

2014 Reduction in Uplift

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- Some members have expressed concern that little has been done to reduce uplift which was the goal of Phase 1
- Phase 1 matrix doesn't have any solutions that will greatly impact the level of uplift
- PJM has taken action on its own with regard to scheduling changes and price setting
- Some of these have already been completed, others are pending software and other market rule changes

Month	DA OR	BOR	Reactive	LOC	TOTAL UPLIFT (no Blackstart)
Jan-13	\$5,928,134	\$67,758,162	\$23,604,234	\$11,481,334	\$108,771,864
Feb-13	\$4,980,867	\$62,395,543	\$17,624,984	\$4,730,617	\$89,732,011
Mar-13	\$6,302,475	\$10,288,210	\$14,350,137	\$7,127,313	\$38,068,135
Apr-13	\$5,712,618	\$17,635,540	\$13,670,581	\$5,781,873	\$42,800,612
May-13	\$5,403,220	\$14,006,295	\$17,214,142	\$8,518,338	\$45,141,995
June-13	\$6,584,357	\$10,816,722	\$22,055,238	\$7,029,836	\$46,486,153
July-13	\$8,306,004	\$23,655,288	\$19,633,772	\$19,492,274	\$71,087,338
Aug-13	\$4,159,470	\$8,819,526	\$27,827,070	\$5,683,959	\$46,490,025
Sep-13	\$6,005,482	\$19,918,883	\$27,534,906	\$11,131,760	\$64,591,031
Oct-13	\$2,473,705	\$9,505,540	\$41,721,300	\$3,085,323	\$56,785,868
Nov-13	\$2,799,522	\$15,565,028	\$42,743,907	\$2,144,870	\$63,253,327
Dec-13	\$5,224,275	\$34,868,619	\$43,464,829	\$1,108,575	\$84,666,298
Jan-14	\$35,826,983	\$486,477,754	\$3,773,749	\$77,493,612	\$603,572,098
Feb-14	\$9,492,506	\$44,584,342	\$1,043,326	\$11,465,139	\$66,585,313
Mar-14	\$5,672,743	\$46,695,050	\$2,682,504	\$12,826,397	\$67,876,694
Apr-14	\$4,185,011	\$6,706,531	\$5,272,525	\$2,995,687	\$19,159,754
May-14	\$6,385,691	\$7,684,234	\$5,278,711	\$12,957,142	\$32,305,778
June-14	\$5,252,998	\$7,041,106	\$4,156,518	\$8,117,598	\$24,568,220

Month	2013 TOTAL UPLIFT (no Blackstart)	2014 TOTAL UPLIFT (no Blackstart)	2014 - 2013
Feb	\$89,732,011	\$66,585,314	-\$23,146,697
Mar	\$38,068,135	\$67,876,695	\$29,808,560
April	\$42,800,612	\$19,159,754	-\$23,640,858
May	\$45,141,995	\$32,305,779	-\$12,836,216
June	\$46,486,153	\$24,568,221	-\$21,917,932
Total	\$262,228,906	\$210,495,763	-\$51,733,143

For February through June...

- 2013 uplift is \$262M
- 2014 uplift is \$210M
- The \$52M reduction equates to about a \$10M per month reduction
- Extreme cold weather was a contributor to the uplift during the months of January and March

- 2013 Blackstart costs during this period averaged ~ \$7.9M/month
- 2014 Blackstart costs during this period averaged ~ \$2.1M/month
- *Reduction of about \$5.8M/month*

Month	2014 - 2013 DA OR	2014 - 2013 BOR	2014 – 2013 Reactive	2014 - 2013 LOC
Feb	\$4,511,639	-\$17,811,201	-\$16,581,658	\$6,734,522
Mar	-\$629,732	\$36,406,840	-\$11,667,633	\$5,699,084
April	-\$1,527,607	-\$10,929,009	-\$8,398,056	-\$2,786,186
May	\$982,471	-\$6,322,061	-\$11,935,431	\$4,438,804
June	-\$1,331,359	-\$3,775,616	-\$17,898,720	\$1,087,762
Total	\$2,005,412	-\$2,431,047	-\$66,481,498	\$15,173,986

- Doing great with BOR and Reactive
- DA OR is very close to last year
- LOC needs to be improved
 - Manual dispatch of units (including wind)
 - CT LOC (paid to CTs scheduled in DA and then not run in RT)

- Three main drivers
 1. Committing less baseload generation for reactive
 2. Planning upgrades
 3. Pricing changes

- 1 & 2 result in scheduling less generation that is typically sitting at min throughout the day
 - The cost of the units committed specifically for reactive via that process
 - Those resources can also contribute to BOR by suppressing prices

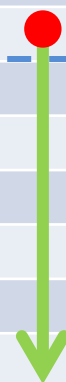
- BGE/PEP and APSOUTH
 - *Committing less baseload generation*
 - *Transmission upgrades completed in the area*
- Cleveland
 - *Transmission upgrades completed in the area*
- Seneca area of PN
 - *Switching solution and Seneca Interface*
 - *2015 upgrades in the area*
- Delmarva
 - *High voltage issues still require local generation support*

- **BGE/PEP and APSOUTH**

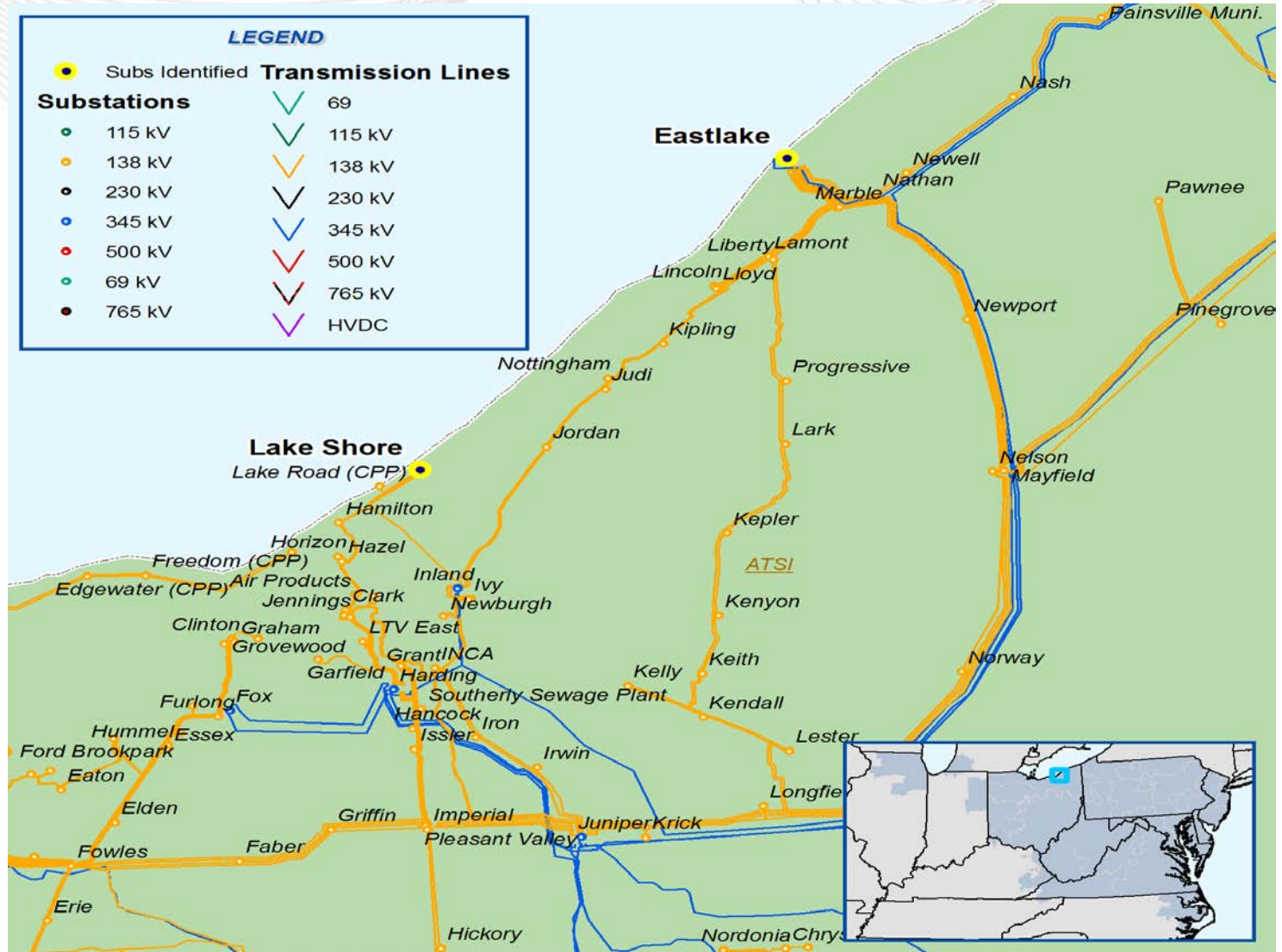
- Reliance on uneconomic steam generation throughout 2013
 - A large portion of reactive charges
- *Re-evaluate scheduling methodologies*
 - *Beginning late December 2013*
- *Committing less steam generation and relying more on CTs*
- *Hitting constraints in the area more frequently (BGE/PEP interface, GRA-BAG, GRA-SAF) that elevate prices in the area and help further reduce uplift*

Month	Reactive \$\$
Jan-13	\$23,604,234
Feb-13	\$17,624,984
Mar-13	\$14,350,137
Apr-13	\$13,670,581
May-13	\$17,214,142
June-13	\$22,055,238
July-13	\$19,633,772
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Implementation of new reactive scheduling practice

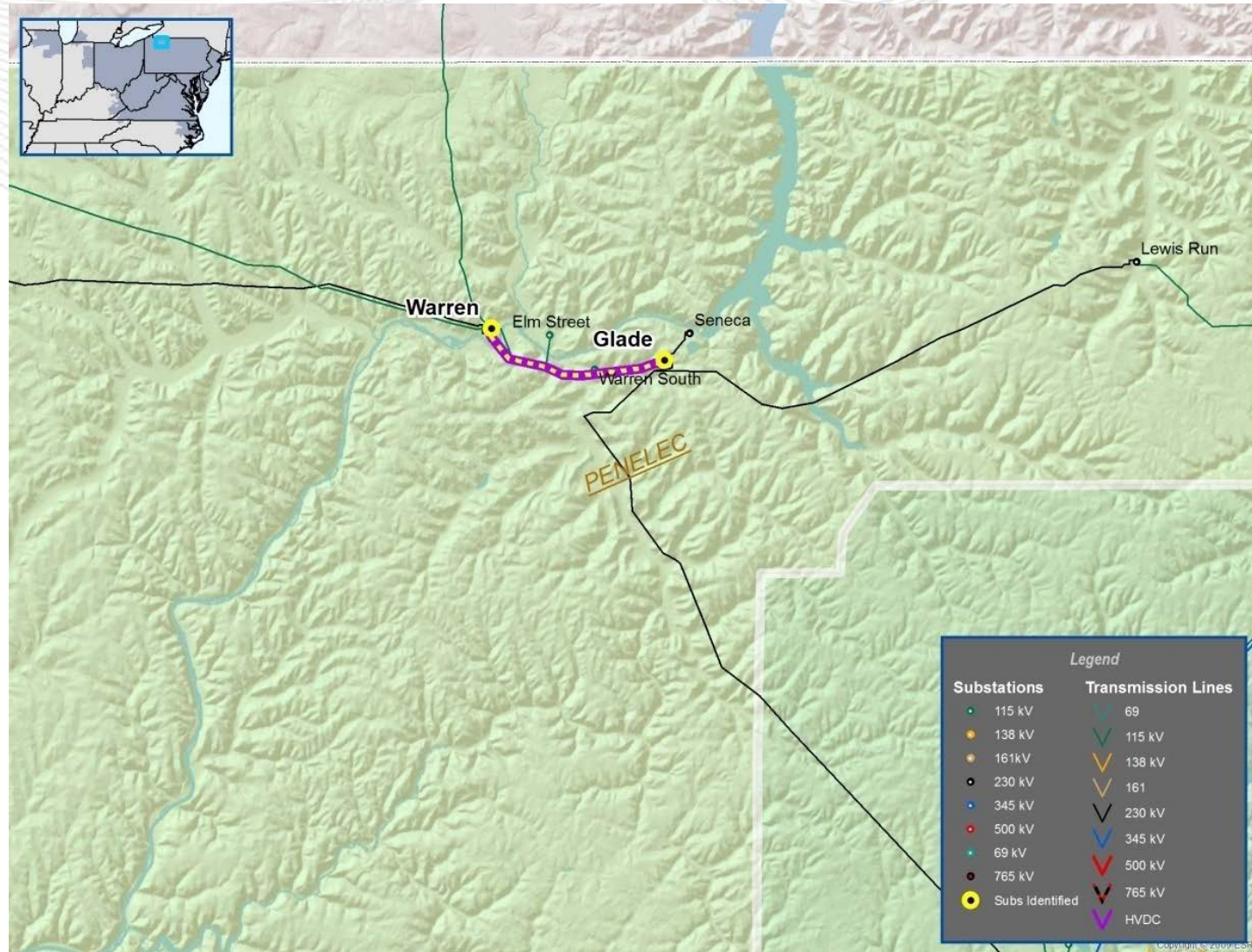


- Implemented for summer of 2014
 - Synchronous condensers at East Lake
 - Beaver-Davis Besse 345 kV line
- Scheduling requirements in the area still exist but are much less impactful



- *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*
- *We've minimized the amount of time we need to run out-of-merit generation and when we do we're using the SENECA interface to set price for it*

- 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.



- Two main drivers
 1. Committing less baseload generation for reactive
 2. Stop “over-optimizing” the system
- “Over-optimizing” the system
 - Eliminate the practice of scheduling long lead time generation that is estimated to be economic
 - Usually only done on high load days
 - Schedule long lead time generation only when it is needed for reliability

- Units previously running for reactive support are typically loaded at min for a large portion of the day
- Having uneconomic generation online will result in suppressed prices
- Running less of it will...
 - Result in less unloaded generation online and lower uplifts
 - Depending on the location, result in congestion that can raise prices and further reduce uplift
 - This has been the case in the BGE/PEP area

- Historic practice for PJM has been to commit longer lead time generation outside of the DA market and RAC analysis going into high load days when it was estimated to be economic
- This practice adds additional generation, which may be economic, on top of the supply committed in the DA market and RAC
- While this generation may be economic, the extra supply can cause resources at the top of the stack to become uneconomic causing additional uplift
- PJM has stopped this practice

- PJM is working to reduce this
- Typical components are:
 1. Manual dispatch reductions for generators
 2. CT LOC payments
- Discussing incorporating CT LOC into clearing and commitment engines
- Software and process changes to help minimize the instances where manual dispatches are needed
 - Bind constraints earlier where it makes sense

- The weather has significantly impacted uplift all year
 - Hurt us in the winter
 - Has helped us in the spring and summer

Year	Total Energy Uplift Charges	Annual Change	Annual Percentage Change	Energy Uplift as a Percent of Total PJM Billing
1999	\$133,897,428	NA	NA	7.5%
2000	\$216,985,147	\$83,087,719	62.1%	9.6%
2001	\$284,046,709	\$67,061,562	30.9%	8.5%
2002	\$273,718,553	(\$10,328,156)	(3.6%)	5.8%
2003	\$376,491,514	\$102,772,961	37.5%	5.4%
2004	\$537,587,821	\$161,096,307	42.8%	6.1%
2005	\$712,601,789	\$175,013,968	32.6%	3.1%
2006	\$365,572,034	(\$347,029,755)	(48.7%)	1.7%
2007	\$503,279,869	\$137,707,835	37.7%	1.6%
2008	\$474,268,500	(\$29,011,369)	(5.8%)	1.4%
2009	\$322,729,996	(\$151,538,504)	(32.0%)	1.2%
2010	\$622,843,365	\$300,113,369	93.0%	1.8%
2011	\$605,017,353	(\$17,826,013)	(2.9%)	1.7%
2012	\$640,635,507	\$35,618,154	5.9%	2.2%
2013	\$866,865,836	\$226,230,329	35.3%	2.6%
Jan - Jun 2014	\$829,483,381	(\$37,382,455)	(4.3%)	2.7%
Jan - Jun 2014 <i>(uses Jan 2013)</i>	\$329,483,381	(\$537,382,455)	(62.0%)	1.1%

- Average uplift as a percentage of total billing is 2.3% since 1999
- Since 2006 it has been 1.8%
 - Both include the billing from January 2014
- Current year-to-date uplift as a percentage of billing is 2.7%
- If substituting Jan 2013 (also a bad month) for Jan 2014, year-to-date the total uplift as a percentage of billing is 1.1%
- Thanks to the IMM for data on the previous slide

- Much of the discussion of Phase 1 has centered around tweaks to the existing uplift calculation methodology
- PJM has taken actions to reduce uplift which have been successful
 - Most notably with reactive and BOR
- PJM's effort to reduce uplift is ongoing
 - Further minimize the amount of LOC being paid
 - FTRSTF discussion to minimize underfunding will result in additional energy market efficiencies
 - Units setting price at min