

The background of the slide is a photograph of a large, white, lattice-structured transmission tower against a clear blue sky. Power lines are visible extending from the tower across the frame.

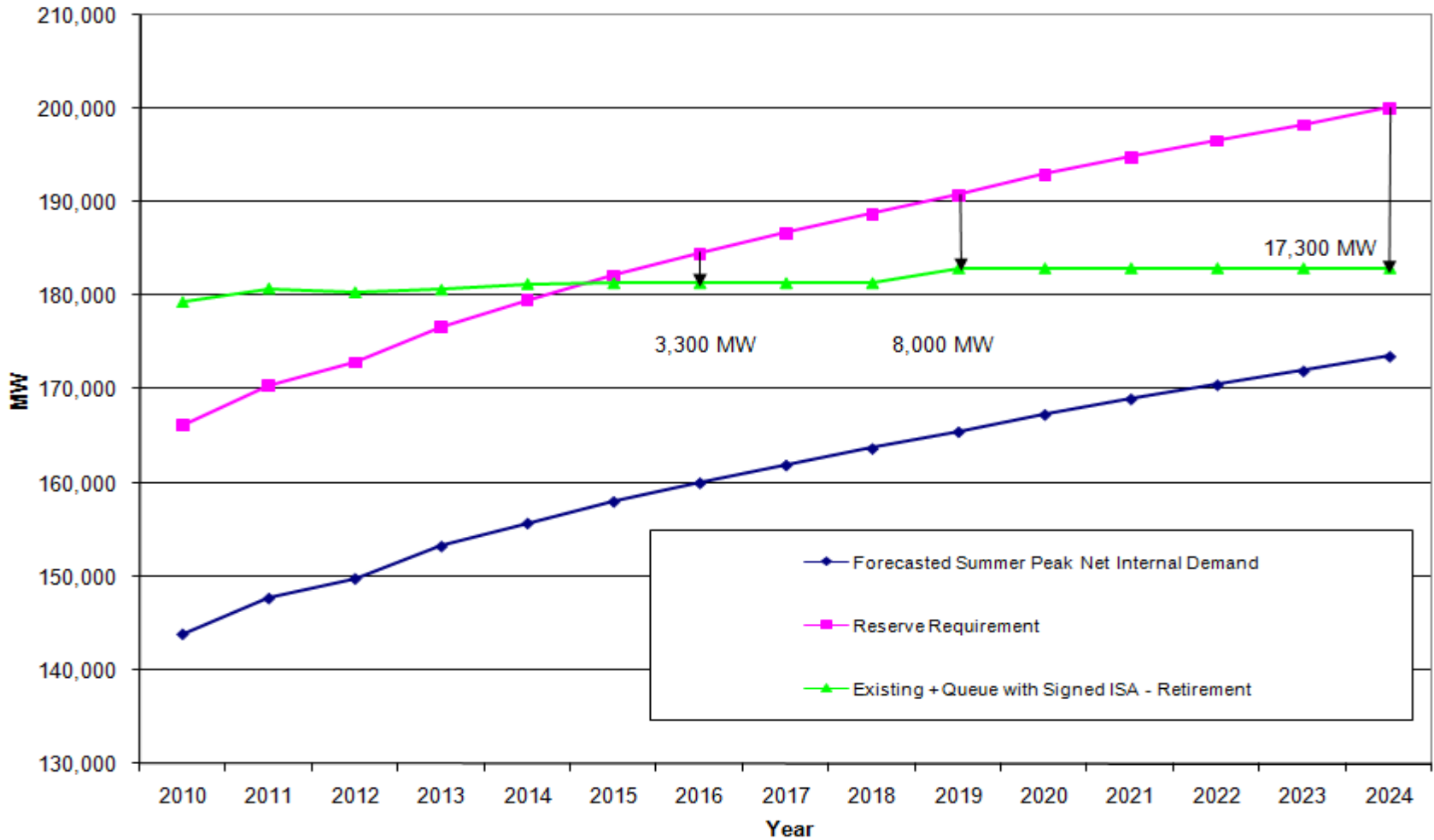
Transmission Expansion Advisory Committee Meeting

2010 Market Efficiency Analysis Results Update

October 28, 2010

- Discussion of future generation modeling and scaling required to meet reserve requirement
- Discussion of modeling of Wind resources
- Update on Benefit/Cost Analysis for requested projects.
 1. **BCP Transmission Project submitted by LS Power for new single 345 kV line from Byron to Cherry Valley to Pleasant Valley with ISD of 6/1/2015.**
 2. LaSalle Transmission Project submitted by LS Power for new single or double 345 kV line from Pontiac Midpoint to Reynolds to Dumont (V4-026) with ISD of 6/1/2014.
 3. La Fayette Transmission Project submitted by LS Power for new single or double 345 kV line from Quad Cities to Kewanee to Pontiac Midpoint to Reynolds to Dumont along with 345/138 KV transformers at Kewanee station with ISD of 6/1/2015.
 4. Various configurations of 2 and 3

Figure 2 - PJM Market Efficiency Reserve Margin



- generation model includes all existing in-service generation plus active queue generation with executed ISA minus expected future deactivations
- installed reserve requirement is met through study year 2013
- To meet installed reserve requirement for study years 2016, 2019 and 2024, 3,300 MW, 8,000 MW and 17,300 MW of new generation will be added to model, respectively
- New generation will be added to PJM regions in proportion to the regional location and regional generation type of future generation projects in Generation Interconnection Queues through Queue V

Table 3 – Location and Generator Type to Maintain Reserve Margin

Region	Nuclear	Coal	Gas	Oil	Wind	Other Renewables	Total Region
AECO/DPL/JCPL/PECO/PSEG	1.1%	0.0%	16.8%	0.3%	0.6%	1.0%	19.8%
AEP/APS/ATSI/COM/DAY/DUQ	0.6%	10.0%	14.1%	0.0%	18.4%	2.3%	45.4%
BGE/PEP	5.1%	0.0%	7.5%	0.0%	0.0%	0.4%	13.0%
DOM	0.0%	0.0%	9.6%	0.0%	0.1%	0.8%	10.5%
ME/PN/PPL	5.1%	0.4%	2.3%	2.5%	0.8%	0.3%	11.3%
Total By Fuel	12.0%	10.4%	50.2%	2.7%	19.9%	4.7%	100.0%

- Section 1.5.7 (k) (viii) of Operating Agreement states:
 - “If the Office of the Interconnection finds that the PJM reserve requirement is not met in any of its future year market efficiency analyses then it will model adequate future generation based on type and location of generation in existing PJM interconnection queues.”
- Determination of type, amount, and general location of added generation is easily determined.
- Exact Location of future generation is unknown if there is no signed ISA
 - PJM scales existing resources

Scaling Concerns

- Base case results for 2016 and 2019 show scaling of COMED wind directly increases congestion in COMED
 - Wind modeled with a 13% capacity factor
 - RTO additional Wind added at 19.9% of Reserve shortage
 - 2016 : 5,052 MWs
 - 2019: 12,246 MWs
 - COMED additional Wind added
 - 2016: 2549 MWs
 - 2019: 6181 MWs
 - Marengo-Pleasant Valley showed \$1,031.7 billion in congestion for 2019 year.
- Scaling of existing resources is most logical approach but can have large impact on studied projects located near scaled units.
- Projects that pass benefit/cost test and are located near and affected by scaling require sensitivities around scaling assumptions.

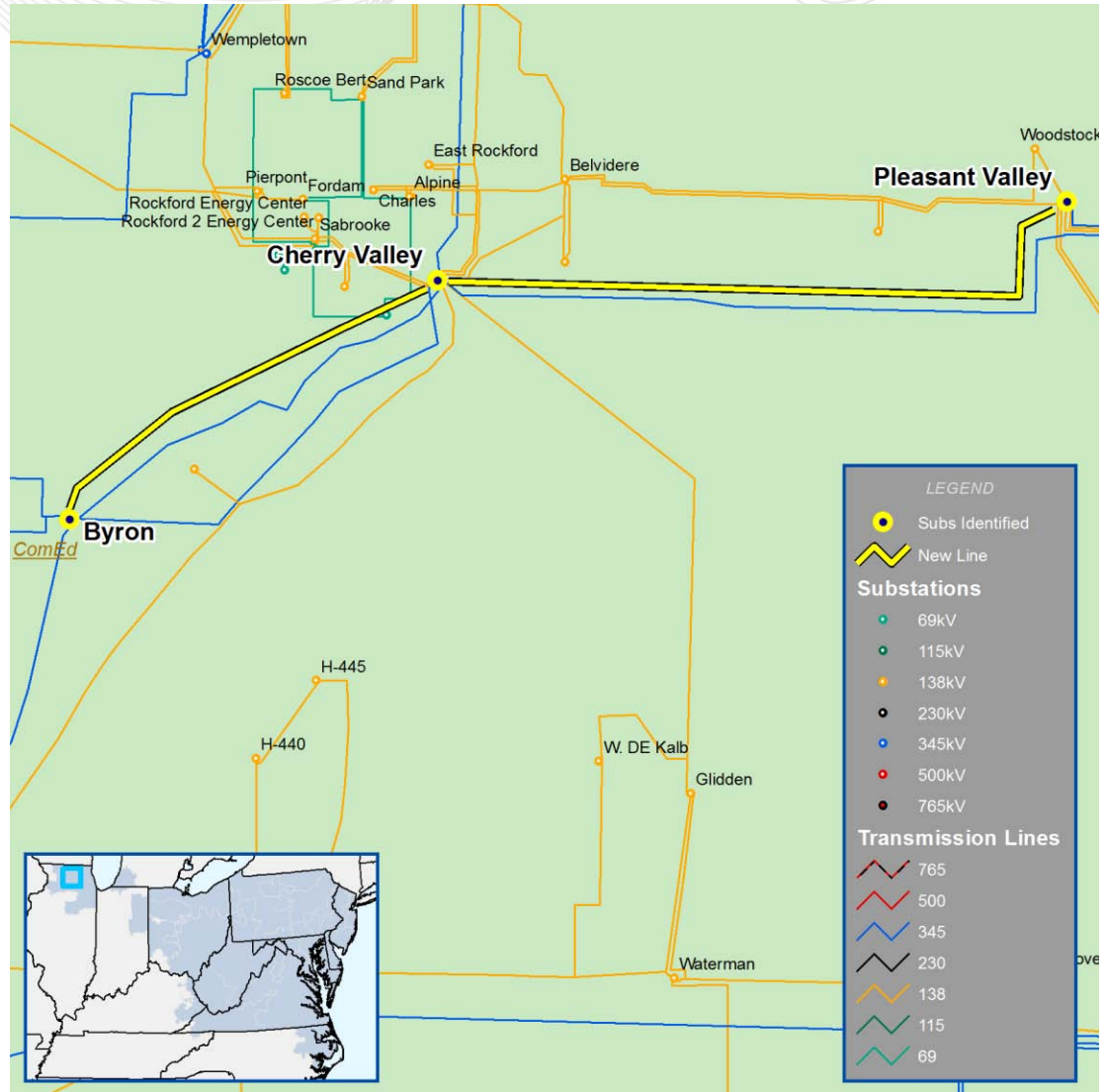
PJM Real-Time Market

- PJM may request wind generator to reduce output if causing transmission constraint
- Based on the intermittent nature of wind, the PJM Unit Dispatch System will only curtail (not increase) Wind Resources to control transmission based on their bid parameters
- Wind may return to normal operating point once constraint is no longer being controlled

Market Efficiency Wind model

- Wind currently modeled as a fixed transaction and non dispatchable.
 - Will not turn off at any cost which results in unanticipated solution results.
 - Not representative of market conditions
- Future studies will model Wind as dispatchable
 - Reflective of actual market bids for wind units
 - Wind will pay to run if economically justified

- BCP Transmission Project submitted by LS Power for new single 345 kV line from Byron to Cherry Valley to Pleasant Valley.
- Expected IS date: 6/1/2015
- LS Power estimated project Costs. \$100-\$125 million
- Results: See next slide





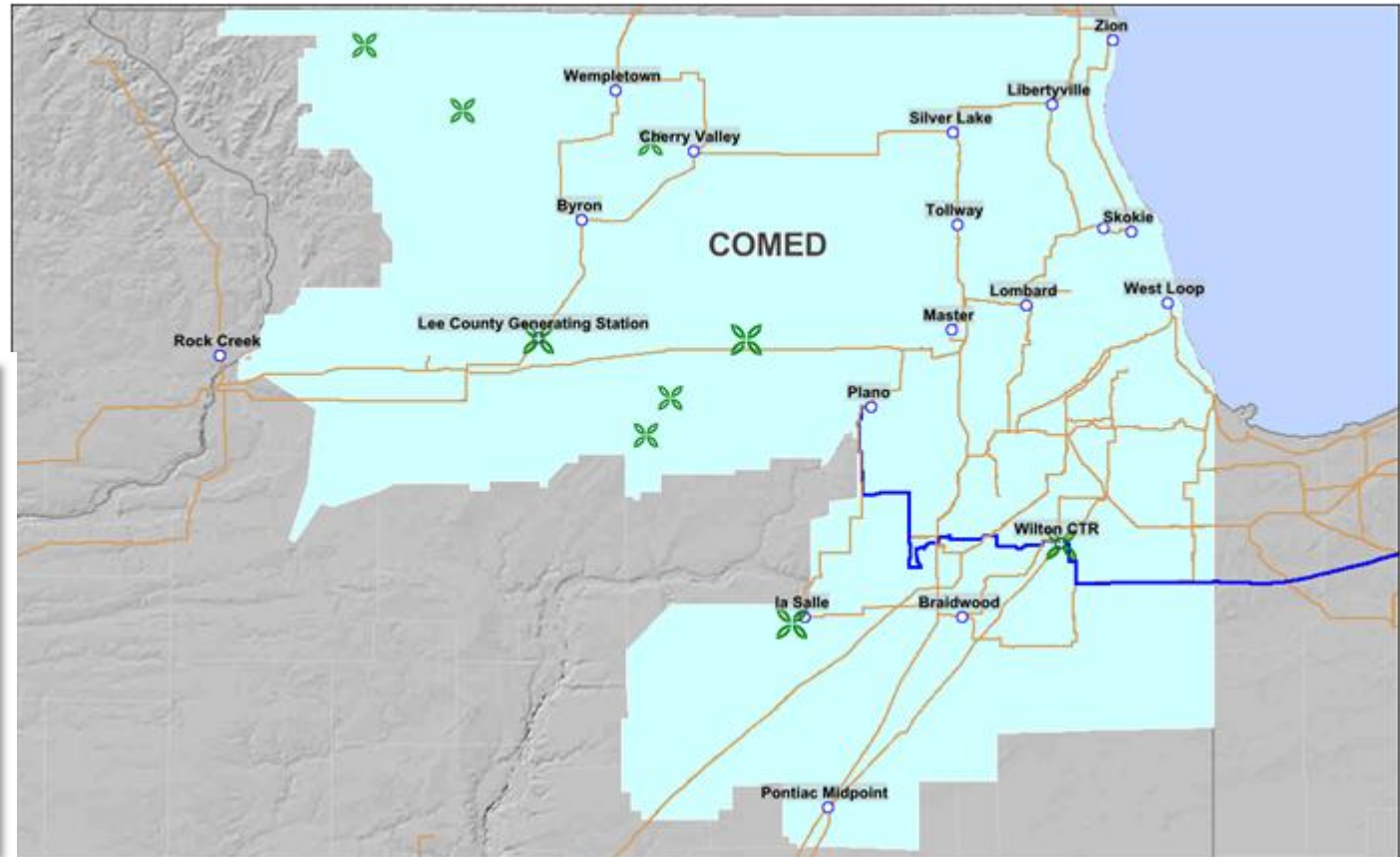
BCP Transmission Project Preliminary Results

Project: Byron – Cherry Valley -Pleasant Valley 345 KV

Scenario	Modeling of Wind in COMED to meet Reserve requirement	Wind bid curve	Total COMED Wind Added in 2019 (MWs)	Average LS Power Estimated Costs (\$millions)	Benefit/Cost Test*
Base	Scale Existing Resources. See slide 12.	Non Dispatchable	6181	112.5	Pass
Base- Wind Dispatchable	Scale Existing Resources. See slide 12.	Dispatchable	6181	112.5	Pass
Western Wind Sensitivity	Western Wind model instead of scaling for COMED only. See slide 13.	Non Dispatchable	6181	112.5	Pass
1/2 Western Wind Sensitivity	1/2 Western Wind model instead of scaling for COMED only. See slide 13.	Non Dispatchable	3091	112.5	Pass

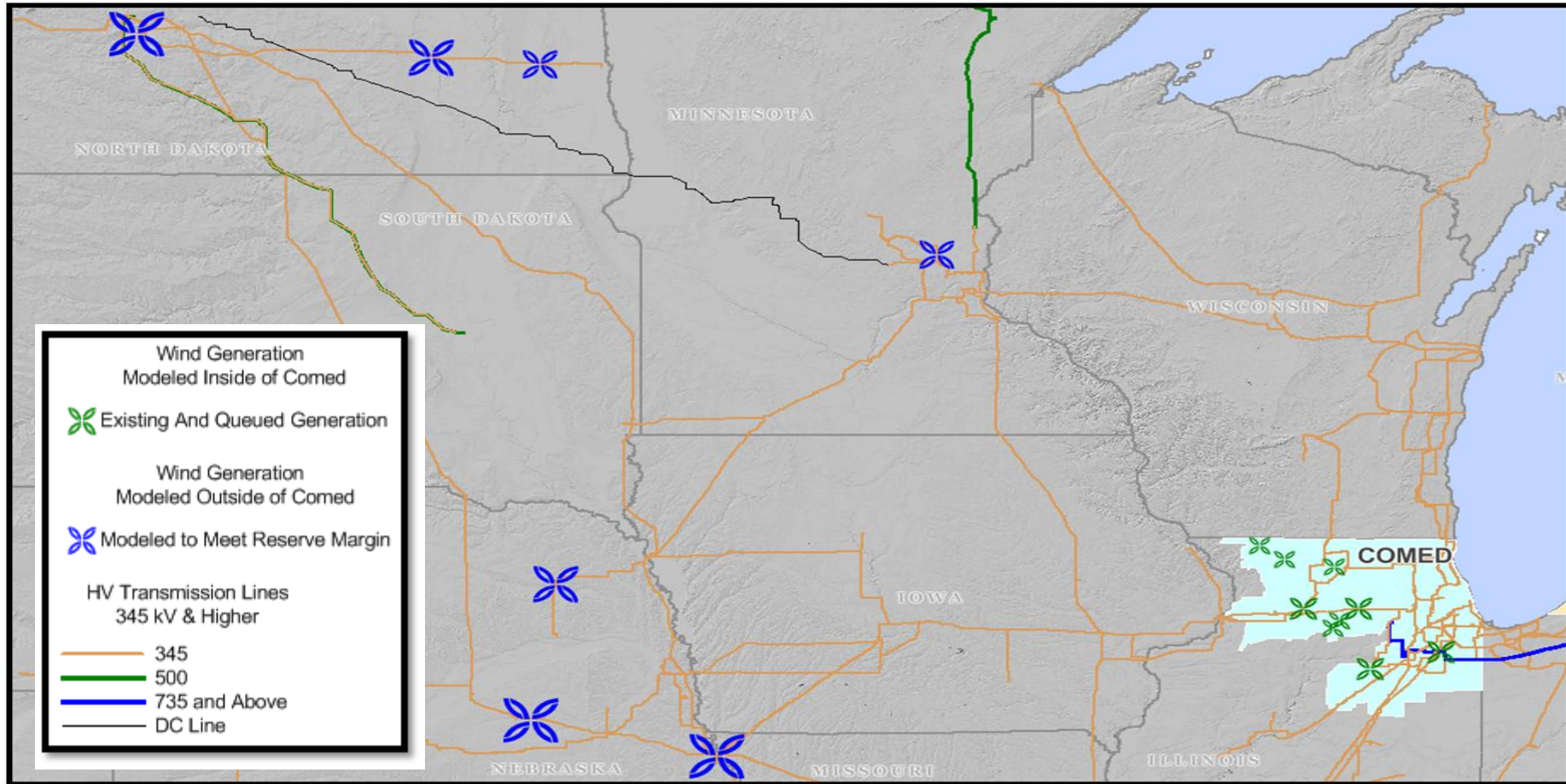
* Benefit/Cost ratio must exceed 1.25 and is calculated as NPV Benefit/NPV Cost for 15 years starting from projected in service date

Base Case – Scaling of existing COMED Resources to meet reserve requirement



Plot developed using Velocity Suite Data and Analysis tool developed by Ventyx Corporation

Western Wind Sensitivity instead of Scaling of existing COMED Resources to meet reserve requirement



Plot developed using Velocity Suite Data and Analysis tool developed by Ventyx Corporation

- Validate Base Case Results
- Study BCP Transmission Project Variations to optimize the Benefit/Cost
 - Variations being developed by LS Power and PJM
 - Run additional sensitivities
- Per 1.5.7 (h) of Operating Agreement, an independent review of costs for projects that exceed \$50 million shall be performed.
 - BCP project subject to this review pending final variation of project

Future Studies:

- LaSalle Transmission Project submitted by LS Power for new single or double 345 kV line from Pontiac Midpoint to Reynolds to Dumont (V4-026) with ISD of 6/1/2014.
- La Fayette Transmission Project submitted by LS Power for new single or double 345 kV line from Quad Cities to Kewanee to Pontiac Midpoint to Reynolds to Dumont along with 345/138 KV transformers at Kewanee station with ISD of 6/1/2015.
- Various configurations of LaSalle and LA Fayette Projects

Market Efficiency Proposed Projects: COMED Zone

- La Fayette Transmission Project submitted by LS Power for new single or double 345 kV line from Quad Cities to Kewanee to Pontiac Midpoint to Reynolds to Dumont along with 345/138 KV transformers at Kewanee station
- Expected IS date: 6/1/2015
- LS Power estimated project Costs.
 - \$500-\$540 million single circuit
 - \$635-\$675 million double circuit
- Results: Under Study

