

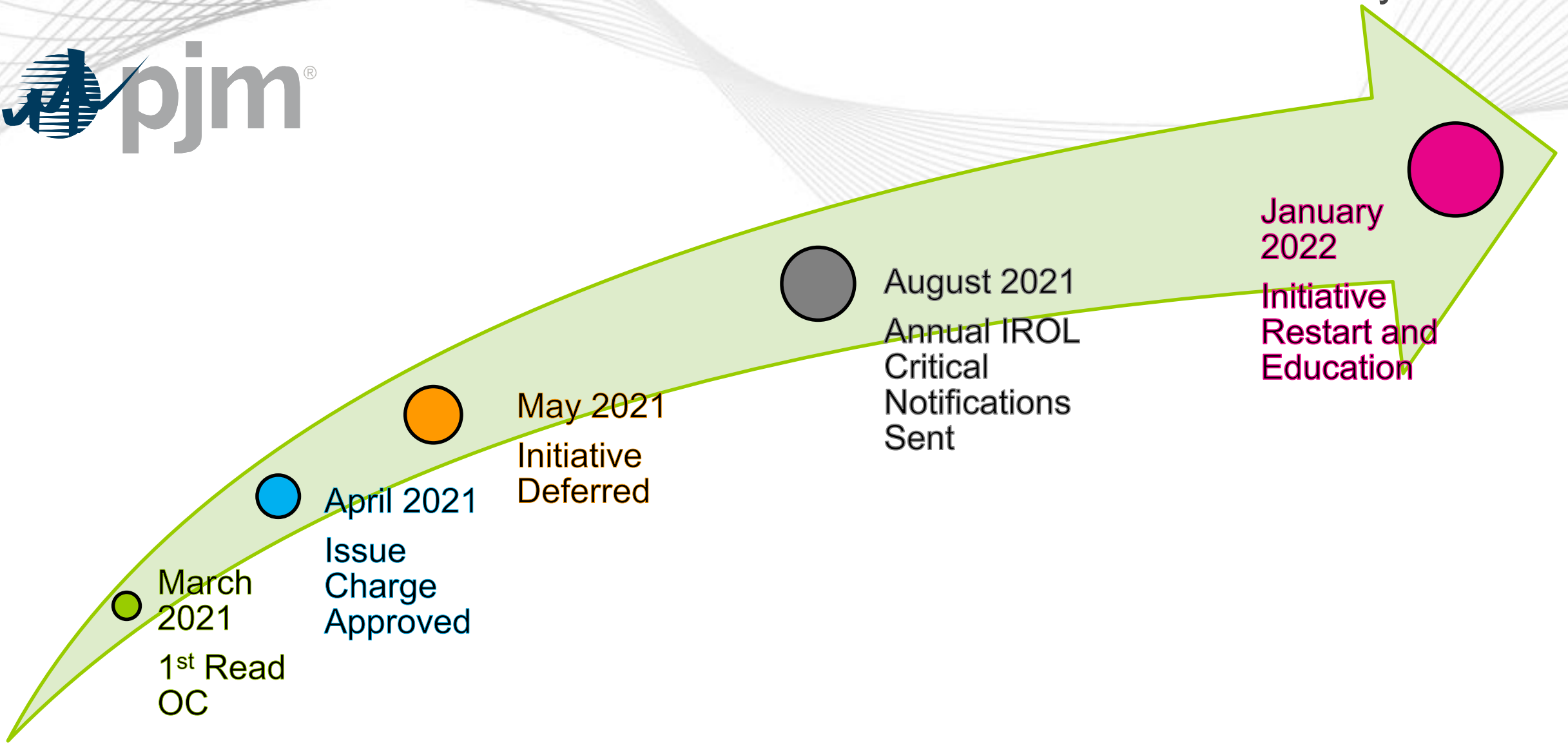


Interconnection Reliability Operating Limit (IROL) Critical Infrastructure Protection (CIP) Cost Recovery

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Brief History



Generator Owners required to make upgrades above and beyond typical requirements

- PJM develops a list of “IROL-critical” facilities to meet NERC CIP standards which could include generators
- These generators may require upgrades to meet other NERC CIP standards
- PJM brought this Problem Statement and Issue Charge on behalf of Generator Owners since classification of a generator as “IROL-critical” is considered CEII information

PJM does not currently have any cost recovery mechanism for this issue

- The NERC re-categorization, from low to medium, creates a significant additional cost burden on the Generator Owner having to upgrade the security features of the facility both physical and cyber.

Key Work Activities and Scope

Education

- NERC CIP standards, specifically CIP-002-5.1
- Review how a generator's status is determined by PJM
- Review types of costs that generators will incur
- Other RTO/ISO solutions, including ISO-NE Schedule 17 of their tariff for recovery of IROL-CIP costs

Discuss how costs should be recovered

- Determine process to evaluate which costs should be recovered
- Determine cost recovery mechanism through which capital and recurring costs could be recovered, allocated, and the appropriate transparency of payments

Update document language

- Tariff language change to accommodate CIP upgrade cost recovery as seen fit
- Allow for possible future recurring costs for units currently on the list as well as capital and recurring costs for units added in future analysis

Expected Deliverables and Approach

Expected Deliverables

- Recommendation to the MRC on a proposed cost recovery mechanism
- Update Manuals, Operating Agreement and Tariff as needed
- Determine documentation required by the impacted generators to PJM, the IMM, and the FERC if necessary, to support costs

Approach

- Issue worked through the OC
- Updates to be provided to MIC
- Estimated 3-6 months of effort to be completed before next annual notifications in August

Standards

- NERC CIP standards, specifically CIP-002-5.1

Process

- Review how a generator's status is determined by PJM

Upgrades and Cost

- Review types of costs that generators will incur

Existing Solutions

- ISO-NE Schedule 17 of their tariff for recovery of IROL-CIP costs



CIP-002

- CIP-002-5.1 Attachment 1:
2.6. Generation at a single plant location or Transmission Facilities at a single station or substation location that are identified by its Reliability Coordinator, Planning Coordinator, or Transmission Planner as critical to the derivation of Interconnection Reliability Operating Limits (IROs) and their **associated contingencies**



Purpose

- To identify critical cyber assets and apply appropriate security requirements to reduce adverse impact that loss, compromise, or misuse of those assets could have on reliable operation
- Specifically, this could mean physical loss of the unit or incorrect data and subsequent analysis from the unit



Implementation

- Standard was implemented in 2015
- Since that time PJM has never had more than 9 units on the list at any one time
- Only 2 of those units were not already classified as “medium impact” for other criteria



Other factors of “medium impact” generators

- Generators greater than 1500MW at any single point of interconnection
- Nuclear facilities with a protection plan filed with NRC are exempt



Background

- 9 IROLs (defined in Manual 37)
- All PJM IROLs are thermal limits derived for voltage issues also called “reactive interfaces”
- No stability-based IROLs
- These limits are determined by increasing source to sink deliverability



Analysis Basis

- Assessment of limiting contingencies is based on previous 2 year rolling real-time congestion data
- During this rolling window a congestion threshold is set to delineate limiting contingencies as critical or non-critical to an IROL
- This minimum congestion value is based on PJM Planning's loss of load expectation percentage
- Analysis must be completed at a minimum of once every 15 months



Supplemental Analysis

- IROLs without real-time congestion have further analysis
- The latest OATF results are used to determine the most-limiting contingency for that IROL
- These studies are load deliverability studies that are similar to IROL limit source to sink determinations in real-time



Validation Considerations

- Analyze the impact of planned RTEP upgrades and/or generation retirements on the limiting contingencies
- Consider congestion caused by long duration outages related to completing RTEP upgrades that otherwise would not be limiting under normal system configuration
- Previously limiting contingencies which have already been mitigated by the completion of RTEP upgrade project
- Validating contingencies due to special circumstances, such as N-1-1 or Conservative Operations scenarios



Results

- 14 generators have been identified in the past 6 years
- Most generators have been “medium impact” already or have an NRC exemption
- Number of units on the list has declined almost every year
- Currently only 1 generator on the 2021 list
- Expected to only change by 1 or 2 each year



Types of Capital Costs

- Physical access control upgrades
- New cyber systems/assets
- Cyber systems/assets upgrades
- Upgraded metering/telemetry
- Upgraded data communications



Types of Recurring Costs

- Cyber system maintenance
- Cyber asset replacements
- Additional security personnel
- Personnel training
- Application/Software renewal



Cost Estimates

- Capital Costs
 - up to 3 million per site
- Annual Costs
 - up to 1 million per site

ISO-NE Solution

- Added Schedule 17 tariff revision
- Effective March 6, 2020
- Provides for the recovery of an IROL-Critical Facility Owner's incremental capital, operation and maintenance costs incurred to comply with the NERC CIP Reliability Standards corresponding to the medium impact category
- Permits recovery only of CIP costs incurred on or after the effective date of a section 205 filing made by an IROL-Critical Facility Owner to recover such costs



ISO-NE Solution

- Not involved in developing or reviewing IROL-CIP Costs
- Collect pre-filing materials as provided to them by IROL-Critical Facility Owners
- Act as the billing and collection agent on behalf of IROL-Critical Facility Owners for recovery of IROL-CIP Costs accepted by FERC
- Monthly payments of equal amounts over 12 consecutive months for Commission-approved IROL-CIP costs



ISO-NE Solution

- Supported 205 Filing
- Spreadsheets and portal for assistance submitting cost recovery
- IROL-Critical Facility Owners are not prevented from a 205 filing outside of the Schedule 17 provisions

Other RTO/ISOs

- Still searching for other known solutions
- Currently no other solutions have been found
- Most are in similar scenario as PJM
 - Either a small number of affected generators or none on the IROL-critical list

Focused Education

- Any areas that may need more understanding

Work on Package Development

- Start building component matrix

Deliverables for Discussion

- Determine a process to evaluate which costs should be recovered
- Determine a process for allocation of the recovered costs
- Determine cost recovery mechanism through which capital and recurring costs could be recovered, allocated, and the appropriate transparency of payments
- Allow for possible future recurring costs for units currently on the list as well as capital and recurring costs for units added in future analysis

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