PJM Planning Criteria

Discussion of comparisons for external generation resources

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Resource types

- Capacity Resource
  - Permits participation in RPM
  - Requires reinforcement of all contingencies with exception of NERC TPL-001-4 P3 and P6 (single and multiple facility contingency required, N-1-1 excluded)
  - Similar to NRIS construct in other regions though still different
- Energy Resource
  - Permits participation in energy market
  - Requires reinforcement of NERC TPL-001-4 P3, P4, P5, P7 (multiple facility contingencies only)

Interconnection

- Some entities allow interconnection under what is termed “minimum interconnection standards”
  - Essentially connection facilities and local protection (little contingency analysis – may vary between entities)
  - Allows resource to operate until congestion is encountered
- PJM limits injections based on criteria for testing of resource type and does not allow continued operation until reinforcements built
  - Remedial Action Schemes allowed for short term duration assuming transmission system reinforcements planning and/or construction underway

Basic Overview

	PJM
Study Horizon	Uses 5 year case
ERIS Analysis	Summer Peak, Light Load, and Winter[1]
NRIS Analysis	Summer Peak, Light Load, and Winter[1]

- Light Load and Winter testing not required under same conditions for any known criteria
- Study horizons differ and in some cases are chosen when the study starts

Note 1: Winter testing will commence with New Service Queue requests which use the 2021 RTEP case for study

Case

	PJM
Case year	Typically a 5 year case
Base line reliability Upgrades	Model upgrades which have been approved as needed in all years leading up to and including the year on which the study is to be performed
Using upgrades not contained in the base case (potential future base line upgrades)	Test upgrades for future base case years. If upgrades can fix a violation and the upgrade is chosen as the appropriate reinforcement the customer must pay for advancement costs associated with the upgrade

- PJM has not identified any neighboring entities which study generation, merchant transmission, and transmission service on same case
- Some areas allow customers to take partial interim service and wait for baseline upgrades to come into service (baselines in future years)

Case

	PJM
Deactivations	1. Generators turned off to prevent backing off loading based on the date the deactivation request is received 2. Generators removed as required based on deactivation date & transfer of rights and then any upgrades are modeled
Previously queued requests	1. All previously queued requests still active (under study) are modeled off line. This results in the projects aggravating a constraint, but not having the ability to back off a constraint. 2. Capacity (firm) portion of all projects with signed ISAs is modeled on-line. This allows projects to both aggravate and back off constraints 3. Projects under suspension (in the construction phase) are turned off so they do not back off constraints

- PJM has not identified any neighboring entities which study generation, merchant transmission, and transmission service on same case
- Some areas allow customers to take partial interim service and wait for baseline upgrades to come into service (baselines in future years)

Summer Peak Reinforcement – Capacity (Firm) / Network Resource Requests

	Load	Category A (System intact)	Category B NERC Category B (loss of 1 element):	Category C NERC category C1, 2, 4, 5: (loss of 2+ elements)	TO Criteria Transmission Owner Criteria (FERC 715)
PJM Capacity Resource / Firm merchant transmission 100% of requested Capacity Interconnection Rights	Summer peak	1. <500kV: 5% DF or 5% impact on facility rating 2. >500kV: 10% DF or 5% impact on facility rating	1. <500kV: 5% DF or 5% impact on facility rating 2. >500kV: 10% DF or 5% impact on facility rating	1. <500kV: 10% DF or 5% impact on facility rating 2. >500kV: 10% DF or 5% impact on facility rating	As Required
Long Term Firm Transmission Service (Into PJM)	Summer Peak	3% DF or 3% impact on facility rating			As Required
Long Term Firm Transmission Service (Out of PJM)	Summer Peak	1. PJM facilities: 5% DF or 5% impact on facility rating 2. Other facilities: 3% DF or 3% impact on facility rating			As Required

Note: (For PJM) Project which is first to cause the need for a reinforcement will always have cost allocation regardless of the MW contribution

- PJM unaware of any neighbor which uses this mix of thresholds

Summer Peak Reinforcement – Energy (Non-Firm) / Energy Resource Requests

	Load	Category A (System intact)	Category B NERC Category B (loss of 1 element):	Category C NERC category C1, 2, 4, 5: (loss of 2+ elements)	TO Criteria Transmission Owner Criteria (FERC 715)
PJM Energy Resource / Non-Firm merchant transmission All fuel types at 100% of Summer Energy Output	Summer peak	N/A	N/A	1. <500kV: 10% DF or 5% impact on facility rating 2. >500kV: 10% DF or 5% impact on facility rating	As Required

Note: Project which is first to cause the need for a reinforcement will always have cost allocation regardless of the MW contribution

- PJM unaware of any neighbor which uses this mix of thresholds

Light Load (PJM) / Shoulder Peak (MISO) Reinforcement

	Resource modeling	Load	Category A (System intact)	Category B NERC Category B (loss of 1 element):	Category C NERC category C1, 2, 4, 5: (loss of 2+ elements)	TO Criteria Transmission Owner Criteria (FERC 715)
PJM Load at 50% of summer peak	Wind 40% ramp to 80% energy Oil & Gas off Coal (<500MW) at 45% initial Coal (≥ 500MW) at 60% initial Nuclear at 100% Pumped Storage – Full Pump Other fuel resources at 0%	50% of summer peak	1. <500kV: 5% DF or 5% impact on facility rating 2. >500kV: 10% DF or 5% impact on facility rating	1. <500kV: 5% DF or 5% impact on facility rating 2. >500kV: 10% DF or 5% impact on facility rating	1. <500kV: 10% DF or 5% impact on facility rating 2. >500kV: 10% DF or 5% impact on facility rating	As Required

Note: Project which is first to cause the need for a reinforcement will always have cost allocation regardless of the MW contribution

- PJM unaware of any neighbor which uses this mix of thresholds

Next Steps

- Individual side by side comparisons will require additional coordination and time to develop
- Current comparison shows that planning criteria, when comparing individual external planning authorities, diverge at some basic level