



PJM Steps to Minimize Uplift

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- Reactive
 - BGE/PEP and APSOUTH
 - Cleveland
 - Seneca area of PN
 - Delmarva
- Thermal
 - Local area(s) within Mid-Atlantic

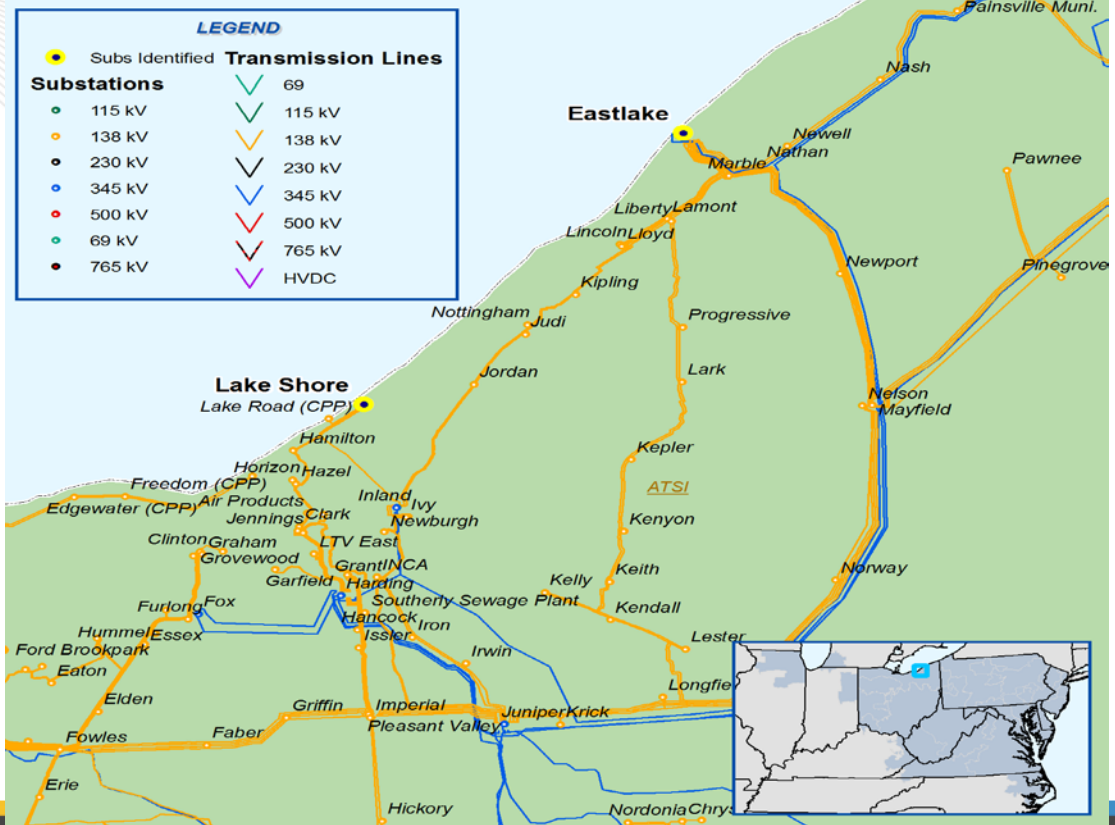
- ***BGE/PEP and APSOUTH***
 - Reliance on uneconomic steam generation throughout 2013
 - *Re-evaluate scheduling methodologies*
 - *Committing less steam generation and relying more on CTs*
 - *Hitting constraints in the area more frequently (BGE/PEP interface) that elevate prices in the area and help reduce uplift*

- ***Cleveland Interface***

- Required scheduling protocols for reactive support in the area
- Units are often uneconomic leading to large reactive payments
- *Closed-loop interface*
 - *Concerns on impacts to FTR*
- *Planning solutions for June 1, 2014*
 - *Synchronous condensers being added*
 - *NEW! Beaver-Davis Besse 345 kV line*
- *Local scheduling requirements should be eliminated in many occasions therefore reducing uplift*

ATSI Transmission Zone Reinforcement

- New Cleveland LDA
- Convert Eastlake units 1, 2, 3, 4 and 5, and Lakeshore unit 18 to a synchronous condenser
- There are also a number of upgrades to address voltage issues including new 345 kV lines, new 345/138 kV substations and transformers, SVCs and capacitors

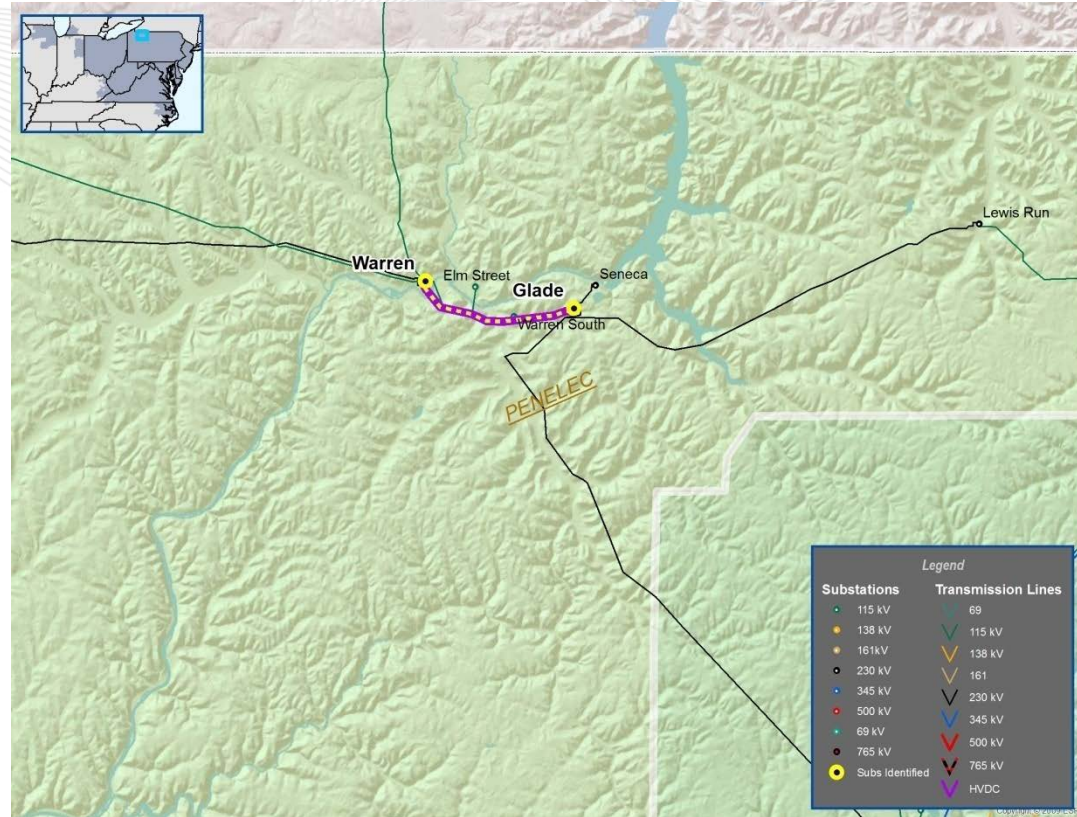


- ***SENECA area of PN***
 - Post-contingency low voltages when SENECA is pumping
 - *PJM created SENECA closed-loop interface on 2/1/2014*
 - *Minimal FTR impacts*
 - *PJM investigated a switching solution with the TO that was implemented at the same time*
 - *Minimized the need for running additional generation in the area but did not eliminate it*
 - *Planning solutions for June 1, 2015*
 - *New Glade-Warren 230kV line*



PN Transmission Zone

- Seneca pumping low voltages
- There are various low voltage magnitude and voltage drop violations in the Seneca area for various contingencies.
- Proposed Solution: Build a 2nd Glade - Warren 230 kV line (b2180).
- Cost Estimate:
\$29.6 M
- Required IS Date: 6/1/2015.



- **Delmarva Zone**

- Actual high voltages during low load conditions
- *Closed-loop interface*
 - *Not a good model for this*
- *Merchant solutions being sought in the area*
- *Planning solutions for 2014*
 - *2 more variable reactors scheduled to go in-service by EOY 2014*
 - *5 total between 2012 and 2014*

- Too early to tell
 - Saw reductions in late December
- Extreme cold in Jan/Feb skews results
- May need to look in several months

- Emergency Uplift Costs
 - Emergency DR
 - Emergency purchases
- ERPIV tasked with short and long term changes during peak periods
 - Better management of interchange
 - Scheduling and operating to increased reserve requirements
 - Short term discussions underway
 - Mixed feedback

- Closed-loop interfaces and/or binding thermals at levels significantly less than their rating
 - This can create significant (additional) FTR funding problems
 - ATSI interface from 2013 is an example
- ARR allocation methodology requires over-allocation in some cases
 - Binding facilities where there are more FTRs than the flow on the line will create underfunding
 - Stage 1A infeasible facilities

- Some statistics from 2013:
 - DA OR Top 10 = 60% of total DA OR
 - **Top 5 are 55% of total**
 - BOR Top 10 = 58% of total BOR
 - **Top 5 are 46% of total**
 - Reactive Top 10 = 62% of total Reactive

- PJM has reviewed problem areas to schedule more optimally
- Several paths
 - Live with the uplift (attempt to minimize)
 - Bind the facilities and live with the underfunding
 - Allocate underfunding on these facilities differently?
 - Change the ARR allocation to limit over-allocating and bind the facilities
 - Allocate underfunding on these facilities differently?

