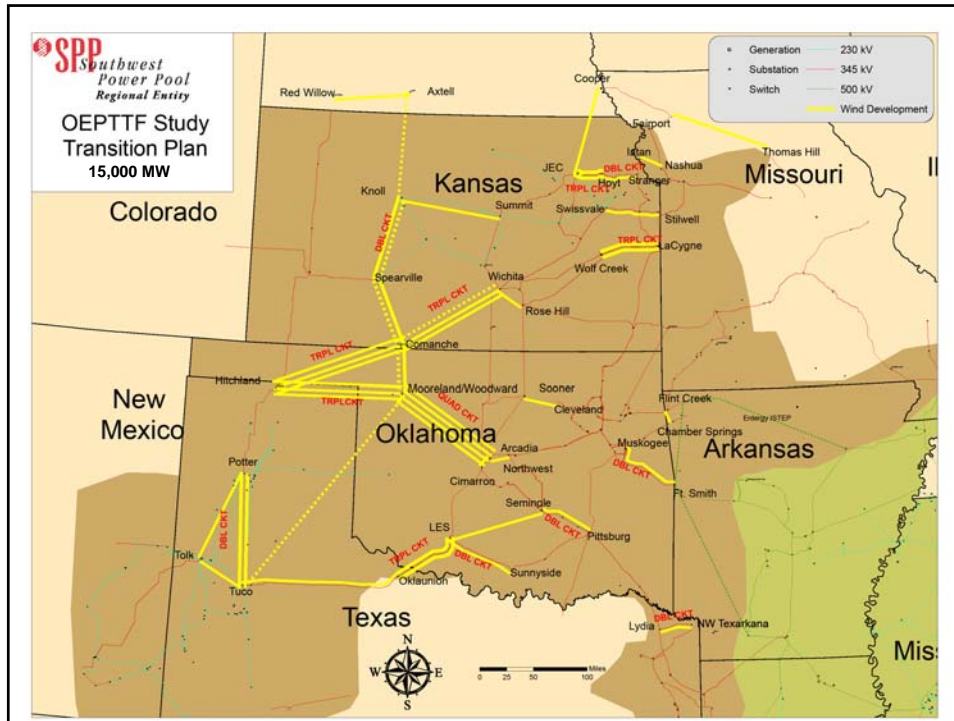
## OEPTTF 765 kV Alternatives

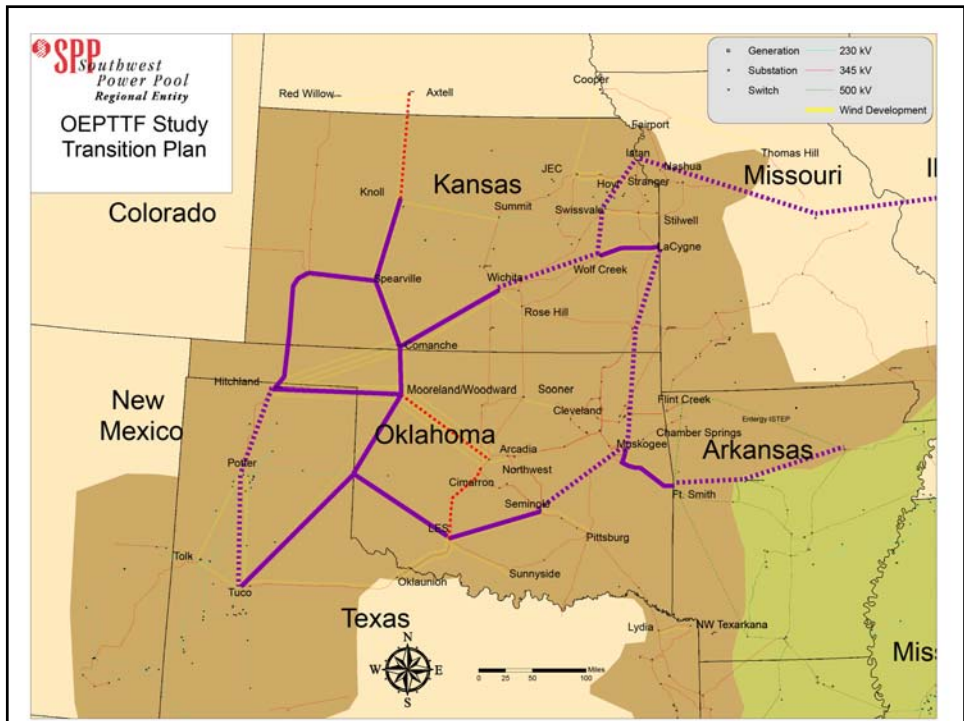
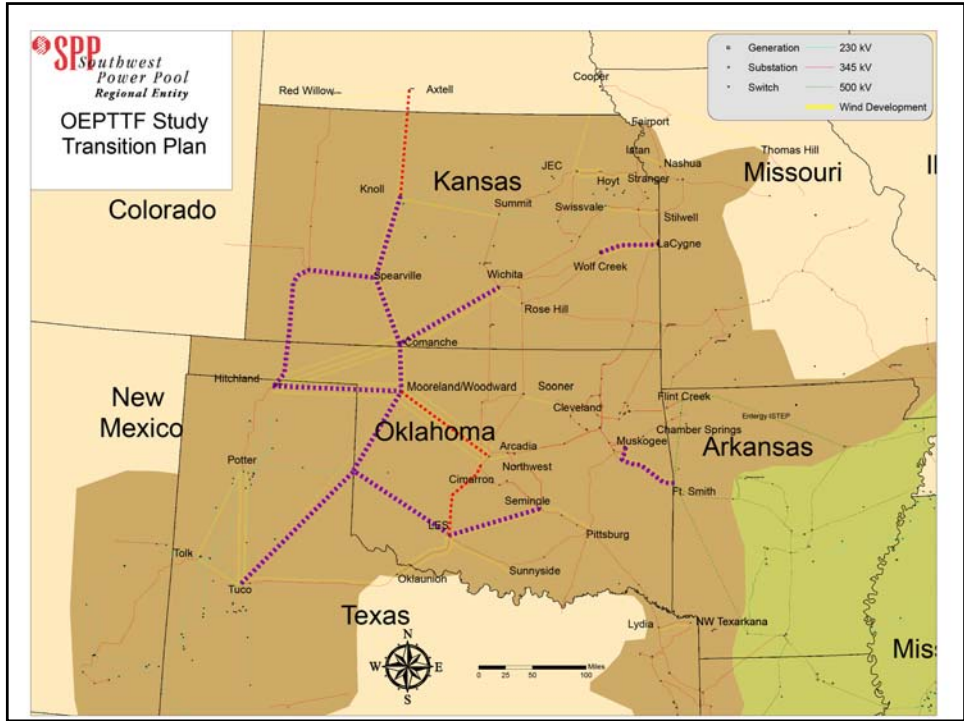
- **Lines shown as triple and quad circuits should be considered for 765 kV construction.**
- **Potential 765 kV circuits are based on recommendations provided by Quanta Technologies in Updated EHV Overlay Study**











## OEPTTF Economic Analysis - Assumptions

- **Wind modeled as curtailable**
- **Assume \$40/MWh price for wind energy with sensitivities of \$30/MWh and \$50/MWh**
- **Assume wind collector facilities cost of \$5 – 10/MWh**
- **\$9/MMBtu natural gas**

## OEPTTF Economic Analysis - Process

- **Significant challenges in modeling desired scenarios**
  - Existing flowgates constrain economic commitment and dispatch
  - New flowgates in / around SPP = ?
  - Consolidated Balancing Authority required in SPP
  - Difficult to simulate desired transfers/consumption with wind energy at 10% of sales in SPP and excess for off-system sales to major markets

## OEPTTF Economic Analysis - Results

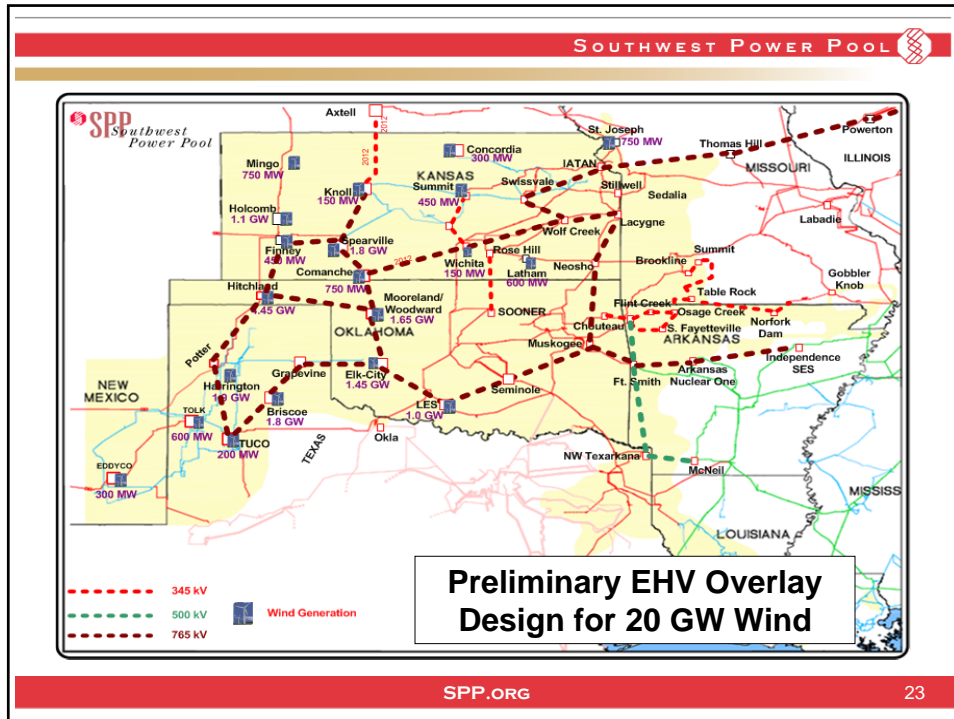
- **Transmission expansion required to provide firm deliveries for 345 kV build out virtually eliminate all existing flowgate constraints in SPP saving \$100 – 300 M / year in adjusted production costs**
- **Revenues for wind energy payments and collector system fees are remarkable**
  - Wind Revenues for 15,000 MW = \$2.4B / year
  - Collector System Fees are \$300 – 600M / year

## OEPTTF Economic Analysis - Project Costs

### **Total Estimated Cost of Projects:**

- 345 kV option = \$4.5 Billion
- 765 and 345 kV option = \$3.4 Billion

**765 and 345 kV alternative warrants serious consideration**



SOUTHWEST POWER POOL

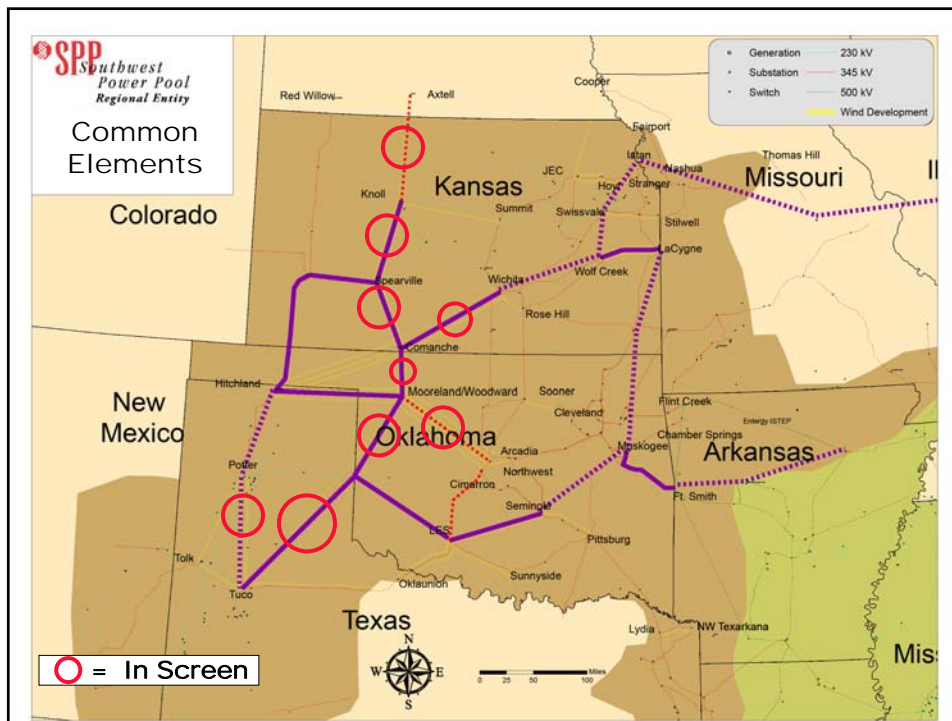
### Portfolio and OEPTTF Study Differences

- OEPTTF Study conducted on 2010 and 2020, Portfolio so far on 2012
- OEPTTF contains between 3,500 – 15,000 MW of nameplate wind, Portfolio contained 4,400 MW

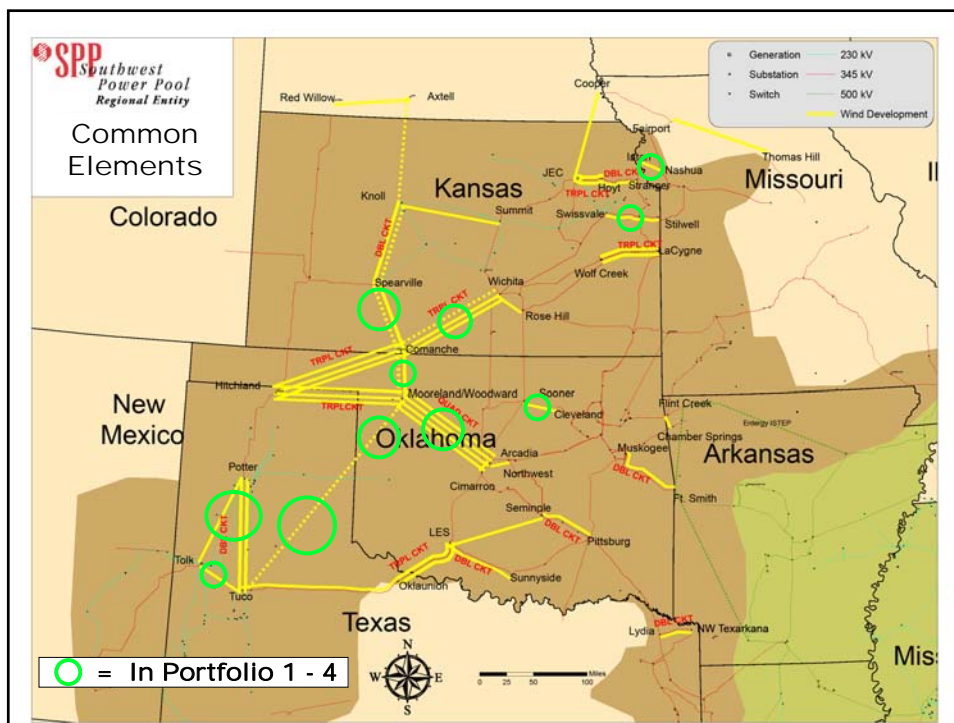
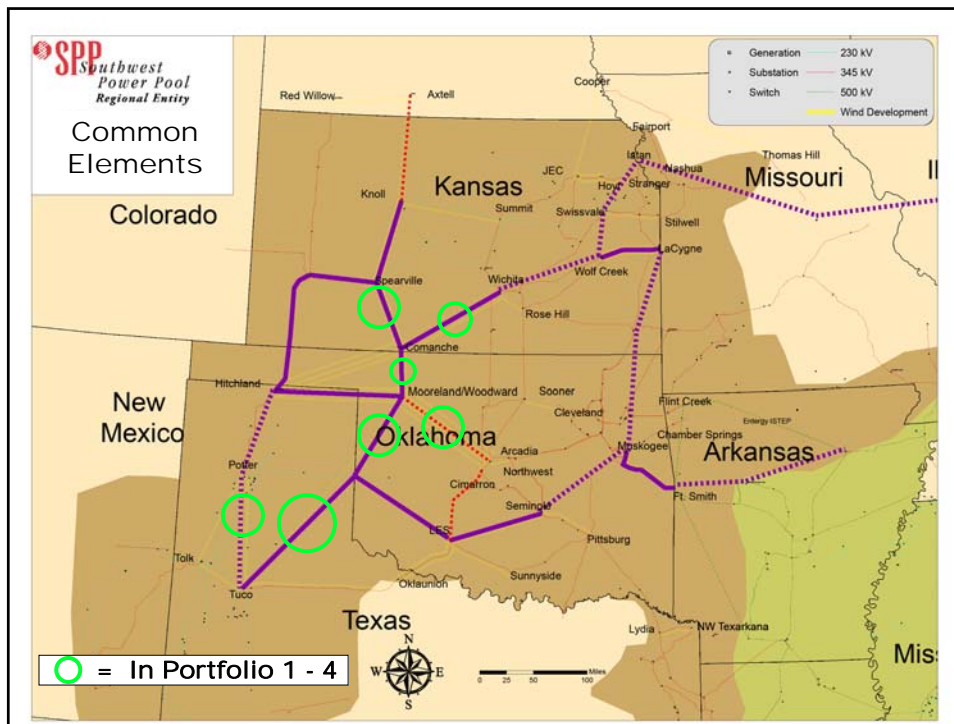
SPP.ORG 24

## Economic Portfolio – Commonality

- Many projects continue to be key facilities in studies conducted at SPP
- For many scenarios, certain projects always appear to be solutions
- Additionally, many projects in both studies are very similar to portfolio projects (e.g. Seminole – Muskogee – Ft. Smith vs Pittsburg – Ft. Smith)
- Such projects should be considered for inclusion in the economic portfolio







## Economic Portfolio – Next Steps

- **Integration with OEPTTF, EHV Overlay and STEP Plans**
- **Portfolio tweaking and iterations**
- **Futures**
- **Balance.....**

## Questions/Comments







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## Cost Allocation for Network Upgrades for Wind Resources

During discussions at the CAWG, Wind Resources have been described as presenting different challenges with regard to the allocation of the cost of Network Upgrades. These challenges stem from the fact that these resources tend to be located in specific areas of the region that are not directly associated with the load they will be used to serve. In addition, the accredited capacity of the resources is significantly less than their rated output. Finally the source zone may be assigned a disproportionate share of the cost using SPP's existing cost allocation methods.

In addition there are other factors that suggest that different treatment for the cost of wind resources deserves consideration. Wind energy is "green" and therefore can help reduce green house gases. The likelihood of a renewable portfolio standard grows stronger each year. Finally developing wind energy resources is the "right" thing to do in the long run.

With these thoughts in mind, the TDUs have put together this suggested cost allocation plan for network upgrades for wind resources. Our proposal won't vary much from other proposals we have put forward for cost allocation because of other factors that we still believe are relevant. We are convinced that, in general, all transmission system upgrades ultimately are in the best interest of the transmission system users. We also believe in the keep it simple principle.

Therefore, we propose that the cost of network upgrades identified in the Aggregate Study process as being required for wind powered Designated Resources serving load under the SPP OATT be collected through a region wide postage stamp rate.

The following entities are sponsors of this proposal:

- AECC
- ETEC
- GSEC
- KEPCO
- LUS
- OMPA

# Compromise Cost Allocation for the Costs of Upgrades Assigned to Designated Wind Resources

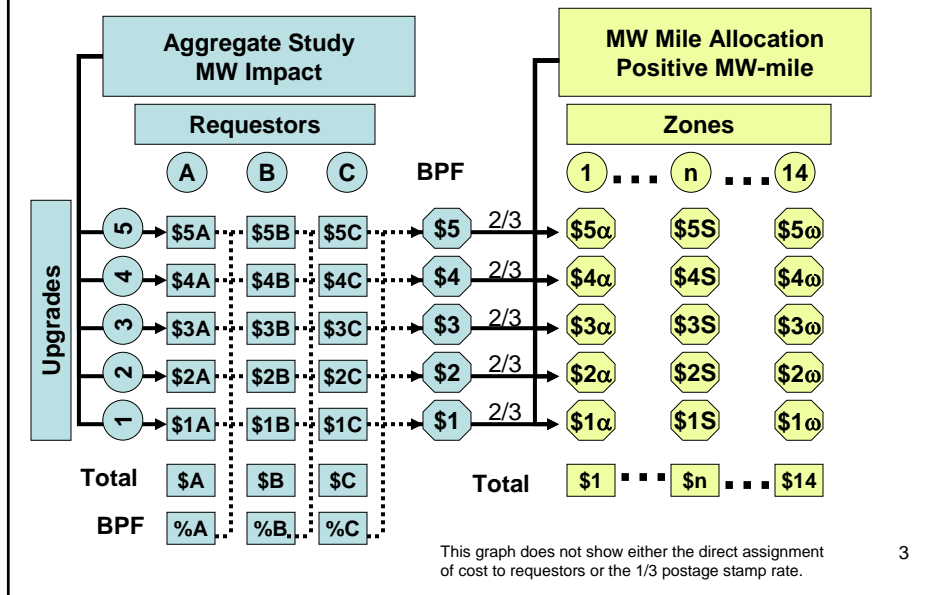
Larry Holloway & Mike Proctor  
CAWG Meeting  
March 26, 2008

## Context: Two Distinct Cost Assignments/Allocations

- 1. Aggregate Studies** assign costs to requestors based on **MW impact** for ALL upgrade facilities required by the study requests.
  - A request for a new wind resource can be assigned costs from many different upgrades, not just the upgrades in the supply zone.
  - The purpose of the Aggregate Study assignment is to determine how much of these assigned costs are **eligible for base-plan funding (BPF)** and what is directly assigned to the requestor.
- 2. MW-mile allocations** are made individually for each upgrade that comes out of the Aggregate study based on the % of those costs eligible for BPF.

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# Context in Graphical Form



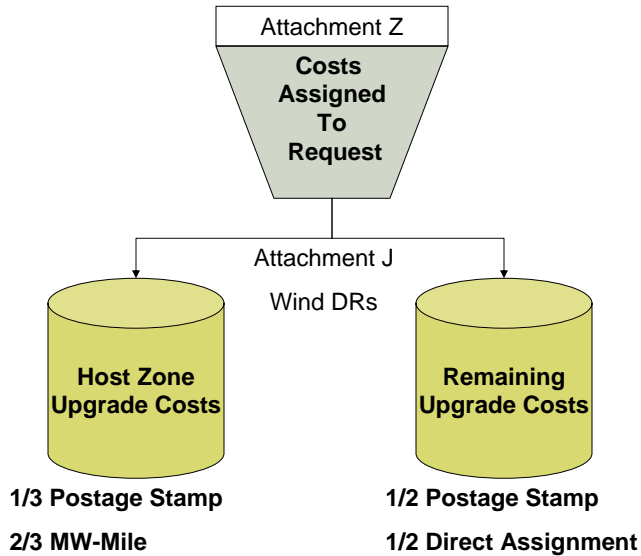
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## Compromise Proposal

- Focuses on the results of the Aggregate Study process.
  1. The costs assigned to the requestor of all upgrades, except those required in the host zone of the requestor, are removed from the existing Attachment J, Base Plan Funding Process (1/3 Postage Stamp / 2/3 MW-mile).
    - This includes all the costs of upgrades in the supply zone and “pass-through” zones assigned in the aggregate study process to deliver the wind power to the requestor.
  2. Attachment J is modified to allocate these costs: 50% postage stamp and 50% directly assigned to the requestor.

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## Two Buckets with Different Allocations



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## Other Restrictions

1. With potentially larger costs going into the 1/2 PS / 1/2 DA bucket:
  - Cap Directly Assigned cost to 1/3 of the total costs assigned to the requestor. Any cost above this cap would be rolled into the region-wide postage stamp rate.
2. With the potential for operational problems past 20% of peak load:
  - Limit the allocation to 20% of peak load for all LSEs in SPP.

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# Example 1

		Aggregate Study MW Impacts			
Upgrades		A	B	C	Total
<b>C's Zone</b>	<b>1</b>	10%	5%	<b>85%</b>	100%
	2	40%	40%	20%	100%
	3	10%	15%	75%	100%
	4	40%	50%	10%	100%
	5	70%	30%	0%	100%

Upgrades	Millions	A	B	C
1	\$20	\$2.0	\$1.0	\$17.0
2	\$35	\$14.0	\$14.0	\$7.0
3	\$50	\$5.0	\$7.5	\$37.5
4	\$75	\$30.0	\$37.5	\$7.5
5	\$100	\$70.0	\$30.0	\$0.0

<b>Total BPF</b>		<b>\$121.0</b>	<b>\$90.0</b>	<b>\$17.0</b>
MW Trans Service		700	500	200
Safe Harbor	\$180	\$126	\$90	\$36
<b>Direct Assignment</b>		<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Postage Stamp</b>		<b>\$42.0</b>	<b>\$30.0</b>	<b>\$12.0</b>
<b>MW-mile</b>		<b>\$84.0</b>	<b>\$60.0</b>	<b>\$24.0</b>
<b>Total Wind</b>		<b>\$0.0</b>	<b>\$0.0</b>	<b>\$52.0</b>
	1/2 of Total Wind			\$26.0
	1/3 of Total Assignment			\$23.0
<b>Direct Assignment</b>				<b>\$23.0</b>
<b>Postage Stamp</b>				<b>\$29.0</b>

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# Example 2

		Aggregate Study MW Impacts			
Upgrades		A	B	C	Total
<b>C's Zone</b>	<b>1</b>	0%	0%	<b>100%</b>	100%
	2	40%	40%	20%	100%
	3	10%	15%	75%	100%
	4	40%	50%	10%	100%
	5	70%	30%	0%	100%

Upgrades	Millions	A	B	C
1	\$20	\$0.0	\$0.0	\$20.0
2	\$35	\$14.0	\$14.0	\$7.0
3	\$50	\$5.0	\$7.5	\$37.5
4	\$75	\$30.0	\$37.5	\$7.5
5	\$100	\$70.0	\$30.0	\$0.0

<b>Total BPF</b>		<b>\$119.0</b>	<b>\$89.0</b>	<b>\$20.0</b>
MW Trans Service		700	500	100
Safe Harbor	\$180	\$126	\$90	\$18
<b>Direct Assignment</b>		<b>\$0</b>	<b>\$0</b>	<b>\$2</b>
<b>Postage Stamp</b>		<b>\$42.0</b>	<b>\$30.0</b>	<b>\$6.0</b>
<b>MW-mile</b>		<b>\$84.0</b>	<b>\$60.0</b>	<b>\$12.0</b>
<b>Total Wind</b>		<b>\$0.0</b>	<b>\$0.0</b>	<b>\$52.0</b>
	1/2 of Total Wind			\$26.0
	1/3 of Total Assignment			\$24.0
<b>Direct Assignment</b>				<b>\$22.0</b>
<b>Postage Stamp</b>				<b>\$30.0</b>

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## Relevant Questions

- Why keep MW-mile allocations for 2/3 of the cost of assigned upgrades in the host zone?
- What is the impact on the requests for wind DRs?
- What is the impact if the supply zone is the host zone for the request?
- Why not apply to non-wind DR requests?
- Why limit to 20% of peak demand?

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## Why Keep Host Zone Upgrade in Current BPF Allocation Process?

1. Not exactly the same as current → use MW of transmission service rather than accredited capacity for \$180,000/MW safe harbor calculation.
2. Upgrades to host zone increases the import capability into that zone irrespective of the fuel source of the DR.
3. Increased import capability into the host zone is measured by MW of transmission service, not accredited capacity of resource.
4. The MW-mile allocation measures the transmission capacity freed up in the host zone and its neighbors.

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## What is the Impact on DR Requests for Wind Power

- The proposal will significantly reduce the amount of directly assigned costs to the requestor to at most 1/3 of the costs of the upgrade.
  - This is because of the current practice of limiting rolled in costs to 10% of the MWs used for the transmission service requests.
  - This can result in as much as 90% of the upgrade cost being directly assigned to the requestor.
- However, the proposal maintains a beneficiary pays perspective through:
  - 2/3 MW-mile allocation of upgrades within the host zone of the requestor; and
  - Direct assignment to the requestor of 1/2 the costs outside of the host zone.

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## What is the impact if the Supply Zone is the Host Zone for the Request?

- Same rule applies to the supply zone. This means:
  - Any costs assigned to the request for wind power from load within the supply zone that is associated with upgrades within that host zone will be allocated 1/3 Postage Stamp and 2/3 MW-mile.
  - Any costs associated with upgrades outside that zone will be allocated 1/2 Postage Stamp and 1/2 Direct Assignment.
- The allocation of cost for delivery of wind to load within the supply zone was not seen as the problem. The problem is that the MW-mile allocation would allocate a large share of the costs caused by load outside the supply zone or pass through zones to be paid by load within those zones.

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## Why not apply this same approach to the Costs Assigned to Non-Wind DR Requests?

- While the proposal decreases the Direct Assignment of costs to a DR request for wind, if applied to other DRs, it would increase the Direct Assignment of upgrade costs for these requests.
- Any other issues related to non-wind DRs will be considered in the upcoming review of Attachment J.

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## Why Limit to 20% of Peak Load?

The primary concern is the operational problems that can result from adding too much wind:

1. Regulation: If the wind suddenly stops generating, the power grid will need to rapidly pick up lost generation through generators on automatic generation control. Too much wind that can simultaneously stop generating will result in a significant increase in % regulation.
2. Minimum Generation Operating Levels: If wind blows at night and injects too much power into the grid, this will result in problems for base load units that must operate at minimum levels to stay on line.
3. The calculations below show that, depending on the capacity factor (CF) assumed for wind (33% up to 40%), a 20% limit on percent of peak demand corresponds to a range of 13.3% up to 16.0% of energy in the Renewable Portfolio. This appears to include what most states are considering in terms of Renewable Portfolio standards or targets.

### Calculations

MW	Peak	1,000	1,000
	LF	0.5	0.5
MWh	Energy	4,382,000	4,382,000
	RPS	13.30%	16.00%
MWh	Wind Energy	582,806	701,120
	CF for Wind	33%	40%
MW	Wind Capacity	200	200
	Divided by Peak	20.0%	20.0%

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**REGULAR MEETING**  
**Monday, April 21, 2008**  
**1:00-5:00 p.m.**  
**The Skirvin Hilton, Oklahoma City, OK**

1. CALL TO ORDER
2. PRELIMINARY MATTERS
  - a. Declaration of a quorum
  - b. Adoption of January 28, 2008 Minutes
3. BUSINESS MEETING
  - a. Cost Allocation Working Group.....Dr. Mike Proctor
    1. Revisions to the Base Plan Funding Policy for Wind
    2. Cost Allocation for Economic Upgrades
      - Tariff Language Development
      - Balanced Portfolio Development
  - b. Initiatives on Seams Agreements, Balancing Authority Consolidation and Future Market Benefit/Cost Analysis ..... Lanny Nickell
  - c. OEPTTF and Updated EHV Reports..... Jay Caspary
  - d. Customer Response Task Force (CRTF)/Demand Response Survey and the Upcoming July 27-28, 2008 Demand Response Education Forum .....Bill Wylie
4. UPDATES
  - a. RSC Financial Report
  - b. Other RSC officer reports
  - c. FERC
  - d. SPP
  - e. RE
5. SCHEDULING OF NEXT REGULAR MEETING, SPECIAL MEETINGS OR EVENTS
6. ADJOURNMENT