Transmission Security Cost Allocation

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Background

- The NYISO identified a potential concern that its current tariffs provide for the allocation through its tariffs of the costs associated with transmission projects that resolve resource adequacy issues, but does not provide for such cost allocation for transmission projects that resolve transmission security violations on Bulk Power Transmission Facilities, other than those that also resolve resource adequacy issues.
- As part of the October 2013 compliance filing, a placeholder was inserted in Section 31.5.3.2.1.4 stating that the NYISO "will address through its stakeholder process the development of a methodology to allow for the allocation of costs of transmission solutions to thermal or voltage security issues."
- The NYISO stated in the September 2014 compliance filing it will proceed with a stakeholder review process to develop this cost allocation methodology and file with Commission through a Section 205 filing by the end of the first quarter of 2015.

Current Reliability Cost Allocation Methodology

- Step 1: LCR Deficiency
  - *Determine MW deficiencies in meeting LCRs*
- Step 2: Statewide Resource Deficiency
  - *Use free flow test to determine statewide distribution of Compensatory MW necessary to meet LOLE of 0.1*
- Step 3: Constrained Interface Deficiency
  - *If NYCA is not resource limited as determined in Step 2, determine bounded regions to which cost responsibility is assigned*
- If after completion of Steps 1 through 3 there is a thermal or voltage security issue that does not cause an LOLE violation, it will be deemed a local issue and related costs will not be allocated under the NYISO tariff.

Objective

- **Develop a Step 4 in the methodology to allocate the costs of bulk thermal security (N-1-1) transmission solutions to those load zones and transmission customers which contribute to the thermal overload, based on their relative contribution.**
- **The methodology should be based on the thermal analysis which identified the thermal overload.**
- **Apply cost allocation method to solutions that relieve overloads identified on Bulk Power Transmission Facilities (BPTFs).**

A Few Key Principles

- Primary beneficiaries shall initially be those Load Zones identified as contributing to the reliability violation.
- The cost allocation among primary beneficiaries shall be based upon their relative contribution to the need for the regulated solution.
- The ISO will examine the development of specific cost allocation rules based on the nature of the reliability violation (e.g., thermal overload, voltage, stability, resource adequacy and short circuit).
- Consideration should be given to the use of a materiality threshold for cost allocation purposes.

N-1-1

- **Required by NERC, NPCC, and NYSRC**
  - ***NPCC and NYSRC are more stringent: more contingencies evaluated and virtually no load shedding allowed***
- **N-1-1 analysis is performed using a NYCA coincident peak powerflow case**
  - ***Snapshot in time: A single NYCA-wide generator dispatch to secure all BPTFs***
- **A Reliability Need is identified when any allowable re-dispatch of the system cannot alleviate a thermal overload**
  - ***If overloads occur, system is dispatched to minimize overloads***

N-1-1 steps

1. **N-1: Loss of any critical generator, transmission circuit, transformer, series or shunt compensating device, or HVDC pole**
2. **Any generation and power flow adjustments inside the NYCA that can be made within 30 minutes are applied to secure the system for the next contingency**
3. **N-1-1: Loss of any critical design contingency, including common tower or stuck breaker**

Concept

- **N-1-1 analysis results in a single NYCA-wide optimized generator dispatch**
- **Using that generator dispatch with the most severe first and second contingencies applied to the model, determine how much each load contributes to the power flow on the overloaded element**
- **Calculate a cutoff factor to identify which loads have a significant contribution to the overloaded element and allocate costs to those loads**

Method

1. **Apply most severe contingency pair to the model with associated optimized generator dispatch**
   - ***An element may be overloaded for various first and second contingencies.***
   - ***The modeling year and contingency pair that result in the highest loading on the element will be used for the cost allocation calculation.***
   - ***In most cases, the 10th year will be the most severe.***

Method (continued)

2. Identify the Contributing Loads

- ***For each load, increase by 1 MW while simultaneously increasing all supply generation by a total of 1 MW. Each supply generation unit participates relative to that unit's dispatch (i.e., the higher the dispatch, the greater that unit participates).***
- ***Monitor the change in flow on the overloaded element. This change in flow divided by the change in load (1 MW) is the Transfer Distribution Factor (TDF).***
- ***The TDF represents the percentage of the given load that contributes to the flow on the overloaded element on a per-megawatt basis.***
- ***The load is a <u>Contributing Load</u> if the TDF is positive (i.e. flow increases in direction of nominal flow on overloaded element).***

Method (continued)

3. **Calculate TDF Cutoff**
   - ***TDF Cutoff will be used as a materiality threshold to identify Allocated Loads.***
   - ***TDF Cutoff represents the percentage of all Contributing Load that flows across the overloaded element.***
   - ***First calculate the MW flow on the overloaded element that is due to each of the Contributing Loads:***
     - **For each Contributing Load, multiply the total load (MW) at the bus by the TDF for the bus. This equals the Contributing MW for each load. The sum of all Contributing MW represents the flow on the overloaded element due to the Contributing Loads.**
   - ***<u>TDF Cutoff</u> = Sum of all Contributing MW / Sum of all Contributing Load***
4. **Identify Allocated Loads**
   - ***Any load with a TDF greater than or equal to the TDF Cutoff is identified as an <u>Allocated Load</u>.***

Method (continued)

5. **Calculate Allocated MW for each zone or subzone**
   - ***For each Allocated Load, multiply the total load (MW) at the bus by the TDF for that bus. This equals the Allocated MW for each load.***
   - ***Sum Allocated MW for all loads for each zone or subzone.***
6. **Calculate allocation for each zone or subzone**
   - ***Divide the total Allocated MW for each zone or subzone by the total of all Allocated MW in NYCA.***

Equation

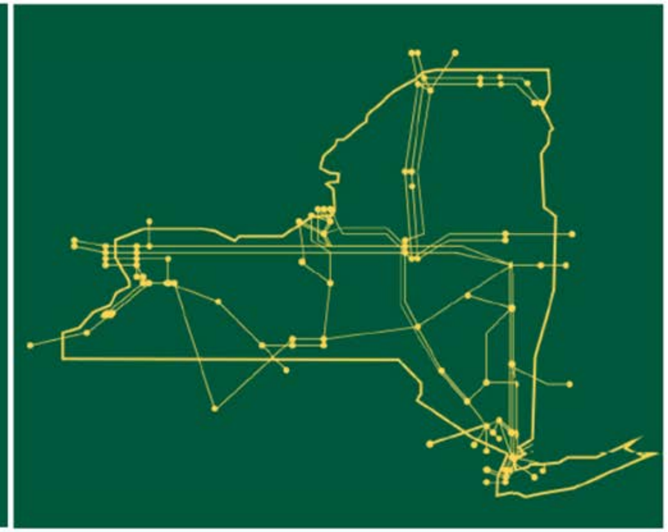
$$Allocation_i = \left[\frac{\sum_{ALi=1}^{n} (ALfactor_{ALi} \times ALload_{ALi})}{\sum_{k=1}^{m} \sum_{ALk=1}^{n} (ALfactor_{ALk} \times ALload_{ALk})} \right] \times 100\%$$

- **i = each Zone or Subzone**
- **m = the total Zones or Subzones**
- **n = the total Allocated Loads in a Zone or Subzone**
- **ALfactor = the increase in the thermal violation per megawatt increase of an Allocated Load (TDF)**
- **ALload = the size of a Allocated Load in megawatts**

Next Steps

- **Present examples**
- **Consider additional thresholds**
- **Develop tariff language**
- **Further stakeholder meetings – leading to stakeholder approval and NYISO FERC filing Q1 2015**

The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.



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