

2024 RTEP Window 1 Update

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Heavy transmission interface flows west to east driven by load increase in Dominion/East. PJM earlier identified need for additional west-east reinforcement is materializing earlier – higher forecasted load in MAAC/Dominion/APS.

- 10 GW and 15 GW of load increase for 2029 and 2032 respectively between the 2022 LF and 2024 LF
- The load growth is attributed primarily to data centers and some electrification/EV loads.

Proposed reinforcements through 2022 RTEP Window 3 and 2023 RTEP Windows 1 and 2 are performing well.

No major transmission upgrades identified east of DOM/APS.

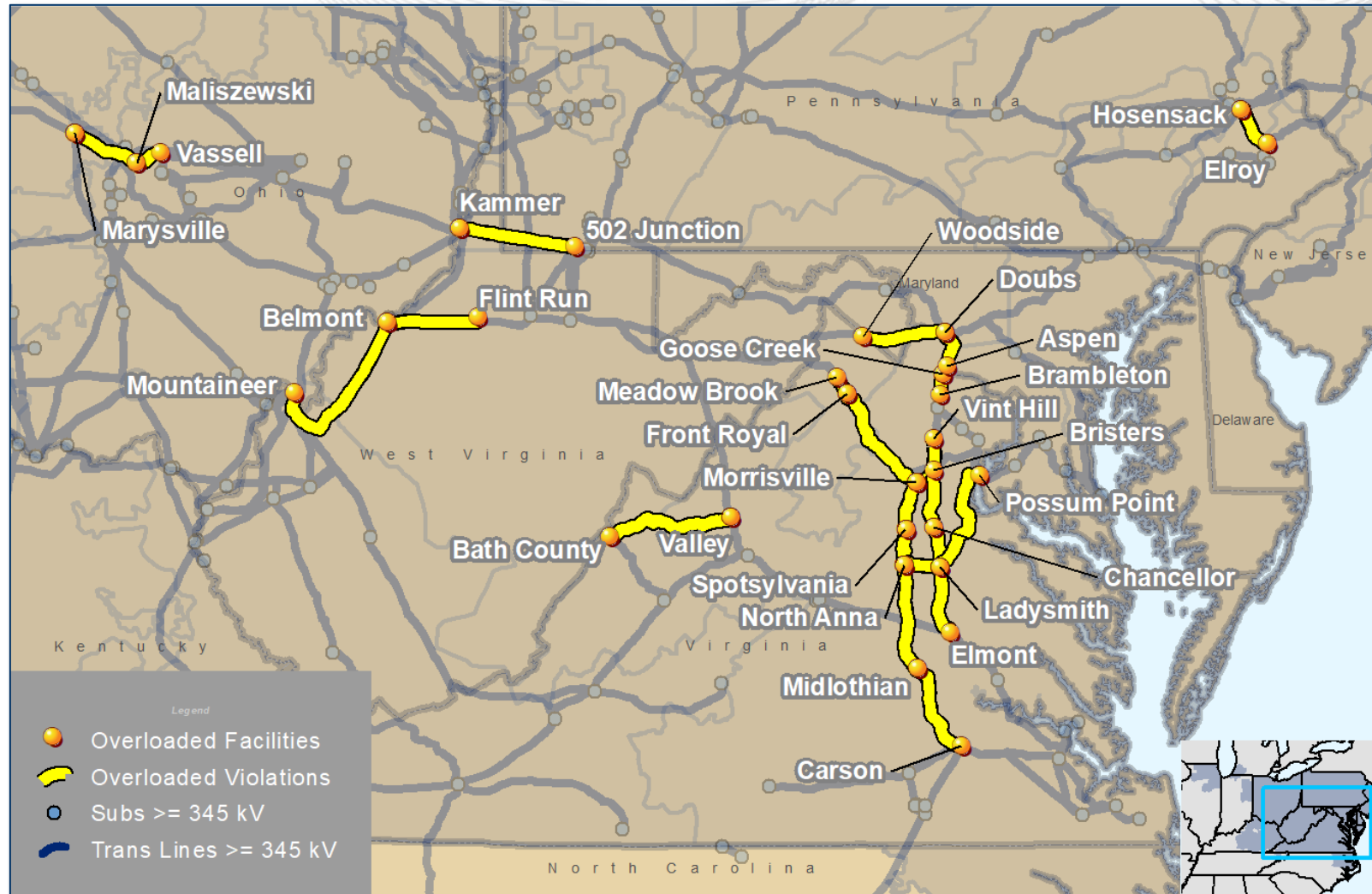
In addition to regional transfer requirements, there are load pockets that need to be addressed in AEP, ATSI, Dominion, PECO, BGE and PPL transmission zones.

Primarily due to shift in generation flow as a result of overall system load increase and +2 GW of generation deactivations.

The eight-year RTEP (2032) scenarios mainly focus on right-sizing solutions.

- Long-lead transmission needs (capture long-lead items).
- Check/confirm impact of “forecast” generation on transmission needs identified in the five-year model.
- PJM will also be considering robustness of the solutions in view of the anticipated 2025 PJM Load Forecast.

2024 RTEP Window 1 Needs: 500 kV & 765 kV



Window **opened**
July 15, 2024

60-Day Window

Window **closed**
Sept. 17, 2024

94 total proposals submitted from 16 different entities
(10 incumbent and 6 non-incumbent).

40 Greenfield Projects
and **48** Upgrades

6 Joint Proposals
(Parent Projects – representing combinations of select
projects from above group)

- Several proposals have cost containment commitments – mostly minor (e.g., engineering).
- Proposals range from simple upgrades to facilities, to new extra-high-voltage transmission lines and facilities.
- Targeting Q1 2025 Board approval – December and January for TEAC first and second reads

All proposals submitted to address west-east regional flows recommended 765 kV solutions:

<p>A number of proposals attempt to address in-zone N-1-1 conditions that were found to be alleviated with the selected regional solutions. These needs will then be eliminated accordingly (Primarily in PPL zone).</p>	<ul style="list-style-type: none"> Multiple proposals recommend variants of Joshua Falls/Axton-Morrisville area 765 kV development. <ul style="list-style-type: none"> Transource (Dominion, FirstEnergy, and Transource) LS Power NextEra The Joint Planning Proposals (by DOM/FE/Transource) recommend a northern, John Amos-Northern Virginia 765 kV development. West-east regional solutions will include at least one variant of these proposals for a 765 kV development, plus accompanying 500 kV and 765 kV upgrades.
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Individual Proposal Screening	Complete
Baseline Scenarios Were Developed and Analyzed	<ul style="list-style-type: none"> Preliminary analysis shows good performance of a number of holistic proposals (joint proposals and those submitted to cover both regional transfer and local needs combined). PJM developed scenarios incorporating (or eliminating) components to identify an optimal combination yielding better performance.
Transfer Capability Analysis	PJM conducted Transfer Capability analysis for key proposals — regional west-east needs.
Scenario Analysis	<ul style="list-style-type: none"> PJM scenario analysis considered variants to where both future generation (west-north and west-south) may materialize and ratio of future load growth split (DOM, PPL and PSEG “Eastern MAAC”). Full scenario details and evaluation results will be shared at the November 19th TEAC.

Scenarios with their associated proposed developments will be ranked based on:

Meeting the system needs of 2029 (all kV levels) and 2032 (long-lead reinforcements)	Being scalable/flexible to address forecasted needs going forward (for right-sizing and limiting disruption) Anticipated load growth to be included in the PJM 2025 Load Forecast (Eastern PJM/MAAC), which will further increase west-east flow requirements from modeled 2024W1 base models.
Utilization of existing ROWs and brownfield development/expansion (where possible and efficient) <ul style="list-style-type: none">Greenfield developments will be required, particularly along all proposed 765 kV solutions – Varying degrees.Expansion to existing 500 kV ROWs instead of wreck and rebuild due to outage and scheduling considerations.	Cost evaluation using third-party cost benchmarking metrics – weak cost containment provisions
	Proposing entity experience in developing and operating 765 kV facilities

Zone	Cluster	Description	Cost (\$M)
ACE	Delco Tap-Mickleton	Circuit switcher replacement	\$ 1.030
AEP	Beatty-Adkins	Replace various substation equipment	\$ 5.500
AEP	Canal-Gay St	Rebuild existing underground line	\$ 15.595
AEP	Cluster 2	Rebuild existing underground line	\$ 31.090
AEP	Cluster 6	Rebuild two existing lines	\$ 33.113
BGE	Baseline	Circuit breaker replacement	\$ 1.921
BGE	Local N-1-1	New 115 kV substation	\$ 107.620
ComEd	Cluster 1	Reconductor line, install circuit breakers and other equipment	\$ 16.270
ComEd	Cluster 2	New transformer	\$ 14.310
ComEd	Wilton Center	Circuit breaker replacement	\$ 2.700
DPL	Milford and Cedar Creek	Adjust relay settings	\$ 0.200
PECO	Baseline	Reconductor existing lines	\$ 43.220
PECO	Elroy-Hosensack	Replace various substation equipment	\$ 1.500
PPL	Baseline	Expand and reconfigure two substations	\$ 31.700
PPL	Pocono area	New capacitor bank	\$ 4.930
First read totals			\$ 310.699

- As part of the 2024 RTEP Window 1, the projects listed in the table below were proposed to address Cluster AEP-3, 4, 5

Proposal ID #	Project Type	Entity	Cluster	Project Title	Project Description	kV Level	Estimated Cost (\$M)
408	GREENFIELD	AEPSCT	AEP - 3/4/5	Maliszewski 765/345 kV Upgrades	Establish a 345 kV yard at the existing Maliszewski station and upgrade the 765 kV portion of the station to accommodate and install a 765/345 kV transformer and cut in the existing Hyatt - West Millersport 345 kV; Hyatt - West Millersport 345 kV Cut In at Corridor 345KV station; Station work at Corridor 345 kV station, Hyatt 35kV station and Marysville 345kV station; Relaying Upgrades at West Millersport 345 kV ; Maliszewski - Corridor 345 kV Reconductoring; Bokes Creek - Marysville 345kV Reconductoring; Marysville - Hyatt 345 kV Rebuild	765/345	145.494
350	GREENFIELD	TRNSRC	AEP - 3/4/5	Jester - Hayden	- Jester greenfield 765/345kV station - Approx. 12 miles of greenfield 345kV double circuit transmission line between Jester greenfield 765/345kV Station and Hayden 345kV stations.	765/345	229.411
863	UPGRADE	AEPSCT	AEP - 3/4	Maliszewski Series Reactor Upgrades	Replace the existing 138 kV series reactor at Maliszewski station with a 4% reactor with a higher continuous current rating. In addition, the proposal will upgrade limiting station equipment on the reactor bypass.	138	2.328
744	UPGRADE	AEPSCT	AEP - 4	Maliszewski-Polaris Rebuild	Rebuild the 2.8 mile 138 kV line between Maliszewski and Polaris stations.	138	8.884
338	UPGRADE	AEPSCT	AEP - 3	Genoa-Westar Rebuild	Rebuild the approximately 2 mile long 138 kV line between Westar and Genoa stations.	138	8.789
464	UPGRADE	AEPSCT	AEP - 3	Genoa-Westar Sag Remediation	Perform a sag study and mitigate clearance issues on Westar - Genoa 138 kV line to allow line to operate to conductor's designed rating	138	2.815

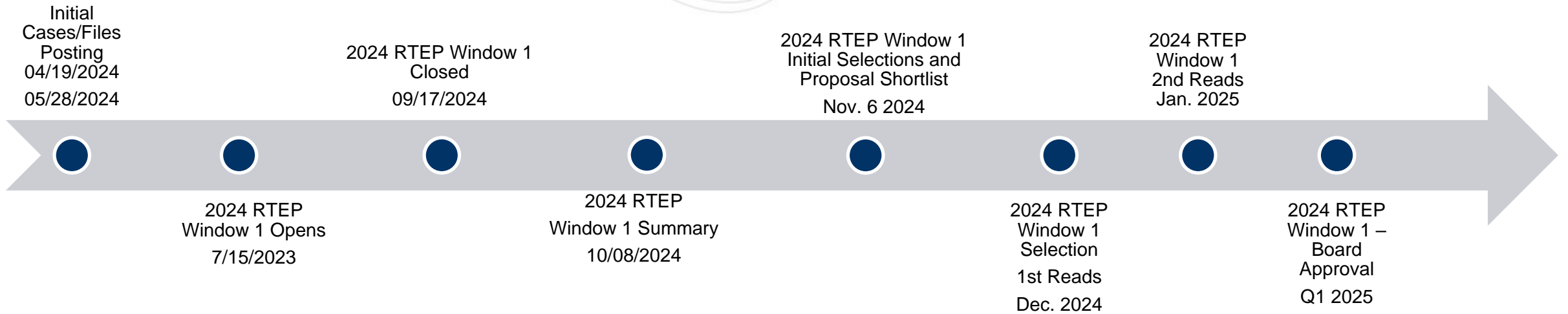
- Additionally, in the non-competitive solution, AEP submitted a solution to upgrade 765 kV circuit breaker 'B' to a 5000A 50 kA breaker at Maliszewski station. In addition, the project will replace disconnect switches on breakers 'B' and 'D', upgrade the existing wavetrap towards Marysville, and upgrades relays on the 765 kV lines towards Marysville and Vassell. **Estimated cost: \$6.9M;**

- As part of the 2024 RTEP Window 1, the projects listed in the table below were proposed to address Cluster 2 in ATSI zone

Proposal ID #	Project Type	Entity	Cluster	Project Title	Project Description	kV Level	Estimated Cost (\$M)
605	UPGRADE	ATSI	ATSI - 2	Rebuild/Reconductor existing 138 kV lines/Terminal upgrades at 345 kV substations	Rebuild Beaver to Johnson, Greenfield to Lakeview, Avery to Shinkrock, Avery to Hayes and Greenfield to Beaver Corridor. Reconductor 1 span from Ottawa substation. Upgrade terminal equipment at Beaver, Davis Besse & Bayshore 345 kV substation. Swap 345 kV line terminals at Beaver 345 kV substation	138/345	265.1
843	GREENFIELD	ATSI	ATSI – 2	New 345 kV line between Lemoyne to Lake Ave	Build a new approximately 88 miles Lemoyne - Lake Avenue 345 kV line by leveraging existing 138 kV corridors. Associated yard work at Lemoyne and Lake Ave 345 kV substations	345	455.0
694	GREENFIELD	TRNSRC	ATSI – 2	New double circuit 345 kV line between Fostoria Central and Lake Ave	Build a new 79 mile 345kV double circuit line from Fostoria Central to Lake Avenue 345kV station. - Lake Ave 345kV station. Associated Substation work at Fostoria Central and Lake Ave 345 kV substations	345	328.3
533	GREENFIELD	NEXTERA	ATSI – 2	New 345 kV line between Lemoyne - Lake Ave	Construct a single circuit 345kV line from ATSI's Lemoyne substation to ATSI's Lake Ave substation. Associated yard work at Lemoyne and Lake Ave 345 kV substations	345	202.0
294	GREENFIELD	NEXTERA	ATSI – 2	New 345 kV line between Bayshore to Davis Besse to Lake Ave	Install second circuit on open tower position along the existing Bayshore - Davis-Besse 345 kV line. Utilize spare tower position on the Davis-Besse to Lemoyne line to string a new 345kV circuit from Davis-Besse to Lake Ave. Associated yardwork at existing Bay Shore, Davis Besse and Lake Ave 345 kV substations	345	257.3
357	GREENFIELD	NEXTERA	ATSI - 2	New 345 kV line between Bayshore to Davis Besse to Lake Ave New 345 kV line between Lemoyne to Lake Ave	Install second circuit on open tower position along the existing Bayshore - Davis-Besse line. Utilize spare tower position on the Davis-Besse to Lemoyne line to string a new 345kV circuit from Davis-Besse to Lake Ave. Install new circuit on empty tower position on portion of Lemoyne - Davis Besse corridor. Associated yardwork at existing Bay Shore, Davis Besse, Lemoyne and Lake Ave 345 kV substations	345	344.1

- The Following Proposals are selected for further evaluation (Short-Listed):
 - Proposal # 636
 - Proposal # 610
 - Proposal # 262
- All other proposals part of the preliminary shortlist are not subject to further consideration.

- PJM will continue evaluation of the shortlisted projects.
- PJM will provide and publish the Reliability and Constructability/Cost Assessment Reports in December 2024.
- December 2024 TEAC will cover all 1st Reads and 2nd Reads for projects selected and presented at the current meeting.



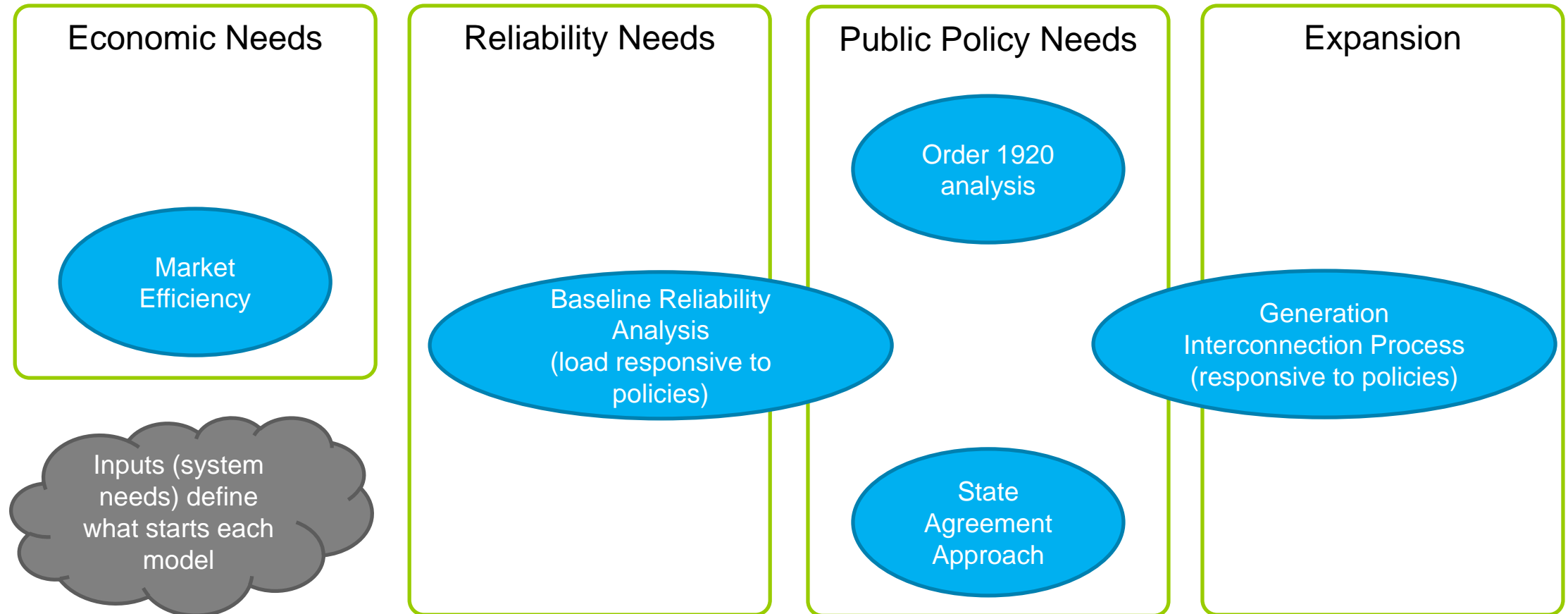
November 6 TEAC Slides – [link](#)
November 19 TEAC Slides – [link](#)

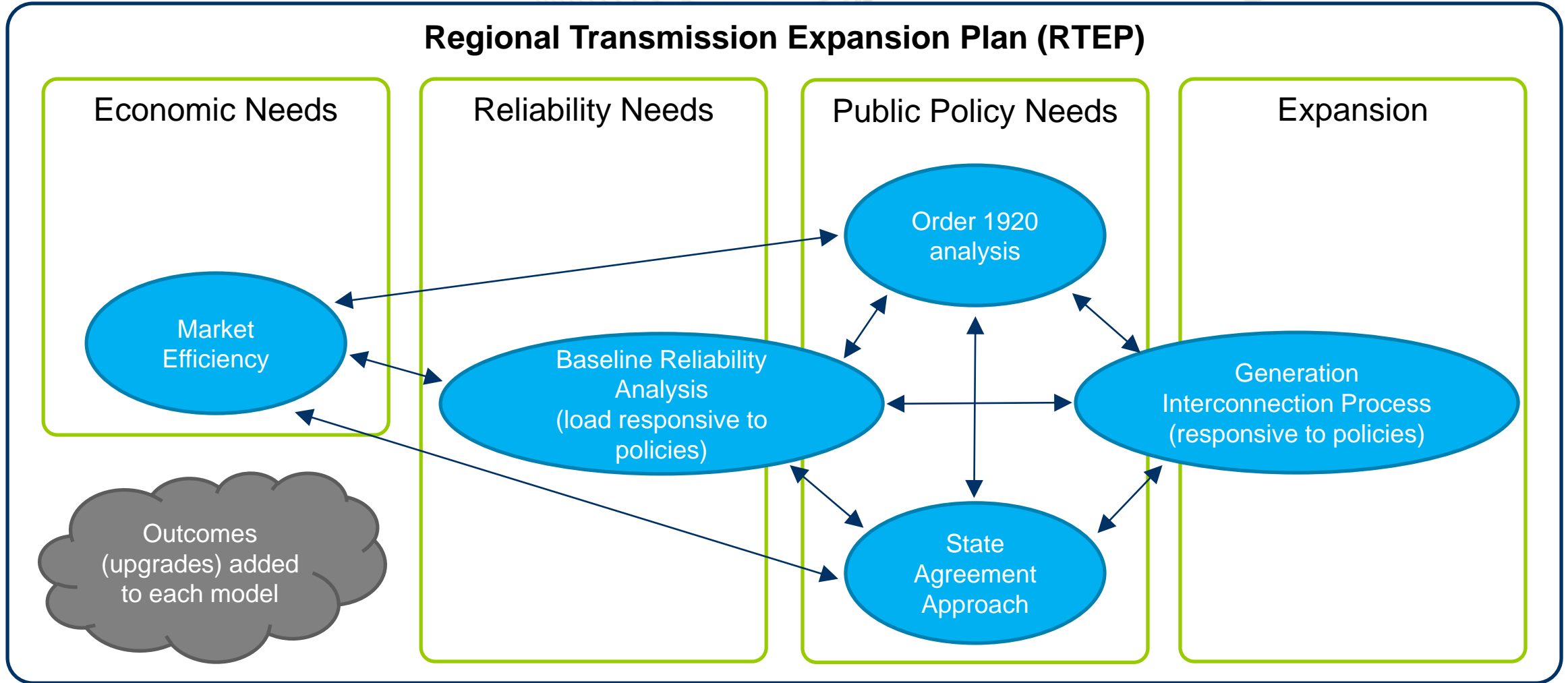
Near-term and Long-term Planning Post Order 1920

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- Order 1000 processes
 - Reliability Planning (base needs of the system)
 - State Agreement Approach (public policy needs)
 - Competitive window (solicitation of solutions)
- Order 1920 process
 - Scenarios for public policy

Regional Transmission Expansion Plan (RTEP)





- Planning doesn't happen in a vacuum.
 - Models and upgrades are synchronized to ensure the best solutions are selected and built.
- Each decision influences subsequent analysis.
 - Signed GIAs add network upgrades to the next near-term case.
 - Approved baselines are included in the next interconnection case.