Attachment VI

Transmission Security Cost Allocation

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RMR Order

- ¶14: After considering the necessary reliability studies, NYISO must be the entity that makes the determination whether a specific generator is needed to ensure reliable transmission service and thus whether the facility is designated an RMR unit.
- ¶20: NYISO's RMR compliance filing should include tariff provisions specifying a methodology for allocating the costs of RMR agreements, as appropriate cost allocation is essential to ensuring that the rates charged are just and reasonable and not unduly discriminatory or preferential.
- ¶20: NYISO should ensure that any cost allocation regime is consistent with the Commission's cost allocation principles and precedents.

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.

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.

Objectives

- The NYISO proposes to use its current reliability cost allocation methodology to allocate RMR or transmission related costs, with the following revisions:
- Develop a Step 4 in the reliability cost allocation methodology to allocate the costs of a reliability solution (RMR or transmission) to those load zones that contribute to a thermal overload on a Bulk Power Transmission Facility (BPTF), based on load's relative contribution.
- Develop a Step 5 in the reliability cost allocation methodology to allocate the costs of an RMR for non-BPTF reliability needs that are otherwise deemed local.

Bulk Thermal 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 materiality thresholds 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 10^{th} year will be the most severe.***
   - ***For an RMR, the last year of the initial RMR term will be used.***

Leeds-PV Example

- **Apply most severe contingency pair to the model with associated optimized generator dispatch**
  - ***Highest loading on Leeds-PV occurred in summer 2024 case (2014 RNA)***
  - ***First contingency: L/O Athens-PV 345 kV***
  - ***Second contingency: L/O Marcy South – South tower (41&33)***
  - ***Use the generation dispatch that results from securing the system for this contingency pair in the summer 2024 case.***

Method (continued)

2. Calculate Nodal TDF and MW Flows

- ***For each Nodal Load, increase load 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) for that node.***
- ***The Nodal TDF represents the percentage of the given load that contributes to the flow on the overloaded element on a per-megawatt basis. The sign (+ or -) indicates the direction of flow caused by the node.***
- ***The Nodal MW Flow represents the amount of MW flow due to the load.***
- ***Nodal MW Flow = Nodal TDF x Nodal Load***

Leeds-PV Example

- **Calculate Nodal TDF and MW Flows**
  - ***Generation-to-load transfer analysis to calculate TDFs:***
    - **a) Serve load within transmission-constrained zones (currently G thru J) by resources within those transmission-constrained zones**
    - **b) Serve load by remaining resources within the same zone**
    - **c) Serve load by remaining resources from all surplus zones if necessary**
  - ***Example – Zone J:***
    - **Zone J load+losses = 13,055 MW (73% of G-J load)**
    - **Zones G-J generation dispatch + scheduled imports = 14,252 MW**
    - **a) Serve Zone J load from Zones G-J: 73% of 14,252 = 10,456 MW from G-J**
    - **b) Serve Zone J load from remaining Zone J resources: 0 MW available**
    - **c) Serve Zone J load from surplus zones:**
      13,055 – 10,456 = 2,599 MW from Zones A, C, D, F, K
    - **Result: Zone J load served from each zone as follows:**

	A	B	C	D	E	F	G	H	I	J	K
J	5.1%	0.0%	8.4%	5.2%	0.0%	0.7%	12.4%	11.9%	0.0%	55.8%	0.4%

Leeds-PV Example

- Monitor the change in flow on the overloaded element.
- A Nodal TDF is calculated for every load bus in NYCA.
- Nodal MW Flow the product of load and TDF
- Sample from Leeds-PV results:

Bus	Name	KV	Zone	Subzone	TDF	Load	Flow
126741	S CREEK AS	13.8	J	CON_ED	0.06044	310.9	18.79080
126000	SHEN12	13.8	G	CENT_HUD	0.03922	30.1	1.18052
135344	KNGTSCRK	34.5	A	NGRD_WES	0.03490	1	0.03490
136794	OGDENSBG	115	E	NGRD_MVN	-0.00364	15.8	-0.05751
131723	SIDNEY46	46.0	E	NYSEG_EA	-0.01200	13.8	-0.16560

Method (continued)

3. **Identify the Contributing Loads and Flow**
   - ***A nodal load is a Contributing Load if the Nodal TDF is positive (i.e. flow increases in direction of nominal flow on overloaded element).***
   - ***The Nodal MW Flow for each load bus with a positive Nodal TDF is Contributing Flow.***
4. **Calculate Contributing Materiality Threshold**
   - ***Contributing Materiality Threshold represents the percentage of all Contributing Load that flows across the overloaded element.***
   - ***Contributing Materiality Threshold = Sum of all Contributing Flow / Sum of all Contributing Load***

Method (continued)

5. **Identify the Helping Loads and Flow**
   - ***A nodal load is a <u>Helping Load</u> if the Nodal TDF is negative or zero (i.e. flow increases in the opposite direction of nominal flow on overloaded element).***
   - ***The Nodal MW Flow for each load bus with a negative or zero Nodal TDF is <u>Helping Flow</u>.***
6. **Calculate Helping Materiality Threshold**
   - ***Helping Materiality Threshold represents the percentage of all Helping Load that flows across the overloaded element.***
   - ***<u>Helping Materiality Threshold</u> = Sum of all Helping Flow / Sum of all Helping Load***

Leeds-PV Example

- **Calculate Contributing Materiality Threshold**
  - ***<u>Contributing Materiality Threshold</u> = Sum of all Contributing Flow / Sum of all Contributing Load***
  - ***Leeds-PV total Contributing Load = 30,506.7 MW***
  - ***Leeds-PV total Contributing Flow = 1,116.1 MW***
  - ***Leeds-PV Contributing Materiality Threshold = 1,116.1 / 30,506.7 = <u>0.03659</u>***
- **Calculate Helping Materiality Threshold**
  - ***<u>Helping Materiality Threshold</u> = Sum of all Helping Flow / Sum of all Helping Load***
  - ***Leeds-PV total Helping Load = 4,979.4 MW***
  - ***Leeds-PV total Helping Flow = -51.3 MW***
  - ***Leeds-PV Contributing Materiality Threshold = -51.3 / 4,979.4 = -<u>0.01031</u>***

Method (continued)

7. Calculate Material Subzone Flows

- ***Material Subzone Contributing Flow*: Summation of Contributing Flow for nodal load buses within the subzone with Nodal TDF greater than or equal to the Contributing Materiality Threshold.**
- ***Material Subzone Helping Flow*: Summation of Helping Flow for nodal load buses within the subzone with Nodal TDF less than or equal to the Helping Materiality Threshold.**
- ***Net Material Subzone Flow*: Summation of Material Subzone Contributing Flow and Material Subzone Helping Flow for each subzone.**

Method (continued)

8. **Calculate Allocated Flow for each subzone**
   - *If the Net Material Subzone Flow for a subzone is positive, the Allocated Flow is equal to the Net Material Subzone Flow.*
   - *If the Net Material Subzone Flow for a subzone is negative or zero, the Allocated Flow for that subzone is zero.*
9. **Check reasonableness of allocation**
   - *If the total Allocated Flow is less than 60% of the total Contributing Flow, then the Contributing Materiality Threshold will be reduced until the total Allocated Flow is at least 60% of the total Contributing Flow*
10. **Calculate allocation % for each subzone**
    - *Divide the total Allocated Flow for each subzone by the total of all Allocated Flow in NYCA.*

Leeds-PV Example

- **Identify Material Flows**
  - ***Any load with a TDF greater than or equal to the Contributing Materiality Threshold is identified as a material contributing load.***
  - ***Any load with a TDF less than or equal to the Helping Materiality Threshold is identified as a material helping load.***
  - ***For Leeds-PV, any load bus with a TDF greater than or equal to 0.03659 or less than or equal to -0.01031 would be material.***

Bus	Name	KV	Zone	Subzone	TDF	Load	Flow	Material Flow
126741	S CREEK AS	13.8	J	CON_ED	0.06044	310.9	18.79080	18.79080
126000	SHEN12	13.8	G	CENT_HUD	0.03922	30.1	1.18052	1.18052
135344	KNGTSCRK	34.5	A	NGRD_WES	0.03490	1	0.03490	0.00000
136794	OGDENSBG	115	E	NGRD_MVN	-0.00364	15.8	-0.05751	0.00000
131723	SIDNEY46	46.0	E	NYSEG_EA	-0.01200	13.8	-0.16560	-2.28528

Leeds-PV Example

Zone	SubZone	Material Contributing MW	Material Helping MW	Net Material MW	**Allocated MW**	**Allocation %**
A	NGRD_WES	6.438052	0	6.43805	**6.438052**	**0.66%**
A	NYSEG_WE	0.1517	0	0.15170	**0.1517**	**0.02%**
A	NYPA_WES	0.61347	0	0.61347	**0.61347**	**0.06%**
B	RG_E	0	0	0.00000	**0**	**0.00%**
B	NYPA_B	0	0	0.00000	**0**	**0.00%**
B	NGRD_GNS	0	0	0.00000	**0**	**0.00%**
C	NGRD_CEN	0	0	0.00000	**0**	**0.00%**
C	NYSEG_CE	25.070166	0	25.07017	**25.070166**	**2.58%**
C	NYPA_C	1.731292	0	1.73129	**1.731292**	**0.18%**
D	NYPA_NOR	0	0	0.00000	**0**	**0.00%**
D	NYSEG_NO	0	0	0.00000	**0**	**0.00%**
D	NGRD_NTH	0	0	0.00000	**0**	**0.00%**
E	NGRD_MVN	0	-12.781295	-12.78130	**0**	**0.00%**
E	NYSEG_EA	33.660282	-3.342407	30.31788	**30.317875**	**3.12%**
E	NYPA_E	0	-1.80336	-1.80336	**0**	**0.00%**
E	CENT_H_C	0	-0.09306	-0.09306	**0**	**0.00%**
F	NGRD_EAS	52.228063	0	52.22806	**52.228063**	**5.37%**
F	NYPA_F	0	0	0.00000	**0**	**0.00%**
F	NYSEG_ME	9.461901	0	9.46190	**9.461901**	**0.97%**
G	NYSEG_HU	0	0	0.00000	**0**	**0.00%**
G	CENT_HUD	4.736227	-24.980474	-20.24425	**0**	**0.00%**
G	O_R	50.006657	0	50.00666	**50.006657**	**5.15%**
G	NYPA_G	0	0	0.00000	**0**	**0.00%**
G	CE_UPNY	0	0	0.00000	**0**	**0.00%**
H	NYPA_H	0	0	0.00000	**0**	**0.00%**
H	CON_ED_N	19.070725	0	19.07073	**19.070725**	**1.96%**
H	NYSEG_BR	28.017295	0	28.01730	**28.017295**	**2.88%**
I	NYPA_I	0	0	0.00000	**0**	**0.00%**
I	CON_ED_C	101.643288	0	101.64329	**101.643288**	**10.46%**
J	CON_ED	646.975488	0	646.97549	**646.975488**	**66.58%**
J	NYPA_J	0	0	0.00000	**0**	**0.00%**
K	LIPA	0	0	0.00000	**0**	**0.00%**
K	NYPA_K	0	0	0.00000	**0**	**0.00%**

Leeds – Pleasant Valley