PJM Solution-Based DFAX Technical Conference

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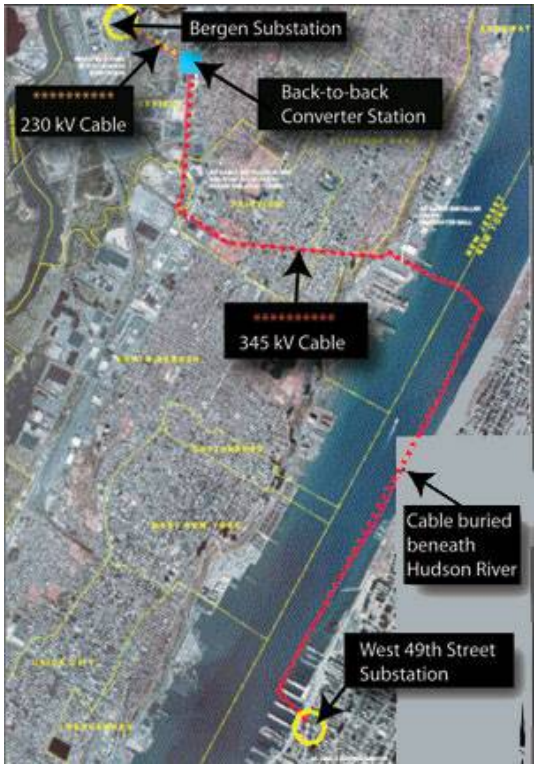
Neptune and Hudson Transmission Projects

Neptune

- Single line Merchant Transmission Facility
- 65-Mile-Long, 660-MW HVDC cable linking PJM electricity market with Long Island Power Authority ("LIPA") in NYISO
- Completed June 2007
- Approx. $650 million total cost, including approximately $9 million in PJM system upgrades
- 673 MW of FTWRs from PJM and 660 MWs of UDRs in NYISO 100% currently sold to LIPA
- Exempt in NYISO's capacity markets
- Physically capable of bi-directional flow, but currently only approved for flows from PJM to NYISO

Hudson

- Single line Merchant Transmission Facility
- 7-mile underground and underwater power cable linking PJM and NYISO power grids between Ridgefield, New Jersey and ConEd's West 49th St. Substation in NYC
- Completed May 2013
- Approx. $900 million total cost, including approx. $300 million in PJM system upgrades
- 320 MW of FTWRs as of Nov 30, 2015, 353 MW of NFTWRs and 660 of UDRs in NYISO
- Currently mitigated in NYISO's capacity market
- Physically capable of bi-directional flow, but currently only approved for flows from PJM to NYISO



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Hudson Transmission Project

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Merchant Transmission Facilities (MTFs)

- Each of Neptune and Hudson are "Merchant Transmission Facilities" – they do not have any captive customers and do not recover their costs through rate base, but instead from the price differentials of energy and capacity between PJM and NYISO
  - As a non-rate based transmission asset, the "costs" of Merchant Transmission Facilities are only recovered from the sale of energy and capacity across the transmission line.
  - Therefore, "benefits" for an MTF can only be derived from (1) buying energy and capacity in PJM at lower prices, (2) selling energy and capacity in NYISO at higher prices, or (3) selling more energy and capacity across the line at the same price differential (which they cannot do, because MTFs are fixed by PJM and cannot ever increase, regardless of new PJM transmission facilities).

- The transmission lines are economically dispatched – energy is only scheduled across the line to NYISO when prices in PJM are less than those in NYISO.
  - Historically, during peak PJM loads, MTF's have not operated near peak capacity (often zero).
  - In fact, Linden VFT has often flowed in reverse from NYISO to PJM during these periods to alleviate transmission system problems in PJM.

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Merchant Transmission Facilities (MTFs) - continued

- MTFs are treated like Generation for Interconnection, and like Load for RTEP Cost Allocation.

- Treated like Generation for Interconnection:
  - PJM Interconnection Study process
  - "But for" cost allocation for all new upgrades
    - Charged 100% share of costs of all new transmission facilities for interconnection
  - Cannot ever grow or change
  - Load is not subjected to this process or cost allocation.
- Treated like Load for RTEP Cost Allocation:
  - Allocated % share of all new PJM transmission facilities across the system
    - Based on Solution-Based DFAX Methodology and Load Ratio Share
  - Generation is not subjected to this process or cost allocation.

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Principals of Cost Allocation for New Transmission Facilities

- The Commission has explained the Regional Cost Allocation Principal 1 in Order 1000, as follows:
  - "As the Commission stated in Order 890, the one factor that it weighs when considering a dispute over cost allocation **is whether a proposal fairly assigns costs among those who cause the costs to be incurred and those who otherwise benefit from them**."

- The 7th Circuit held that:
  - FERC is **not authorized** to approve a pricing scheme that requires a group of utilities to pay for facilities **from which it members derive no benefits, or benefits that are trivial in relation to the costs sought** to be shifted to its members. "All approved rates [must] **reflect to some degree the costs actually caused by the customer** who must pay them."

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MTF Interconnection Cost Allocation

- At the time that an MTF executes its Interconnection Service Agreement to join PJM, it must agree to pay for 100% of any PJM transmission system upgrades required for its interconnection
  - This is entirely in compliance with the principals of **"cost causation"**
  - For HTP, this amount was approximately $300 million, for Neptune it was approximately $9 million.

- If everything in the PJM system was frozen and remained static at that point forward, just like an MTF is frozen and remains static, there would be no need for any RTEP transmission system upgrades except those required for the replacement of "end of life aged equipment" (no upgrades required)
  - Being "static" means the MTF could not possibly have caused the need for any RTEP upgrade
  - This does not mean, however, that the MTF won't receive some "incidental" benefits from the RTEP upgrade

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History of PJM Cost Allocation

- 100% Load Ratio Share:
  - This was the cost allocation method when Neptune and Hudson elected to join the PJM system. With 0.2% load-ratio for HTP and 0.4% for Neptune, a reasonable level of costs could be anticipated by the MTFs.
  - This was the assumption used for the "business decision" to invest in and build the MTFs and take the business risk (MTFs have no captive customers)
  - The 7th Circuit Court found this methodology had not been demonstrated to comply with principals of Cost Allocation, principally because Western PJM TOs were being asked to pay significant costs for new RTEP facilities that they did not "cause"
- 50% Violations-based DFAX/50% Load Ratio Share - as noted by the PJM TO's pre-filing comments, Violations-based DFAX has several shortcomings, including:
  - Inability to identify the causers of multiple constraints
  - Inability to account for multiple constraints in multiple areas
  - Inability to account for changes in the usage and direction over time
- 50% Solutions-based DFAX/50% Load Ratio Share – instituted by settlement between PJM and its TOs for administrative ease
  - Acts as a proxy for estimated benefits in lieu of determining "cost causation"
- Since MTFs are static, they cannot be the cause for any new RTEP transmission facilities
  - For this reason, MTF's should be carved out of any Solution-based DFAX cost allocation, but could be included in any Load-ratio share cost allocation (as a proxy for incidental benefits)

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Economics of Cost Allocation to HTP

RTEP Project	Cost Estimate	HTP SBDFAX/LRS Allocation(1)	HTP SBDFAX/LRS Allocation(2)	HTP 100% LRS Allocation
B2218	$46 MM	$16.8 MM	$16. 8 MM	$0.1 MM
B2276	$101 MM	0	0	$0.2 MM
B2436	$1,180 MM	$100.4 MM	$648.8 MM	$2.4 MM
B2437	$132 MM	$3.4 MM	$3.9 MM	$0.3 MM
Total	$1,371 MM	$120.5 MM	$669.5 MM	$3.0 MM
Equivalent Annual TRR(3)		$18 MM	$100 MM	$0.45 MM

Source: PJM model for Northern New Jersey Cost Allocation Sensitivity, evaluating impact of ConEd dropping the "wheel"
(1) Cost allocation with ConEd wheel (based on PJM calculations)
(2) Cost allocation without ConEd wheel (based on PJM calculations)
(3) First year estimated annual Transmission Revenue Requirement with reasonable assumptions for debt/equity, interest, ROE, taxes, etc.

- PJM would charge HTP an additional $18 MM to $100 MM per year under the Solution-Based DFAX Methodology
- Amount is economically infeasible and has no relationship to benefits
- To recover the proposed PJM TRR obligation from capacity sales, the RTEP upgrade would need to reduce the cost of capacity in PJM by $153/Mw-Day in the case with the ConEd wheel and in the case without the ConEd wheel, by $850/Mw-Day

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Concerns with PJM's Solution-Based DFAX Methodology

- MTFs, given their static nature, cannot be the cause of the need for the new transmission facilities, and therefore should not be included in any Solution-based DFAX cost allocation and should only be assigned incidental benefits through Load Ratio Share allocation
- 1% *de minimis* assumption is discriminatory to all smaller TOs (including MTFs)
  - Allows large TOs to have a higher threshold of usage of a new facility without any cost allocation. Why should a TO using 100 MW of an RTEP facility be exempt from costs, while a TO (MTF) using 6 MWs have to pay costs?
- Gross Up is discriminatory to MTFs
  - It allows for "Free Riders" and often the "Free Rider" TO is actually using the new facility more than those allocated costs given the *de minimis* and netting rules
- Netting is discriminatory to MTFs
  - Arbitrarily underestimates the usage of any facility.
  - Could lead to a situation where a 400 MW transmission facility is built, and HTP could shown by PJM's methodology to have 5 MWs of usage and a much larger TO is shown to have only 45 MWs, after application of netting
  - If the TO is say, DP&L, HTP will be allocated 10% of the costs, if it is PSEG or AEP, HTP will be allocated 100% of the costs. How do HTP's benefits increase 10x in the 2nd case?
  - If only 50 MWs of flow is shown on a 400 MW line, why is such a large transmission facility being built at all?

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Thoughts to Consider throughout the Day

- MTFs are different than every other TO in this room
  - Not rate based
  - Static in nature; cannot grow or change
  - Treated like Generation for Interconnection; treated like Load for RTEP Cost Allocation
  - Will not and cannot participate in the investment, so shareholders of MTFs will never earn a return on RTEP transmission investments
  - Are not voting members in PJM TO group

- MTFs are different than any other Load in PJM
  - Again, static and cannot grow without incremental interconnection request
  - MTFs look like a generator on the other end in NYISO
  - Economically dispatched, so as history demonstrates typically does not withdraw energy during peak load periods (the opposite of PJM's assumption in the Solution-based DFAX methodology)
  - Other Loads can manage their peak through Demand Response, MTFs cannot

- MTFs are different and may require a different allocation methodology than what is applied to the rest of the TOs
  - Solution-based DFAX methodology definitely does not work for MTFs
  - We are talking about a sub-group of "TOs" that represent 1300 MW out of 175,000 MW, less than 1%

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