

Subregional RTEP Committee - Western FirstEnergy Supplemental Projects

March 19, 2021

Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

Need Number: APS-2021-002

Process Stage: Need Meeting 3/19/2021

Project Driver:
Customer Service

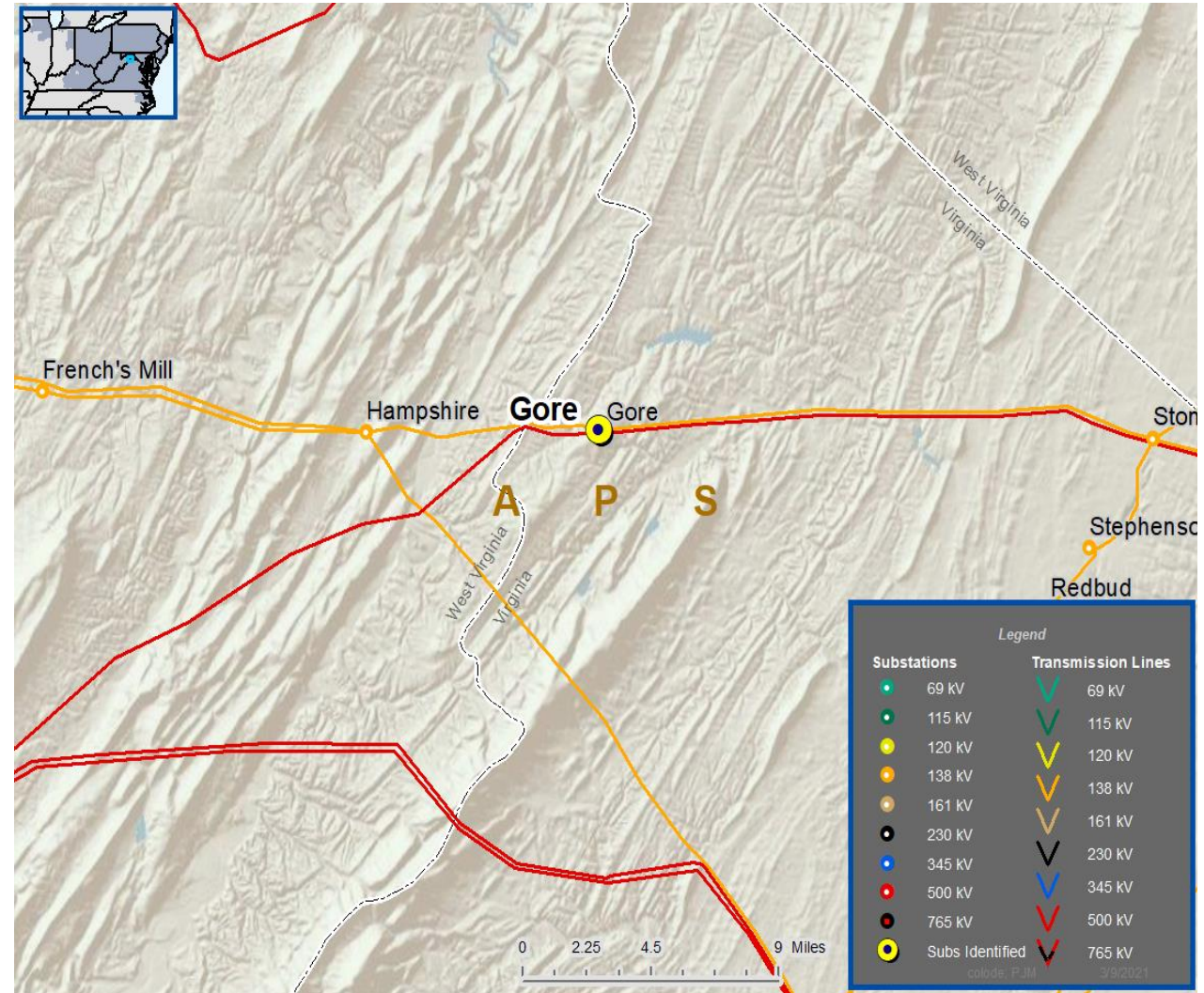
Specific Assumption Reference:

Existing wholesale customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

Existing Wholesale Customer Connection – Gore substation expansion to accommodate existing wholesale customer station upgrades.

Requested in-service date is May 2021.



Solutions

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

Need Number: APS-2019-015 and APS-2020-009

Process State: Solutions Meeting 03/19/2021

Previously Presented: 12/18/2019 and 05/22/2020

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

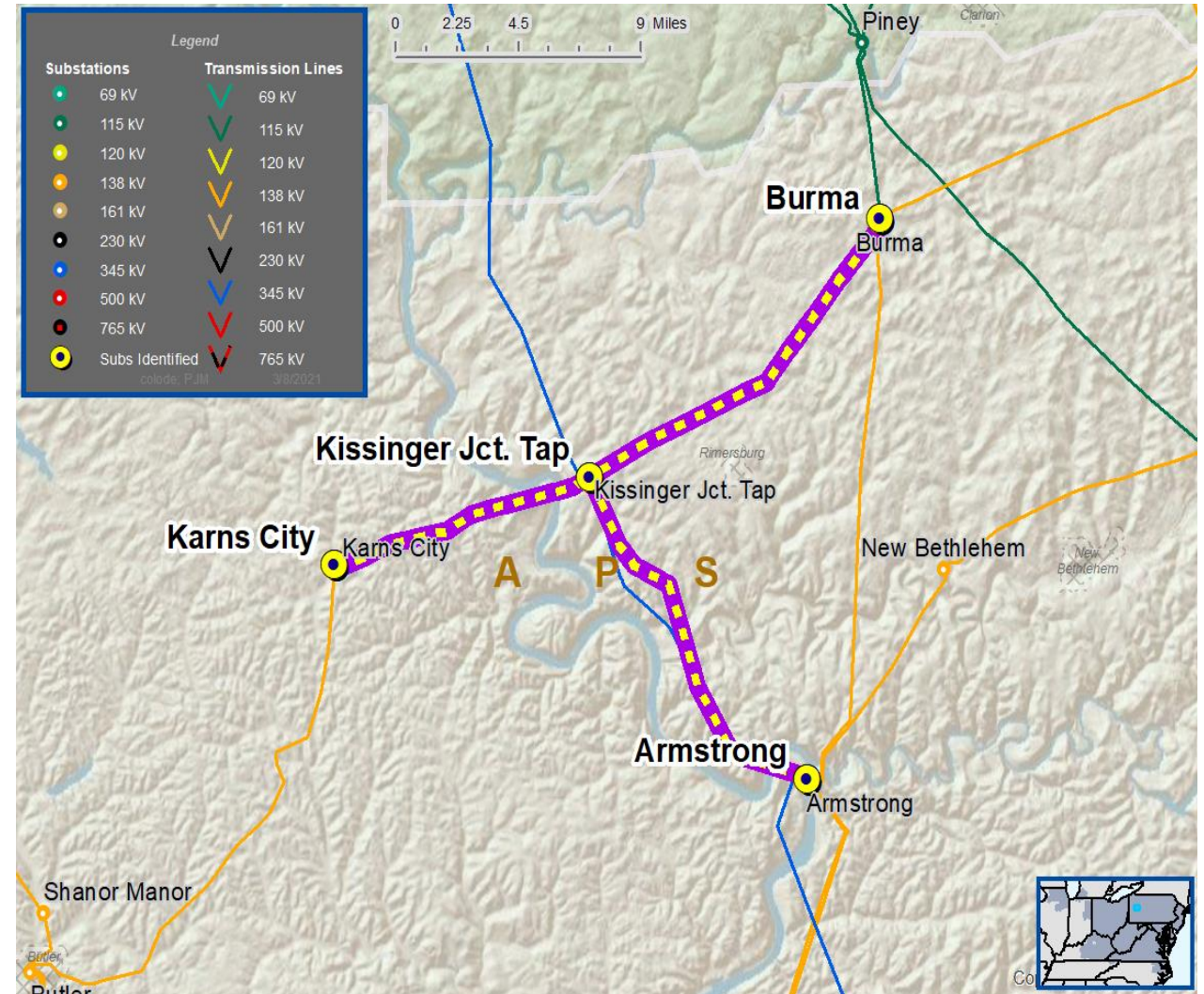
Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

Upgrade Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Bus Protection schemes



Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
APS-2019-015	Karns City–Butler 138kV Line	141/179	160/192	Substation Conductor
APS-2020-009	Karns City–Kissinger 138kV Line	221/268	221/268	Line Relaying (existing rating 306 MVA (WE) conductor rating 317 MVA (WE))
	Armstrong –Kissinger 138kV Line	221/268	221/268	N/A
	Burma –Kissinger 138 kV Line	293/332	308/376	Substation Conductor, Line Relaying, Line Trap, Circuit Breaker

Proposed Solution:

Need Number	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE)	Scope of Work	Estimated Cost (\$ M)	Target ISD
APS-2019-015	Karns City–Butler 138 kV Line	160/192	<ul style="list-style-type: none"> At Karns City 138 kV Substation – Replace breaker, disconnect switches, line trap, line tuner, coax, CVT, and substation conductor. Install MCOV surge arrestors and AMETEK Smart-Gap in line tuner At Butler 138 kV Substation – Replace breaker, disconnect switches, line trap, line tuner, coax, CVT, and substation conductor. Install MCOV surge arrestors and AMETEK Smart-Gap in line tuner 	\$1.9	12/22/2023
APS-2020-009	Karns City–Kissinger Jct 138 kV Line	221/268	<ul style="list-style-type: none"> At Karns City 138 kV Substation – Replace breaker, line trap, line tuner, coax, and CVT. Install MCOV surge arrestors and AMETEK Smart-Gap in line tuner 	\$1.8	06/01/2023
	Armstrong – Kissinger Jct 138 kV Line	221/268	<ul style="list-style-type: none"> At Armstrong 138 kV Substation – Install AMETEK Smart-Gap in line tuner 		
	Burma – Kissinger Jct 138 kV Line	308/376	<ul style="list-style-type: none"> At Burma 138 kV Substation – Replace breaker, disconnect switches, line trap, CVT, and substation conductor. Install MCOV surge arrestors and AMETEK Smart-Gap in line tuner 		

Alternatives Considered:

Maintain existing condition with elevated risk of failure

No topology changes, no bubble diagram required.

Project Status: Engineering

Model: 2020 RTEP model for 2025 Summer (50/50)

Need Number: APS-2020-007

Process State: Solutions Meeting 03/19/2021

Previously Presented: 05/22/2020

Project Driver:

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects

- Load at risk in planning and operational scenarios

Add/Expand Bus Configuration

- Reduce the amount of exposed potential local load loss during contingency conditions
- Eliminate simultaneous outages to multiple networked elements

Problem Statement:

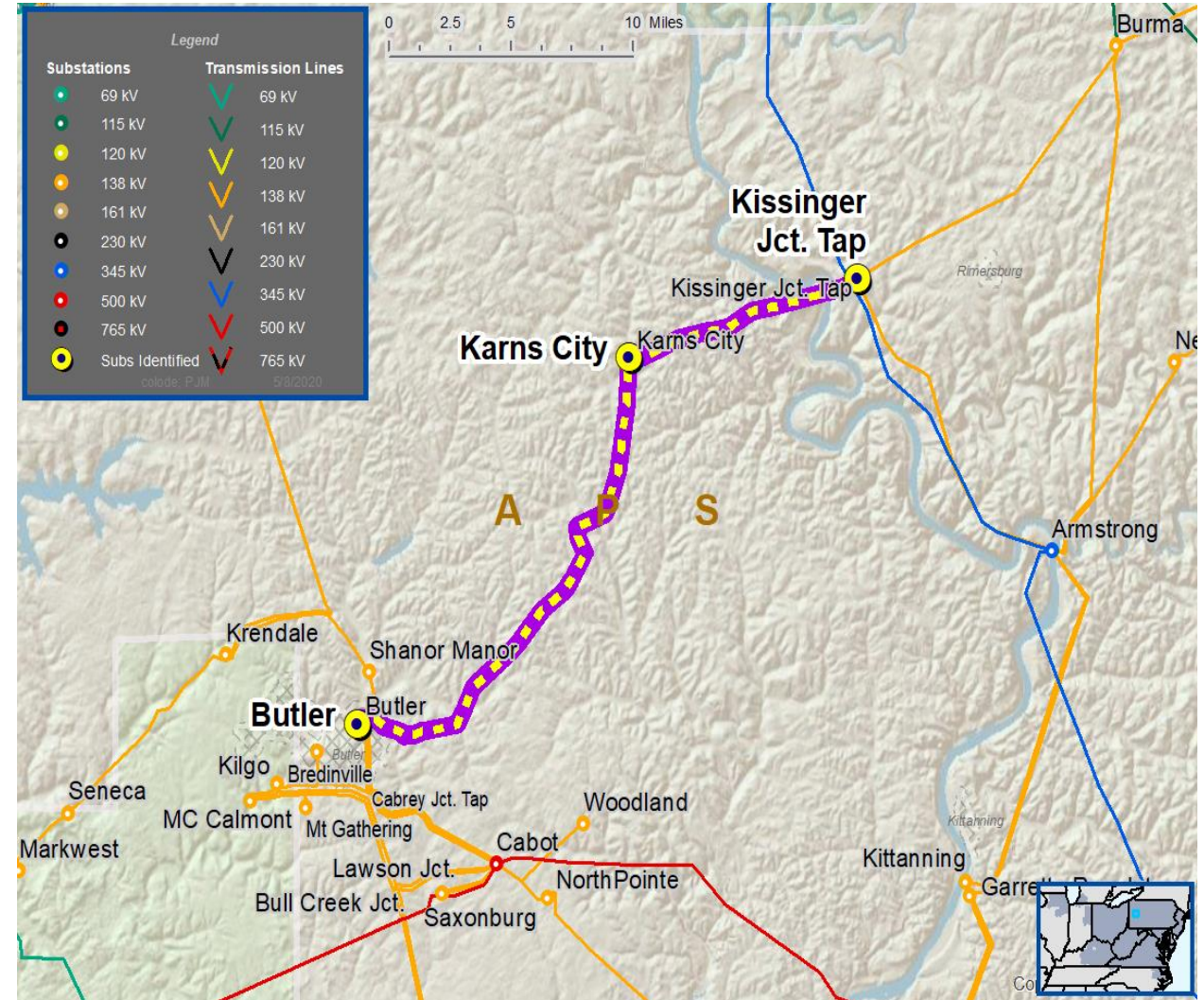
Loss of the Karns City #1 or #2 138-25 kV transformer results in significant voltage drop on the 25 kV system. Karns City substation consists of:

- Two distribution transformers connected to transmission with switches
- Two networked 138 kV transmission lines

Transmission lines are limited by terminal equipment.

- Karns City–Butler 138 kV existing line rating is 141 / 179 MVA (SN/SE). The existing transmission line conductor rating is 160 / 192 MVA (SN/SE). (substation conductor) Refer to APS-2019-015.
- Karns City–Kissinger Junction 138 kV existing line rating is the existing transmission line conductor rating of 221 / 268 MVA (SN/SE). The winter emergency line rating is limited to 306 MVA from 317 MVA. (line relaying) Refer to APS-2020-009.

Model: 2020 RTEP model for 2025 Summer (50/50)



Need Number: APS-2020-007

Process State: Solutions Meeting 03/19/2021

Proposed Solution:

At Karns City 138 kV Substation:

- Install a 138 kV bus tiebreaker disconnect switches.
- Install 138 kV CVT's and support structure.
- Replace/add 25 kV VT's.
- Upgrade relaying and protection.

Estimated Project Cost: \$1.3M

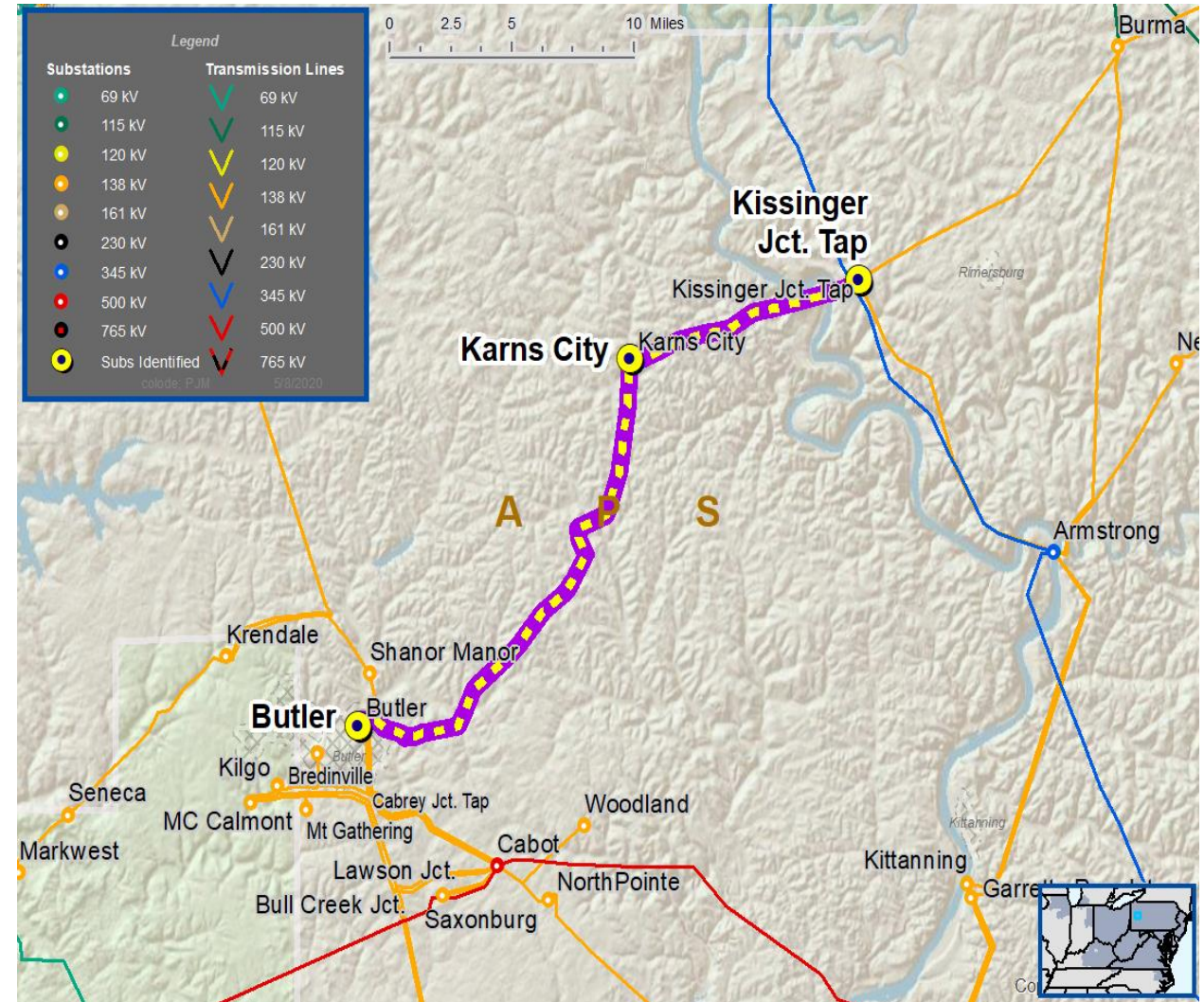
Alternatives Considered:

- Install 138 kV breakers on the high side of both 138-25 kV transformers.

Projected In-Service: 12/22/2023

Project Status: Conceptual

Model: 2020 RTEP model for 2025 Summer (50/50)



Appendix

High Level M-3 Meeting Schedule

Assumptions	Activity	Timing
	Posting of TO Assumptions Meeting information	20 days before Assumptions Meeting
	Stakeholder comments	10 days after Assumptions Meeting
Needs	Activity	Timing
	TOs and Stakeholders Post Needs Meeting slides	10 days before Needs Meeting
	Stakeholder comments	10 days after Needs Meeting
Solutions	Activity	Timing
	TOs and Stakeholders Post Solutions Meeting slides	10 days before Solutions Meeting
	Stakeholder comments	10 days after Solutions Meeting
Submission of Supplemental Projects & Local Plan	Activity	Timing
	Do No Harm (DNH) analysis for selected solution	Prior to posting selected solution
	Post selected solution(s)	Following completion of DNH analysis
	Stakeholder comments	10 days prior to Local Plan Submission for integration into RTEP
	Local Plan submitted to PJM for integration into RTEP	Following review and consideration of comments received after posting of selected solutions

Revision History

xx/xx/2021 – V1 – Original version posted to pjm.com

03/18/2021 – V2 – Updated ISD date for APS-2019-015 and APS-2020-007

03/19/2021 – V3 – Updated diagram for APS-2021-002 and formatting