

# Wind Integration - PJM

December 11, 2008

IPSAC

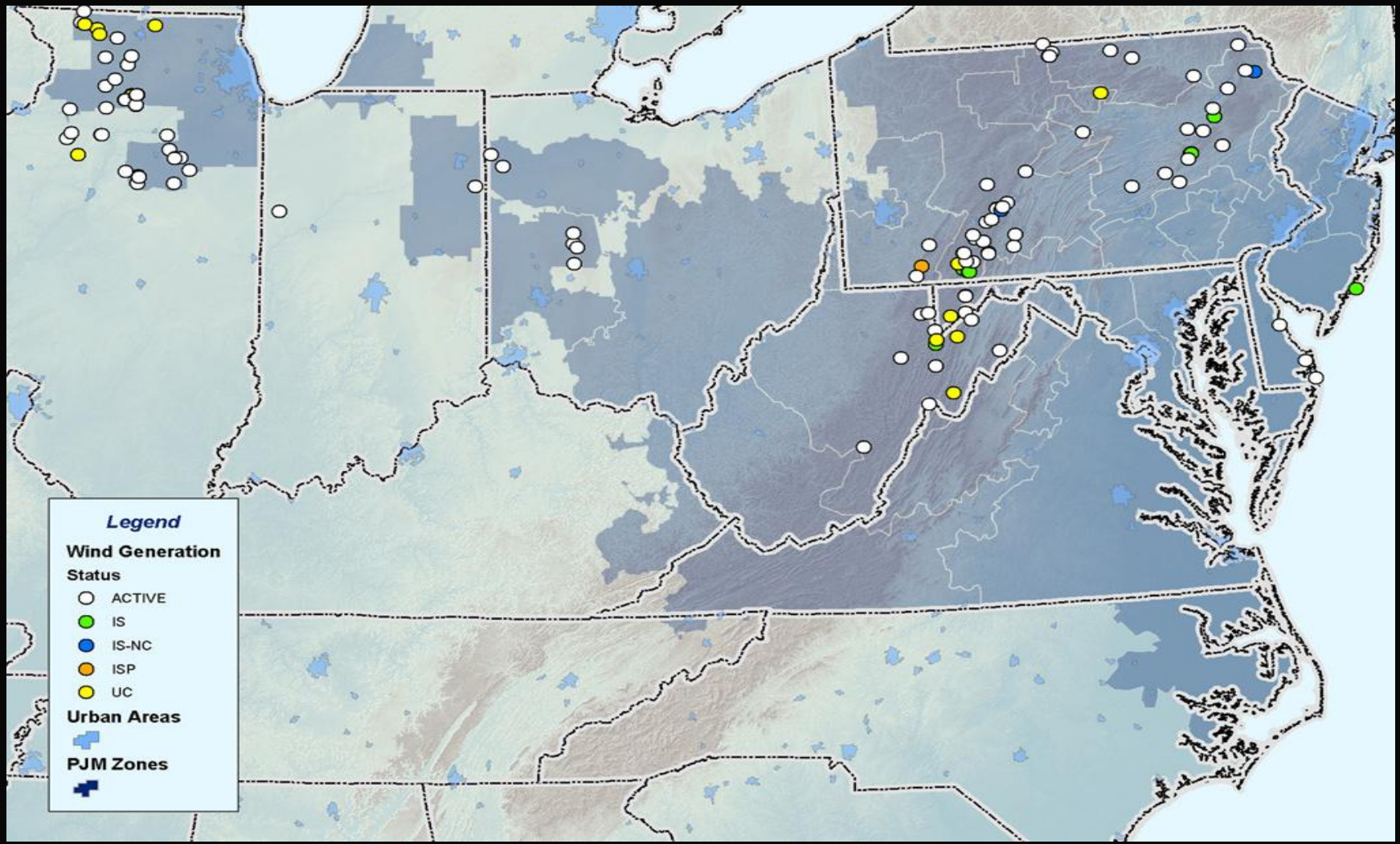
# Wind Queue Status

- In-Service - 1,795 MWE
- Under Construction - 1,816 MWE
- Suspended - 1,193 MWE
- Active (in the queue process) - 41,840 MWE
- Withdrawn - 7,336 MWE
- On shore wind project - 44,330 MWE
- Off Shore wind project - 2,316 MWE

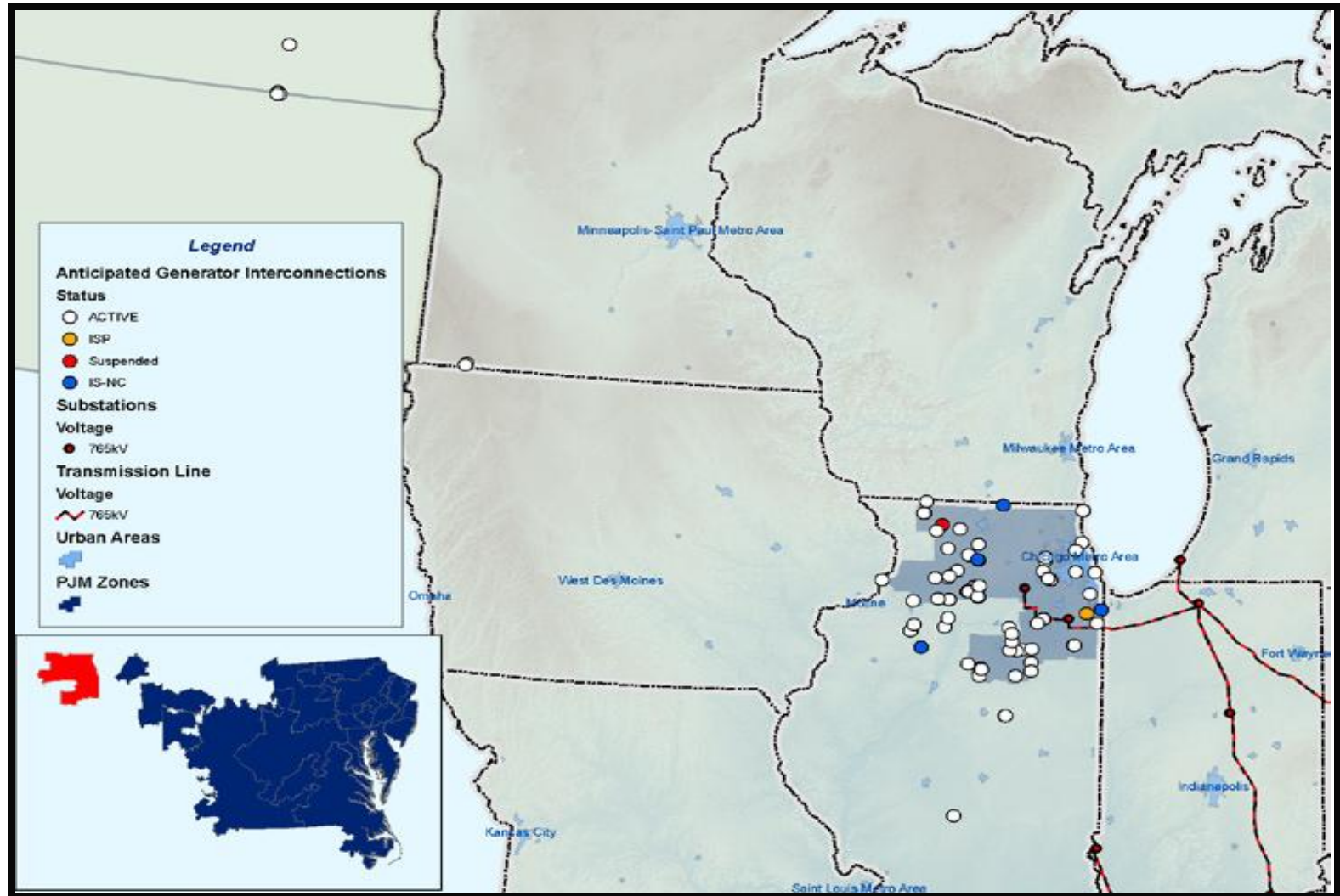
# How is wind different from other interconnections?

- Most Wind projects ask to be in-service within 2 years
  - Not a close fit with the interconnection process
- Projects tend to cluster in specific areas of PJM
  - Rural / Not supported by strong transmission systems
- Wind projects can only request 13% Capacity Interconnection Rights (was 20%)
  - Interconnection studies for new projects are conducted using class average capacity injection rights, unless a higher value can be justified.
- Frequent changes to electrical parameters
- Low Voltage Ride-through testing unique to wind

# Clustered Locations of Wind Generation Projects in PJM



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# Wind Interconnection Study - Background

- New Wind Generation was assigned a 20% capacity factor class average.
  - Now 13% class average
- Interconnection studies for new projects are conducted using class average capacity injection rights, unless a higher value can be justified.
- Network upgrades by the developer, if any, are those required to deliver studied capacity.
- 100% energy rights are available to be used as an energy resource, but can be curtailed.

# Issues

- Wind projects tend to cluster along favorable locations, often on lower voltage transmission lines.
- During periods of favorable wind conditions it's possible that all wind projects in an area will be at their full energy output.
- If that happens the transmission line could become a reliability problem, and generation on that line would need to be curtailed.
- Projects have the option to build upgrades needed to deliver 100% of their energy output, but other subsequent projects could use that increased transmission capacity.

# On-going Wind Activities

- Eastern Interconnection Wind Integration studies
- Storage technology
- Wind forecasting in Operations