Long Term Transmission Service Modeling and Studies

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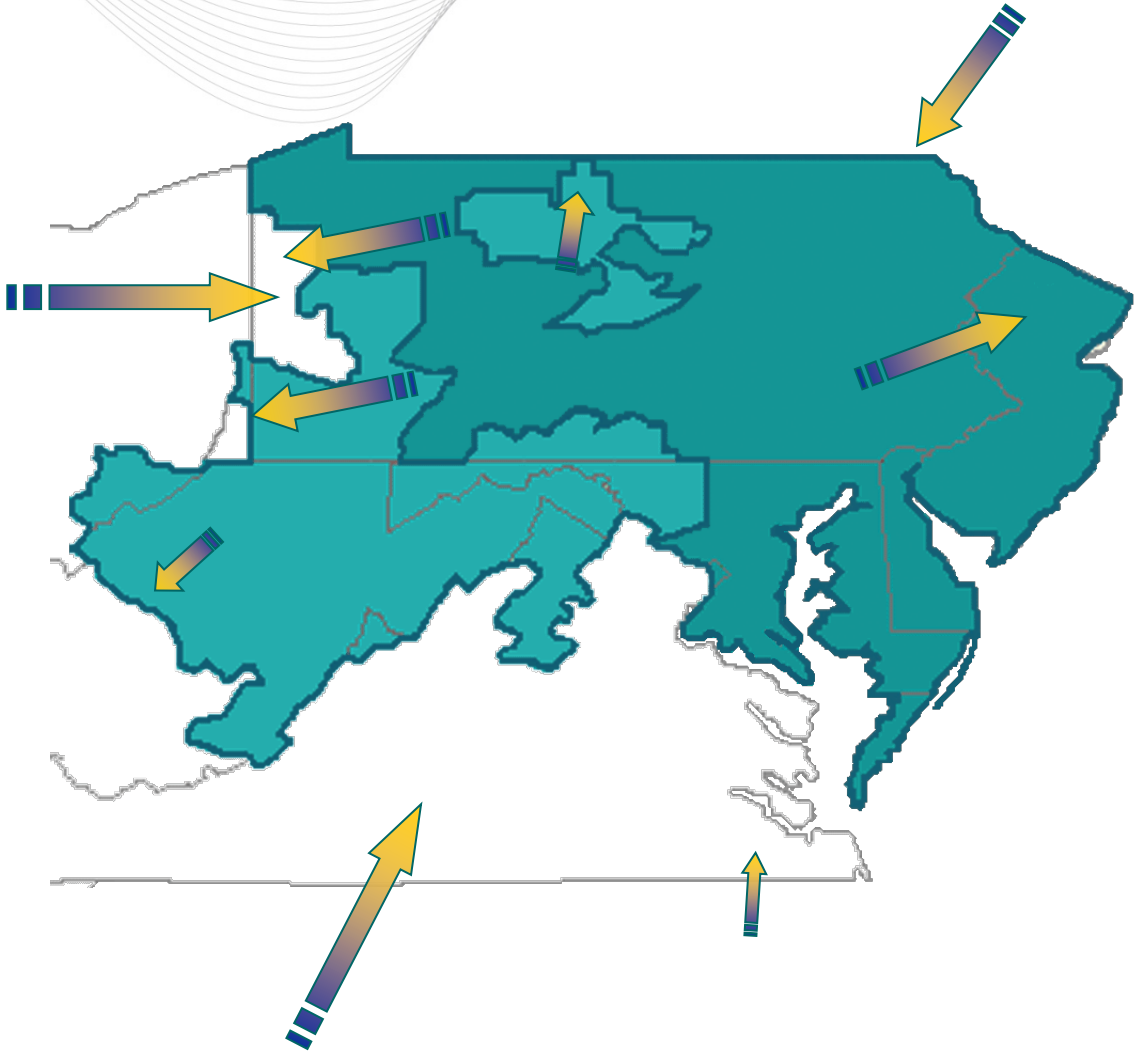
RTEP Case Interchange

- Transactions are first individually identified
- Transactions for individual paths on OASIS are then netted
- Resulting interchange is the sum of the flows along any path
- Resulting interchange is modeled in the case

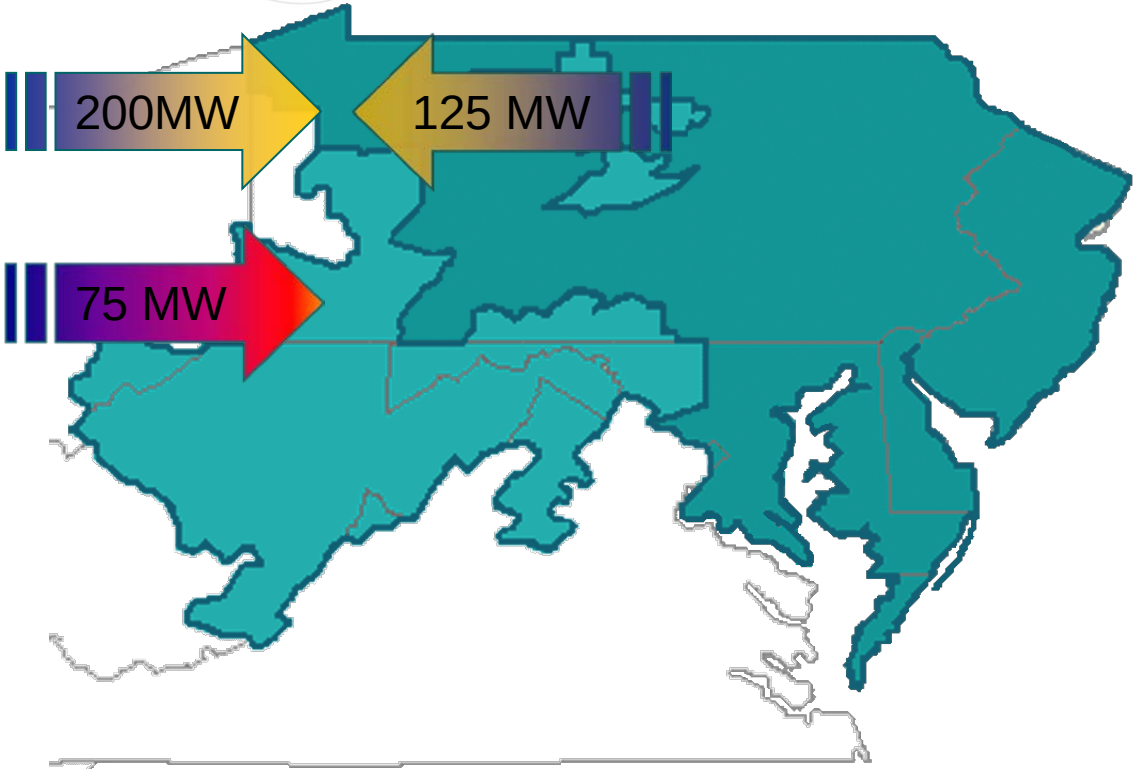


RTEP Case Interchange

Example:

On a single path, e.g.: AMIL-PJM, one customer has a reservation for 200MW import into PJM while a second customer has a 125MW export from PJM

The interchange is then netted such that a representation of 75MW is imported at the border



- Netting reduces flows and may mask problems

Area	In to PJM	Out of PJM	Net (modeled in case)
1	195	265	70 out
2	785	567	218 in
3	1320	346	974 in

- Possible options
  - Model multiple cases
    1. Model all flows in to PJM and not model flows out
    2. Model all flows out of PJM and not model flows in
    3. Model flows based on utilization
    4. Other options?

Import Only

- Test #1 removed the exports
  - Long term firm transmission service import to PJM modeled but export out of PJM is removed
- Additional violations identified for generation deliverability tests as compared to netted import/export interchange

Area	Number of Overloaded Facilities
APS	4
ATSI	1
AEP	17
ATSI - AEP	1
AEP - APS	1
AEP - OVEC	2
AEP - DEOK	1
DEOK	1
DEOK - OVEC	1
DEOK - DAYTON	1
DL	1
ComEd	4
ComEd-AMIL	1
Penelec	8
PPL	2
EKPC	3
EKPC-LGEE	1
DOM	4

Note: The violations listed above are preliminary with all transmission service ramped as point to point service and not unit specific.

Export Only

- Test #2 removed the imports
  - Long term firm transmission service export from PJM modeled but import into PJM is removed
- Additional violations identified for generation deliverability tests as compared to netted import/export interchange

Area	Number of Overloaded Facilities
APS	13
ATSI	4
AEP	4
DEOK	2
ComEd-AMIL	2
Penelec	6
Meted	5
PPL	1
PPL-BGE	2
BGE-PECO	1
PECO	4
BGE	2
AEC	1
EKPC-LGEE	2
DOM	1

Note: The violations listed above are preliminary with all transmission service ramped as point to point service and not unit specific.

Transmission Service Utilization

Export

Year	Reservations (MW)	Not utilized	
		MW	Percentage
2014	4071	1487	36.5%
2013	4071	1529	37.6%
2012	3172	1253	39.5%
2011	2568	866	33.7%
2010	2268	1619	71.4%

Import

Year	Reservations (MW)	Not utilized	
		MW	Percentage
2014	4241	1029	24.3%
2013	2574	752	29.2%
2012	1725	701	40.6%
2011	1222	900	73.6%
2010	566	145	25.6%

Note: Values above for utilization indicate a peak usage of the reserved MWs at some point in the year and not an average for the year.

- Transmission service reservations are held by a customer and may envision future use
- PJM currently grants equal weight to all reservations when modeling in the RTEP case, regardless of use

Transmission Service Utilization

- Customer use of export reservations indicates slight fluctuation with average of ~37% unused for last four years
  - Possible Options:
    - Do not model exports when studying imports
      - Most conservative approach
    - Model a percentage of the exports when studying imports
    - Continue to model all exports when studying imports
      - Least conservative approach

Transmission Service Utilization

- Customer use of import reservations increasing with unused portion now below 25% and appears to be trending lower
  - Possible Options:
    - Do not model imports when studying exports
      - Most conservative approach
    - Model a percentage of the imports when studying exports
    - Continue to model all imports when studying exports
      - Least conservative approach

External Energy Sources

- Due to the number of tie lines from external locations to PJM, the MWs are diffuse at any single point (element)
- Similar to a new internal generator which may have 10, 20, 30 or more individual attachment lines to different locations on the system
- While diffuse flow is appropriate and represents how some of the energy is transferred, these MWs are discounted in calculations due to their magnitude
  - If the MWs impacting a flowgate have less than the distribution factor cut-off, or do not exceed a percentage of line rating, the impacts are removed from the calculation for total impacts to an element

Threshold For Constraint Identification

- Diffuse impacts mean that thresholds for cost allocation not met
  - First to cause overload always has cost allocation
  - Contribution (Upgrade <$5M)
    - The first New Service Customer to cause the facility identified in the study which exceeds 100% loading of the applicable rating and develops the need for the Network Upgrade will in all cases have some cost allocation.
    - Contingent to the individual New Service Request contributing MW impact being greater than 5 MW AND greater than 1% of the applicable line rating OR (if its Distribution Factor (DFAX) on the facility is greater than 5% AND its MW impact on the facility's rating is greater than 3%), the contribution of a New Service Customer is determined by the voltage level of the facility that it impacts:
      - For a transmission facility whose rated voltage level is below 500 kV, a New Service Customer will have some cost allocation if its Distribution Factor (DFAX) on the facility is greater than 5% OR if its MW impact on the facility's rating is greater than 5%.
      - For a transmission facility whose rated voltage level is 500 kV or above, a New Service Customer will have some cost allocation if its DFAX on the facility is greater than 10% OR if its MW impact on the facility's rating is greater than 5%

Threshold For Constraint Identification

- Contribution (Upgrade ≥$5M)
  - Contingent to the contributing MW impact being greater than 5 MW AND greater than 1% of the applicable line rating, the contribution of an New Service Customer following the first New Service Customer to cause the need for the Network Upgrade is determined by the voltage level of the facility that it impacts:
    - For a transmission facility whose rated voltage level is below 500 kV, a New Service Customer will have some cost allocation if its Distribution Factor (DFAX) on the facility is greater than 5% OR if its MW impact on the facility's rating is greater than 5%.
    - For a transmission facility whose rated voltage level is 500 kV or above, a New Service Customer will have some cost allocation if its DFAX on the facility is greater than 10% OR if its MW impact on the facility's rating is greater than 5%.

Note: For Network Upgrades with an "as-built" cost of $5.0 million or greater, a New Service Customer will be responsible for allocated costs, within previously stated cost allocation guidelines, if their New Service Queue Close Date occurs less than 5 years following the execution of the first Interconnection Service Agreement or Upgrade Construction Service Agreement which identifies the need for this Network Upgrade.

Threshold For Constraint Identification

- Possible options:
  - Lower MW threshold
  - Decrease percentage impact threshold
  - Changes rules for TSRs to only look for a minimum MW impact

Capacity Import Limit

- The Capacity Import Limit (CIL) establishes the maximum amount of power that can be reliably transferred to PJM from defined regions external to PJM
- Reflects the maximum amount of external capacity that can be cleared in the PJM capacity market auction(s)
- These external supply regions will be divided into five zones for the purpose of determining both a simultaneous import limit and five directional non-simultaneous import limits
- CBM not added to the generation deliverability transfers
- CIL study functions more like load deliverability

Incorporation Of CIL

- CIL study determines ability to participate in RPM auction
- Purpose of majority of studies is to allow participation in RPM by customers with external generation
- Possible Options:
  - Incorporate CIL test results into study of projects in queue