

Belmont Substation: Install Second 765/500 kV Transformer

General Information

Proposing entity name	Company specific
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	2023-W1-850
PJM Proposal ID	850
Project title	Belmont Substation: Install Second 765/500 kV Transformer
Project description	Install second 765/500 kV transformer (#6) with nameplate rating of 1080/1440/1800 MVA (ONAN/ONAF/ONAF), consisting of three single-phase transformers and a spare unit, in parallel with the existing Transformer #5. The loadability ratings of the new transformer #6 are 2351/3148/3600 SN/SE/SLD and 2754/3380/3600 WN/WE/WLD. Install 765 kV four-breaker ring bus and two 500 kV breakers. Replace 500 kV disconnect switches.
Email	Company specific
Project in-service date	06/2028
Tie-line impact	Yes
Interregional project	No
Is the proposer offering a binding cap on capital costs?	No
Additional benefits	

Project Components

1. Belmont 765/500 kV Transformer #6

Substation Upgrade Component

Component title	Belmont 765/500 kV Transformer #6
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Project description	Install second 765/500 kV transformer (#6) with nameplate rating of 1080/1440/1800 MVA (ONAN/ONAF/ONAF), consisting three single-phase transformers and a spare unit, in parallel with the existing Transformer #5. The loadability ratings of the new transformer #6 are 2351/3148/3600 SN/SE/SLD and 2754/3380/3600 WN/WE/WLD. Install 765 kV four-breaker ring bus and two 500 kV breakers. Replace 500 kV disconnect switches. This will require expansion of the substation fence.
Substation name	Belmont
Substation zone	APS
Substation upgrade scope	- Install foundation, conduit, and grounding for new equipment. - Install conduit for fiber. - Install fencing, stoning, grading, and ground grid for expansion area. - Install (4) 765 kV circuit breakers. - Install (10) 765 kV disconnect switches. - Install (3) 765kV deadends. - Install (8) 765kV CVTs. - Install (6) 765kV surge arresters. - Install (6) 765kV wave traps, line traps, and coax. - Install (4) 765/500 kV single-phase transformers. - Install (2) 500 kV circuit breakers. - Replace (1) 500 kV circuit breaker. - Install (5) 500 kV disconnect switches. - Relocate (2) 500 kV disconnect switches - Replace (5) 500 kV disconnect switches with (5) 500 kV, 3000 A disconnect switches. - Install (1) lot of cables, steel structures, grounding, rigid and strain bus, and fittings. - Install (6) break control panels with (1) SEL relay. - Replace existing East and West 500 kV bus differential panels with (2) bus diff panels with (2) SEL relays. - Install (1) transformer protection panel with (3) SEL relays. - Revise wiring for the existing transformer #5 to include the new 765 kV circuit breakers. - Install (1) SEL relay and associated test switches for existing transformer #5. - Replace (2) line relaying panels for Kammer and Mountaineer with (4) standard line relaying panels. - Install (1) lot of control cables, SEL cables and fiber.

Transformer Information

	Name	Capacity (MVA)
Transformer	Belmont 765/500 kV Transformer #6	3148
	High Side	Low Side Tertiary
Voltage (kV)	765	500
New equipment description	New 765/500 kV transformer (#6) with nameplate rating of 1080/1440/1800 MVA (ONAN/ONAF/ONAF), consisting three single-phase transformers and a spare unit. The loadability ratings of the new transformer #6 are 2351/3148/3600 SN/SE/SLD and 2754/3380/3600 WN/WE/WLD. Assume tertiary winding required on new transformers.	

Substation assumptions	- Existing disconnect switch structures are adequate. - Existing FTP and SCADA RTU are adequate. - There is adequate space in the control house for the new panels. - There is adequate space in an existing panel for the high side T5 lead differential relay. - Existing substation will be expanded southward to accommodate new equipment.
Real-estate description	The land needed for the substation expansion is owned by FirstEnergy and no new real estate acquisition is needed for this project.
Construction responsibility	Company specific
Benefits/Comments	Company specific
Component Cost Details - In Current Year \$	
Engineering & design	Company specific
Permitting / routing / siting	Company specific
ROW / land acquisition	Company specific
Materials & equipment	Company specific
Construction & commissioning	Company specific
Construction management	Company specific
Overheads & miscellaneous costs	Company specific
Contingency	Company specific
Total component cost	\$110,427,010.00
Component cost (in-service year)	\$123,409,009.00

Congestion Drivers

None

Existing Flowgates

FG #	Fr Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
2023W1-GD-S89	242920	05BELMON	235102	01BELMNT	5	765/500	201/205	Summer Gen Deliv	Included
2023W1-GD-S500	242920	05BELMON	235102	01BELMNT	5	765/500	201/205	Summer Gen Deliv	Included
2023W1-GD-S499	242920	05BELMON	235102	01BELMNT	5	765/500	201/205	Summer Gen Deliv	Included
2023W1-GD-S501	242920	05BELMON	235102	01BELMNT	5	765/500	201/205	Summer Gen Deliv	Included
2023W1-GD-S80	242920	05BELMON	235102	01BELMNT	5	765/500	201/205	Summer Gen Deliv	Included
2023W1-GD-S87	242920	05BELMON	235102	01BELMNT	5	765/500	201/205	Summer Gen Deliv	Included

New Flowgates

None

Financial Information

Capital spend start date 06/2024

Construction start date 05/2027

Project Duration (In Months) 48

Additional Comments

None