

Wind Integration Team Working Session

January 23, 2009



Limiting Wind Output for Reliability Purposes when Decremental Reserve Amounts are Reaching Minimal Availability.

- With reserve amounts and scheduling behavior based on 2-hour average persistence, reliability limits would still need to be applied to wind generation on average **1.0** hour a month, with an average **265** MWh reduced.
- With 45-minute persistence reserve amounts and behavior, wind generation would be limited **1.4** average hours a month, with an average **379** MWh per month reduced.
- With 30-minute persistence reserve amounts and behavior, wind generation would be limited **1.7** average hours a month, with an average **339** MWh per month reduced.
- If, in the worst case, 30-minute persistence reserve amounts are used, but behavior remains at a 2-hour persistence level, wind generation would be limited **9** average hours a month, with an average **4,545** MWh per month reduced.



Curtailing Transmission Schedules from Wind Generation for Reliability Purposes when Incremental Reserve Amounts are Reaching Minimal Availability.

- With reserve amounts and scheduling behavior based on 2-hour average persistence, reliability curtailments would still need to be implemented on average **1.5** hour a month, with an average **1,227** MWh curtailed.
- With 45-minute persistence reserve amounts and behavior, wind curtailments would be implemented **1.9** average hours a month, with an average **989** MWh per month curtailed.
- With 30-minute persistence reserve amounts and behavior, wind curtailments would be implemented **2.4** average hours a month, with an average **727** MWh per month curtailed.
- If, in the worst case, 30-minute persistence reserve amounts are used, but behavior remains at a 2-hour persistence level, wind curtailments would be implemented **10** average hours a month, with an average **6,918** MWh per month reduced.



Wind and/or Load Utilization of Reserve Amount Beyond Allocation

- With reserve amounts and scheduling behavior based on 2-hour average persistence, wind or load would exceed allocation **25** hours a month on average; Load would exceed allocation **492** average MWh, and Wind would exceed allocation **1,843** average MWh per month.
- With 45-minute persistence reserve amounts and behavior, wind or load would exceed allocation **42** average hours a month; Load would exceed allocation **291** average MWh, and Wind would exceed the allocation **3,161** average MWh per month.
- With 30-minute persistence reserve amounts and behavior, wind or load would exceed allocation **57** average hours a month; Load would exceed allocation **315** average MWh, and Wind would exceed the allocation **3,551** average MWh.
- If, in the worst case, 30-minute persistence reserve amounts are used, but behavior remains at a 2-hour persistence level, wind or load would exceed allocation **139** average hours a month; Load would still exceed allocation **315** average MWh, but Wind would exceed allocation **22,537** average MWh.

