



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

**COST ALLOCATION WORKING GROUP MEETING**

**February 27, 2008**

**AEP Dallas Offices**

**Renaissance Towers**

**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. Economic Portfolios – First Look (60 min) ..... Charles Cates

**LUNCH, 12:30**

- 3. SPP Updates (30 min) ..... SPP Staff
  - a. Determination of Cost Allocation: Efficient Access Pricing vs. MW-mi
  - b. Wind Penetration: Operating Limitations
  - c. EHV Overlay Restudy Update
- 4. Transmission Planning Survey Results (15 min) ..... Les Dillahunty
- 5. CAWG 2008 Work Plan (10 min)..... SPP Staff

**BREAK, 15 min**

- 6. Proposed Cost Allocation for the Costs of Upgrades in the Supply Zone for Designated Wind Resources (120 min) .....Mike Proctor
- 7. Customer Response Task Force Effort
  - a. Requesting Input on development of “Demand Response Survey” (15 min) ..... Bill Wylie
- 8. Closing Admin

*Relationship-Based • Member-Driven • Independence Through Diversity  
Evolutionary vs. Revolutionary • Reliability & Economics Inseparable*



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



## SPP's Transmission Planning Survey Results

November 30, 2007  
DRAFT

## Overview

- **Purpose**
  - Solicit feedback from a broad range of stakeholders on key issue related to transmission planning
  - Asked for responses in two time frames
    1. Short Term – between now and 2010
    2. Long-term – by 2020
  - Use results to shape key input assumptions
- **Main Topic Areas**
  - Supply & Demand
  - Fuel & Environmental Constraints
- **Distribution**
  - SPP Members
  - Regulators
  - Other related organizations

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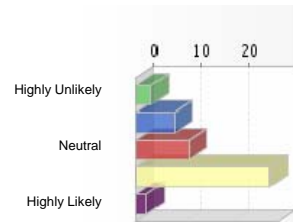
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## Supply Side Related Responses

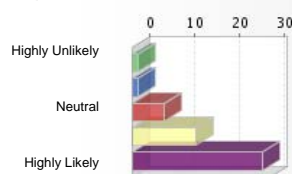
### Renewable Portfolio Standards

- **Most believed that some form of federal or state-mandated RPS would be in place in by 2020**
  1. 76% thought some form of state mandate would be in place by 2020
- **Amount**
  - <10% in short term
  - Between 10% and 15% in long term

Short Term (2010)



Long Term (2020)



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# Treatment of Wind Resources

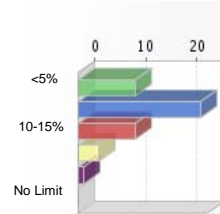
**Majority recognize increase in wind resources from today's 3%**

- 68% say it could be as high as 10% in short term
- 72% see potentially 15% in long-term

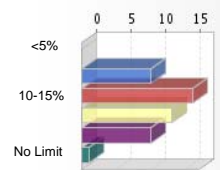
**Transmission needs to support new wind generation**

- 67% believe study should model transmission expansion to support export of wind generation
- 74% see increase in net exports in long-term

Short Term (2010)



Long Term (2020)

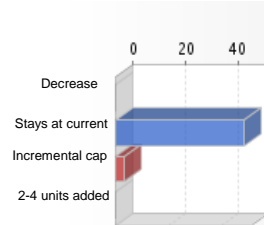


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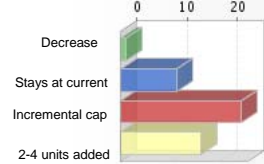
# Nuclear Generation

- **Short term outlook - overwhelming majority see no change in short term**
- **Long-term outlook – 77% see at least some incremental capacity being added**

Short Term (2010)



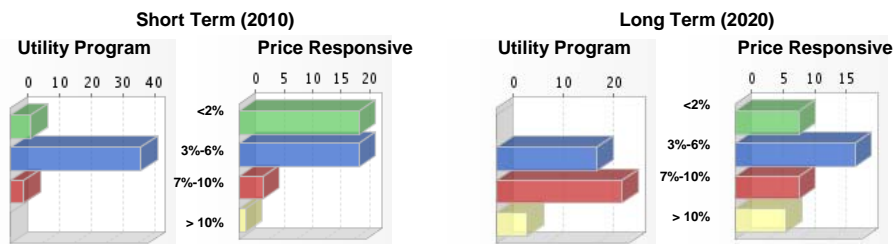
Long Term (2020)



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## Demand Side Responses

- **Scope of questions included utility demand programs, price responsive load, and energy efficiency**
- **Summary across all three areas**
  - **Short term outlook – overwhelming majority (80.4%) see current levels of demand response capability (3%-6%) being roughly maintained**
  - **Long-term outlook**
    - Increase in utility demand response programs could be in the 7%-10% of load
    - Price sensitive load remains in same range of 3%-6%



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## Fuel & Environmental Constraints

- **Emissions Constraint Policies**
  - 81% see cap and trade system being put in place
  - Majority see price of emissions credits increasing at (31%) or greater (58%) than rate of inflation
- **Fuel Prices**
  - **Natural Gas prices**
    - upward pressure on prices at or greater than rate of inflation
    - 78% see prices rising greater than inflation in long-term forecast
  - **Coal prices**
    - Prices increase at a pace slower than rate of change in natural gas prices

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## Interpreting the Results

- **Supply & Demand Areas**
  - An RPS standard will be in place in the long term that could be as high as 10% or more
  - **Wind resources**
    1. Could make up as much as 10%-15% of the region's capacity
    2. Transmission to support exports of these resources to the Eastern Interconnection should be evaluated
  - **Nuclear Generation in the future will remain constant in the short term with the potential for incremental capacity in the long term**
  - **Demand side resources**
    1. will continue to be in the 3-6% range in the short term
    2. Utilities will increase the amount of demand side programs to as much as 10% in the long-term
  - **Imports/Exports**
    - SPP will continue its current pattern although an increase in export capability should be evaluated
- **Fuel & Environment**
  - **Emissions constraints**
    1. A cap and trade system will be in place
    2. The value of emissions credits is expected to increase at a rate at or above inflation
  - **Fuel Price Forecasts**
    - Natural gas prices will increase at or above the rate of inflation
    - Coal prices will increase at a rate below that of natural gas prices

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## Questions?



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### 3a. Cost Allocation Process Review

- SPP is obligated by the OATT to conduct every 5 years a review the reasonableness of the cost allocation methodology (currently 1/3 Regional, 2/3 MW-mi).
- Efficient Access Pricing will be considered for pros and cons vs. the current MW-mi process



## Efficient Access Pricing

- Efficient Access Pricing is a power flow based methodology that will determine the magnitude of who is using the facilities on the grid to serve load
- The system effectively captures the impact on power systems where load and generation may not be geographically close
- Efficient Access Pricing, along with other potential allocation methodologies, will be a topic of future CAWG discussion as outlined in the work plan.

## 3b. Wind Penetration Operation Limits

- ❖ Base Plan Funding ?
  - ❖ Wind DNR Funding ~ SPP Idea
  - ❖ 30% Adjustment Seems High

### Interim solution

#### **0 – 20%**

increase wind capability adjustment from 10% to 20% given wind integration study results showing that penetrations up to 20% do not pose significant impacts on operations or ancillary services.

#### **20% – 30%**

To fund facilities necessary to support injections beyond 20% name plate up to and including 30% name plate, the customer, rather than the host transmission owner/balancing authority, must provide the necessary ancillary service to ensure reliable operation including, but not limited to, voltage and reactive support, regulation and energy imbalance service.”

## February 24, 2007 ERCOT Wind Event

**Strong winds caused wind generation levels to drop from 2200 MW to 500 MW in a time period of 90 minutes.**

**Performance characteristics of different machines were noteworthy.**

**Similar affects, albeit significantly less, were seen within SPP given the larger geographic diversity of wind farms in SPP.**

**Minimal impact seen on SPP wind farms in KS.**



## So, What is the SPP wind injection limit?

- ❖ **Joint Coordination System Plan, Phase 2**
  - ❖ SPP, MISO, TVA, PJM, SERC
- ❖ **Determine stiffness of the grid**
  - ❖ dynamic nature of wind
  - ❖ frequency control
  - ❖ Low voltage ride thru, FERC Order 661
- ❖ **Modified Capacity & Operating Reserve Policies and/or Services**
- ❖ **Regulating requirements have costs**
- ❖ **Development of operational practices**

## Questions?



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# Proposed Cost Allocation for the Costs of Upgrades in the Supply Zone for Designated Wind Resources

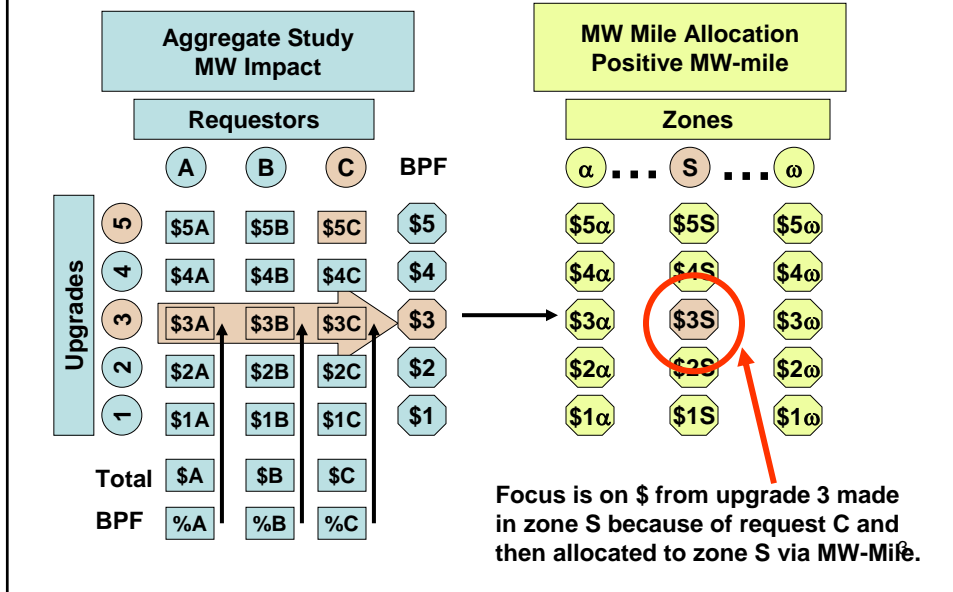
Mike Proctor  
CAWG Meeting  
February 27, 2008

## Context: Two Distinct Cost Assignments/Allocations

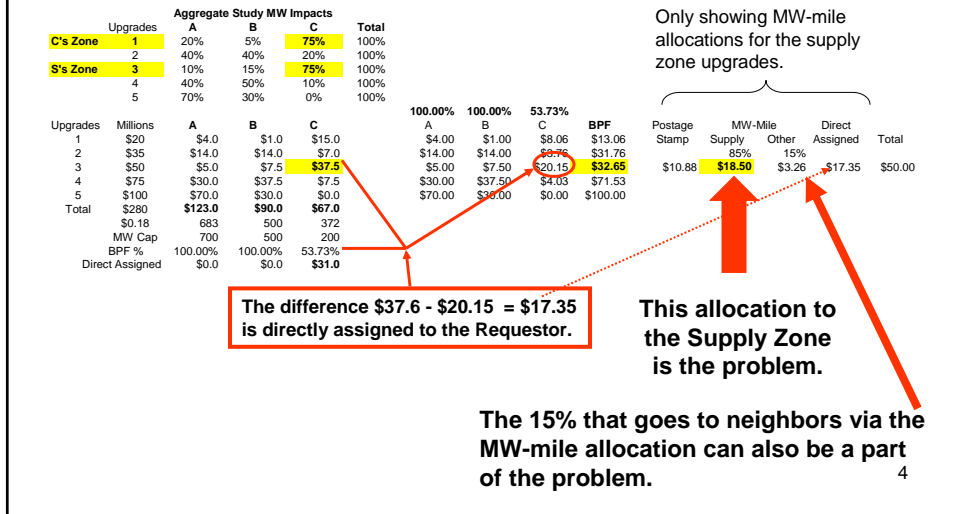
- 1. Aggregate Studies** assign costs to requestors based on **MW impact** for ALL upgrade facilities required by the study requests.
  - A request for a new wind resource can be assigned costs from many different upgrades, not just the upgrades in the supply zone.
  - The purpose of the Aggregate Study 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.
  - Any solution to the supply zone problem **should focus on upgrades in the supply zone** that would not otherwise be required **“but for”** requests for wind as designated resources.
  - The solution **should not focus on the other costs assigned to requestor in the aggregate study process**. These costs can include upgrades made throughout the SPP system, and in particular can include upgrades made within the zone of the requestor.
    - For example, the requestor's zone may have limited import capability so that any new or changed DR located outside the zone would require the same upgrades to increase import capability as would be required by a wind resource.
    - These upgrade costs should not receive special treatment simply because wind was the designated as a resource.

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# Context in Graphical Form



# Example of Allocation Without Modifying for Supply Zone



## Initial Thoughts About Changing the Allocation for Wind DRs

- A. \$180,000 per MW of **requested transmission service** as safe-harbor for designated wind resources
  - "But for" upgrades within the supply zone are not included in safe harbor calculation
  - Up to 12.5 % of total peak demand
- B. Dollars allocated from positive MW-mile impacts to Alternative 1: the supply zone / Alternative 2: all zones from **upgrades made within the supply zone** to meet the request for a designated wind resource are allocated:
  - 25% Postage Stamp
  - 75% Direct Assignment to Requestor who is then eligible for revenue credits from subsequent users of the upgrade.

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## Example Allocation with Modifications for Upgrades in the Supply Zone

		Aggregate Study MW Impacts								Only showing MW-mile allocations for the supply zone upgrades.				
Upgrades		A	B	C	Total	A	B	C	BPF	Postage Stamp	Supply	MW-Mile	Other	Total
<b>C's Zone</b>	1	20%	5%	75%	100%									
	2	40%	40%	20%	100%									
<b>S's Zone</b>	3	10%	15%	75%	100%									
	4	40%	50%	10%	100%									
	5	70%	30%	0%	100%									
Upgrades	Millions	A	B	C		100.00%	100.00%	100.00%						
1	\$20	\$4.0	\$1.0	\$15.0		\$4.00	\$1.00	\$15.00	\$20.00					
2	\$35	\$14.0	\$14.0	\$7.0		\$14.00	\$14.00	\$7.00	\$35.00					
3	\$50	\$5.0	\$7.5	\$37.5		\$5.00	\$7.50	\$37.50	\$50.00	\$16.67	\$28.33	\$5.00		\$50.00
4	\$75	\$30.0	\$37.5	\$7.5		\$30.00	\$37.50	\$7.50	\$75.00					
5	\$100	\$70.0	\$30.0	\$0.0		\$70.00	\$30.00	\$0.00	\$100.00					
Total	\$280	\$123.0	\$90.0	\$29.5										
	\$0.18	683	500	164										
	MW Cap	700	500	200										
	BPF %	100.00%	100.00%	100.00%										
	Direct Assigned	\$0.0	\$0.0	\$0.0										
		Total for C excludes costs from upgrade 3. This adjustment is made so that the requestor is not hit with a double direct assignment from upgrade 3.												
						Supply Zone MW-mile				All MW-mile Zones				
						Postage Stamp \$7.08 25%				Postage Stamp \$8.33 25%				
						Direct Assignment \$21.25 75%				Direct Assignment \$25.00 75%				
						Total \$28.33				Total \$33.33				
						Postage Stamp \$23.75 47.50%				Postage Stamp \$25.00 50.00%				
						Zonal MW-mile \$5.00 10.00%				Zonal MW-mile \$0.00				
						Direct Assigned \$21.25 42.50%				Direct Assigned \$25.00 50.00%				
						Total \$50.00				Total \$50.00				

The alternative eliminates the MW-mile allocation of the costs from the supply zone.

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## Alternative Approach: All Upgrade Costs from Supply Zone Are Included

- In the alternative approach, the allocation will always be 1/3 postage stamp and 2/3 direct assignment of the cost of the upgrade(s) in the supply zone.

1/3 is postage stamp from BPF

1/4 of 2/3 is postage stamp from proposal

$$\Rightarrow 1/3 + (1/4) * (2/3) = 1/3 + 1/6 = 2/6 + 1/6 = 3/6 = 1/2$$

or **50% Postage Stamp**.

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## Alternative Made Simple

### Apply KISS principle

Remove cost of the supply zone from BPF calculations and therefore from the assignment process of the Aggregate Study, and directly allocate these costs via:

50% Postage Stamp

50% Direct Assignment

Similar to the Allocation method adopted by MISO for Large Generator Interconnections of Generators that are designated as network resources.

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# Adding Interconnection Costs

- If Wind Resources interconnect as energy resources that are deliverable to the SPP market, then:
  - 1) Most if not all of the upgrades to deliver energy to the SPP market will occur in the supply zone; and
  - 2) All upgrades to the supply zone required for designating wind as a resource would already be included for delivery to the SPP market.
- When wind is designated as a network resource by a load within the SPP, all of the network upgrades associated with the interconnection of wind as an energy resource would be included in the 50% PS / 50% Direct Assignment (DA) to Requestor allocation.
- This simplifies the process to three steps:
  - Step 1: Interconnect Wind as an energy resource deliverable to the SPP market.
  - Step 2: When designated as a resource by a load, allocate all network upgrades from the interconnection costs on a 50% PS / 50% DA basis.
  - Step 3: Wind deliverable as a DR goes through the aggregate study process and follows the current BPF formulas using Megawatts of Transmission Service. All interconnection costs are excluded from the BPF calculations.

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# Interconnection Alternatives for Wind Resources

## Wind interconnections have three options

- 1) Interconnect with no deliverability requirements
  - ✓ Would require SPP to perform the second study for purposes of information on costs eligible for 50% cost allocation at the time that it is designated as a resource.
  - ✓ Until designated as a resource, the wind resource would incur no additional network upgrade costs beyond its basic interconnection costs. When designated as a resource ⇒ 3) below.
- 2) Interconnect with deliverability into the SPP energy market
  - ✓ SPP would perform the deliverability study at the time of the interconnection and all network upgrade costs would be eligible for 50% cost allocation at the time it is designated as a resource.
  - ✓ The wind resource would initially incur all network upgrade costs, including those beyond its basic interconnection costs. When designated as a resource, those cost would transfer to the 50% cost allocation.
- 3) Interconnect with deliverability to a load as a designated resource
  - ✓ SPP would need to separate out those upgrades necessary for deliverability to the SPP market from those necessary for deliverability to a specified load.
  - ✓ The cost of network upgrades necessary for deliverability to the SPP market would be eligible for the 50% cost allocation and the wind resource would incur no network upgrade costs.

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## What if Deliverability to the SPP Market Results In Upgrades Needed Beyond the Supply Zone?

- The calculation of deliverability of energy to the SPP market is made in the power flow studies by increasing the output of the proposed new interconnection to its maximum level and decreasing the output from every other generator by the same total amount using an equal percentage decrease from each generator.
  - With the decrease, it is unlikely that problems in non-supply areas will occur.
    - Export issues from the supply zone should show up.
    - Import issues into zones should be handled by the decrease in generation within the zones.
    - Transport issues from the supply zone to all the other load zones should also be handled by the decrease in generation throughout the footprint.
- However, if this is not the case: Non-supply zone upgrades required for the transport of energy from the supply zone to the SPP market may also be included in the 50% PS / 50% DA allocation. However, upgrades required to increase the import capability into any of the load zones should be excluded from this allocation.
  - Costs associated with upgrades needed to increase the import capability into load zones should be included in the Aggregate Study process and be subject to normal BPF.

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## Alternative

- Could limit upgrades to be included to those that are associated with adding wind as an energy resource.
- My understanding of this is that deliverability of an energy resource is limited to the zone in which that resource is located.
- Further discussion??

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## Attachment Z Implications

- The requestor would be eligible for revenue credits on the assigned costs.
  - A new wind power interconnection requestor without a DR could also require deliverability into the SPP market as a project sponsor, and would be responsible for upgrade cost on previously upgraded facilities.
  - Subsequent requests for transmission service (PTP or DR) through the Aggregate Study that have a MW impact on these previously upgraded facilities would be responsible for MW percent (MW share of capacity) of upgrade cost on these facilities.
    - Funding for revenue credits would come 50% PS and 50% DA to requestor

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## Why Limited to 12.5% 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.

### Calculations

<b>1,000 MW</b>	<b>Peak</b>
<b>50%</b>	<b>LF</b>
<b>4,382,000 MWh</b>	<b>Energy</b>
<b>10.00%</b>	<b>RPS</b>
<b>438,200 MWh</b>	<b>Wind Energy</b>
<b>40%</b>	<b>CF for Wind</b>
<b>125 MW</b>	<b>Wind Capacity</b>
<b>12.5%</b>	<b>Divided by Peak</b>

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## Alternatives

- Could move from 12.5% of peak load up to as much as 18% - 20%. This would correspond to a 15% energy RPS.
- If this alternative is taken, should the percent of direct assignment to the requestor increase depending on percent of peak. For example:
  - At 12.5%, direct assignment of 50%
  - At 22.5%, direct assignment of 100%
  - Implies a 5% increase in direct assignment for every 1% increase in percentage of peak demand.
  - Above 22.5%, BPF applies as in current tariff.

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SPP CRTF Tasks (portion in **BOLD** are the proposed objectives of the required survey)

1. Demand Response survey of SPP members for the objectives of:
  - **Determining the current state of DR within SPP**
    1. **Numbers and types of DR programs (total amount of loads enrolled)**
    2. **Tariffed vs. non-tariffed programs**
    3. **Measurement & Verification elements**
    4. **Connections between DR programs and utility planning reserves,**
    5. **Triggering mechanisms (reliability or economic or both) and detail of the mechanisms**
    6. **Generalized statements as to the current valuation methodology for demand response**
    7. **Innovative approaches to targeting DR opportunities (e.g. focusing on congested areas, as with direct load control A/C switches for residential and commercial customers in areas characterized by rapidly-growing demand).**
    8. **Advantages/disadvantages of programs that combine elements of both DR and energy efficiency, such as smart thermostats that allow customers to save energy and utilities to reduce peak. This may include the issue of significant lost revenues.**
  - **Determining the barriers to:**
    1. **Customer participation**
    2. **Regulatory participation**
    3. **Utility participation**
  - **Determining key differences in DR programs**
    1. **Between SPP states**
    2. **Between SPP members**
  - **Determining the current accumulation of megawatts within SPP participating in demand response for use in the SPP MOPC Cost Benefit Task Force work (Task #4).**
  - **The results of this survey will provide a springboard for a future educational/informational forum for SPP members regarding DR (Task #2).**
  - **The results of the survey will help raise the level of understanding and awareness of DR among SPP members (Task #2).**
  - **The survey results will also be useful in dialogues among the SPP state regulatory commissions (Task #2).**
  - **The survey results will aid in better evaluating and then addressing any discontinuities between the values of demand response to a wholesale market vs. what is in place for the retail market. This will be of value to the Cost Benefit Task Force (Tasks #3 and #4).**

**Comment [A1]:** Is it possible to capture the time it may have taken a program to begin operating? Is this even helpful?

**Comment [A2]:** I'd swap 2 and 3.

**Comment [A3]:** How do you anticipate that this will be reflected? by member? by state?

2. SPP member education regarding DR
3. Identify discontinuities, overlaps or inter-relationships for DR within wholesale and retail markets.
4. Interplays of DR cost-effectiveness criteria (i.e. real-time energy markets, ancillary services markets, day-ahead markets, etc)

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[Additional information for the SPP RSC CAWG:](#)

[The FERC issued this past Friday a Notice of Proposed Rulemaking in Dockets NOs. AD07-7 and RM07-19. This Docket proposes to REQUIRE each ISO and RTO to take certain steps as regards to making provisions for demand response to participate in wholesale, organized markets.](#)

[It is suggested each state regulatory agency carefully read, review, and understand the issues presented in the NOPR as they may relate to retail demand response tariffs.](#)