

Submission of Supplemental Projects for Inclusion in the Local Plan

Need Number: APS-2021-006, APS-2021-010

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/11/2022

Previously Presented:

Solution Meeting 11/19/2021

Need Meeting 5/28/2021

Project Driver:

*Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency*

Specific Assumption Reference:

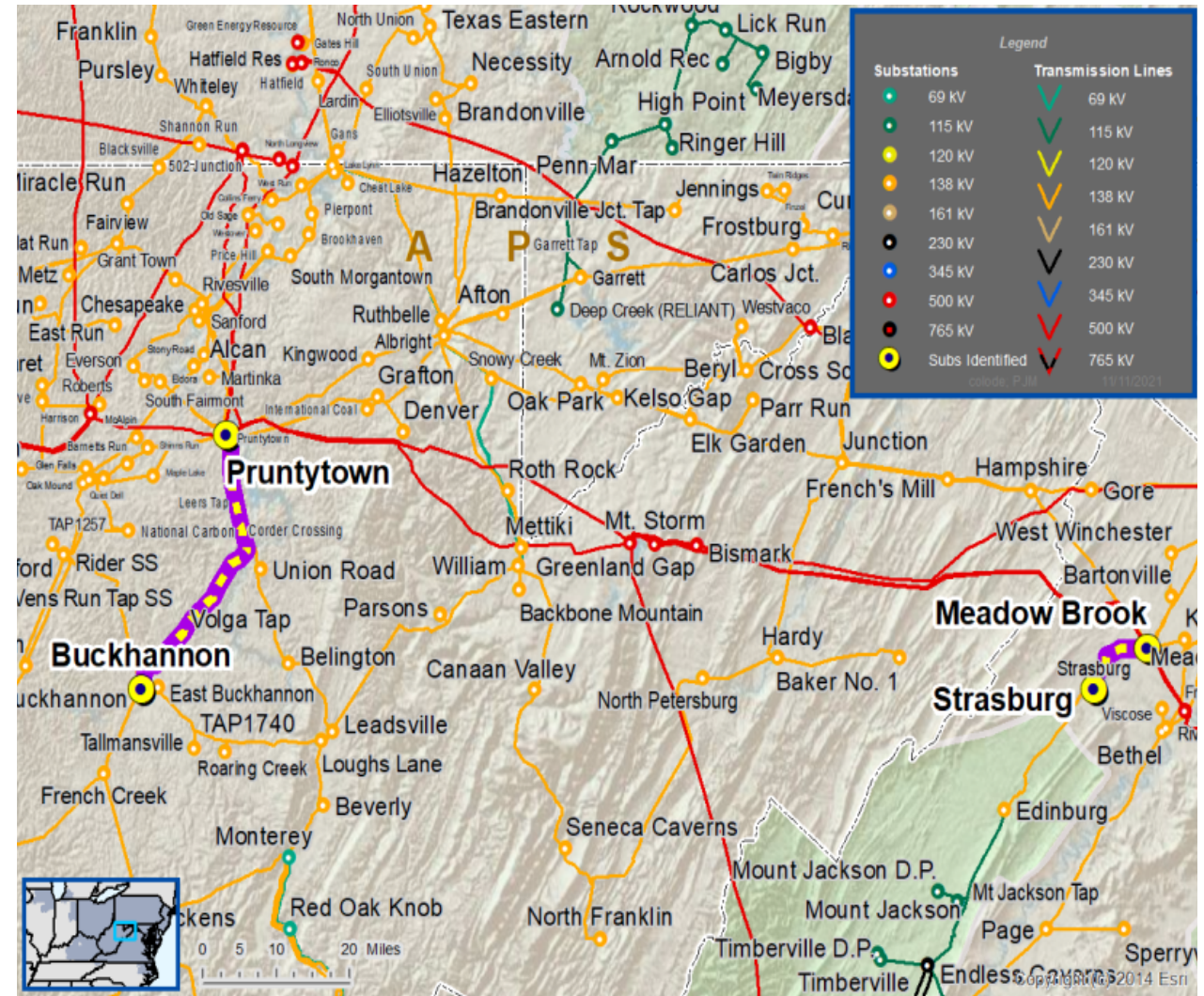
System Performance Projects Global Factors

- 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.)
- Communication technology upgrades
- Bus protection schemes

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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many cases the protection equipment cannot be repaired due to a lack of replacement part and available expertise in the outdated technology.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-2021-006	Meadow Brook – Strasburg 138 kV Line	229 / 229	275 / 333	Relay Thermals, CT, and Wave Trap

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
APS-2021-010	Buckhannon – Volga Tap 138 kV Line	164 / 206	221 / 268	Disconnect Switch, Substation Conductor, Wave Trap
	Volga Tap – Corder Crossing 138 kV Line	221 / 268	221 / 268	N/A
	Corder Crossing – Leer South 138 kV Line	221 / 268	221 / 268	N/A
	Leer South – Pruntytown 138 kV Line	250 / 287 WN/WE	250 / 317 WN/WE	Meter



APS Transmission Zone M-3 Process Misoperation Relay Projects

Selected Solution:

Need Number	Transmission Line / Substation Locations	Supplemental ID	New MVA Line Rating (SN / SE)	Scope of Work	Estimated Cost (\$ M)	Target ISD
APS-2021-006	Meadow Brook – Strasburg 138 kV Line	s2699	275 / 333	<ul style="list-style-type: none"> Meadow Brook 138 kV Substation – Replace wave trap Strasburg 138 kV Substation – Replace line relaying, CT, and wave trap 	\$1.1M	03/31/2022

Need Number	Transmission Line / Substation Locations	Supplemental ID	New MVA Line Rating (SN / SE)	Scope of Work	Estimated Cost (\$ M)	Target ISD
APS-2021-010	Buckhannon – Volga Tap 138 kV Line	s2700	221 / 268	<ul style="list-style-type: none"> Pruntytown 138 kV Substation – Replace disconnect switch, substation conductor, and wave trap 	\$1.6M	11/23/2022
	Leer South – Pruntytown 138 kV Line		221 / 268	<ul style="list-style-type: none"> Pruntytown 138 kV Substation – Meter 		

Need Number: APS-2022-002

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/11/2022

Previously Presented: Solution Meeting 07/22/2022
Need Meeting 05/19/2022

Project Driver:

Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency

Specific Assumption Reference:

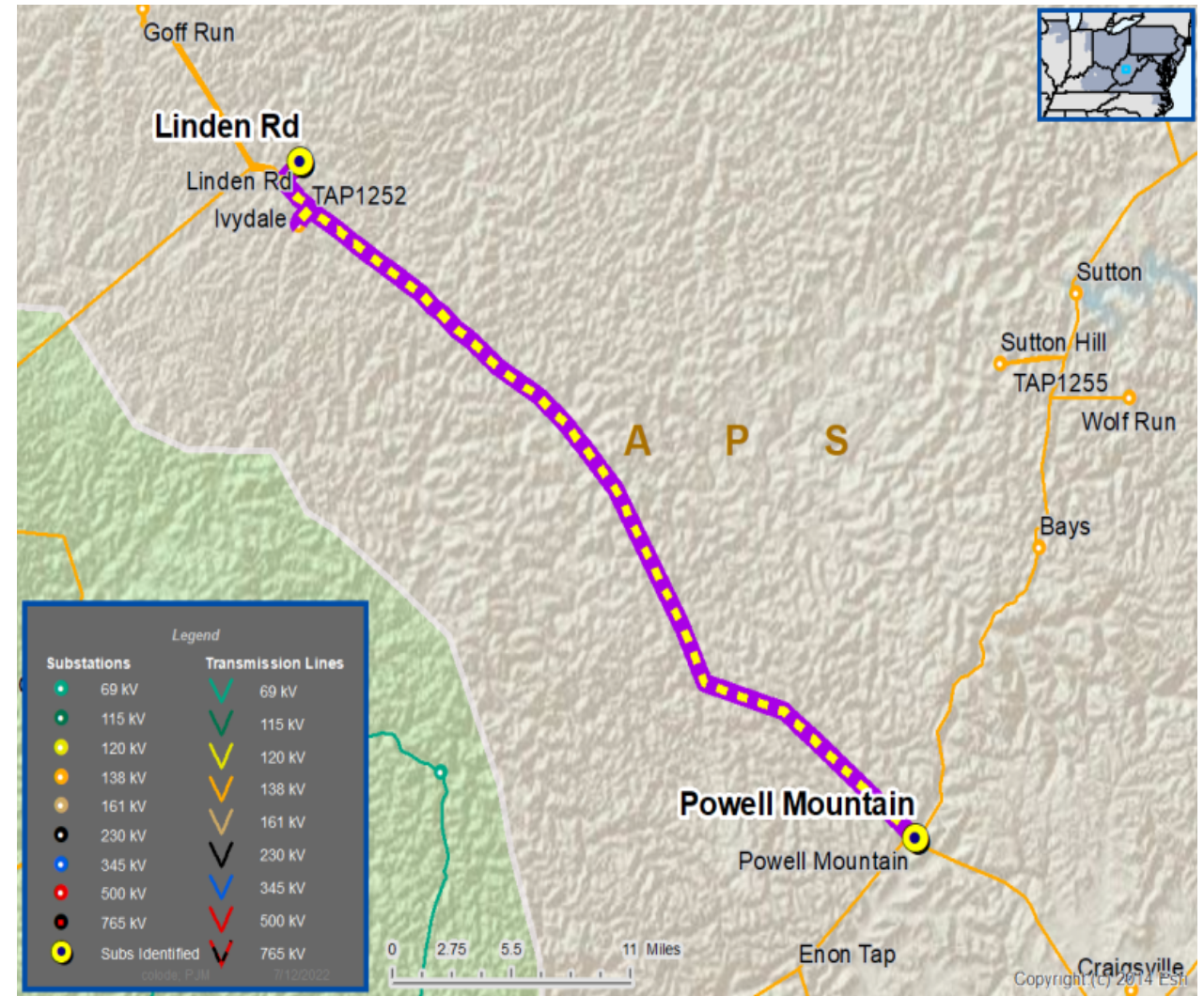
System reliability and performance.
System Condition Projects

- Line Condition Rebuild/Replacement
 - Transmission Line Switches

Problem Statement:

The Powell Mountain – Linden Road 138 kV line has two in-line switches that have limited availability of spare parts and vendor technical support. Age/condition of wood pole transmission line structures and associated switches lead to operational limitations.

- Switches A-1225 and A-1226
 - Transmission line rating is 164/206 MVA (SN/SE)



Need Number: APS-2022-002

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/11/2022

Selected Solution:

- Replace existing switches A-1225 and A-1226 at the Ivydale tap on the Powell Mountain – Linden Road 138 kV line

Ratings Before:

- Powell Mt – Ivydale Tap 138 kV Line:
 - 164/206/228 MVA SN/SE/SLD
 - 216/229/245 MVA WN/WE/WLD
- Ivydale Tap – Linden Road 138 kV Line:
 - 164/206/237 MVA SN/SE/SLD
 - 216/248/271 MVA WN/WE/WLD

Ratings After:

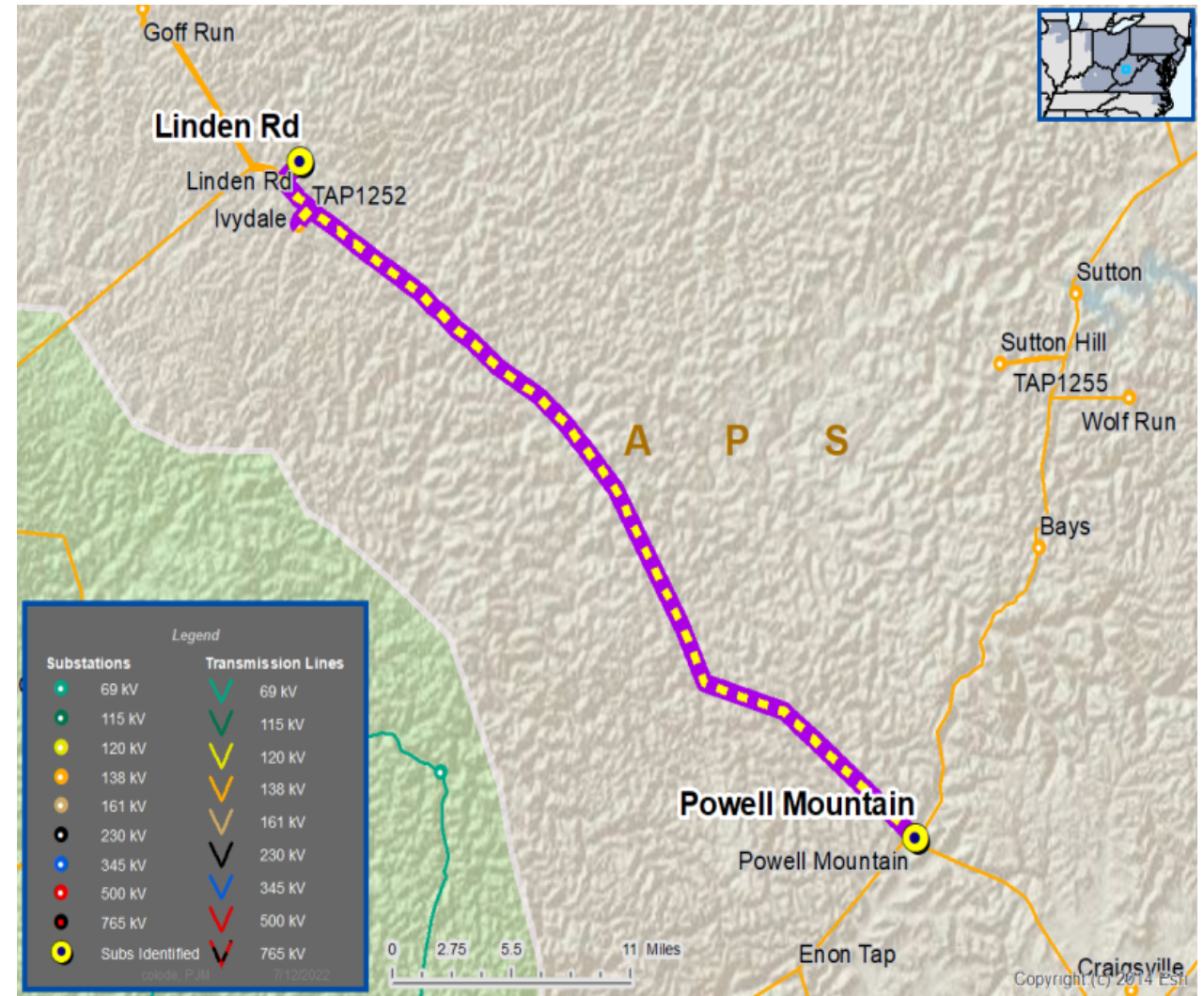
- Powell Mt – Ivydale Tap 138 kV Line:
 - 169/209/228 MVA SN/SE/SLD
 - 217/229/245 MVA WN/WE/WLD
- Ivydale Tap – Linden Road 138 kV Line:
 - 169/213/245 MVA SN/SE/SLD
 - 217/280/303 MVA WN/WE/WLD

Estimated Project Cost: \$0.5M

Projected In-Service: 11/01/2022

Supplemental Project ID: s2760

Model: 2022 RTEP model for 2027 Summer (50/50)



Need Number: APS-2022-004

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/11/2022

Previously Presented:

Solution Meeting 07/22/2022

Need Meeting 05/19/2022

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

Specific Assumption Reference:

Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures
- Age/condition of steel tower or steel pole transmission line structures

Substation Performance Projects Global Factors

- Substation/line equipment limits

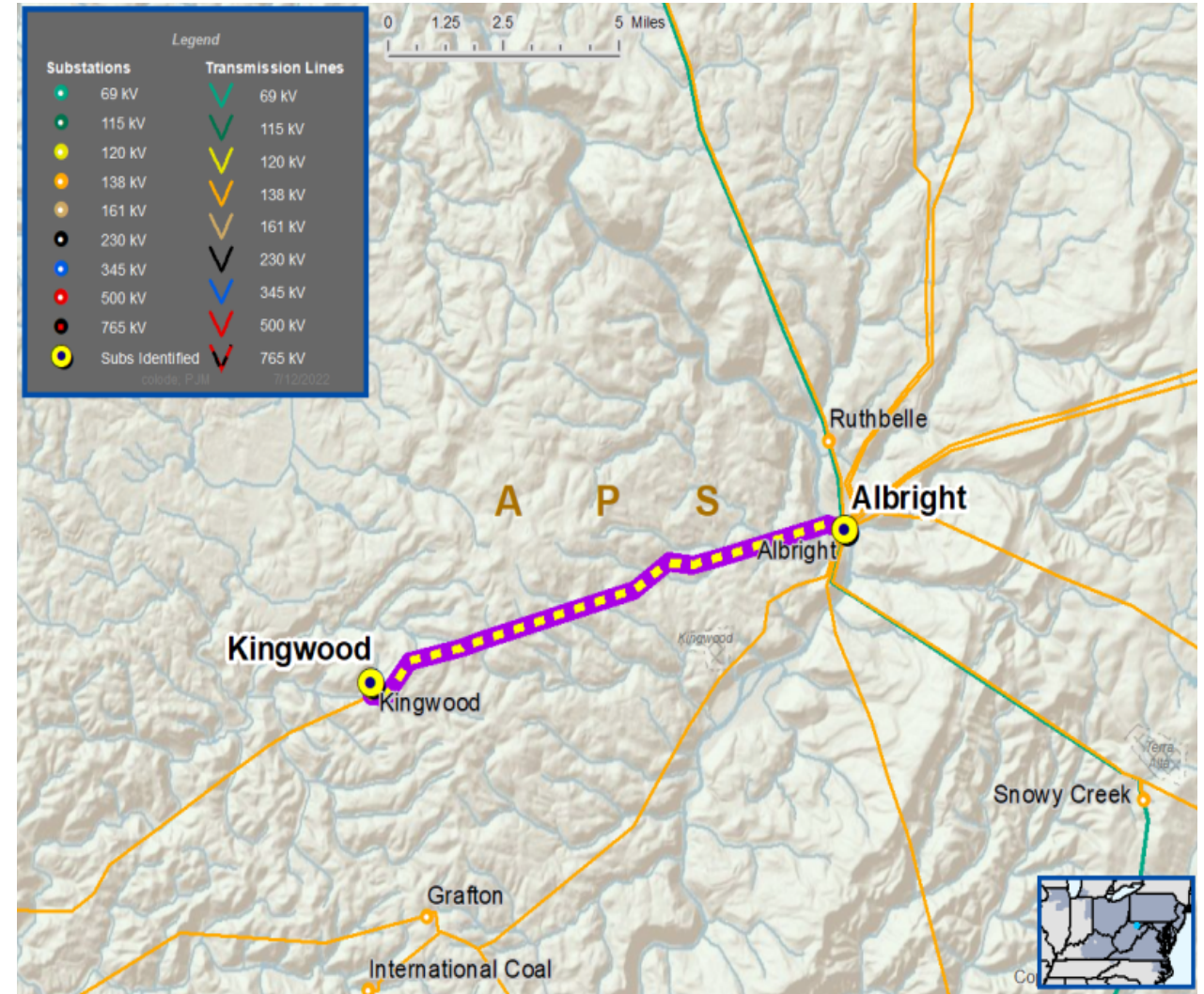
Problem Statement:

Albright – Kingwood 138 kV line is exhibiting deterioration.

- The transmission line was constructed in 1953.
- Total line distance is approximately 4.0 miles.
- 25 out of 30 structures failed inspection (83% failure rate)
- Failure reasons include woodpecker damage, cracking, and decay

Transmission line ratings are limited by terminal equipment (Substation Conductor , Wave trap).

- Existing line rating: 176/209 MVA (SN/SE)
- Existing conductor rating: 221/268 MVA (SN/SE)



Need Number: APS-2022-004

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/11/2022

Selected Solution:

- Replace 138 kV structures between Albright and Kingwood substations
- At Albright substation:
 - Replace line trap, line relaying, substation conductor, and install line surge arrestors.

Ratings Before:

- Albright – Kingwood 138 kV Line:
 - 176/209/228 MVA SN/SE/SLD
 - 217/229/245 MVA WN/WE/WLD

Ratings After:

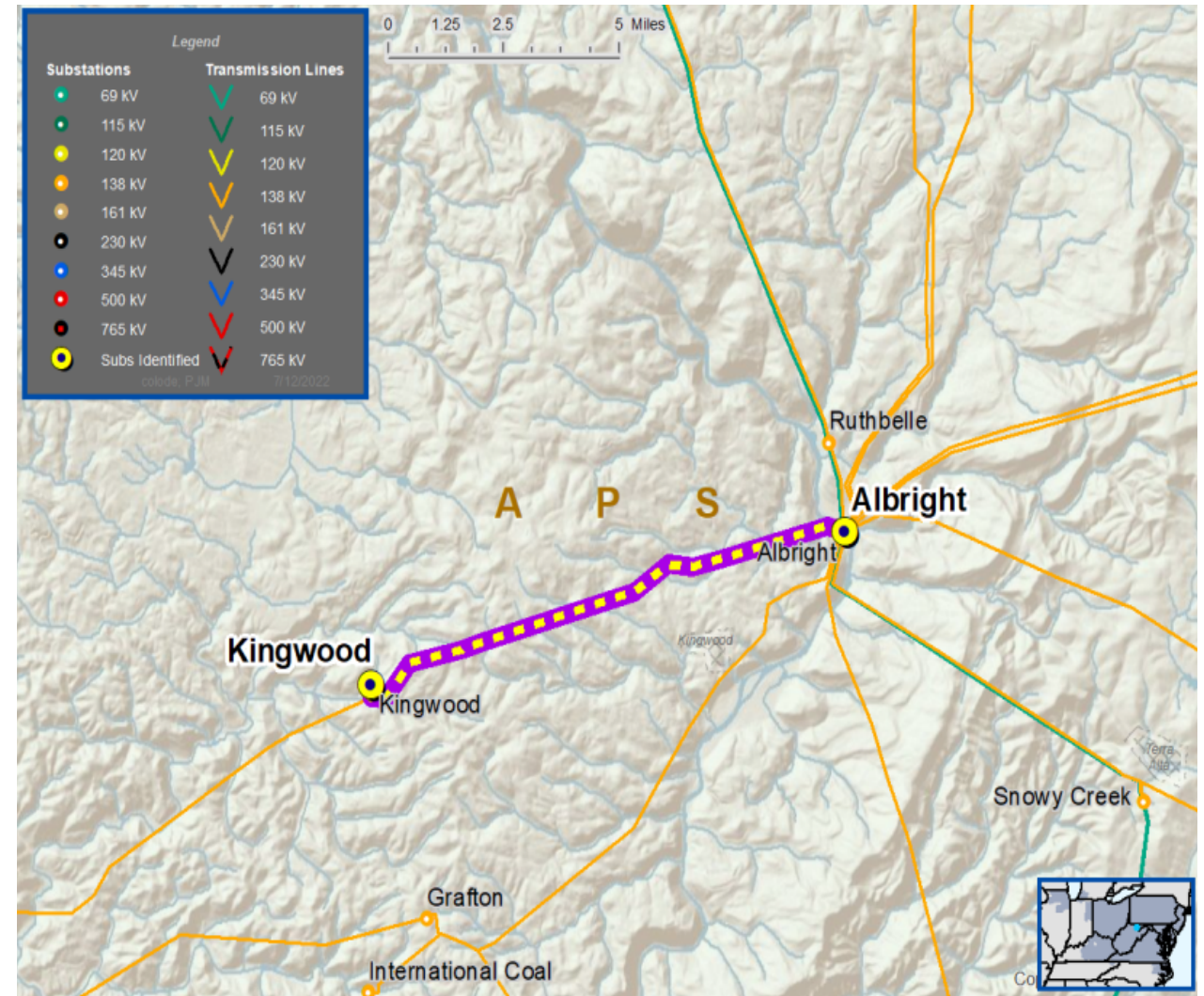
- Albright – Kingwood 138 kV Line:
 - 221/268/302 MVA SN/SE/SLD
 - 250/317/342 MVA WN/WE/WLD

Estimated Project Cost: \$8.0M

Projected In-Service: 12/31/2023

Supplemental Project ID: s2761

Model: 2022 RTEP model for 2027 Summer (50/50)



Revision History

10/12/2022 – V1 – Original version posted to PJM.com (s2699, s2700, s2760 & s2761)