

ERGIS Stakeholder Conference Call #2



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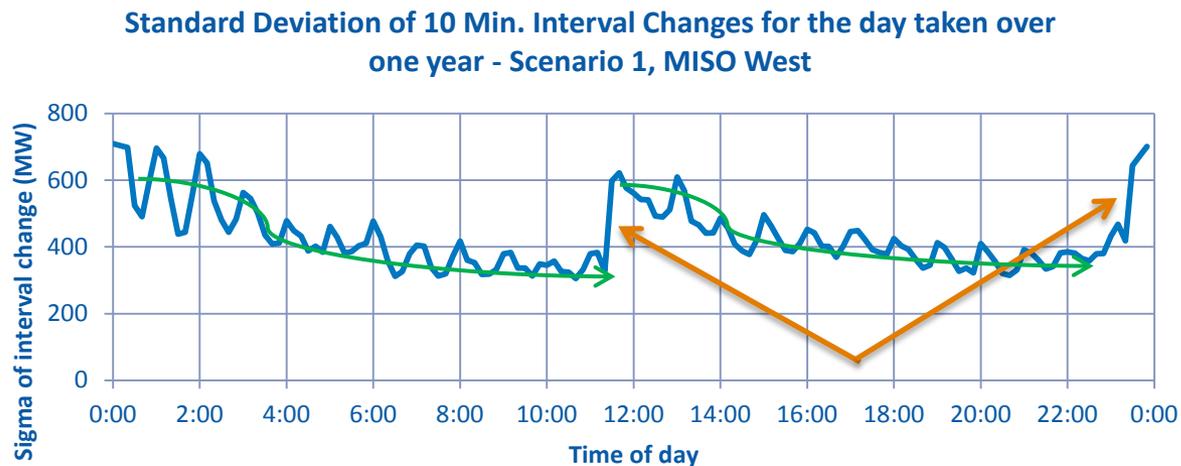
Agenda

- Status
 - Wind data update
- Scenario definition
 - Benchmark
 - Study scenario #1
 - Study scenario #2
- Production simulation

Wind Data Update

– Data review

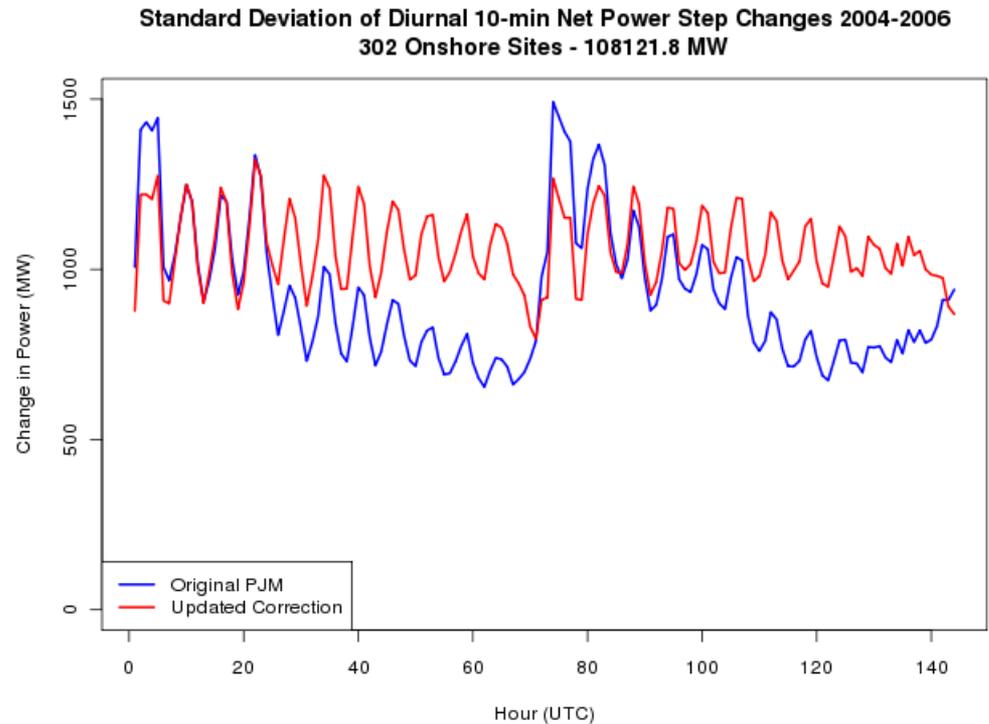
- Checked for artifacts of data synthesis at plant & aggregate level
- Observed data assimilated every 12 hours to align model
- Results showed need for a fix to the 12 hour feed-in anomaly



Wind Data Update

– Data revision

- All of Eastern Interconnection (i.e., EWITS footprint)
- Statistical fix for 12 hour feed-in issue
- New power curve
- Updated data will be available



Potential Study Scenarios

- Project specific
- Approximate EIPC
 - Business as usual
 - Regional implementation of national RPS
 - National implementation of national carbon policy
- Hybrid

	BAU	Regional RPS	National Carbon
2010 EI Total Generation Capacity (GW)	816	816	816
2030 EI Total Generation Capacity (GW)	887	986	918
2030 EI Energy Generated (TWh)	4187	4713	4161
2030 EI Energy Generation (%)			
Coal	34%	25%	0%
Nuclear		17%	25%
Natural Gas		11%	19%
Renewable	12%	24%	29%
Hydro	5%	5%	5%
On-shore wind	5%	10%	20%
Off-shore wind	0%	3%	0%
Other		6%	5%
Other		0%	0%
2011-2030 EI Load Growth (%)	17%	14%	-5%
2030 EI Load (TWh)	3814	3704	3067
2030 EI Energy Penetration (% of Load)			
Renewable	13%	30%	39%
Hydro	5%	6%	7%
On-shore wind	5%	12%	27%
Off-shore wind	0%	4%	0%
Other	2%	7%	2%
Variable Renewable	5%	16%	27%

Drawn from www.eipconline.com (Comparisons_11-8-2011.xlsx, F1S17_Stakeholder_Report.xlsx, F6S10_Stakeholder_Report_8-18.xlsx, F8S7_Stakeholder_Report.xlsx)

Revised EIPC Summary

	F1S17	F6S10	F8S7
	BAU	Regional RPS	National Carbon
2010 EI Total Generation Capacity (GW)	824	824	824
2030 EI Total Generation Capacity (GW)	898	995	932
2030 EI Energy Generated (TWh)	3,717	3,626	3,029
2030 EI Energy Generation (%)			
Coal	38%	33%	0%
Nuclear	22%	23%	34%
Natural Gas	26%	14%	26%
Renewable	13%	30%	37%
<i>Hydro</i>	5%	6%	7%
<i>On-shore wind</i>	5%	13%	27%
<i>Off-shore wind</i>	0%	4%	0%
<i>Other Renew</i>	2%	7%	2%
Other	1%	1%	2%
2011-2030 load growth	17%	14%	-5%
2030 EI Load (TWh)	3,702	3,609	3,008
2030 EI Energy Penetration (% of Load)			
Renewable			
<i>Hydro</i>	5%	6%	8%
<i>On-shore wind</i>	5%	13%	27%
<i>Off-shore wind</i>	0%	4%	0%
<i>Other</i>	2%	7%	3%
Variable Renewable	5%	16%	28%

Courtesy Stan Hadley, ORNL

Benchmark Scenario

- Objectives
 - Credible benchmark, reflecting realistic future
- Assumptions
 - State RPS goals achieved
 - Renewable generation = variable generation (wind and solar)
 - Primarily with on-shore wind
 - No off-shore in the benchmark
 - Remainder is PV, if solar component of RPS
 - 40% rooftop PV, 60% best resource located utility scale PV
 - In-state resources
 - As approximated by transmission areas or combinations of transmission areas
 - Site selection based on best-to-worst within a state
 - No additional wind and/or solar in non-RPS states
 - Penetration = annual wind & solar energy as % of load energy
 - Transmission areas as defined in database
 - Approximates but does not match balancing area definitions
 - 2020 study year, ~1%/yr load growth, ~9% growth vs. 2012

Study Scenario 1

- Objective
 - Test higher variable generation penetration levels
- Assumptions
 - Same study year, load growth, area definitions as benchmark
- Variable generation penetration levels
 - 25% penetration wind
 - 20% on-shore, 5% off-shore
 - 5% penetration solar
 - 40% rooftop PV, 60% best resource located utility scale PV
 - Regional implementation
 - By ISO/RTO/RRO (as approximated by transmission areas or combinations of transmission areas)
 - Site selection based on best-to-worst within region
 - Exceptions
 - No wind data in South, therefore 15% penetration solar PV instead and/or import wind from SPP into SERC
 - PV mix of 40% rooftop PV, 60% best resource located utility scale PV
- Remaining generation expansion plan
 - Approximate EIPC, Other TBD

Study Scenario 2

- Objective
 - Test higher variable generation penetration levels
- Assumptions
 - Same study year, load growth, area definitions as other scenarios
- Variable generation penetration levels
 - 25% penetration wind
 - 20% on-shore, 5% off-shore
 - 5% penetration solar
 - 20% rooftop PV, 40% population located utility scale PV, 40% best resource located utility scale PV
 - Best resource implementation
 - Site selection based on best-to-worst within EI
 - Capped at 40% by ISO/RTO/RRO (as approximated by transmission areas or combinations of transmission areas)
 - Exceptions
 - No wind data in South, therefore 15% penetration solar PV instead and/or import wind from SPP into SERC
 - PV mix of 40% rooftop PV, 60% best resource located utility scale PV
- Remaining generation expansion plan
 - Approximate EIPC, Other TBD

Operational Analysis

- Production simulation software
 - Plexos
- Status
 - EI database under development
- Next steps
 - Database review & shakedown
 - Scenario definition & setup

Next Steps

- To be posted on NREL website (<http://wind.nrel.gov/public/ergis>)
 - Stakeholder call slides
 - Summary of discussion/decisions
 - Also in email to stakeholder list
- Two weeks for written comments (March 21, 2012)
- Further development of study scenarios for production simulation at future TRC and stakeholder calls

Thanks!



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