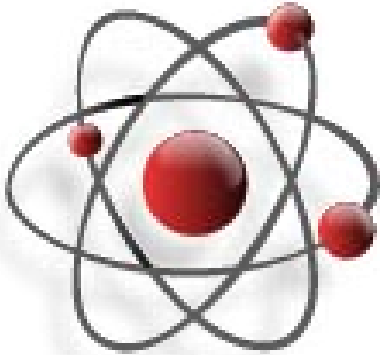


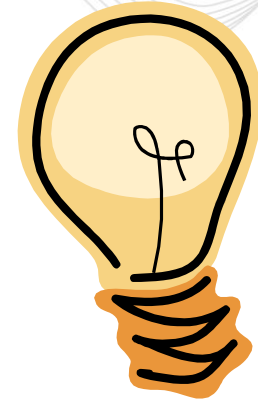


Energy Resources in PJM Deliverability Testing

Paul McGlynn
Planning Committee
July 7th, 2011



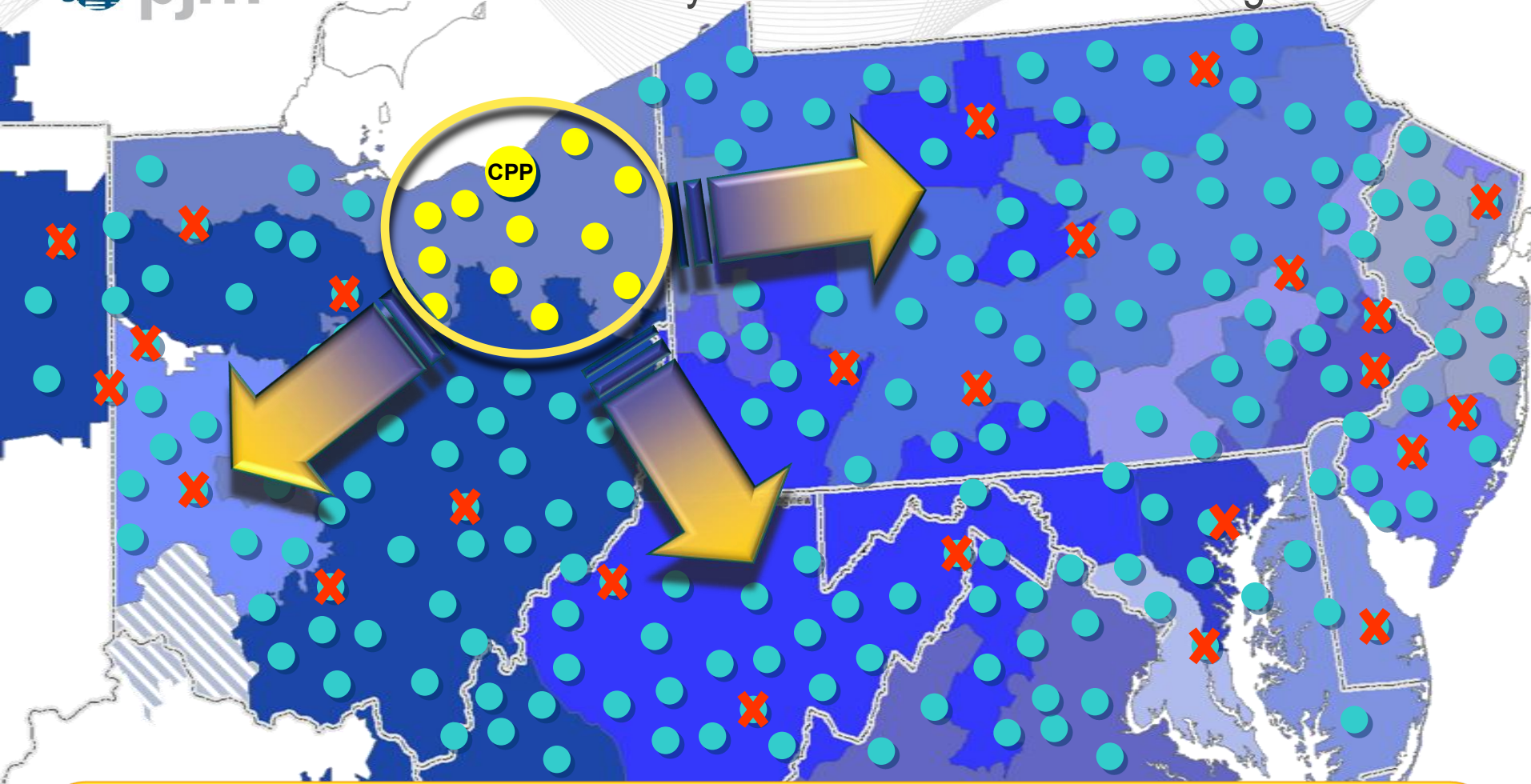
Deliverable Capacity
& Energy



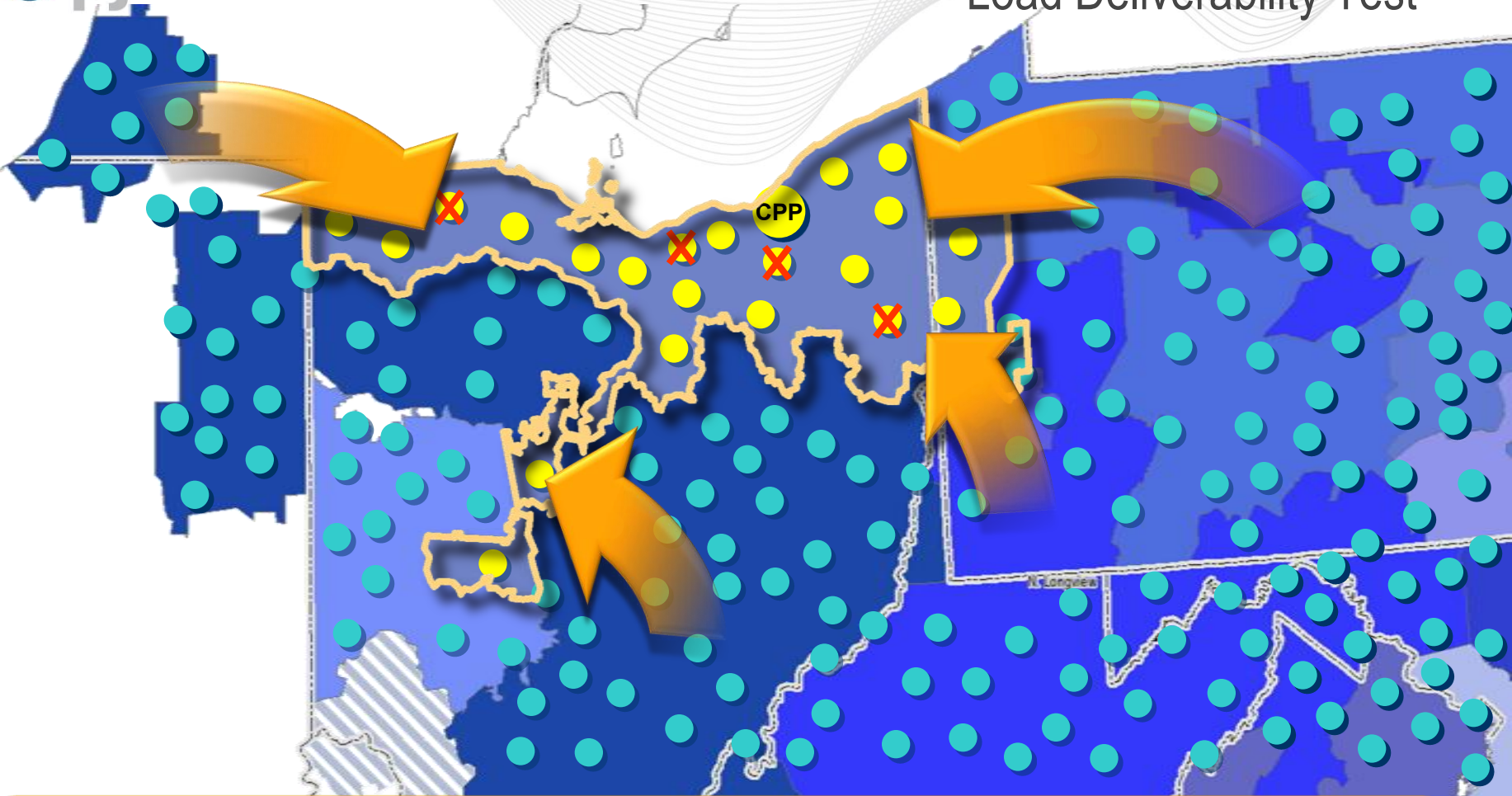
- Want to ensure the transmission system is robust enough to deliver capacity resources to load
- Ensures generation is not “bottled,” even under contingency conditions
- 15 Year Planning considers this test

- Transmission adequacy is assessed with several tests including
 - Generator Deliverability
 - Normal system and single contingency
 - Load Deliverability
 - Normal system and single contingency
 - Common Mode Outage Test
 - Multiple contingency – Tests NERC Category “C” contingencies except for C3 (a.k.a. N-1-1)

pjm Generator Deliverability Test & Common Mode Outage Procedure



Strength of the transmission system to ensure that the aggregate of generators in a given area can be reliably transferred to the rest of PJM.



Transmission system's capability to deliver energy from aggregate of all capacity resources to an electrical area experiencing a capacity deficiency.



Wind Resources

- 20% capacity factor before U queue
- 13%* capacity factor after U queue



Solar Resources

- 38% capacity factor

Recall PJM's deliverability procedures test the system under peak conditions. Intermittent resource capacity factor is based on historical operation.

Generator Deliverability

- Normal
- Single Contingencies
- Only Capacity Resources

Common Mode Outage

- Tower Contingencies
- Bus Contingencies
- Stuck Breaker Contingencies
- Considers Nameplate Energy Capability

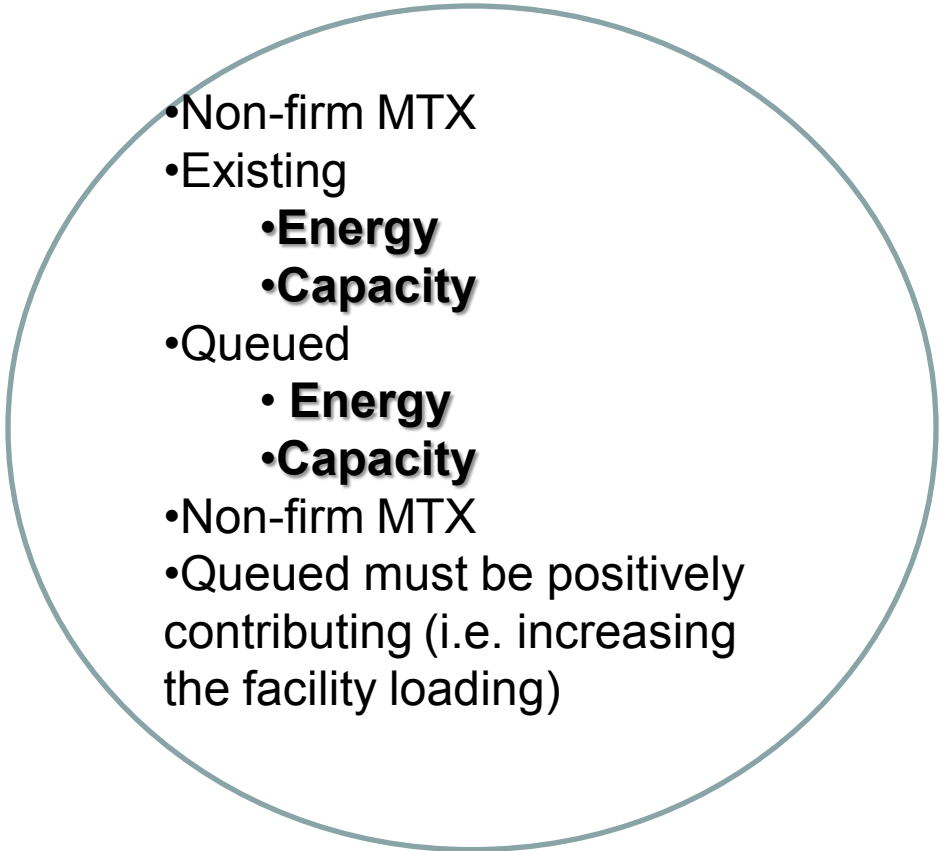
Load Deliverability

- Normal
- Single Contingencies

Generator Deliverability

- 
- A large light blue circle with a thin dark blue outline. A teal-colored segment is shaded at the top of the circle. Inside the circle, there is a bulleted list.
- Queued **Capacity**
 - Positive Ramping Impact

Common Mode Outage

- 
- A large light blue circle with a thin dark blue outline. Inside the circle, there is a bulleted list.
- Non-firm MTX
 - Existing
 - **Energy**
 - **Capacity**
 - Queued
 - **Energy**
 - **Capacity**
 - Non-firm MTX
 - Queued must be positively contributing (i.e. increasing the facility loading)

- Based on the DFAX calculations generation can either help (back off the loading) or harm (contribute to the violation) of a facility
- Existing and ISA generation are allowed to both contribute and back off the loading of a facility
- Queued generators are allowed to contribute (increase) to the loading, but are not allowed to back off (decrease) loading