Southwest Power Pool

ECONOMIC STUDIES WORKING GROUP

May 24, 2011

Kansas City, KS

10:00 am – 4:00 pm

• SUMMARY OF ACTIONS TAKEN •

1. The ESWG kept for further consideration metrics dealing with competitiveness in the SPP grid.

Southwest Power Pool

Southwest Power Pool

ECONOMIC STUDIES WORKING GROUP

May 24, 2011

Kansas City, KS

10:00 am – 4:00 pm

• Minutes •

Agenda Item 1 – Administrative Items

Chair Alan Myers (ITC Great Plains, LLC) called the meeting of the Economic Studies Working Group (ESWG) to order at 10:00 a.m., welcomed those in attendance, and asked for introductions (Attachment – Attendance List).

Agenda Item 1a – Attendance

There were 14 in person participants and 13 teleconference participants representing 11 of 12 members. Tim Miller (SPP staff) received proxy statements (Attachment – Proxy Statements).

Agenda Item 1b – Agenda Modifications

Chair Alan Myers (ITC Great Plains, LLC) presented the agenda for review and asked for any additions or corrections (Attachment – Agenda). Modifications were made and adopted by the group.

> **A motion to approve the agenda as modified was made by Kip Fox (AEP) and seconded by Tom Hestermann (Sunflower). The motion was approved unanimously.**

Agenda Item 1c – Minutes Approval

Tim Miller (SPP staff) presented minutes from the previous two meetings for approval (Attachment – Approved Minutes). Leon Howell's name was added to the attendance list for the April 27 minutes.

> **A motion to approve the minutes of the April 19 meeting was made by Kip Fox (AEP) and seconded by Bruce Merrill (LES). The motion was approved unanimously.**

> **A motion to approve the minutes of the April 27 meeting was made by Bruce Merrill (LES) and seconded by Tom Hestermann (Sunflower). The motion was approved unanimously.**

Agenda Item 1d – Future Meetings

The group discussed the logistics of upcoming meetings.

Agenda Item 2 – Metric Selection Kick-Off for ITP10

Tim Miller (SPP staff) led a discussion of the metrics that could be used in the 2011 ITP10. The group tentatively selected and dropped metrics for the study (Attachment – Metrics). Detailed discussion of each metric was pursued. The metrics dealing with competition in the SPP footprint were especially discussed and the group moved to keep the metrics for consideration.

> **A motion to keep for consideration metric 2: Levelization of LMP's, and metric 3: Improved Competition in SPP Markets, was made by Tom Hestermann (Sunflower) and seconded by Kip Fox (AEP). The motion was approved unanimously.**

Chair Alan Myers (ITC Great Plains, LLC) and Tim Owens (NPPD) mentioned that the weighting of these metrics may need to be revisited.

Tim Miller presented metrics that were not used in the 2010 ITP20 that could be adopted for use in the ITP10. David Ried (OPPD) commented that while possible Metric 12: Ability to Reduce Cycling of Base load units is possible but would require detailed modeling of plants including mill costs, frequency and duration of commitments. Tim Miller indicated that staff is currently investigating Metric 1.1.3: Backstop to Catastrophic Events to determine if information exists to make the calculation feasible. Mike Proctor

(Consultant to SPP RSC) agreed that the use of Value of Lost Load for this metric could be made, but the determination of the assumptions would be key.

ACTION ITEM: SPP staff will bring this information back for discussion at the June 27 meeting in preparation for the July Markets and Operations Policy Committee (MOPC).

Agenda Item 3 – Review ITP10 Section of ITP Manual

Chair Alan Myers (ITC Great Plains, LLC) recommended that a thorough review be completed by group members outside of the meeting and be provided back to staff.

ACTION ITEM: ESWG Members will review the ITP Manual and submit updates to SPP staff by June 10, 2011.

Agenda Item 4 – Benchmarking Results

Tim Miller (SPP staff) presented the results of ITP10 benchmarking analyses (Attachment – Benchmark Results).

ACTION ITEM: Staff will investigate further modifications to the modeling parameters as part of the benchmarking efforts.

- Continue to investigate the maintenance and scheduled outages within the simulations
- Refine the modeling of the hydro units within SPP to reflect historical flows
- Hurdle rates should be investigated further
- Investigate the calculation of reserves utilized (consult with Warren Lasher at ERCOT)
- Use the implied hurdle rate using natural gas prices

Agenda Item 5 – Futures' Resource Plan Summary for MOPC

For lack of time this item was not discussed.

Adjournment

Chair Alan Myers (ITC Great Plains, LLC) adjourned the meeting at 4:15pm on Tuesday, May 24, 2011..

Respectfully Submitted,

Tim Miller
Secretary

Southwest Power Pool

Southwest Power Pool, Inc.

ECONOMIC STUDIES WORKING GROUP MEETING

May 24, 2011

Crowne Plaza Kansas City Downtown/Kansas City, MO

• ATTENDANCE LIST •

Name	Company
Alan Myers	ITC Great Plains
Bruce Merrill	LES
Kurt Stradley	LES
Tim Owens	NPPD
Paul Dietz	Westar Energy
— TELECONFERENCE ATTENDEES —	
David Ried	OPPD
Doug Collins	OPPD
Kenny Hale	City Utilities
Mitch Williams	WFEC
Roy Boyer	Xcel Energy
Terri Gallup	AEP

Southwest Power Pool

Southwest Power Pool, Inc.

ECONOMIC STUDIES WORKING GROUP MEETING

May 24, 2011

Crowne Plaza Kansas City Downtown/Kansas City, MO

• ATTENDANCE LIST •

Name	Company
Walt Cecil	MoPSC Staff
Mike Procter	SPP RSC
Kip Fox	AEP
Tim Miller	SPP Staff
Tom Hestermann	Sunflower Electric
John Stephens	City Utilities of Springfield
Jim Sanderson	KCC
Jim Okenfuss	KCP&L
Darrell J. Calhoun	Kansas City Board of Public Utilities
— Teleconference Attendees —	
Bennie Weeks	SPS / Excel
Bruce Walkup	AECC
Leon Howell	OG+E
Brett Hooton	SPP Staff
Brittney Miller	ARPSC Staff
Charles Cates	SPP Staff
Dan Lenihan	OPPD

FYI, for your records in case you didn't get this separately.

Thanks,
Alan

From: Tamimi, Al [mailto:atamimi@sunflower.net]
Sent: Monday, May 23, 2011 10:51 PM
To: Myers, Alan K.
Cc: Hestermann, Tom
Subject: Proxy for KC Meeting

Alan,

Tom Hestermann will attend the KC face to face ESWG meeting. He has my Proxy for this meeting.

Thanks,
AL

Hi Darrell,
The materials for the meeting were posted this morning. You can find them on the ESWG page of SPP.org. Here is a direct link that will take you there. Please let me know if you have any questions.
Sincerely,
Tim Miller

From: Blake Elliott [mailto:belliott@bpu.com]
Sent: Monday, May 02, 2011 1:13 PM
To: Tim Miller
Cc: Calhoun, Darrell
Subject: RE: May 24th ESWG Meeting Location

Tim,

Darrell Calhoun of BPU will represent us. Please direct him to getting access to the materials through email list.

Blake L. Elliott
Director Electric Supply Planning

Kansas City Board of Public Utilities
Electric Supply Administration Office
PO Box 2409
Kansas City, KS 66102

Kansas City Board of Public Utilities
Electric Supply Administrationn Office
312 N 65th St.
Kansas City, KS 66102

Office: 913.573.6837
Cell: 913.645.1457
mailto:belliott@bpu.com

From: bounce-28555-29477@spplist.spp.org [mailto:bounce-28555-29477@spplist.spp.org] **On Behalf Of** Tim Miller
Sent: Monday, May 02, 2011 8:10 AM
To: Economic Studies Working Group - Created by MSB 5/5/09
Subject: May 24th ESWG Meeting Location

ESWG Members,

The May 24th meeting will remain at the scheduled location in Kansas City at the Crowne Plaza downtown. Staff looked into rescheduling the meeting closer to the airport but found the costs prohibited such a move. Please register for the meeting at SPP.org for complete scheduling information.

Sincerely,

Tim Miller | SPP | Economic Planning | 501.614.3357

Southwest Power Pool

ECONOMIC STUDIES WORKING GROUP

May 24, 2011

Teleconference

• A G E N D A •

10:00 am – 4:00 pm

1. Administrative Items .... 15 min
   a. Attendance
   b. Agenda Modifications
   c. Minutes Approval
   d. Future Meetings
2. Metric Selection Kick-Off for ITP10 .... 2 hrs
3. Review ITP10 Section of ITP Manual.. 2 hrs
4. Benchmarking Results.. 1 hr 30 min
5. Futures' Resource Plan Summary for MOPC .... 30 min

Minutes No. [46]

Southwest Power Pool

ECONOMIC STUDIES WORKING GROUP

April 19, 2011

Teleconference / Net Conference

1:00 pm – 3:00 pm

• Summary of Action Items •

1. Group will reconvene to discuss approval of the 2011 ITP10 Resource Plan, Wind Siting and Reference Fuel Costs.
2. Staff will work with NPPD and OPPD to consistently treat the City of Grand Island, City of Fremont, and the City of Hastings's generation and load within the ITP studies.
3. Staff will review recommendations from the WITF study regarding operating reserves with large amounts of wind in the footprint.
4. Staff will review the inclusion of Jones and Antelope planned units in the study.
5. Constraints for use in the ITP10 need to be discussed with the TWG and staff.

Minutes No. [46]

Southwest Power Pool

ECONOMIC STUDIES WORKING GROUP

April 19, 2011

Teleconference / Net Conference

1:00 pm – 3:00 pm

• Minutes •

Agenda Item 1 – Action Items from March 28th Meeting

Vice-Chair Kip Fox called the meeting to order with the following members attending via teleconference:

Kip Fox, AEP	Leon Howell, OGE
Al Tamimi, Sunflower	Mark Loveless, OMPA
Bruce Walkup, AECC	
Bruce Merrill, LES	James Sanderson, KCC
Greg Sweet, Empire	Mike Proctor, Consultant

The group discussed moving the hotel reservation for the May 24th meeting in Kansas City closer to the airport to help attendees get to their flights in the late afternoon and asked Staff to check into the expense of making the change (the cost proved excessive).

The purpose of this teleconference centered on finalizing the key inputs in the 2011 ITP10.

Agenda Item 2 – ITP10 Model Finalization

Tim Miller, SPP staff, provided an update on the status of the models being used for the 2011 ITP10 and outlined the remaining items that require approval by the ESWG. Questions were asked about the use of constraints in the model and the treatment of them in light of the current dispute between Midwest ISO and SPP JOA. Staff committed to bringing an update to the TWG regarding the use of constraints in the models.

Agenda Item 3 – ITP10 Resource Plan

Tim Miller shared the latest updates to the capacity margin calculations and made further modifications following suggestions on the call. Items touched on included:

- The treatment of the City of Grand Island, City of Fremont, and the City of Hastings's generation and load within the ITP studies. The group tasked staff to work with NPPD and OPPD to determine the best treatment of these entities within the study.
- Capacity purchases from other members where discussed. It was determined that these purchases did not pertain to the study unless they crossed outside of the SPP RTO footprint. Such purchases were explicitly marked out on the resource planning worksheet.
- A write-up of the process and how it fits in to the rest of the ITP10 study. Especially definition of the numbers and how they may differ from those used in the powerflow simulations.
- The use of 100-m hub height NREL data for the wind profiles of all wind plants in the SPP footprint. The wind locations were not driven by the SPP Generation Interconnection Queue.
- OPPD asked that staff review the WITF study's recommendations for reserve requirements with large amounts of wind in the footprint.
- SPS asked that staff verify the inclusion of the Jones and Antelope units within the ITP10 study.

The group committed to revisit this issue on an upcoming phone call.

Agenda Item 4 – ITP10 Fuel Prices

David Ried, OPPD, presented the group with the work he, Bennie Weeks and Paul Dietz had done regarding reference fuel costs for the 2011 ITP10. The group asked that assumptions be written up for the fuel price decisions and that special emphasis be given to the use of a multiple forecasts in the selection of a price by the ESWG. The group will discuss fuel price sensitivities at a later date, and will be looking to Paul Dietz to provide some statistical data to aid the group's decision making.

A motion was entertained to accept the fuel prices as presented. **Bruce Merrill made the motion and Blake Elliot seconded. A quorum was not found for the vote and the motion did not pass.** The group committed to discussing this item at the next meeting.

Agenda Item 5 – Upcoming Meetings

A call was scheduled from April 27th to follow up on these items.

Adjournment

Kip Fox closed the meeting at 3:15 pm.

Respectfully Submitted, Tim Miller, Staff Secretary

Other Teleconference Attendees

Brad Schwarz, EON
Brenda Harris, OXY
Bruce Cude, Xcel Energy
Dan Jones, SPP
Dan Lenihan, OPPD
David Reid, OPPD
Doug Collins, OPPD
Henry Schwab, ITC
James Okenfuss, KCPL
John Mayhan, OPPD
Kenny Hale, City Utilities
Mitch Williams, WFEC
Nathan McNeil, Midwest Energy
Roy Boyer, Xcel Energy
Steve Gaw, Wind Coalition
Terri Gallup (AEP), AEP
Tim Owens, NPPD
Tom Hestermann, Sunflower
Tony Gott (AECI), AECI
Walt Cecil, MO PSC

Minutes No. [47]

Southwest Power Pool

ECONOMIC STUDIES WORKING GROUP

April 27, 2011

Teleconference

1:30 pm – 2:30 pm

• Summary of Action Items •

1. Staff will publish a document showing the process, assumptions and results of the ITP10 resource planning portion of the study.

Minutes No. [47]

Southwest Power Pool

ECONOMIC STUDIES WORKING GROUP

April 27, 2011

Teleconference

1:30 pm – 2:30 pm

• Minutes •

Agenda Item 1 – ITP10 Resource Plan

Chair Alan Myers called the meeting to order with the following members attending via teleconference:

Alan Myers, ITC	Bruce Merrill, LES
Kip Fox, AEP	Greg Sweet, Empire
Al Tamimi, Sunflower	Leon Howell, OGE
Bruce Walkup, AECC	
Bennie Weeks, Xcel Energy	Mike Proctor, Consultant

The group picked up where the last meeting left off discussing the resource plan. Several changes were made by members during the call and staff will publish an updated document describing the results and the process used in the resource plan.

Kip Fox mentioned that EPA rules will probably cause much of the coal in the footprint not to run and wondered if it would be smarter to put CTs in SPS rather than large CCs. Mike Proctor noted that our plans look pretty close to the results of the Boston Pacific report that was presented at the board meeting and that of the NERC report published last fall. Leon Howell asked for an explanation of the $35 carbon tax and the group discussed this method of approximating the impact of EPA regulations upon non-retired units. Kip noted that this does not take into effect the regulations that would cause scrubbers and other emissions control devices to be installed upon large units (causing derates).

Tim Miller indicated staff will be identifying projects needed to handle the generation increases and that they will be specifically identified within the study.

The group accepted the resource plan to move forward with the study. **Greg Sweet motioned to accept the plan following edits made during the meeting. Bennie Weeks seconded the motion and it passed with one abstention.** Kip Fox abstained with the concern that the group has not really addressed the EPA impacts adequately enough to cover large unit derates.

Agenda Item 2 – ITP10 Fuel Prices

Tim Miller reiterated the presentation given by David Ried on April 19th. And **Kip Fox made a motion to accept these prices as presented for both futures. Bennie Weeks seconded the motion.** Discussion of the prices was brought up by Greg Sweet and Leon Howell: to clarify a few points:

- A monthly fuel curve is being followed for Natural Gas.
- An update to the price after April 1st or April 27th doesn't increase our study accuracy.
- When other years are simulated to stage projects a relative gas price should be used for that year (such as using the futures trading for that year).
- These fuel prices will be used in both futures (with and without CO_2 prices). Determining a second gas price for future 2 would take time that isn't allowed to us within this study cycle. Treatment of this may be undertaken through the weighting of fuel price sensitivities in the economic analysis.

The motion carried with no abstentions or opposition.

Adjournment

Alan Myers noted as an information item that these decisions should be communicated to the MOPC before their scheduled July meeting out of courtesy. Alan & Tim Miller will coordinate with the MOPC leadership regarding this communication.

Dan Lenihan asked if the models are ready for stakeholder review now that these decisions have been made. Tim responded that the plan is to make the models available in early May.

Other Teleconference Attendees

Dan Witt, OPPD

Dan Lenihan, OPPD

John Mayhan, OPPD

Kenny Hale, City Utilities

Nathan McNeil, Midwest Energy

Roy Boyer, Xcel Energy

Steve Gaw, Wind Coalition

Tim Owens, NPPD

Tony Gott (AECI), AECI

Walt Cecil, MO PSC

Metric #	Description	Use in ITP10?
CM1	Adjusted Production Cost Savings	Yes
CM2	Future is met (criteria, requirements)	Yes
1.1.1	Value of replacing previously approved projects	Yes
1.1.2	Value of improved Available Transfer Capabilities	Yes
1.3	Reduced Losses	Yes
1.5	Ability to Reduce Cost of Capacity	Yes
1.6	Positive Impact on Losses Capacity	Yes
2	Levelization of LMP's	Yes
3	Improved Competition in SPP Markets	Yes
6	Limited Export/Import Improvements	Yes
10	Reduction of Emissions Rates and Values	Yes
14	Ability to Serve New Load	Yes
1.1.3	Backstop to Catastrophic Events	Possible
1.2	Enable Efficient Location of New Generation Capacity	No
1.4	Increased Effective Capacity Factor	No
4	Change in the Installed Capacity Reserve Margin	No
5	TLR Reduction-Enabling Market Solutions	No
7	Improved Market Dynamics NOT measured in The PCM	No
8	Improved Market Dynamics measured in the PCM	No
9	Reduction in Market Price Volatility	No
11	Transmission Corridor Utilization	No
12	Ability to Reduce Cycling of Base load units	No
13	Generation Resource Diversity	No
15	Value of replacing previously approved projects	No

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

SPP Southwest Power Pool

ITP10 Simulation Reference Points

May 24, 2011

Kansas City, KS

ESWG

Southwest Power Pool

Reference Points & Benchmarking

- 2011 ITP10 Benchmarking Effort
- Model reflects transmission in-service during 2010
- Determine if simulation is reasonable
- Catch errors and fine tune the results
- Compare to Historical Data

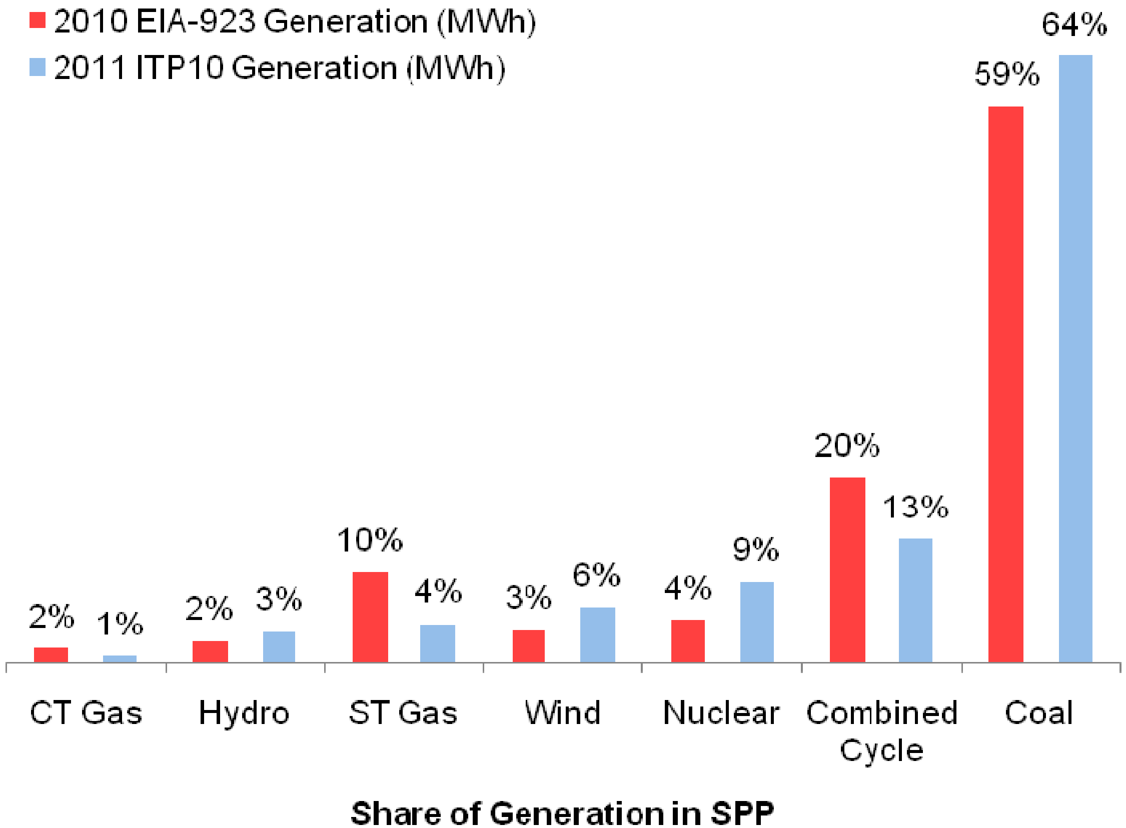
Capacity Factor by Unit Type

Total energy generated for the year as a ratio of the total possible generation by type is Capacity Factor (CF)

Unit Category	2011 ITP10 Capacity Factor	EIA Capacity Factor Range
Nuclear	96%	89 – 92%
ST Coal	75%	64 – 74%
Wind	42%	40 – 47%
Combined Cycle	40%	37 – 42%
Hydro	34%	36 – 42%
ST Gas	6%	10 – 11%
CT Gas	2%	10 – 11%

Capacity factors too low!

- CTs should have a CF less than 20%
  - Modeled with coal as fuel, oops!
- Ft. Calhoun nuclear CF less than 80%
  - Maintenance Outage for Fort Calhoun = 2 months….
  - Recommend utilizing a percentage of refueling time but not whole period



Generation by Unit Category in SPP

Coal and combined cycle gas generation sources provide 79% of the total generation in the simulation. Historically, according to the EIA, these sources provided 77%. The gas prices between 2010 and the simulation warrant this difference.

Pegging Hurdle Rates via Interchange

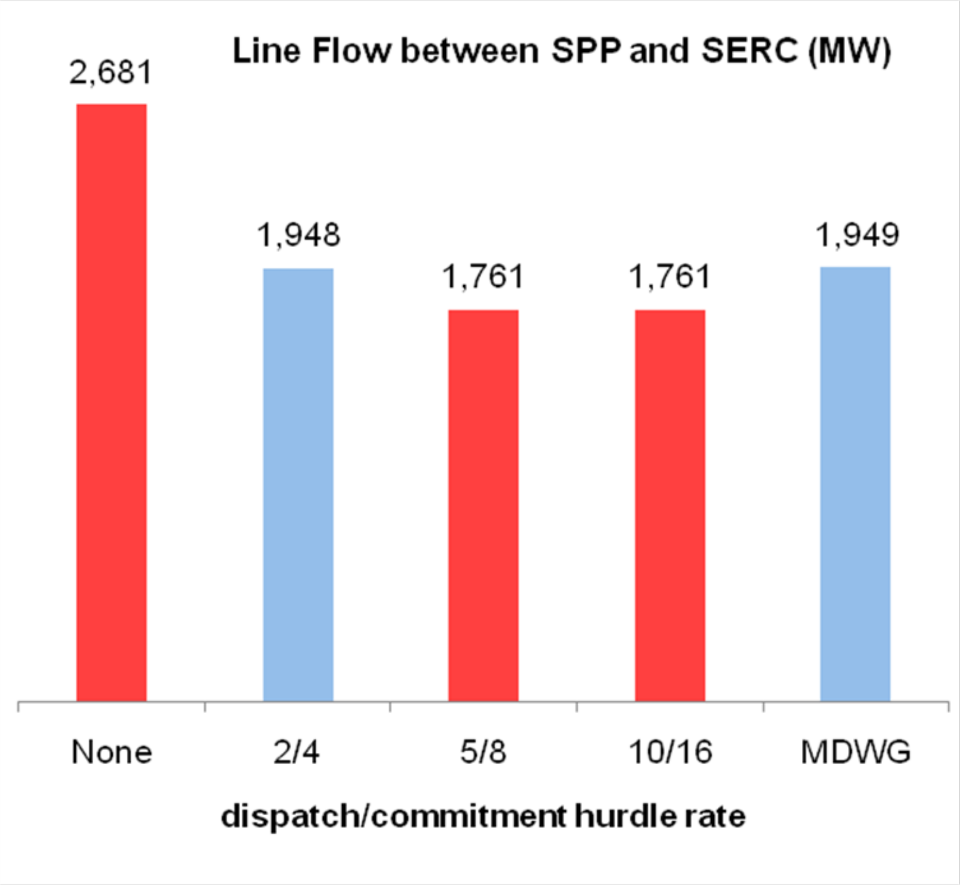
Modeled various hurdle rates

Selected the peak load hour from August for 2010

Focused upon the flow on tie lines between SPP and SERC

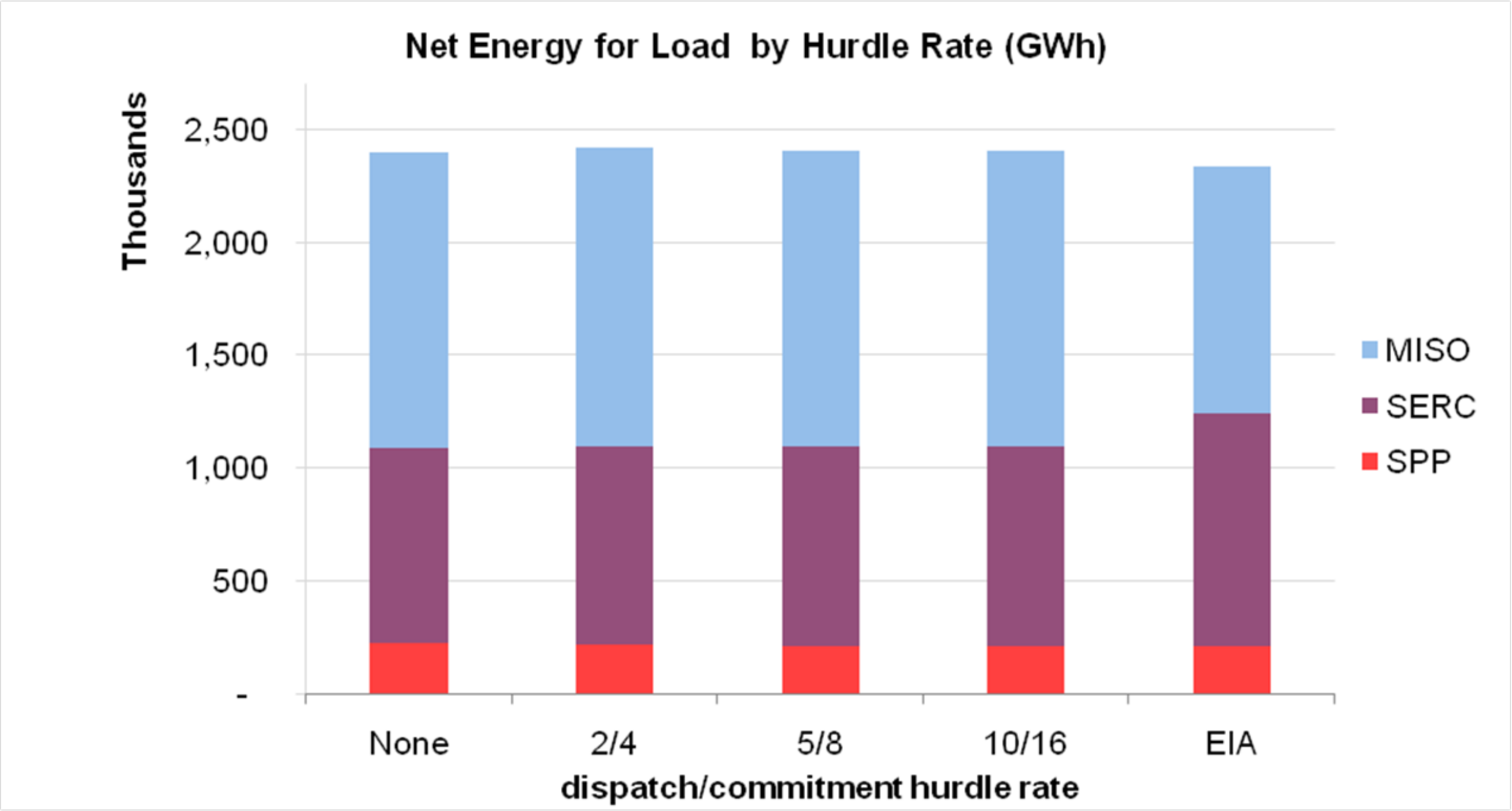
Compared flows against those in 2009 MDWG planning cases

Consistent interchange found for a $2 hurdle rate



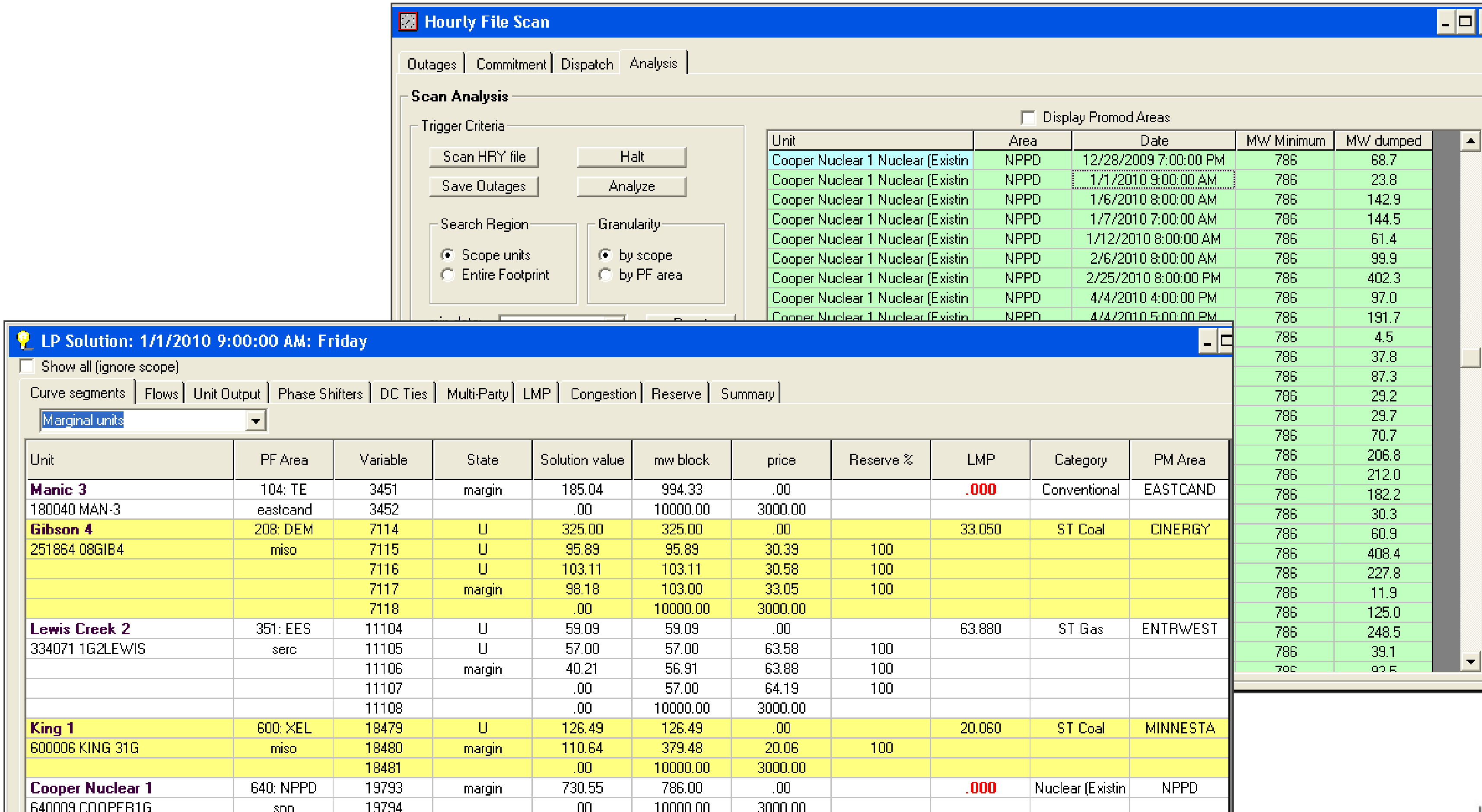
Hurdle Rates: Buying & Selling

- Net Energy for Load with different hurdle rates



Dumped Energy @ Cooper and FT Calhoun

- Units on the margin, free energy dumped



Hourly File Scan

Outages | Commitment | Dispatch | Analysis

Scan Analysis

Trigger Criteria

Scan HRY file | Halt

Save Outages | Analyze

Search Region: Scope units / Entire Footprint

Granularity: by scope / by PF area

Display Promod Areas

Unit	Area	Date	MW Minimum	MW dumped
Cooper Nuclear 1 Nuclear (Existin	NPPD	12/28/2009 7:00:00 PM	786	68.7
Cooper Nuclear 1 Nuclear (Existin	NPPD	1/1/2010 9:00:00 AM	786	23.8
Cooper Nuclear 1 Nuclear (Existin	NPPD	1/6/2010 8:00:00 AM	786	142.9
Cooper Nuclear 1 Nuclear (Existin	NPPD	1/7/2010 7:00:00 AM	786	144.5
Cooper Nuclear 1 Nuclear (Existin	NPPD	1/12/2010 8:00:00 AM	786	61.4
Cooper Nuclear 1 Nuclear (Existin	NPPD	2/6/2010 8:00:00 AM	786	99.9
Cooper Nuclear 1 Nuclear (Existin	NPPD	2/25/2010 8:00:00 PM	786	402.3
Cooper Nuclear 1 Nuclear (Existin	NPPD	4/4/2010 4:00:00 PM	786	97.0
Cooper Nuclear 1 Nuclear (Existin	NPPD	4/4/2010 5:00:00 PM	786	191.7
			786	4.5
			786	37.8
			786	87.3
			786	29.2
			786	29.7
			786	70.7
			786	206.8
			786	212.0
			786	182.2
			786	30.3
			786	60.9
			786	408.4
			786	227.8
			786	11.9
			786	125.0
			786	248.5
			786	39.1

LP Solution: 1/1/2010 9:00:00 AM: Friday

Show all (ignore scope)

Curve segments | Flows | Unit Output | Phase Shifters | DC Ties | Multi-Party | LMP | Congestion | Reserve | Summary

Marginal units

Unit	PF Area	Variable	State	Solution value	mw block	price	Reserve %	LMP	Category	PM Area
Manic 3	104: TE	3451	margin	185.04	994.33	.00		.000	Conventional	EASTCAND
180040 MAN-3	eastcand	3452		.00	10000.00	3000.00				
Gibson 4	208: DEM	7114	U	325.00	325.00	.00		33.050	ST Coal	CINERGY
251864 08GIB4	miso	7115	U	95.89	95.89	30.39	100			
		7116	U	103.11	103.11	30.58	100			
		7117	margin	98.18	103.00	33.05	100			
		7118		.00	10000.00	3000.00				
Lewis Creek 2	351: EES	11104	U	59.09	59.09	.00		63.880	ST Gas	ENTRWEST
334071 1G2LEWIS	serc	11105	U	57.00	57.00	63.58	100			
		11106	margin	40.21	56.91	63.88	100			
		11107		.00	57.00	64.19	100			
		11108		.00	10000.00	3000.00				
King 1	600: XEL	18479	U	126.49	126.49	.00		20.060	ST Coal	MINNESTA
600006 KING 31G	miso	18480	margin	110.64	379.48	20.06	100			
		18481		.00	10000.00	3000.00				
Cooper Nuclear 1	640: NPPD	19793	margin	730.55	786.00	.00		.000	Nuclear (Existin	NPPD
640009 COOPER1G	spp	19794		.00	10000.00	3000.00				

Constraints that cause energy to dump

Shift Factor Report

Close | Copy | Clear warnings | Suppress warnings

Shift factors for Unit: Cooper Nuclear 1 at bus 640009 COOPER1G

For binding constraints only

```
Binding shift factors...
Constraint Name                                    :  Sh Fctr    Shadow Pr Congestion LP State
Pool: spp                                          :   1.000       36.11      36.109 U (267)
CBRVRBCOPSTJ                                       :    .274     -126.24     -34.561 U (15)
334026  334060 (1)  4GRIMES 138-4MT.ZION 138 (EES):    .008     -207.98      -1.652 U (85)
FTCAL_S                                            :   -.094        -.78        .074 U (8)
STLOUIS_EAST                                       :   -.023       -1.34        .031 U (11)
```

CBRVRBCOPSTJ

Marginal Units only. | Phase Shifters

Not commit | At Max | Marginal | Outaged | At min | Emergency | All pools

Generator unit	PF Area	PM Area	Shift factor	mw	Flow	min mw	max mw	Correction	Gen Price	State	Type	v
Total flow:					**186.00**							
Outside World part			**1.0**	**-4.01**	**-4.01**							
Promod Load part			**1.0**	**-7722.47**	**-7722.47**							
All DC ties			1		-29.44						aggregate	
All shifters			1		-82.49						aggregate	
Richardson County Wind Farm	NPPD	NPPD	0.2738	24.3	6.65	24.3	24.3		1000.00	At min		v
Cooper Nuclear 1	NPPD	NPPD	0.2738	730.6	200.01	786.0	786.0		.00	Margin	Nuclear	v
Farmers City ALL	MEC	ALWSTTA	0.2631	17.1	4.51	17.1	17.1		1000.00	At min		v
Nebraska City 1	OPPD	OPPD	0.2453	328.5	80.57	328.5	508.5		.00	At min	ST Coal	v
Nebraska City 2	OPPD	OPPD	0.2453	274.0	67.20	274.0	394.0		.00	At min	ST Coal	v
Walter Scott Jr 2	MEC	ALWSTTA	0.2417	.0	.00	21.7	88.0			off	ST Coal	v
Cass County 1	OPPD	OPPD	0.2331	.0	.00	44.5	178.0			off	CT Gas	v
Cass County 2	OPPD	OPPD	0.2331	.0	.00	44.5	178.0			off	CT Gas	v
Sarpy County 5a	OPPD	OPPD	0.2284	13.0	2.97	13.0	13.0		1000.00	At min		v
Sarpy County BSD	OPPD	OPPD	0.2284	.0	.00	3.0	3.0			off	Internal	v
Sarpy County 4a	OPPD	OPPD	0.2284	13.0	2.97	13.0	13.0		1000.00	At min		v

Why is <u>this</u> hour dumped?

- Units with strong helpful shift factors outaged

Flow Constraint Detail

CBRVRBCOPSTJ

Marginal Units only. | Phase Shifters | Not commit | Outaged | At Max | At min | Marginal | Emergency | All pools

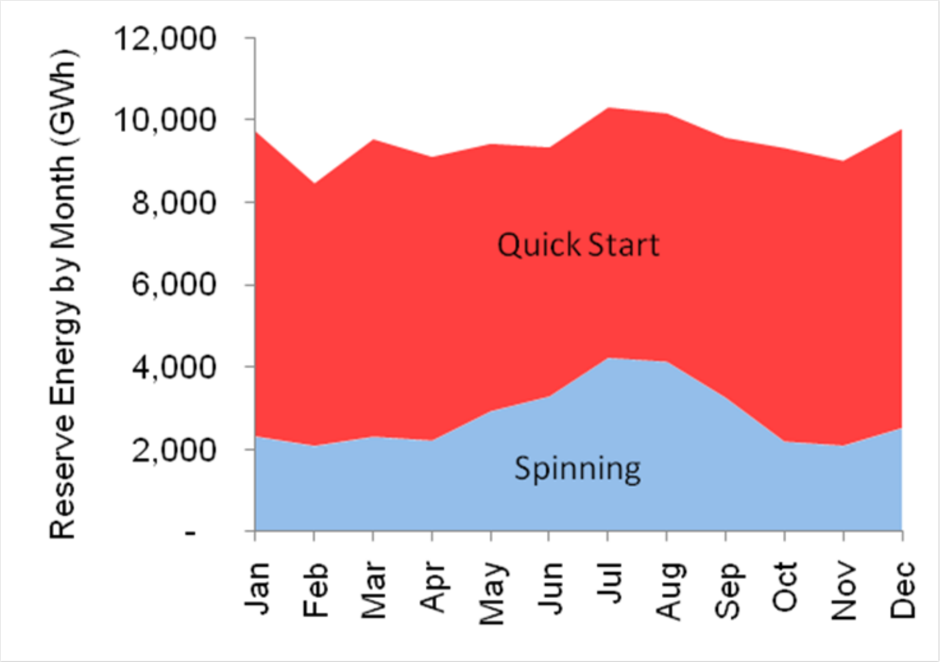
Generator unit	PF Area	PM Area	Shift factor	mw	Flow	min mw	max mw	Correction	Gen Price	State	Type	v
Total flow:					**186.00**							
Outside World part			**1.0**	**-4.01**	**-4.01**							
Promod Load part			**1.0**	**-7722.47**	**-7722.47**							
Crosswinds Egy Proj ALL	MEC	ALWSTTA	-0.2810	5.1	-1.43	5.1	5.1		.00	Fixed		^
Lake Road 3	GMO	GMO	-0.1882	10.0	-1.88	4.0	10.0		26.92	At max	ST Coal	^
Lake Road 1	GMO	GMO	-0.1882	22.0	-4.14	8.8	22.0		26.19	At max	ST Coal	^
Lake Road 7	GMO	GMO	-0.1882	.0	.00	5.5	22.0	4.1		off	CT Oil	^
Lake Road 5	GMO	GMO	-0.1882	.0	.00	15.7	63.0	11.9		off	CT Gas	^
Lake Road 6	GMO	GMO	-0.1882	.0	.00	5.3	21.0	4.0		off	CT Oil	^
Lake Road 2	GMO	GMO	-0.1882	27.0	-5.08	10.8	27.0		26.61	At max	ST Coal	^
Lake Road 4	GMO	GMO	-0.1882	97.0	-18.26	24.1	97.0		26.76	At max	ST Coal	^
Iatan 1	KCPL	KCPL	-0.1565	.0	.00	.0	.0			Out: forced	ST Coal	^
Iatan 2	KCPL	KCPL	-0.1565	.0	.00	.0	.0			Not built yet	ST Coal	^
Nodaway County 1	AECI	ASEC	-0.1458	.0	.00	28.4	113.7	16.6		off	CT Gas	^
Nodaway County 2	AECI	ASEC	-0.1458	.0	.00	28.4	113.7	16.6		off	CT Gas	^
Kansas City Intl 2	GMO	GMO	-0.1360	.0	.00	4.2	17.0	2.3		off	CT Gas	^
Kansas City Intl 1	GMO	GMO	-0.1360	.0	.00	4.3	17.0	2.3		off	CT Gas	^
Hawthorn 69	KCPL	KCPL	-0.1248	.0	.00	68.0	92.0	11.5		off	Combined	^
Hawthorn 5R	KCPL	KCPL	-0.1248	545.0	-68.00	244.6	545.0		15.23	At max	ST Coal	^
Hawthorn 69	KCPL	KCPL	-0.1248	.0	.00	65.0	88.0	11.0		off	Combined	^

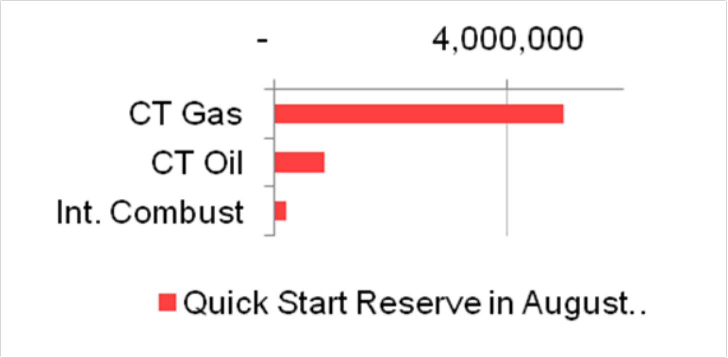
Dispatching the Lowest Capacity Segment

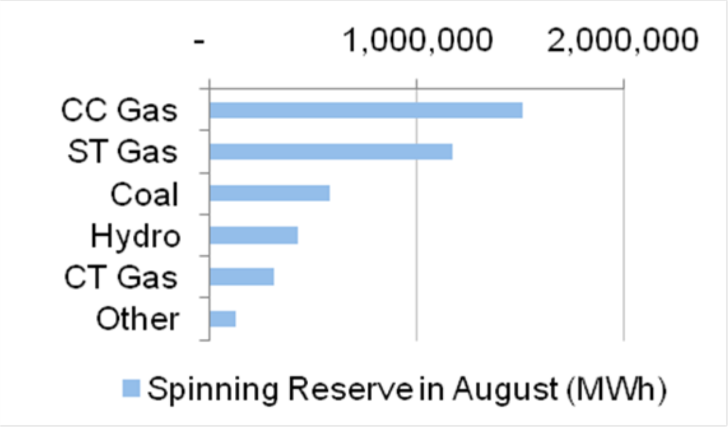
- Why is this important?
  - Economics should drive the dispatch, but reliability must inform the decision
  - May create an artificially high capacity factor
- Historical data tells us which units are "always" committed (80% CF guideline was adopted)

Unit Category	Must Run Capacity (MW)
Coal	7,722
Nuclear	2,526
CT Gas	55
Combined Cycle	72

Operating & Spinning Reserve





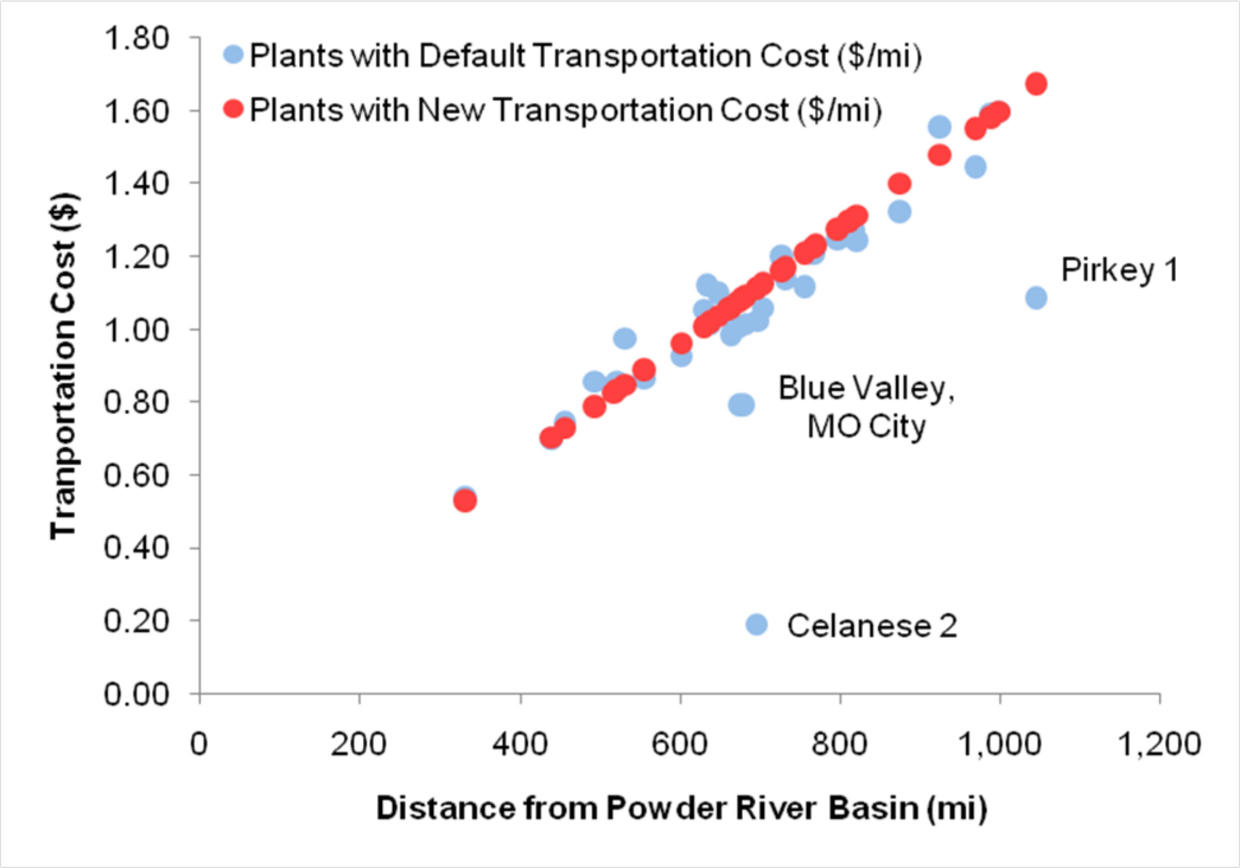


WITF – Wind & Reserves

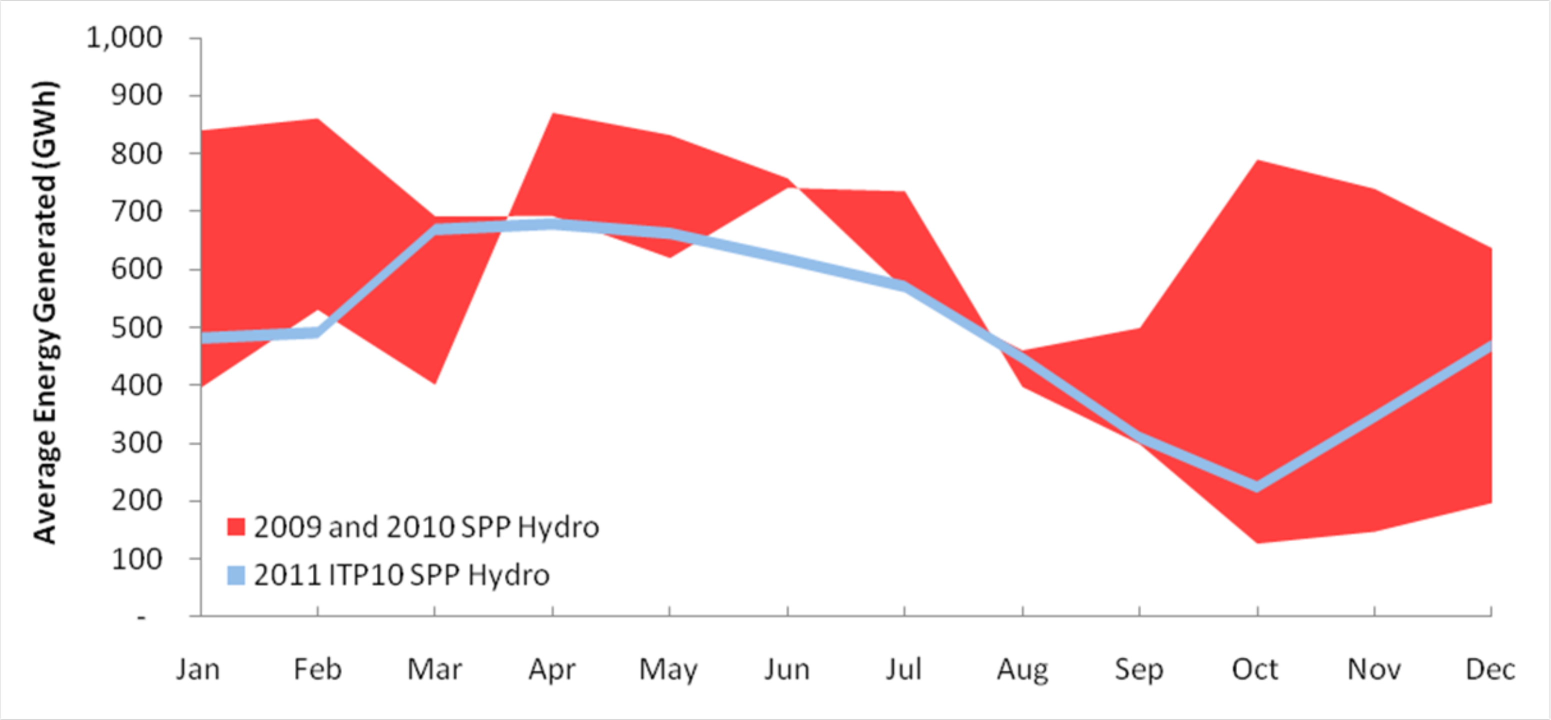
- WITF comments
  - "It is important that the Contingency Reserve requirement be reevaluated in the near future if the wind penetration level within SPP increases and more high-voltage transmission lines are added." (section 5.2.3 of the CRA SPP WITF Study Report)
- What's the impact to our study?
  - Increases production cost
  - Could influence commitment decisions
  - No Intra-day commitment occurring to account for wind variability

Coal Transportation Costs

- Transportation costs made sense for most plants, some outliers were corrected



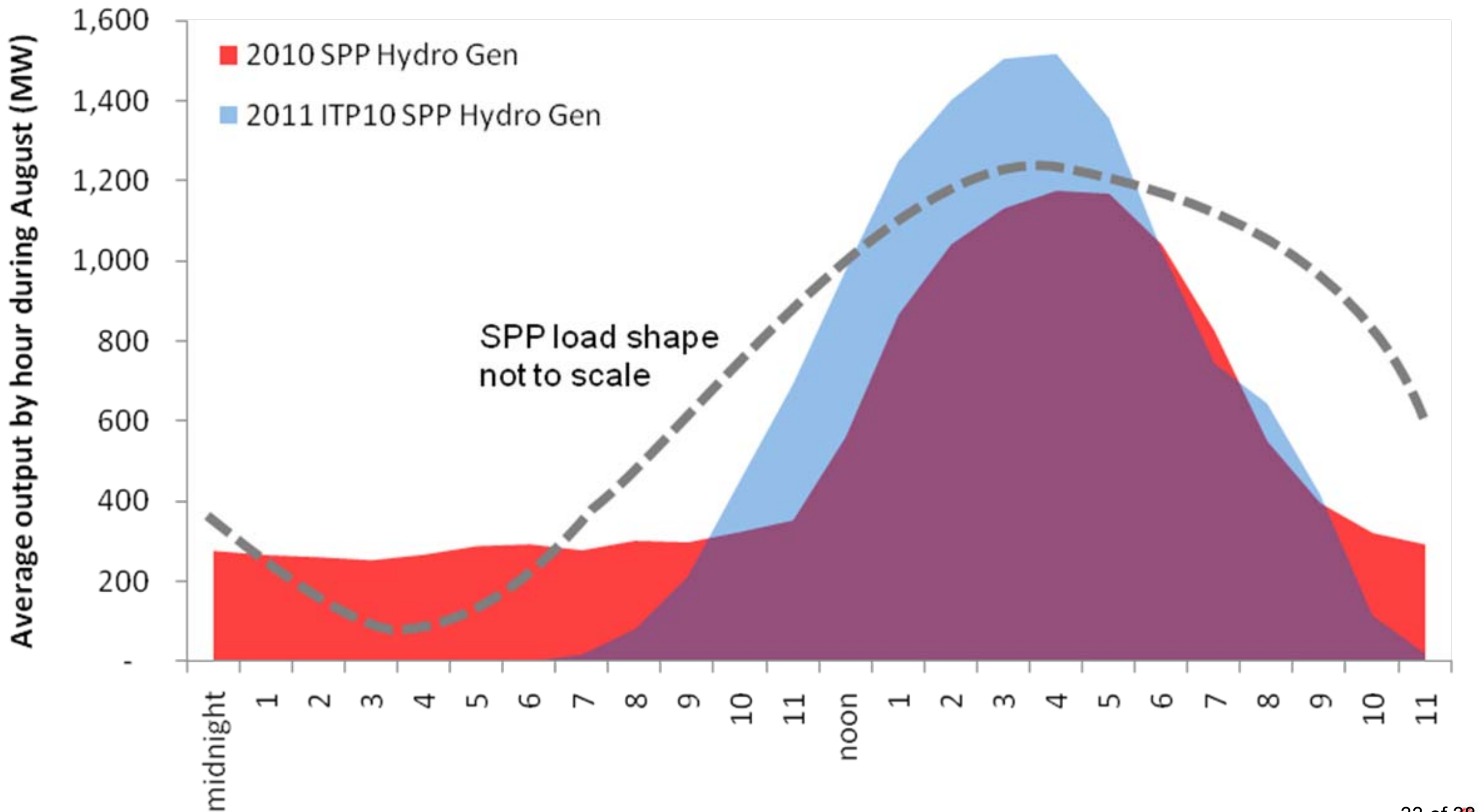
Hydro Generation by Month



- **The monthly hydro energy output corresponds with historical SPP trends**

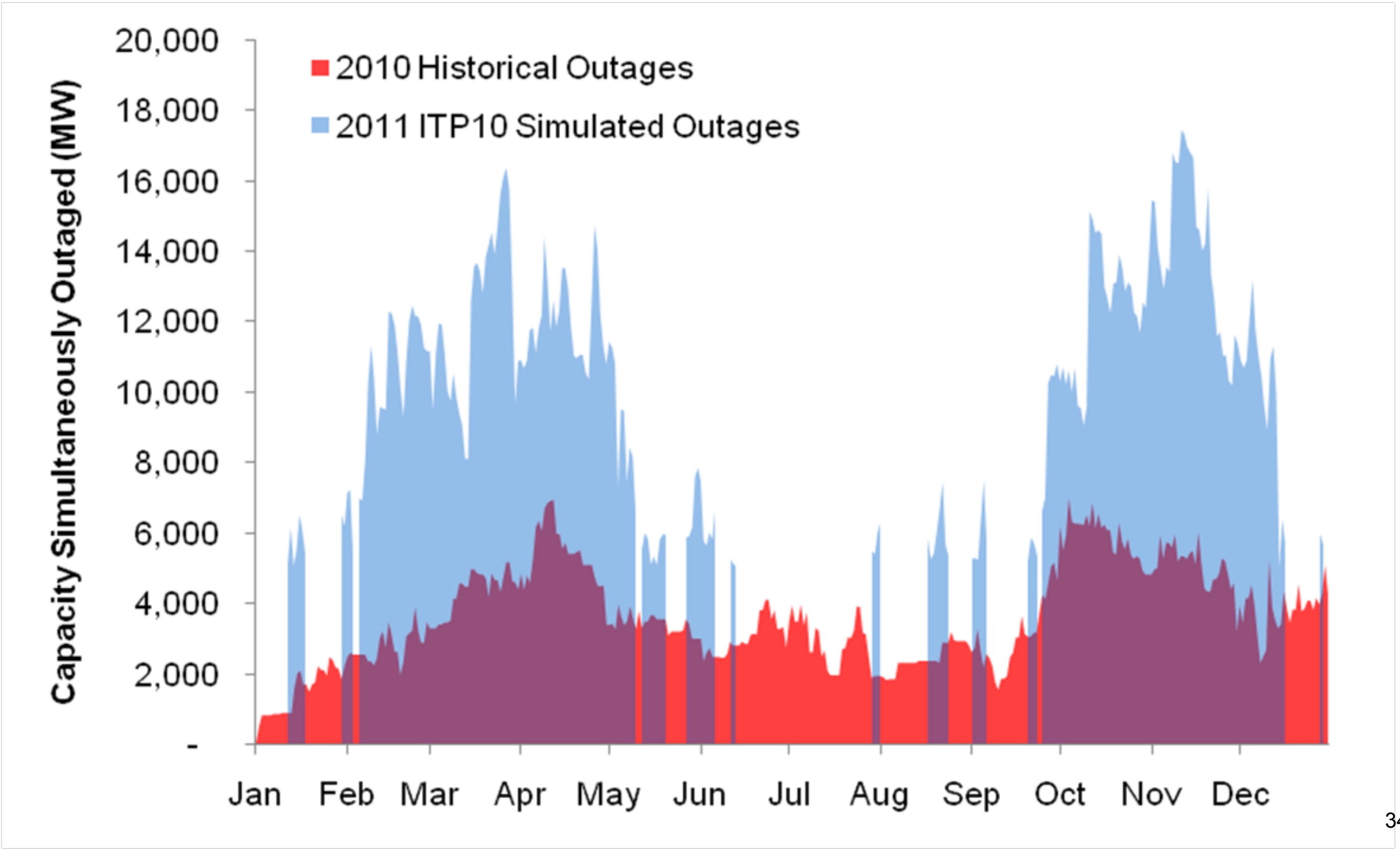
Hydro Generation by Hour during Peak

- Historically hydro generation becomes available after noon during the peak months



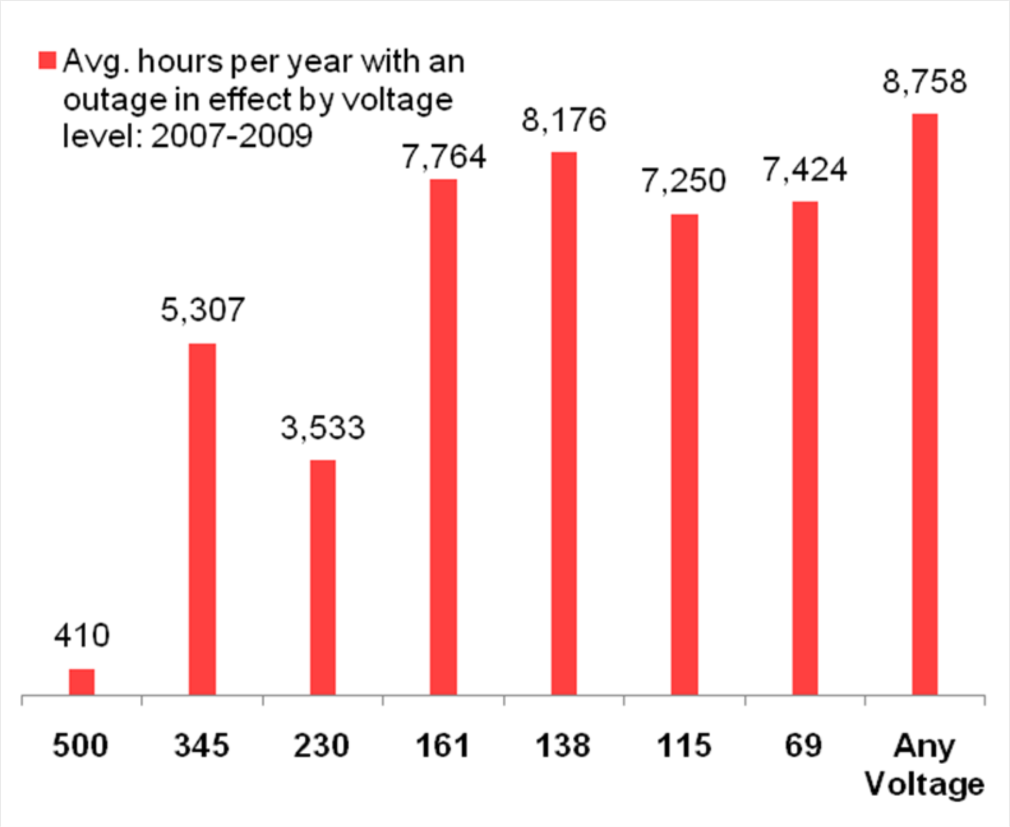
Generator Outage Rates

- Graph of capacity outaged by time period
- Compared to operations data



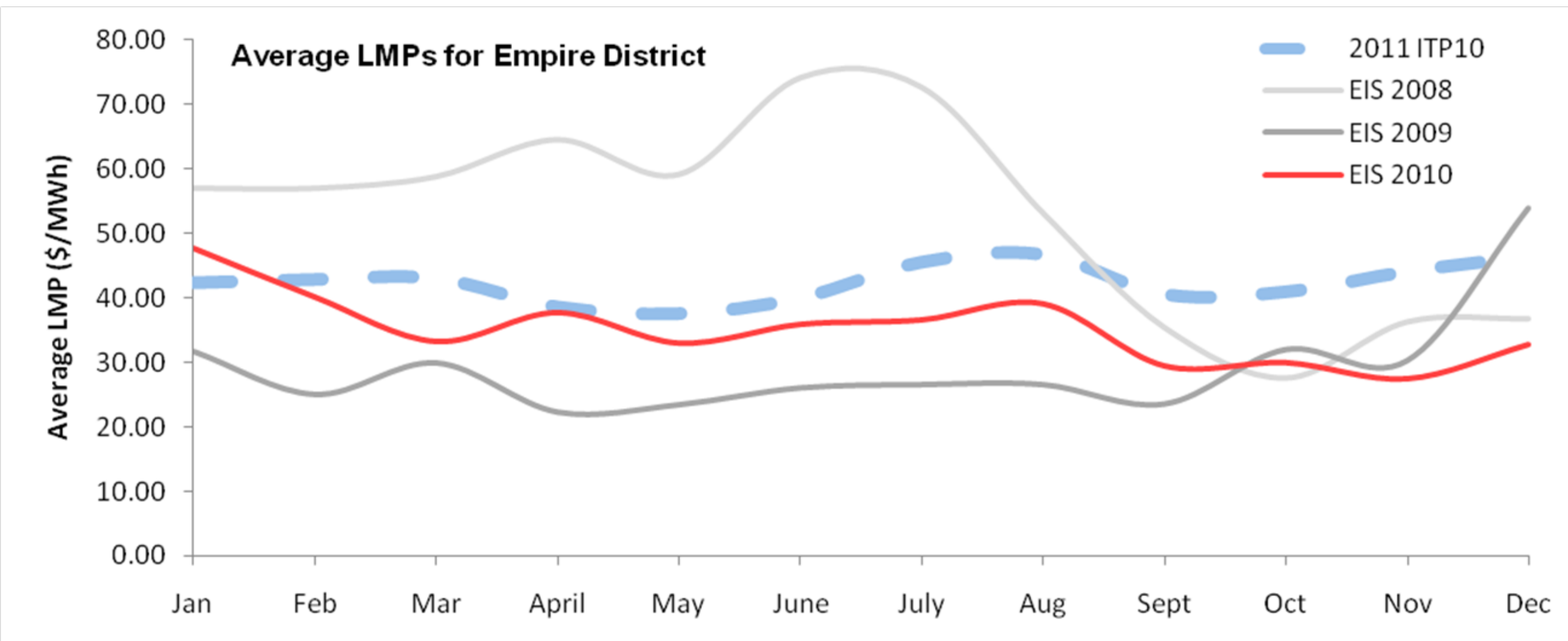
Transmission Line & Transformer Outages

- PROMOD simulations do not take transmission maintenance into account
- This is an everyday operational concern



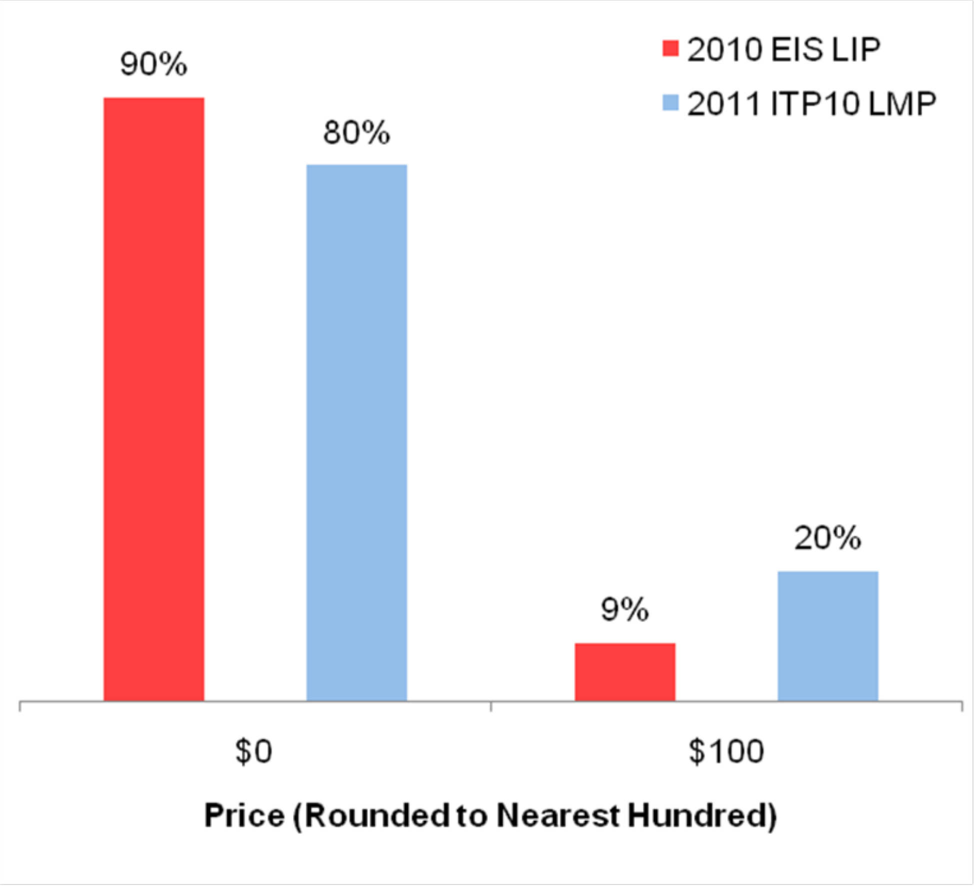
Average LMP by Area

- The average LMP of each area trends well with the results of the EIS market in 2008, 2009, and 2010



Distribution of LMPs for SPP

- The distribution of nodal prices coincides with the results of the EIS market in 2010
- High percentage of prices between below $100 in both datasets



Annual Generation & Cost for 2010

Area	Gen (GWh)	Cost ($M)
AEPW	46,589	1,368
SWPS	26,118	871
OKGE	30,482	783
WRI	28,043	537
KCPL	23,144	417
GMO	9,334	260
NPPD	19,535	246
OPPD	12,928	182
WEFA	4,217	127
GRDA	6,571	123
KACY	5,617	117

Area	Gen (GWh)	Cost ($M)
EMDE	3,685	101
SPCIUT	3,229	91
SUNC	4,590	87
LAFA	1,858	47
LES	3,185	43
SWPA	6,362	42
INDN	1,168	38
MKEC	487	35
LEPA	737	18
HASTNPPD	519	11
GINPPD	360	7
MEANNPPD	1	0