Initial Review and Screening
2020/21 Long-Term Window 1 – Cluster No. 4 (Charlottesville to Proffit 230 kV)

Version 1

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2020/21 Long-Term Window No. 1 – Cluster No. 4

As part of its 2020/21 RTEP process cycle of studies, PJM identified flowgates that were put forward for proposals as part of the 2020/21 Long-Term Window No. 1. Specifically, Cluster No. 4 - discussed in this Initial Review and Screening report - includes the flowgate listed in **Table 1**.

Table 1. 2020/21 Long-Term Window No.1 - Cluster No. 4 List of Flowgates

Flowgate ID	Description	Voltage Level	Driver
ME-5	Charlottesville to Proffit	230 kV	Congestion Relief - Economic

Proposals Submitted to PJM

PJM opened the 2020/21 Long-Term Window No. 1 for 120 days beginning January 11, 2021 and closing May 11, 2021. For this window, twelve proposals were evaluated from PJM's Competitive Planner Tool for this cluster[1]. The proposals are summarized in **Table 2**. Publicly available redacted versions of the proposals can be found on PJM's web site: https://www.pjm.com/planning/competitive-planning-process/redacted-proposals.aspx.

Table 2. 2020/21 Long-Term Window No. 1 - Cluster No. 4 List of Proposals

Proposal ID#	Project Type	Project Description	Estimated Total In-Service Construction Cost ($, millions)	Cost Capping Provisions (Y/N)
196	Upgrade	Charlottesville-Proffit 230kV Line Rebuild	$19.49	N
238	Greenfield	Charlottesville-Gordonsville 230kV Greenfield Line.	$45.83	Y
309	Upgrade	5 MW Battery Energy Storage System at Louisa CT substation	$25.98	N
327	Greenfield	New Hollymeade Tap 230kV Substation. Charlottesville-Hollymeade Tap-Cash's Corner-Gordonsville 230kV Line Rebuild.	$35.93	N
533	Upgrade	10 MW Battery Energy Storage System at Hollymeade substation	$40.45	N
578	Greenfield	New Hollymeade Tap 230kV Substation	$10.02	N
589	Greenfield	Build Second Charlottesville-Gordonsville 230kV Line. Upgrade terminal equipment from Hollymeade to Gordonsville 230 kV.	$25.97	Y

632	Upgrade	5 MW Battery Energy Storage System at Gordonsville Substation	$29.15	N
651	Upgrade	Charlottesville-Proffit 230kV Line Series Reactor	$11.38	N
669	Upgrade	5 MW Battery Energy Storage System at Hollymeade Substation	$25.95	N
692	Greenfield	Sleepy Hollow-Stoney Point 230kV Greenfield Project	$36.07	Y
813	Greenfield	New Cismont 230kV Substation. Charlottesville-Hollymeade Tap-Cash's Corner-Gordonsville 230kV Line Rebuild.	$73.64	N

The Charlottesville to Proffit 230 kV constraint was also posted as a reliability violation in the 2021 Window 1. Ten reliability proposals addressing this constraint were received in the 2021 Window 1 (see Appendix A. Reliability Proposals 2021 Window 1). Five of these reliability proposals were identical to corresponding market efficiency proposals submitted to the 2020/21 Long-Term Window No. 1. The other five reliability proposals were added to the market efficiency analysis for Cluster No. 4.

Initial Review and Screening

PJM has completed an initial review and screening of the proposals listed in **Table 2** above based on data and information provided by the project sponsors. This review and screening included the following preliminary analytical quality assessments:

- *Initial Performance Review* – PJM evaluated whether or not the project proposal satisfied the benefit to cost ratio threshold of 1.25 and solved the required congestion driver.
- *Initial Planning Level Cost Review* – PJM reviewed the estimated project cost submitted by the project sponsor and any relevant cost containment mechanisms submitted.
- *Initial Feasibility Review* – PJM reviewed the overall proposed implementation plan to determine if the project, as proposed, can feasibly be constructed.

Initial performance reviews yielded the following results for the market efficiency proposals received in the 2020/21 Long-Term Window 1:

1. Proposal Nos. 238, 327, 651, and 813 address the congestion driver by eliminating congestion on flowgate ME-5 and did not create significant congestion on any additional flowgates.
2. Proposal Nos. 309, 533, 578, 632, and 669 do not address the congestion driver. Therefore, these proposals will not be considered as solutions for Cluster No. 4.

3. Proposal Nos. 196 and 589 address the congestion driver, however shift significant congestion to Hollymeade - Cash's Corner 230 kV circuit. Therefore, these proposals will not be considered as solutions for Cluster No. 4.
4. Proposal No. 692 addresses the congestion driver, however shifts significant congestion to Stoney Point-Cash's Corner 230 kV circuit. Therefore, this proposal will not be considered as a solution for Cluster No. 4.
5. Proposal Nos. 238, 327, 651, and 813 yield lower voltage benefit to cost ratios above 1.25.

Initial performance reviews yielded the following results for the reliability proposals received in the 2021 Window 1:

6. Proposal Nos. 111, 182, 268, 385, and 624 are identical to the market efficiency Proposal Nos. 589, 238, 327, 813, and 196, respectively.
7. Proposal Nos. 6, 26, 170, and 298 do not address the congestion driver. Therefore, these proposals will not be considered as solutions for Cluster No. 4.
8. Proposal No. 38 clears congestion on the driver and yields a B/C Ratio of 3.97 (see details in Table 4).

An initial cost review shows cost commitment provisions from Proposal Nos. 38, 238, 589, and 692 that, in summary, will cap ROE incentives for the project cost portion that exceeds estimated designated project capital costs. All other proposals do not contain cost commitment provisions.

Proposal Nos. 38, 238, 327, 578, 589, 632, 692, and 813 incorporate greenfield constructions that will require new or additional easements, and which may impact the ability to timely complete the proposal.

A high level review of the plans identified in each of the twelve proposals did not reveal any other concerns at this stage of PJM's review.

Informational FSA Sensitivity

PJM completed an informational sensitivity of the proposals listed in Table 2 and Table 4 that passed the initial review and screening. The sensitivity was conducted using a generation expansion plan that included additional generation, specifically, generators which were added as part of the FSA (Facility Study Agreement) sensitivity. Proposal Nos. 38, 327 and 651 yield lower voltage benefit to cost ratios above 1.25. Proposal Nos. 238 and 813 yield lower voltage benefit to cost ratios below 1.25. All other proposals failed to address the congestion driver and therefore results of the FSA sensitivity will not be presented.

Initial Review Conclusions and Next Steps

Proposal Nos. 38, 238, 327, 651, and 813 yield lower voltage benefit to cost ratios above 1.25, solve the identified congestion driver, and do not shift significant amounts of congestion.

Table 3. 2020/21 Long Term Window No. 1 - Cluster No. 4 - Comparison of Anticipated Costs and B/C Ratios

Proposal ID#	Project Description	Estimated Total Construction Cost ($, millions)	B/C Ratio Metric	B/C Ratio	Percent Congestion Alleviated
196	Charlottesville-Proffit 230kV Line Rebuild	$19.49	Low voltage	N/A*	100%
238	Charlottesville-Gordonsville 230kV Greenfield Line.	$45.83	Low voltage	3.02	100%
309	5 MW Battery Energy Storage System at Louisa CT substation	$25.98	Low voltage	N/A*	0.87%
327	New Hollymeade Tap 230kV Substation. Charlottesville-Hollymeade Tap-Cash's Corner-Gordonsville 230kV Line Rebuild.	$35.93	Low voltage	3.99	99.48%
533	10 MW Battery Energy Storage System at Hollymeade substation	$40.45	Low voltage	N/A*	7.82%
578	New Hollymeade Tap 230kV Substation	$10.02	Low voltage	N/A*	0%
589	Build Second Charlottesville-Gordonsville 230kV Line. Upgrade terminal equipment from Hollymeade to Gordonsville 230 kV.	$25.97	Low voltage	N/A*	100%
632	5 MW Battery Energy Storage System at Gordonsville substation	$29.15	Low voltage	N/A*	4.57%
651	Charlottesville-Proffit 230kV Line Series Reactor	$11.38	Low voltage	16.05	99.52%
669	5 MW Battery Energy Storage System at Hollymeade substation	$25.95	Low voltage	N/A*	6.46%
692	Sleepy Hollow-Stoney Point 230kV Greenfield Project	$36.07	Low voltage	N/A*	100%
813	New Cismont 230kV Substation. Charlottesville-Hollymeade Tap-Cash's Corner-Gordonsville 230kV Line Rebuild.	$73.64	Low voltage	2.17	100%

*Proposal shifted significant congestion and therefore a B/C ratio was not calculated

Table 4. 2021 Window 1 - Reliability Cluster No. 7 - Comparison of Anticipated Costs and B/C Ratios

Proposal ID#	Project Description	Estimated Total Construction Cost ($, millions)	B/C Ratio Metric	B/C Ratio	Percent Congestion Alleviated
38	Sleepy Hollow-Gordonsville 230kV Greenfield Project	$40.17	Low voltage	3.97	100%

PJM intends to conduct a final review of the potential solutions to this cluster. The review will include Proposal Nos. 38, 238, 327, 651, and 813. PJM intends to share the results of this final review with stakeholders at the December TEAC. After which a final recommendation will be made to the PJM Board for review and approval.

Appendix A. Reliability Proposals 2021 Window 1

Proposal ID #	Project Type	Project Description	Total Construction Cost M$	kV Level	Analysis	Reliability Flowgate
26	Upgrade	Proposal 99-2947-5 is to add 16 MW-64 MWh battery energy storage device at Hollymeade 230 kV substation. The BESS is added as a generator injecting and absorbing real power to replicate discharging and charging modes. The BESS is sized to mitigate the reliability violation for 4 hours.	35.158	230kV	Thermal, GenDeliv	GD-S30
268	Greenfield	Build a new 230kV substation at Hollymeade Tap with a 4-breaker ring bus. Split lines 2054 and 2135 and terminate all 4 lines into the new ring bus. Rebuild 8.72-mile line #2054 section from Charlottesville to New Station, from 2-477 ACSR 90°C to 2-636 ASCR 24/7 MOT – 150°C (rating 1046 MVA). Rebuild 7.1-mile (2.83+4.27=7.1 miles) line #2135 section from New Station to Gordonsville, from 2-477 ACSR 90°C to 2-636 ASCR 24/7 MOT – 150°C (1046 MVA).	33.552	230kV	Thermal, GenDeliv	GD-S30
111	Greenfield	Build a new 8.9-mile 230 kV line between Charlottesville and Proffit Rd. DP 230 kV ("Proffit 230 kV") stations using 795 ACRS Drake double bundle conductor. Install necessary breakers to accommodate (1) one new 230 kV line at Charlottesville and Proffit 230 kV stations.	23.708	230kV	Thermal, GenDeliv	GD-S30
170	Upgrade	Proposal 99-2947-4 is to install one 4.35 Ω series reactor to control the power flow on the 230 kV line #2054 from Charlottesville substation to Proffit Rd. DP to reduce the thermal overload on reliability driver GD-S30.	10.621	230kV	Thermal, GenDeliv	GD-S30
6	Upgrade	Rebuild 8.72-mile line #2054 section from Charlottesville to Hollymeade Tap structure 2054/340A, from 2-477 ACSR 90°C to 2-636 ACSR 24/7 MOT – 150°C (rating 1046 MVA).	16.124	230kV	Thermal, GenDeliv	GD-S30
624	Upgrade	Rebuild 8.72-mile line #2054 section from Charlottesville to Hollymeade Tap structure 2054/340A, from 2-477 ACSR 90°C to 2-768.2 ACSS/TW 20/7 with MOT of 250°C (rating 1574 MVA).	16.504	230kV	Thermal, GenDeliv	GD-S30
38	Greenfield	The Sleepy Hollow - Gordonsville 230kV Transmission Project will include a new 3-position ring bus interconnecting the Mount Eagle - Charlottesville 230kV transmission line and a new 230kV transmission line connecting the new Sleepy Hollow Substation to the existing Gordonsville Substation.	34.86	230kV	Thermal, GenDeliv	GD-S30

Proposal ID #	Project Type	Project Description	Total Construction Cost M$	kV Level	Analysis	Reliability Flowgate
182	Greenfield	Build a new 18.22-mile 230 kV line between Charlottesville and Gordonsville 230 kV stations using 795 ACRS Drake double bundle conductor. Install necessary breakers to accommodate (1) one new 230 kV line at Charlottesville and Gordonsville DP 230 kV stations.	41.922	230kV	Thermal, GenDeliv	GD-S30
385	Greenfield	Construct a new Cismont 230 kV 4 breaker ring bus station connecting the Charlottesville-Proffit line segment and the Hollymead-Cash's Corner line segment. Rebuild the ~16 mile single circuit 230 kV corridor from Charlottesville-Cismont-Cash's Corner-Gordonsville. (hereinafter, "the Project")	65.468	230kV	Thermal, GenDeliv	GD-S30