Resilience in Planning

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Resilience in Planning

Anticipate

Absorb

Adapt

Recover
Approaches to Resilience in the RTEP

- Do no harm
- Opportunistic
- Stand-alone resilience criteria
Introduction to Cascading Trees

Cascading Trees

Diagram showing graph with nodes and edges.
Introduction to Cascading Trees

Cascading Trees

1% 1% 5% >=10%

4.9 7.2 52.2 3.5

7.4 49.4 7.9 51.4 9.3 57.1 2.4 28.9
Reducing Probability to Cascade

Original 99% Cascading Probability

1st Offender 95% Cascading Probability

2nd Offender 55% Cascading Probability
Choosing Alternative Projects

Original

100% Cascading Probability
3424 MW at Risk

Rebuild

100% Cascading Probability
3424 MW at Risk

New Line

0% Cascading Probability
PJM Planning Process with Stand-Alone Resilience

NERC Standards

Reliability
- TO Critical System Condition (715 Criteria)
- PJM Critical System Condition

Resilience
- Extreme Events (i.e. ROW Outage)
- CIP-014 - Loss of Substation

Stand-alone Resilience Criteria

TO Local Criteria

Do No Harm (DNH)

RTEP Baseline

Assessment re: Cascading

Physical Protection

RTEP Baseline

Supplemental

Do No Harm (DNH)

RTEP Baseline

Assessment re: Cascading

Physical Protection

RTEP Baseline

Supplemental
PJM Planning Process – Opportunistic (Incorporate in DNH)

NERC Standards

Reliability
- PJM Critical System Condition & Resilience Evaluation
- Extreme Events (i.e. ROW Outage)
- CIP-014 - Loss of Substation

Resilience
- TO Critical System Condition (715 Criteria)
- RTEP Baseline
- RTEP Baseline
- Assessment re: Cascading
- Physical Protection

TO Local Criteria
- Do No Harm (DNH)
- Supplemental

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Next Steps

• PJM continue to refine analytical tools
• Work with Stakeholders to determine possible inputs in future PC discussions

Schedule
• 3Q2018 – PJM continue to refine tools, continue discussions with stakeholders, and develop outline of possible processes
• 4Q2018 – PJM conduct review of 2023 RTEP and review with stakeholders
• 1Q2019 – Finalize development of tools required for analysis