



**Generation Interconnection
Feasibility Study Report
for
Queue Project AG1-072
HILLSBORO-STEELE 138 KV II
50 MW Capacity / 50 MW Energy**

January 2021

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1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is DPL.

2 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

3 General

The Interconnection Customer (IC) has proposed an uprate to a planned/existing Storage generating facility located in Queen Anne's, Maryland. This project is an increase to the Interconnection Customer's AF2-387 project, which will share the same point of interconnection. The AG1-072 queue position is a 50 MW uprate (50 MW Capacity uprate) to the previous project. The total installed facilities will have a capability of 150 MW with 116.6 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this uprate project is December 01, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-072
Project Name	HILLSBORO-STEELE 138 KV II
State	Maryland
County	Queen Anne's
Transmission Owner	DPL
MFO	150
MWE	50
MWC	50
Fuel	Storage
Basecase Study Year	2024

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AG1-072 will interconnect with the DPL transmission system via a new 3-breaker ring bus on the Hillsboro-Steele 138kV line that will be established as part of the AF2-387 project.

5 Cost Summary

The AG1-072 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$0
Total System Network Upgrade Costs	\$232,580,000 ¹
Total Costs	\$232,580,000

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 2016-36, 2016-25 I.R.B. (6/20/2016). If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

6 Transmission Owner Scope of Work

The AG1-072 project is an uprate to the AF2-387 project and will be interconnecting at the new 3-breaker ring bus substation tapping the 138kV Hillsboro – Wye Mills circuit that will be constructed as part of that project. No additional work scope required to facilitate the physical interconnection of the AG1-072 project.

The total physical interconnection costs is given in the table below:

Description	Total Cost
Total Physical Interconnection Costs	\$0

¹ This project currently causes and/or contributes to overloads of the Transmission System (see Summer Peak Load Flow Analysis section below) and therefore has potential to have cost allocation for the system reinforcements listed in the report. This will be re-evaluated in the System Impact phase. The results may vary with queue customers withdrawing from the queue and other generators deactivating over time. If a customer is the first to cause the need for a project (causes loading to exceed 100% of rating), then the customer is responsible. If a customer contributes to a facility that is already overloaded by a prior queue, then they may receive cost allocation.

7 Schedule

The schedule for this project will coincide with the AF2-387 project and can be found in the latest study report for that project.

If the customer is ultimately responsible for network upgrades, then the schedule for those upgrades will be refined in future study phases. The customer would need to wait for those upgrades to be completed prior to commercial operation unless determined deliverable by an interim deliverability study. The elapsed time to complete any network upgrades is provided in the System Reinforcements table of this report.¹

8 Transmission Owner Analysis

None

9 Interconnection Customer Requirements

9.1 Required Relaying and Communications

Relaying and communications will be established as part of the AF2-387 project

Some re-wiring or adjustments to relay schemes may be required as part of this project.

9.2 Interconnection Customer Scope of Direct Connection Work

The IC is responsible for all design and construction related to activities on their side of the Point of Interconnection. Site preparation, including grading and an access road, as necessary, is assumed to be by the IC. Route selection, line design, and right-of-way acquisition of the direct connect facilities is not included in this report and is the responsibility of the IC. Protective relaying and metering design and installation must comply with DPL's applicable standards. The IC is also required to provide revenue metering and real-time telemetering data to PJM in conformance with the requirements contained in PJM Manuals M-01 and M-14 and the PJM Tariff.

9.3 DPL Interconnection Customer Scope of Direct Connection Work Requirements

DPL requires that an IC circuit breaker is located within 500 feet of the DPL substation to facilitate the relay protection scheme between DPL and the IC at the Point of Interconnection (POI).

9.4 Special Operating Requirements

1. DPL will require the capability to remotely disconnect the generator from the grid by communication from its System Operations facility. Such disconnection may be facilitated by a generator breaker, or other method depending upon the specific circumstances and the evaluation by DPL.

2. DPL reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering and telecommunications facilities, owned by DPL.

10 Revenue Metering and SCADA Requirements

10.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

10.2 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

<http://www.pjm.com/planning/design-engineering/to-tech-standards/>

A three phase 138 kV revenue metering point will need to be established within the Interconnection Customer Facilities at the Point of Interconnection. The Interconnection Customer will purchase and install all metering instrument transformers as well as construct a metering structure per the DPL's specifications. The secondary wiring connections at the instrument transformers will be completed by the Interconnection Customer and inspected by DPL, while the connections at the metering enclosure will be completed by the DPL. The metering control cable and meter cabinets will be supplied by the DPL and installed by the Interconnection Customer. The Interconnection Customer will install conduit for the control cable between the instrument transformers and the metering enclosure. The location of the metering enclosure will be determined during construction. The Interconnection Customer will provide 138kV power to the meter cabinet. The DPL will provide, program, install, and own the primary & backup solid state multi-function meters for the new metering position.

Each meter will be equipped with load profile, telemetry, and DNP outputs. The Interconnection Customer will be provided with one-meter DNP output for each meter. DPL will supply a wireless modem for MV90 interrogation. In the event that a wireless modem is unable to reliably communicate, the IC will be required to make provisions for a POTS (Plain Old Telephone Service) line or equivalent technology approved by DPL within approximately three feet of the DPL metering position to facilitate remote interrogation and data collection. It is the Interconnection Customer's responsibility to send the data that PJM and DPL require directly to PJM. The Interconnection Customer will grant permission for PJM to send DPL the following telemetry that the Interconnection Customer sends to PJM: real time MW, MVAR, volts, amperes, generator status, and interval MWH and MVARH.

DPL's revenue meters will be the official meters and must be the source for reporting generation output to PJM. The Interconnection Customer is responsible for installing telemetry equipment necessary to obtain the revenue meter data and submitting the data to PJM.

11 Summer Peak - Load Flow Analysis

The Queue Project AG1-072 was evaluated as a 50 MW (Capacity 50 MW) injection tapping the Hillsboro to Steele 138 kV line in the DPL area. Project AG1-072 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-072 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

11.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

11.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADI NG %	POST PROJE CT LOADI NG %	AC D C	MW IMPA CT
167813615	231000	CLAY_230	230.0	DP&L	214235	LINWOOD84	230.0	PECO	1	PECO_P1-2_220-85/* \$ DELCO \$ 220-85 \$ LC	single	804.0	115.92	116.82	DC	8.33
167813616	231000	CLAY_230	230.0	DP&L	214235	LINWOOD84	230.0	PECO	1	PECO_P1-2_220-85/* \$ DELCO \$ PECO_P1-2_220-85 \$ L	single	804.0	115.82	116.72	DC	8.32
167813626	231001	EDGE MR5	230.0	DP&L	214236	LINWOOD85	230.0	PECO	1	PECO_P1-2_220-84	single	804.0	114.44	115.31	DC	8.05
164859546	232003	CARTANZA	230.0	DP&L	232013	SILVER RUN	230.0	PJM	1	DPL_P7_1_DBL_1NCB_FSA	tower	790.0	151.62	152.43	DC	14.4
166664394	232100	CHURCH	138.0	DP&L	232107	TOWNSE ND	138.0	DP&L	1	DPL_P7_1_DBL_1NCB_FSA	tower	348.0	177.26	181.79	DC	16.33
166664404	232106	MIDLTNT P	138.0	DP&L	232104	MT PLSNT	138.0	DP&L	1	DPL_P7_1_DBL_1NCB_FSA	tower	348.0	157.54	162.07	DC	16.33
166664389	232107	TOWNSE ND	138.0	DP&L	232106	MIDLTNT P	138.0	DP&L	1	DPL_P7_1_DBL_1NCB_FSA	tower	348.0	183.0	187.53	DC	16.33

11.4 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection

Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC/D C	MW IMPAC T
167813613	23100	CLAY_230	230.0	DP&L	214235	LINWOOD84	230.0	PECO	1	PECO_P1-2_220-85/* \$ DELCO \$ 220-85 \$ LC	operati on	804.0	149.64	150.12	DC	8.33
167813624	231001	EDGE5MR	230.0	DP&L	214236	LINWOOD85	230.0	PECO	1	PECO_P1-2_220-84	operati on	804.0	147.07	147.53	DC	8.05
167813834	231002	HARMON Y	230.0	DP&L	231001	EDGE5MR	230.0	DP&L	1	PECO_P1-2_5014/* \$ CHESCO \$ PECO_P1-2_5014 \$ L	operati on	924.0	108.4	109.64	DC	11.57
167813801	231124	GLASGO W	138.0	DP&L	231130	CECIL138	138.0	DP&L	1	PECO_P1-2_5014/* \$ CHESCO \$ PECO_P1-2_5014 \$ L	operati on	378.0	114.72	116.09	DC	5.32
167813695	232000	STEELE	230.0	DP&L	231003	KEEN_230	230.0	DP&L	1	DPL_P1_2_A B2-037 KEENEY	operati on	552.0	122.92	125.72	DC	15.65
167813857	232000	STEELE	230.0	DP&L	923960	AB2-037 TAP	230.0	DP&L	2	DPL_P1_2_C KT 23001	operati on	727.0	99.4	101.94	DC	18.65
167813549	232002	CEDAR CK	230.0	DP&L	232013	SILVER RUN	230.0	PJM	1	CKT 23032B	operati on	678.0	161.22	161.93	DC	12.16
167813551	232002	CEDAR CK	230.0	DP&L	232013	SILVER RUN	230.0	PJM	1	Base Case	operati on	550.0	133.68	133.94	DC	8.82
167813564	232003	CARTANZ A	230.0	DP&L	232013	SILVER RUN	230.0	PJM	1	DPL_P1_2_C KT 23031	operati on	790.0	140.85	141.35	DC	8.83
167813565	232003	CARTANZ A	230.0	DP&L	232013	SILVER RUN	230.0	PJM	1	Base Case	operati on	650.0	140.7	141.15	DC	6.52
167813532	232004	MILF_230	230.0	DP&L	232000	STEELE	230.0	DP&L	1	CKT 23032B	operati on	550.0	157.34	158.12	DC	8.08
167813534	232004	MILF_230	230.0	DP&L	232000	STEELE	230.0	DP&L	1	Base Case	operati on	550.0	101.23	103.16	DC	10.61
167813629	232004	MILF_230	230.0	DP&L	232002	CEDAR CK	230.0	DP&L	1	CKT 23032B	operati on	738.0	120.92	121.44	DC	8.71
167813704	232013	SILVER RUN	230.0	PJM	231004	RL_230	230.0	DP&L	1	PJM500_PS_P1-2_HOPE-SILVER	operati on	678.0	105.91	106.38	DC	7.23
167813685	232100	CHURCH	138.0	DP&L	232107	TOWNSEN D	138.0	DP&L	1	DPL_P1_2_A B2-037 KEENEY	operati on	348.0	128.63	131.76	DC	12.18
167813686	232100	CHURCH	138.0	DP&L	232107	TOWNSEN D	138.0	DP&L	1	Base Case	operati on	280.0	124.19	127.72	DC	9.88
167813793	232106	MIDL TNT P	138.0	DP&L	232104	MT PLSNT	138.0	DP&L	1	DPL_P1_2_A B2-037 KEENEY	operati on	348.0	111.58	114.71	DC	12.18
167813795	232106	MIDL TNT P	138.0	DP&L	232104	MT PLSNT	138.0	DP&L	1	Base Case	operati on	273.0	105.52	109.15	DC	9.88
167813635	232107	TOWNSE ND	138.0	DP&L	232106	MIDL TNT P	138.0	DP&L	1	Base Case	operati on	273.0	137.97	141.6	DC	9.88
167813636	232107	TOWNSE ND	138.0	DP&L	232106	MIDL TNT P	138.0	DP&L	1	DPL_P1_2_A B2-037 KEENEY	operati on	348.0	137.04	140.17	DC	12.18
169550524	923960	AB2-037 TAP	230.0	DP&L	231003	KEEN_230	230.0	DP&L	2	DPL_P1_2_C KT 23001	operati on	727.0	113.07	115.61	DC	18.65

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
164859546	3	CARTANZA 230.0 kV - SILVER RUN 230.0 kV Ckt 1	<p>DPL:</p> <p>dt23032r0002 (1262) : Rebuild Cartanza - Silver Run 230 kV line Project Type : FAC Cost : \$67,000,000 Time Estimate : 48-60 Months</p> <p>ds23032r0001 (1263) : Upgrade terminal equipment at Cartanza Substation (upgrade 3000A Breakers and CTs to 4000A) Project Type : FAC Cost : \$1,000,000 Time Estimate : 12-18 Months</p> <p>dt23032r0001 (2404) : Rebuild Cartanza - Silver Run 230 kV line Project Type : FAC Cost : \$65,000,000 Time Estimate : 48-60 Months</p>	\$133,000,000
166664389	6	TOWNSEND 138.0 kV - MIDLTNTP 138.0 kV Ckt 1	<p>DPL:</p> <p>ds13808r0001 (1255) : Upgrade disconnect switch at Middletown Tap Project Type : FAC Cost : \$100,000 Time Estimate : 12.0 Months</p> <p>dt13808r0004 (1313) : Rebuild the 13808-1 line from Townsend - Middletown Tap with new poles, conductor, foundations, insulators, and OPGW. Terminal equipment at Townsend would also need to be upgraded Project Type : FAC Cost : \$7,500,000 Time Estimate : 36-48 Months</p> <p>ds13808r0003 (1316) : Upgrade terminal equipment at Townsend Substation Project Type : FAC Cost : \$300,000 Time Estimate : 12.0 Months</p>	\$7,900,000

ID	Idx	Facility	Upgrade Description	Cost
167813626	2	EDGEMR 5 230.0 kV - LINWOOD85 230.0 kV Ckt 1	<p>DPL: dt22085r0001 (1293) : To mitigate the (DPL) Edge Moor - (PECO) Linwood 230 kV line (from bus 231001 to 214236) overload it will require increasing the emergency rating of the Edge Moor - Linwood 230 kV line by rebuilding the line with new poles, foundations, insulators and OPGW Project Type : FAC Cost : \$20,000,000 Time Estimate : 36-48 Months</p> <p>ds22085r0001 (1327) : Terminal upgrades at the Edge Moor 230kV Substation (upgrade 2000A Line Trap to 3000A Line trap) Project Type : FAC Cost : \$200,000 Time Estimate : 12.0 Months</p> <p>PECO: pe024 (2212) : Rebuild 8.64 miles of 230 kV line from Linwood to Edgemoor with 2x1590 kcmil 54/19 ACSR Project Type : FAC Cost : \$25,080,000 Time Estimate : 36.0 Months</p>	\$45,280,000
166664394	4	CHURCH 138.0 kV - TOWNSEND 138.0 kV Ckt 1	<p>DPL: ds13833r0001 (1275) : To mitigate the (DP&L) CHURCH to TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) overload will require substation reinforcements at Church Substation. Project Type : FAC Cost : \$500,000 Time Estimate : 24-36 Months</p> <p>ds13833r0002 (1276) : To mitigate the (DP&L) CHURCH to TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) overload will require substation reinforcements (on top of ds13833r001) at Church Substation. Project Type : FAC Cost : \$200,000 Time Estimate : 24.0 Months</p> <p>ds13833r0003 (1277) : To mitigate the (DP&L) CHURCH to TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) overload will require substation reinforcements (on top of ds13833r001, ds13833r002) at Church Substation. Project Type : FAC Cost : \$100,000 Time Estimate : 12-18 Months</p> <p>dt13833r0001 (1278) : To mitigate the (DP&L) CHURCH to TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) overload will require a rebuild of the 13833 Church to Townsend 138 kV Line along with substation reinforcements (on top of ds13833r001, ds13833r002, ds13833r003) at Church and Townsend Substations Project Type : FAC Cost : \$26,000,000 Time Estimate : 48-60 Months</p>	\$26,800,000

ID	Idx	Facility	Upgrade Description	Cost
166664404	5	MIDLTNTP 138.0 kV - MT PLSNT 138.0 kV Ckt 1	<p>DPL: ds13808r0001 (1255) : Upgrade disconnect switch at Middletown Tap Project Type : FAC Cost : \$100,000 Time Estimate : 12.0 Months</p> <p>ds13808r0002 (1256) : Upgrade circuit breaker and associated Current Transformers and Switches from 2000A to 3000A at Mt. Pleasant Substation Project Type : FAC Cost : \$400,000 Time Estimate : 12.0 Months</p> <p>dt13808r0003 (1297) : To mitigate the (DPL) Mt. Pleasant - Middletown Tap 138 kV line (from bus 232104 to 232106) overload is will require increasing the emergency rating of the line by rebuilding the line with new poles, conductor, foundations, insulators and OPGW. In addition, terminal upgrades will be required at Mt. Pleasant Project Type : FAC Cost : \$7,500,000 Time Estimate : 36-48 Months</p>	\$8,000,000
167813615,167 813616	1	CLAY_230 230.0 kV - LINWOOD84 230.0 kV Ckt 1	<p>DPL: dt22084r0001 (1291) : To mitigate the (DPL) Claymont - (PECO) Linwood line (from bus 213750 to 231000) overload, it will require increasing the emergency rating of the Claymont - Linwood 230 kV line by rebuilding the line with new poles, foundations, insulators and OPGW and replacing terminal equipment at Claymont Project Type : FAC Cost : \$7,100,000 Time Estimate : 36-48 Months</p> <p>PECO: pe025 (2213) : Rebuild 1.55 miles of 230 kV line from Linwood to Claymont with 2x1590 kcmil 54/19 ACSR Project Type : FAC Cost : \$4,500,000 Time Estimate : 36.0 Months</p>	\$11,600,000
			TOTAL COST	\$232,580,000

11.6 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

11.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
167813616	231000	CLAY_230	DP&L	214235	LINWOOD84	PECO	1	PECO_P1-2_220-85/* \$ DELCO \$ PECO_P1-2_220-85 \$ L	single	804.0	115.82	116.72	DC	8.32

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
231131	BLOOM ENRGY	0.7141	80/20	0.7141
231505	HR4	14.4603	80/20	14.4603
231900	EM5	35.1168	80/20	35.1168
231901	EM4	9.8687	80/20	9.8687
231902	DC CT7	1.6517	80/20	1.6517
231903	GEN4	2.0204	80/20	2.0204
231904	DC1 NUG	5.2346	80/20	5.2346
231905	DC2 NUG	5.2346	80/20	5.2346
231906	DC3 NUG	2.0661	80/20	2.0661
231907	DC10	0.5158	80/20	0.5158
231908	HR1	7.0896	80/20	7.0896
231909	HR2	7.2262	80/20	7.2262
231910	HR3	7.0896	80/20	7.0896
231915	DC CT6	1.5938	80/20	1.5938
231916	EM3	4.9716	80/20	4.9716
231917	EM10	0.8209	80/20	0.8209
231918	WEST 1	0.8684	80/20	0.8684
231919	CHRIST1	1.1852	80/20	1.1852
231920	CHRIST2	1.1801	80/20	1.1801
232416	X2-083	0.1065	80/20	0.1065
232417	X3-008 C	0.1902	80/20	0.1902
232422	X3-066 C	0.0605	80/20	0.0605
232424	Y1-079 C	0.1003	80/20	0.1003
232426	Y1-080 FULL	0.0317	80/20	0.0317
232902	EASTMUNI	1.7932	80/20	1.7932
232907	VN8	3.7912	80/20	3.7912
232922	MR3 (Deactivation : 01/06/2021)	11.7591	Adder	13.83
233915	AB1-141 C	0.3620	80/20	0.3620
233918	AB1-142 C	0.3620	80/20	0.3620
233931	AB2-179 C	6.8195	80/20	6.8195
919831	AA2-069 (Suspended)	51.9938	Adder	61.17
923921	AB2-032 C	2.3116	80/20	2.3116
923951	AB2-036 C	5.8447	80/20	5.8447
923961	AB2-037 C	12.8496	80/20	12.8496
924681	AB2-120 C	4.9254	Adder	5.79
924781	AB2-130 C O1	4.1578	Adder	4.89
924801	AB2-133 C O1	4.1552	80/20	4.1552
924821	AB2-135 C	4.9012	80/20	4.9012

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
924831	AB2-136 C	3.9085	80/20	3.9085
924971	AB2-153 C	1.2918	80/20	1.2918
925151	AB2-172 C	3.0136	80/20	3.0136
925261	AB2-180 C	1.8297	Adder	2.15
925271	AB2-185 C	2.3412	80/20	2.3412
926131	AC1-091 C	0.8499	Adder	1.0
926141	AC1-092 C	0.8499	Adder	1.0
926151	AC1-093 C	0.8046	Adder	0.95
926161	AC1-094 C	0.6799	Adder	0.8
927031	AC1-190 C	5.5450	80/20	5.5450
927191	AC1-213 C	0.4163	Adder	0.49
930201	AB1-056 C	8.1552	Adder	9.59
931261	AB1-176 C	0.2538	80/20	0.2538
932161	AC2-023 C	3.4738	Adder	4.09
933631	AC2-185 C	1.7225	Adder	2.03
933641	AC2-186 C	2.3810	Adder	2.8
936451	AD2-059 C	0.0580	80/20	0.0580
936611	AD2-076 C O1	3.1531	80/20	3.1531
938651	AE1-087 C	2.5378	80/20	2.5378
938814	AE1-107 C	5.7313	80/20	5.7313
938896	AE1-117 E	16.2591	Adder	19.13
939151	AE1-145	2.5923	Adder	3.05
941021	AE2-093 C	2.7647	80/20	2.7647
941181	AE2-112 C	1.0939	80/20	1.0939
942441	AE2-257 C	4.1895	Adder	4.93
943361	AF1-007 C	0.2406	Adder	0.28
943441	AF1-015 C	1.0417	80/20	1.0417
943651	AF1-036 C	1.4225	80/20	1.4225
945661	AF1-231 C	0.9855	Adder	1.16
945791	AF1-244	1.0420	Adder	1.23
945931	AF1-258	0.4182	Adder	0.49
945941	AF1-259	0.1345	80/20	0.1345
957611	AF2-055 C	4.5381	Adder	5.34
957661	AF2-060	1.1665	Adder	1.37
957671	AF2-061 O1	5.1847	Adder	6.1
959021	AF2-193 C	15.0693	Adder	17.73
959031	AF2-194 C	15.0693	Adder	17.73
959051	AF2-196 C	1.1426	Adder	1.34
959161	AF2-207 C O1	2.6175	Adder	3.08
959571	AF2-248 C	0.4418	Adder	0.52
959581	AF2-249 C	0.0780	Adder	0.09
959591	AF2-250 C	0.1429	Adder	0.17
960221	AF2-313 C	2.1350	80/20	2.1350
960341	AF2-325 C	0.6634	80/20	0.6634
960671	AF2-358 C O1	7.9861	Adder	9.4
960871	AF2-378 C	0.1751	80/20	0.1751
960881	AF2-379 C	0.2138	Adder	0.25
960941	AF2-385 C	6.2062	Adder	7.3
960961	AF2-387 C O1	11.0822	80/20	11.0822
961181	AF2-409 O1	15.7060	80/20	15.7060
962161	AG1-061 C O1	4.5326	Adder	10.06
962261	AG1-072	8.3200	80/20	8.3200

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
962381	AG1-087 C O1	7.7932	Adder	17.3
963001	AG1-149	0.2071	Adder	0.46
963011	AG1-150	2.7479	Adder	6.1
964551	AG1-318 C	0.0202	Adder	0.04
965321	AG1-397 C	0.2873	Adder	0.64
965611	AG1-429 C O1	2.4230	Adder	5.38
965821	AG1-450	1.7654	Adder	3.92
965921	AG1-461 C O1	1.3260	Adder	2.94
965951	AG1-464 C O1	1.3283	Adder	2.95
966281	AG1-497 C O1	5.1325	Adder	11.39
966601	AG1-529 C	3.2295	Adder	7.17
WEC	WEC	0.0290	Confirmed LTF	0.0290
LGEE	LGEE	0.0609	Confirmed LTF	0.0609
CPL	CPL	0.1310	Confirmed LTF	0.1310
CBM-W2	CBM-W2	0.9946	Confirmed LTF	0.9946
NY	NY	0.9716	Confirmed LTF	0.9716
TVA	TVA	0.1736	Confirmed LTF	0.1736
SIGE	SIGE	0.2577	Confirmed LTF	0.2577
CBM-S2	CBM-S2	1.7852	Confirmed LTF	1.7852
CBM-S1	CBM-S1	0.0452	Confirmed LTF	0.0452
MEC	MEC	0.1573	Confirmed LTF	0.1573
LAGN	LAGN	0.2118	Confirmed LTF	0.2118
CBM-W1	CBM-W1	1.2057	Confirmed LTF	1.2057

11.6.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
167813626	231001	EDGEMR5	DP&L	214236	LINWOOD85	PECO	1	PECO_P1-2_220-84	single	804.0	114.44	115.31	DC	8.05

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
231131	BLOOM ENRGY	0.6835	80/20	0.6835
231505	HR4	14.3180	80/20	14.3180
231900	EM5	34.7711	80/20	34.7711
231901	EM4	9.2944	80/20	9.2944
231902	DC CT7	1.5827	80/20	1.5827
231903	GEN4	1.9359	80/20	1.9359
231904	DC1 NUG	5.0157	80/20	5.0157
231905	DC2 NUG	5.0157	80/20	5.0157
231906	DC3 NUG	1.9797	80/20	1.9797
231907	DC10	0.4942	80/20	0.4942
231908	HR1	6.6770	80/20	6.6770
231909	HR2	6.5348	80/20	6.5348
231910	HR3	6.6770	80/20	6.6770
231915	DC CT6	1.5271	80/20	1.5271
231916	EM3	4.4959	80/20	4.4959
231917	EM10	0.7424	80/20	0.7424
231918	WEST 1	0.8023	80/20	0.8023
231919	CHRIST1	1.1183	80/20	1.1183
231920	CHRIST2	1.1134	80/20	1.1134
232416	X2-083	0.1023	80/20	0.1023
232417	X3-008 C	0.1842	80/20	0.1842
232422	X3-066 C	0.0584	80/20	0.0584
232424	Y1-079 C	0.0970	80/20	0.0970
232426	Y1-080 FULL	0.0307	80/20	0.0307
232902	EASTMUNI	1.7360	80/20	1.7360
232907	VN8	3.6744	80/20	3.6744
232922	MR3 (Deactivation : 01/06/2021)	11.3932	Adder	13.4
233915	AB1-141 C	0.3494	80/20	0.3494
233918	AB1-142 C	0.3494	80/20	0.3494
233931	AB2-179 C	6.5520	80/20	6.5520
919831	AA2-069 (Suspended)	50.3760	Adder	59.27
923921	AB2-032 C	2.2312	80/20	2.2312
923951	AB2-036 C	5.6535	80/20	5.6535
923961	AB2-037 C	12.4630	80/20	12.4630
924681	AB2-120 C	4.7730	Adder	5.62
924781	AB2-130 C O1	4.0285	Adder	4.74
924801	AB2-133 C O1	4.0091	80/20	4.0091
924821	AB2-135 C	4.7317	80/20	4.7317
924831	AB2-136 C	3.7867	80/20	3.7867
924971	AB2-153 C	1.2469	80/20	1.2469
925151	AB2-172 C	2.9195	80/20	2.9195

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
925261	AB2-180 C	1.7730	Adder	2.09
925271	AB2-185 C	2.2641	80/20	2.2641
926131	AC1-091 C	0.8231	Adder	0.97
926141	AC1-092 C	0.8231	Adder	0.97
926151	AC1-093 C	0.7792	Adder	0.92
926161	AC1-094 C	0.6585	Adder	0.77
927031	AC1-190 C	5.3718	80/20	5.3718
927191	AC1-213 C	0.4034	Adder	0.47
930201	AB1-056 C	7.9028	Adder	9.3
931261	AB1-176 C	0.2452	80/20	0.2452
932161	AC2-023 C	3.3664	Adder	3.96
933631	AC2-185 C	1.6682	Adder	1.96
933641	AC2-186 C	2.3056	Adder	2.71
936451	AD2-059 C	0.0557	80/20	0.0557
936611	AD2-076 C O1	3.0447	80/20	3.0447
938651	AE1-087 C	2.4586	80/20	2.4586
938814	AE1-107 C	5.4923	80/20	5.4923
938896	AE1-117 E	15.7553	Adder	18.54
939151	AE1-145	2.5121	Adder	2.96
941021	AE2-093 C	2.6775	80/20	2.6775
941181	AE2-112 C	1.0563	80/20	1.0563
942441	AE2-257 C	4.0597	Adder	4.78
943361	AF1-007 C	0.2332	Adder	0.27
943441	AF1-015 C	1.0089	80/20	1.0089
943651	AF1-036 C	1.3736	80/20	1.3736
945661	AF1-231 C	0.9550	Adder	1.12
945791	AF1-244	1.0097	Adder	1.19
945931	AF1-258	0.4053	Adder	0.48
945941	AF1-259	0.1299	80/20	0.1299
957611	AF2-055 C	4.3976	Adder	5.17
957661	AF2-060	1.1304	Adder	1.33
957671	AF2-061 O1	5.0242	Adder	5.91
959021	AF2-193 C	14.6030	Adder	17.18
959031	AF2-194 C	14.6030	Adder	17.18
959051	AF2-196 C	1.1072	Adder	1.3
959161	AF2-207 C O1	2.5363	Adder	2.98
959571	AF2-248 C	0.4281	Adder	0.5
959581	AF2-249 C	0.0755	Adder	0.09
959591	AF2-250 C	0.1385	Adder	0.16
960221	AF2-313 C	2.0621	80/20	2.0621
960341	AF2-325 C	0.6428	80/20	0.6428
960671	AF2-358 C O1	7.7382	Adder	9.1
960871	AF2-378 C	0.1697	80/20	0.1697
960881	AF2-379 C	0.2072	Adder	0.24
960941	AF2-385 C	6.0136	Adder	7.07
960961	AF2-387 C O1	10.7279	80/20	10.7279
961181	AF2-409 O1	15.2220	80/20	15.2220
962161	AG1-061 C O1	4.3917	Adder	9.75
962261	AG1-072	8.0540	80/20	8.0540
962381	AG1-087 C O1	7.5514	Adder	16.76
963001	AG1-149	0.2007	Adder	0.45
963011	AG1-150	2.6628	Adder	5.91

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
964551	AG1-318 C	0.0196	Adder	0.04
965321	AG1-397 C	0.2784	Adder	0.62
965611	AG1-429 C O1	2.3481	Adder	5.21
965821	AG1-450	1.7105	Adder	3.8
965921	AG1-461 C O1	1.2849	Adder	2.85
965951	AG1-464 C O1	1.2863	Adder	2.86
966281	AG1-497 C O1	4.9728	Adder	11.04
966601	AG1-529 C	3.1288	Adder	6.95
WEC	WEC	0.0290	Confirmed LTF	0.0290
LGEE	LGEE	0.0609	Confirmed LTF	0.0609
CPL	CPL	0.1290	Confirmed LTF	0.1290
CBM-W2	CBM-W2	0.9946	Confirmed LTF	0.9946
NY	NY	0.9401	Confirmed LTF	0.9401
TVA	TVA	0.1722	Confirmed LTF	0.1722
SIGE	SIGE	0.2498	Confirmed LTF	0.2498
CBM-S2	CBM-S2	1.7539	Confirmed LTF	1.7539
CBM-S1	CBM-S1	0.0448	Confirmed LTF	0.0448
MEC	MEC	0.1573	Confirmed LTF	0.1573
LAGN	LAGN	0.2118	Confirmed LTF	0.2118
CBM-W1	CBM-W1	1.2057	Confirmed LTF	1.2057

11.6.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
16485954 6	23200 3	CARTANZ A	DP&L	23201 3	SILVE R RUN	PJM	1	DPL_P7_1_DBL_1NCB_FS A	towe r	790.0	151.62	152.43	DC	14.4

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
232405	W1-003 E	3.6565	Adder	4.3
232407	W1-004 E	3.6565	Adder	4.3
232409	W1-005 E	3.6565	Adder	4.3
232411	W1-006 E	3.6565	Adder	4.3
232412	X1-032 E	1.1745	Adder	1.38
232418	X3-008 E	3.3865	Adder	3.98
232423	X3-066 E	0.5827	Adder	0.69
232425	Y1-079 E	1.3965	Adder	1.64
232427	Y1-080 E	0.5881	Adder	0.69
232429	Y3-058 E	1.7612	Adder	2.07
232432	Z2-076 C	0.2217	50/50	0.2217
232433	Z2-076 E	0.7080	50/50	0.7080
232434	Z2-077 C	0.2217	50/50	0.2217
232435	Z2-077 E	0.7080	50/50	0.7080
232616	GEN FOOD	1.5837	50/50	1.5837
232851	DUP-SFR1	2.7717	Adder	3.26
232901	NORTHST	4.7928	50/50	4.7928
232904	IR4	23.2894	50/50	23.2894
232920	IR10	0.9005	50/50	0.9005
232922	MR3 (Deactivation : 01/06/2021)	67.3618	50/50	67.3618
233911	AB1-137 C (Withdrawn : 12/07/2020)	0.2346	50/50	0.2346
233912	AB1-137 E (Withdrawn : 12/07/2020)	0.6372	50/50	0.6372
233916	AB1-141 E	1.1818	Adder	1.39
233919	AB1-142 E	1.1818	Adder	1.39
233920	W3-032A-CTG1	20.1091	50/50	20.1091
233921	W3-032A-STG1	12.1072	50/50	12.1072
917082	CHERRYDALE E	3.6574	Adder	4.3
918835	AA1-102 E	27.2786	Adder	32.09
919831	AA2-069 (Suspended)	297.8449	50/50	297.8449
923921	AB2-032 C	2.5513	Adder	3.0
923922	AB2-032 E	1.2006	Adder	1.41
923951	AB2-036 C	8.0155	Adder	9.43
923952	AB2-036 E	13.1142	Adder	15.43
924681	AB2-120 C	13.1921	50/50	13.1921
924682	AB2-120 E	21.5239	50/50	21.5239
924781	AB2-130 C O1	9.1851	Adder	10.81
924782	AB2-130 E O1	14.9862	Adder	17.63
924801	AB2-133 C O1	4.3282	Adder	5.09
924802	AB2-133 E O1	5.4894	Adder	6.46

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
924821	AB2-135 C	5.3552	Adder	6.3
924822	AB2-135 E	6.1074	Adder	7.19
924831	AB2-136 C	6.8664	Adder	8.08
924832	AB2-136 E	7.2817	Adder	8.57
924971	AB2-153 C	1.4257	Adder	1.68
924972	AB2-153 E	2.3262	Adder	2.74
925151	AB2-172 C	5.1890	Adder	6.1
925152	AB2-172 E	8.4663	Adder	9.96
925261	AB2-180 C	4.0422	Adder	4.76
925262	AB2-180 E	1.7324	Adder	2.04
925271	AB2-185 C	3.1535	Adder	3.71
925272	AB2-185 E	1.3515	Adder	1.59
927031	AC1-190 C	9.5822	Adder	11.27
927032	AC1-190 E	4.1066	Adder	4.83
927191	AC1-213 C	0.9301	Adder	1.09
927192	AC1-213 E	0.6104	Adder	0.72
930201	AB1-056 C	23.0797	50/50	23.0797
930202	AB1-056 E	65.7269	50/50	65.7269
931261	AB1-176 C	0.3013	Adder	0.35
931262	AB1-176 E	0.4969	Adder	0.58
932161	AC2-023 C	7.6175	Adder	8.96
932162	AC2-023 E	5.5478	Adder	6.53
933641	AC2-186 C	4.6095	Adder	5.42
933642	AC2-186 E	7.5208	Adder	8.85
936611	AD2-076 C O1	3.6668	Adder	4.31
936612	AD2-076 E O1	5.9827	Adder	7.04
938651	AE1-087 C	4.3697	Adder	5.14
938652	AE1-087 E	1.0924	Adder	1.29
938895	AE1-117 C	16.9934	50/50	16.9934
938896	AE1-117 E	45.3158	50/50	45.3158
939151	AE1-145	5.9009	Adder	6.94
941021	AE2-093 C	4.2623	Adder	5.01
941022	AE2-093 E	6.9543	Adder	8.18
941181	AE2-112 C	1.2722	Adder	1.5
941182	AE2-112 E	2.0756	Adder	2.44
942441	AE2-257 C	11.6988	50/50	11.6988
942442	AE2-257 E	30.8424	50/50	30.8424
943361	AF1-007 C	0.6809	50/50	0.6809
943362	AF1-007 E	1.9353	50/50	1.9353
943441	AF1-015 C	1.6060	Adder	1.89
943442	AF1-015 E	2.2178	Adder	2.61
943651	AF1-036 C	1.6542	Adder	1.95
943652	AF1-036 E	2.2844	Adder	2.69
945661	AF1-231 C	2.2416	Adder	2.64
945662	AF1-231 E	3.3623	Adder	3.96
945791	AF1-244	2.3465	Adder	2.76
945931	AF1-258	0.9239	Adder	1.09
945941	AF1-259	0.1596	Adder	0.19
957611	AF2-055 C	10.3233	Adder	12.15
957612	AF2-055 E	4.4243	Adder	5.21
957661	AF2-060	2.6554	Adder	3.12
957671	AF2-061 O1	11.8017	Adder	13.88

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959021	AF2-193 C	42.6472	50/50	42.6472
959022	AF2-193 E	115.0400	50/50	115.0400
959031	AF2-194 C	42.6472	50/50	42.6472
959032	AF2-194 E	115.0400	50/50	115.0400
959051	AF2-196 C	3.1906	50/50	3.1906
959052	AF2-196 E	7.4447	50/50	7.4447
959161	AF2-207 C O1	5.8168	Adder	6.84
959162	AF2-207 E O1	8.7252	Adder	10.26
959571	AF2-248 C	0.9837	Adder	1.16
959572	AF2-248 E	1.0994	Adder	1.29
959581	AF2-249 C	0.1736	Adder	0.2
959582	AF2-249 E	0.6944	Adder	0.82
959591	AF2-250 C	0.3182	Adder	0.37
959592	AF2-250 E	0.2459	Adder	0.29
960221	AF2-313 C	2.5342	Adder	2.98
960222	AF2-313 E	1.4367	Adder	1.69
960341	AF2-325 C	1.1572	Adder	1.36
960342	AF2-325 E	1.5980	Adder	1.88
960671	AF2-358 C O1	16.8371	Adder	19.81
960672	AF2-358 E O1	11.2248	Adder	13.21
960871	AF2-378 C	0.3066	Adder	0.36
960872	AF2-378 E	0.4254	Adder	0.5
960881	AF2-379 C	0.4787	Adder	0.56
960882	AF2-379 E	0.6597	Adder	0.78
960941	AF2-385 C	13.7919	Adder	16.23
960942	AF2-385 E	7.8481	Adder	9.23
960961	AF2-387 C O1	16.3042	Adder	19.18
960962	AF2-387 E O1	8.1766	Adder	9.62
961181	AF2-409 O1	28.5031	Adder	33.53
962161	AG1-061 C O1	9.8520	Adder	21.87
962162	AG1-061 E O1	6.5680	Adder	14.58
962261	AG1-072	6.4874	Adder	14.4
962302	AG1-079 E	0.1462	Adder	0.32
962381	AG1-087 C O1	49.5802	50/50	49.5802
962382	AG1-087 E O1	133.7414	50/50	133.7414
963001	AG1-149	0.4664	Adder	1.04
963011	AG1-150	13.8844	50/50	13.8844
964551	AG1-318 C	0.1061	50/50	0.1061
964552	AG1-318 E	0.2476	50/50	0.2476
964962	AG1-360 E	1.3617	Adder	3.02
965321	AG1-397 C	0.6508	Adder	1.44
965322	AG1-397 E	0.8978	Adder	1.99
965611	AG1-429 C O1	5.5120	Adder	12.24
965612	AG1-429 E O1	3.6736	Adder	8.15
965821	AG1-450	3.7104	Adder	8.24
965921	AG1-461 C O1	2.9786	Adder	6.61
965922	AG1-461 E O1	1.6038	Adder	3.56
965951	AG1-464 C O1	2.5716	Adder	5.71
965952	AG1-464 E O1	3.8575	Adder	8.56
966281	AG1-497 C O1	55.4744	50/50	55.4744
966282	AG1-497 E O1	23.7748	50/50	23.7748
966601	AG1-529 C	7.2988	Adder	16.2

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
966602	AG1-529 E	3.8957	Adder	8.65
CALDERWOOD	CALDERWOOD	0.1839	Confirmed LTF	0.1839
NY	NY	0.2229	Confirmed LTF	0.2229
PRAIRIE	PRAIRIE	0.9557	Confirmed LTF	0.9557
O-066	O-066	2.8199	Confirmed LTF	2.8199
SIGE	SIGE	0.0050	Confirmed LTF	0.0050
CHEOAH	CHEOAH	0.1852	Confirmed LTF	0.1852
COTTONWOOD	COTTONWOOD	0.7770	Confirmed LTF	0.7770
G-007	G-007	0.4536	Confirmed LTF	0.4536
HAMLET	HAMLET	0.2131	Confirmed LTF	0.2131
GIBSON	GIBSON	0.2026	Confirmed LTF	0.2026
BLUEG	BLUEG	0.6441	Confirmed LTF	0.6441
TRIMBLE	TRIMBLE	0.2065	Confirmed LTF	0.2065
CATAWBA	CATAWBA	0.1291	Confirmed LTF	0.1291

11.6.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
166664394	232100	CHURCH	DP&L	232107	TOWNSEND	DP&L	1	DPL_P7_1_DBL_1NCB_FS_A	tower	348.0	177.26	181.79	DC	16.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
232405	W1-003 E	2.1162	Adder	2.49
232407	W1-004 E	2.1162	Adder	2.49
232409	W1-005 E	2.1162	Adder	2.49
232411	W1-006 E	2.1162	Adder	2.49
232412	X1-032 E	0.6923	Adder	0.81
232417	X3-008 C	0.3001	50/50	0.3001
232418	X3-008 E	3.1031	50/50	3.1031
232422	X3-066 C	0.1518	50/50	0.1518
232423	X3-066 E	1.2321	50/50	1.2321
232424	Y1-079 C	0.2221	50/50	0.2221
232425	Y1-079 E	2.2972	50/50	2.2972
232426	Y1-080 FULL	0.0468	50/50	0.0468
232427	Y1-080 E	0.4865	50/50	0.4865
232428	Y3-058 C	0.1887	50/50	0.1887
232429	Y3-058 E	1.2800	50/50	1.2800
232433	Z2-076 E	0.3195	Adder	0.38
232435	Z2-077 E	0.3195	Adder	0.38
232813	VAUGHN	0.1051	50/50	0.1051
232851	DUP-SFR1	1.6269	Adder	1.91
232902	EASTMUNI	3.3846	50/50	3.3846
232907	VN8	5.4177	50/50	5.4177
232910	NRG_G1	1.6595	50/50	1.6595
232911	NRG_G2	1.6595	50/50	1.6595
232919	VN10	0.4103	50/50	0.4103
232922	MR3 (Deactivation : 01/06/2021)	9.0454	Adder	10.64
232926	CRISFLD1	0.3223	50/50	0.3223
233912	AB1-137 E (Withdrawn : 12/07/2020)	0.2813	Adder	0.33
233915	AB1-141 C	0.9820	50/50	0.9820
233916	AB1-141 E	2.9046	50/50	2.9046
233918	AB1-142 C	0.9820	50/50	0.9820
233919	AB1-142 E	2.9046	50/50	2.9046
233923	AA1-102 C	1.8373	50/50	1.8373
233931	AB2-179 C	-9.2465	Adder	-10.88
293670	O-025 C	0.1942	50/50	0.1942
917082	CHERRYDALE E	2.1143	Adder	2.49
918835	AA1-102 E	19.0008	50/50	19.0008
919831	AA2-069 (Suspended)	39.9949	Adder	47.05
923921	AB2-032 C	6.2703	50/50	6.2703
923922	AB2-032 E	2.9507	50/50	2.9507
923951	AB2-036 C	12.6635	50/50	12.6635

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
923952	AB2-036 E	20.7187	50/50	20.7187
924681	AB2-120 C	6.4703	Adder	7.61
924682	AB2-120 E	10.5569	Adder	12.42
924781	AB2-130 C O1	5.4550	Adder	6.42
924782	AB2-130 E O1	8.9003	Adder	10.47
924801	AB2-133 C O1	11.5421	50/50	11.5421
924802	AB2-133 E O1	14.6387	50/50	14.6387
924821	AB2-135 C	12.2976	50/50	12.2976
924822	AB2-135 E	14.0250	50/50	14.0250
924831	AB2-136 C	5.9562	50/50	5.9562
924832	AB2-136 E	6.3165	50/50	6.3165
924971	AB2-153 C	3.5040	50/50	3.5040
924972	AB2-153 E	5.7170	50/50	5.7170
925151	AB2-172 C	4.7548	50/50	4.7548
925152	AB2-172 E	7.7578	50/50	7.7578
925261	AB2-180 C	2.9378	50/50	2.9378
925262	AB2-180 E	1.2590	50/50	1.2590
925271	AB2-185 C	5.1871	50/50	5.1871
925272	AB2-185 E	2.2231	50/50	2.2231
926131	AC1-091 C	0.6418	Adder	0.76
926132	AC1-091 E	1.0526	Adder	1.24
926141	AC1-092 C	0.6418	Adder	0.76
926142	AC1-092 E	1.0526	Adder	1.24
926151	AC1-093 C	0.6076	Adder	0.71
926152	AC1-093 E	1.0013	Adder	1.18
926161	AC1-094 C	0.5135	Adder	0.6
926162	AC1-094 E	0.8472	Adder	1.0
927031	AC1-190 C	8.6961	50/50	8.6961
927032	AC1-190 E	3.7269	50/50	3.7269
927191	AC1-213 C	0.6564	50/50	0.6564
927192	AC1-213 E	0.4308	50/50	0.4308
930201	AB1-056 C	9.8959	Adder	11.64
930202	AB1-056 E	28.1818	Adder	33.16
931261	AB1-176 C	0.6372	50/50	0.6372
931262	AB1-176 E	1.0507	50/50	1.0507
932161	AC2-023 C	5.6437	50/50	5.6437
932162	AC2-023 E	4.1103	50/50	4.1103
933631	AC2-185 C	1.3008	Adder	1.53
933632	AC2-185 E	2.1223	Adder	2.5
933641	AC2-186 C	3.1389	Adder	3.69
933642	AC2-186 E	5.1214	Adder	6.03
936611	AD2-076 C O1	8.1710	50/50	8.1710
936612	AD2-076 E O1	13.3317	50/50	13.3317
938651	AE1-087 C	4.0040	50/50	4.0040
938652	AE1-087 E	1.0010	50/50	1.0010
938895	AE1-117 C	7.5027	Adder	8.83
938896	AE1-117 E	20.0072	Adder	23.54
939151	AE1-145	3.4061	Adder	4.01
941021	AE2-093 C	5.0565	50/50	5.0565
941022	AE2-093 E	8.2500	50/50	8.2500
941181	AE2-112 C	2.8348	50/50	2.8348
941182	AE2-112 E	4.6253	50/50	4.6253

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
942441	AE2-257 C	5.1449	Adder	6.05
942442	AE2-257 E	13.5639	Adder	15.96
943361	AF1-007 C	0.2920	Adder	0.34
943362	AF1-007 E	0.8298	Adder	0.98
943441	AF1-015 C	1.9052	50/50	1.9052
943442	AF1-015 E	2.6311	50/50	2.6311
943651	AF1-036 C	3.6862	50/50	3.6862
943652	AF1-036 E	5.0904	50/50	5.0904
945661	AF1-231 C	1.2961	Adder	1.52
945662	AF1-231 E	1.9442	Adder	2.29
945791	AF1-244	1.6345	50/50	1.6345
945931	AF1-258	0.6715	50/50	0.6715
945941	AF1-259	0.3376	50/50	0.3376
957611	AF2-055 C	5.9678	Adder	7.02
957612	AF2-055 E	2.5577	Adder	3.01
957661	AF2-060	1.5328	Adder	1.8
957671	AF2-061 O1	6.8122	Adder	8.01
959021	AF2-193 C	18.2859	Adder	21.51
959022	AF2-193 E	49.3258	Adder	58.03
959031	AF2-194 C	18.2859	Adder	21.51
959032	AF2-194 E	49.3258	Adder	58.03
959051	AF2-196 C	1.4032	Adder	1.65
959052	AF2-196 E	3.2740	Adder	3.85
959161	AF2-207 C O1	3.4920	Adder	4.11
959162	AF2-207 E O1	6.1623	50/50	6.1623
959571	AF2-248 C	0.6946	50/50	0.6946
959572	AF2-248 E	0.7763	50/50	0.7763
959581	AF2-249 C	0.1226	50/50	0.1226
959582	AF2-249 E	0.4903	50/50	0.4903
959591	AF2-250 C	0.2247	50/50	0.2247
959592	AF2-250 E	0.1736	50/50	0.1736
960221	AF2-313 C	5.3589	50/50	5.3589
960222	AF2-313 E	3.0381	50/50	3.0381
960341	AF2-325 C	1.0239	50/50	1.0239
960342	AF2-325 E	1.4139	50/50	1.4139
960671	AF2-358 C O1	13.8072	50/50	13.8072
960672	AF2-358 E O1	9.2048	50/50	9.2048
960871	AF2-378 C	0.2684	50/50	0.2684
960872	AF2-378 E	0.3724	50/50	0.3724
960881	AF2-379 C	0.3375	50/50	0.3375
960882	AF2-379 E	0.4650	50/50	0.4650
960941	AF2-385 C	9.7407	50/50	9.7407
960942	AF2-385 E	5.5428	50/50	5.5428
960961	AF2-387 C O1	21.7542	50/50	21.7542
960962	AF2-387 E O1	10.9098	50/50	10.9098
961181	AF2-409 O1	22.4440	50/50	22.4440
962161	AG1-061 C O1	13.7777	50/50	13.7777
962162	AG1-061 E O1	9.1851	50/50	9.1851
962261	AG1-072	16.3320	50/50	16.3320
962302	AG1-079 E	0.4867	50/50	0.4867
962381	AG1-087 C O1	8.5411	Adder	18.96
962382	AG1-087 E O1	23.0393	Adder	51.14

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
963001	AG1-149	0.6129	50/50	0.6129
963011	AG1-150	3.6105	Adder	8.01
964551	AG1-318 C	0.0249	Adder	0.06
964552	AG1-318 E	0.0581	Adder	0.13
964962	AG1-360 E	0.8026	Adder	1.78
965321	AG1-397 C	0.3777	Adder	0.84
965322	AG1-397 E	0.5210	Adder	1.16
965611	AG1-429 C O1	3.1865	Adder	7.07
965612	AG1-429 E O1	2.1237	Adder	4.71
965821	AG1-450	5.7923	50/50	5.7923
965921	AG1-461 C O1	1.7145	Adder	3.81
965922	AG1-461 E O1	0.9232	Adder	2.05
965951	AG1-464 C O1	1.7512	Adder	3.89
965952	AG1-464 E O1	2.6268	Adder	5.83
966281	AG1-497 C O1	3.9481	Adder	8.76
966282	AG1-497 E O1	1.6920	Adder	3.76
966601	AG1-529 C	3.8100	Adder	8.46
966602	AG1-529 E	2.0336	Adder	4.51
CALDERWOOD	CALDERWOOD	0.0924	Confirmed LTF	0.0924
NY	NY	0.0586	Confirmed LTF	0.0586
PRAIRIE	PRAIRIE	0.4779	Confirmed LTF	0.4779
O-066	O-066	0.4576	Confirmed LTF	0.4576
CHEOAH	CHEOAH	0.0931	Confirmed LTF	0.0931
COTTONWOOD	COTTONWOOD	0.3906	Confirmed LTF	0.3906
G-007	G-007	0.0378	Confirmed LTF	0.0378
HAMLET	HAMLET	0.1091	Confirmed LTF	0.1091
GIBSON	GIBSON	0.1010	Confirmed LTF	0.1010
BLUEG	BLUEG	0.3212	Confirmed LTF	0.3212
TRIMBLE	TRIMBLE	0.1030	Confirmed LTF	0.1030
CATAWBA	CATAWBA	0.0658	Confirmed LTF	0.0658

11.6.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
166664404	232106	MIDLNTNP	DP&L	232104	MT PLSNT	DP&L	1	DPL_P7_1_DBL_1NCB_FSA	tower	348.0	157.54	162.07	DC	16.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
232405	W1-003 E	2.1162	Adder	2.49
232407	W1-004 E	2.1162	Adder	2.49
232409	W1-005 E	2.1162	Adder	2.49
232411	W1-006 E	2.1162	Adder	2.49
232412	X1-032 E	0.6923	Adder	0.81
232417	X3-008 C	0.3001	50/50	0.3001
232418	X3-008 E	3.1031	50/50	3.1031
232422	X3-066 C	0.1518	50/50	0.1518
232423	X3-066 E	1.2321	50/50	1.2321
232424	Y1-079 C	0.2221	50/50	0.2221
232425	Y1-079 E	2.2972	50/50	2.2972
232426	Y1-080 FULL	0.0468	50/50	0.0468
232427	Y1-080 E	0.4865	50/50	0.4865
232428	Y3-058 C	0.1887	50/50	0.1887
232429	Y3-058 E	1.2800	50/50	1.2800
232433	Z2-076 E	0.3195	Adder	0.38
232435	Z2-077 E	0.3195	Adder	0.38
232813	VAUGHN	0.1051	50/50	0.1051
232851	DUP-SFR1	1.6269	Adder	1.91
232902	EASTMUNI	3.3846	50/50	3.3846
232907	VN8	5.4177	50/50	5.4177
232910	NRG_G1	1.6595	50/50	1.6595
232911	NRG_G2	1.6595	50/50	1.6595
232919	VN10	0.4103	50/50	0.4103
232922	MR3 (Deactivation : 01/06/2021)	9.0454	Adder	10.64
232926	CRISFLD1	0.3223	50/50	0.3223
233912	AB1-137 E (Withdrawn : 12/07/2020)	0.2813	Adder	0.33
233915	AB1-141 C	0.9820	50/50	0.9820
233916	AB1-141 E	2.9046	50/50	2.9046
233918	AB1-142 C	0.9820	50/50	0.9820
233919	AB1-142 E	2.9046	50/50	2.9046
233923	AA1-102 C	1.8373	50/50	1.8373
233931	AB2-179 C	27.1217	50/50	27.1217
293670	O-025 C	0.1942	50/50	0.1942
917082	CHERRYDALE E	2.1143	Adder	2.49
918835	AA1-102 E	19.0008	50/50	19.0008
919831	AA2-069 (Suspended)	39.9949	Adder	47.05
923921	AB2-032 C	6.2703	50/50	6.2703
923922	AB2-032 E	2.9507	50/50	2.9507
923951	AB2-036 C	12.6635	50/50	12.6635

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
923952	AB2-036 E	20.7187	50/50	20.7187
924681	AB2-120 C	6.4703	Adder	7.61
924682	AB2-120 E	10.5569	Adder	12.42
924781	AB2-130 C O1	5.4550	Adder	6.42
924782	AB2-130 E O1	8.9003	Adder	10.47
924801	AB2-133 C O1	11.5421	50/50	11.5421
924802	AB2-133 E O1	14.6387	50/50	14.6387
924821	AB2-135 C	12.2976	50/50	12.2976
924822	AB2-135 E	14.0250	50/50	14.0250
924831	AB2-136 C	5.9562	50/50	5.9562
924832	AB2-136 E	6.3165	50/50	6.3165
924971	AB2-153 C	3.5040	50/50	3.5040
924972	AB2-153 E	5.7170	50/50	5.7170
925151	AB2-172 C	4.7548	50/50	4.7548
925152	AB2-172 E	7.7578	50/50	7.7578
925254	AB2-179 E	8.8503	50/50	8.8503
925261	AB2-180 C	2.9378	50/50	2.9378
925262	AB2-180 E	1.2590	50/50	1.2590
925271	AB2-185 C	5.1871	50/50	5.1871
925272	AB2-185 E	2.2231	50/50	2.2231
927031	AC1-190 C	8.6961	50/50	8.6961
927032	AC1-190 E	3.7269	50/50	3.7269
927191	AC1-213 C	0.6564	50/50	0.6564
927192	AC1-213 E	0.4308	50/50	0.4308
930201	AB1-056 C	9.8959	Adder	11.64
930202	AB1-056 E	28.1818	Adder	33.16
931261	AB1-176 C	0.6372	50/50	0.6372
931262	AB1-176 E	1.0507	50/50	1.0507
932161	AC2-023 C	5.6437	50/50	5.6437
932162	AC2-023 E	4.1103	50/50	4.1103
933641	AC2-186 C	3.1389	Adder	3.69
933642	AC2-186 E	5.1214	Adder	6.03
936611	AD2-076 C O1	8.1710	50/50	8.1710
936612	AD2-076 E O1	13.3317	50/50	13.3317
938651	AE1-087 C	4.0040	50/50	4.0040
938652	AE1-087 E	1.0010	50/50	1.0010
938895	AE1-117 C	7.5027	Adder	8.83
938896	AE1-117 E	20.0072	Adder	23.54
939151	AE1-145	3.4061	Adder	4.01
941021	AE2-093 C	5.0565	50/50	5.0565
941022	AE2-093 E	8.2500	50/50	8.2500
941181	AE2-112 C	2.8348	50/50	2.8348
941182	AE2-112 E	4.6253	50/50	4.6253
942441	AE2-257 C	5.1449	Adder	6.05
942442	AE2-257 E	13.5639	Adder	15.96
943361	AF1-007 C	0.2920	Adder	0.34
943362	AF1-007 E	0.8298	Adder	0.98
943441	AF1-015 C	1.9052	50/50	1.9052
943442	AF1-015 E	2.6311	50/50	2.6311
943651	AF1-036 C	3.6862	50/50	3.6862
943652	AF1-036 E	5.0904	50/50	5.0904
945661	AF1-231 C	1.2961	Adder	1.52

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
945662	AF1-231 E	1.9442	Adder	2.29
945791	AF1-244	1.6345	50/50	1.6345
945931	AF1-258	0.6715	50/50	0.6715
945941	AF1-259	0.3376	50/50	0.3376
957611	AF2-055 C	5.9678	Adder	7.02
957612	AF2-055 E	2.5577	Adder	3.01
957661	AF2-060	1.5328	Adder	1.8
957671	AF2-061 O1	6.8122	Adder	8.01
959021	AF2-193 C	18.2859	Adder	21.51
959022	AF2-193 E	49.3258	Adder	58.03
959031	AF2-194 C	18.2859	Adder	21.51
959032	AF2-194 E	49.3258	Adder	58.03
959051	AF2-196 C	1.4032	Adder	1.65
959052	AF2-196 E	3.2740	Adder	3.85
959161	AF2-207 C O1	3.4920	Adder	4.11
959162	AF2-207 E O1	6.1623	50/50	6.1623
959571	AF2-248 C	0.6946	50/50	0.6946
959572	AF2-248 E	0.7763	50/50	0.7763
959581	AF2-249 C	0.1226	50/50	0.1226
959582	AF2-249 E	0.4903	50/50	0.4903
959591	AF2-250 C	0.2247	50/50	0.2247
959592	AF2-250 E	0.1736	50/50	0.1736
960221	AF2-313 C	5.3589	50/50	5.3589
960222	AF2-313 E	3.0381	50/50	3.0381
960341	AF2-325 C	1.0239	50/50	1.0239
960342	AF2-325 E	1.4139	50/50	1.4139
960671	AF2-358 C O1	13.8072	50/50	13.8072
960672	AF2-358 E O1	9.2048	50/50	9.2048
960871	AF2-378 C	0.2684	50/50	0.2684
960872	AF2-378 E	0.3724	50/50	0.3724
960881	AF2-379 C	0.3375	50/50	0.3375
960882	AF2-379 E	0.4650	50/50	0.4650
960941	AF2-385 C	9.7407	50/50	9.7407
960942	AF2-385 E	5.5428	50/50	5.5428
960961	AF2-387 C O1	21.7542	50/50	21.7542
960962	AF2-387 E O1	10.9098	50/50	10.9098
961181	AF2-409 O1	22.4440	50/50	22.4440
962161	AG1-061 C O1	13.7777	50/50	13.7777
962162	AG1-061 E O1	9.1851	50/50	9.1851
962261	AG1-072	16.3320	50/50	16.3320
962302	AG1-079 E	0.4867	50/50	0.4867
962381	AG1-087 C O1	8.5411	Adder	18.96
962382	AG1-087 E O1	23.0393	Adder	51.14
963001	AG1-149	0.6129	50/50	0.6129
963011	AG1-150	3.6105	Adder	8.01
964551	AG1-318 C	0.0249	Adder	0.06
964552	AG1-318 E	0.0581	Adder	0.13
964962	AG1-360 E	0.8026	Adder	1.78
965321	AG1-397 C	0.3777	Adder	0.84
965322	AG1-397 E	0.5210	Adder	1.16
965611	AG1-429 C O1	3.1865	Adder	7.07
965612	AG1-429 E O1	2.1237	Adder	4.71

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
965821	AG1-450	5.7923	50/50	5.7923
965921	AG1-461 C O1	1.7145	Adder	3.81
965922	AG1-461 E O1	0.9232	Adder	2.05
965951	AG1-464 C O1	1.7512	Adder	3.89
965952	AG1-464 E O1	2.6268	Adder	5.83
966281	AG1-497 C O1	3.9481	Adder	8.76
966282	AG1-497 E O1	1.6920	Adder	3.76
966601	AG1-529 C	3.8100	Adder	8.46
966602	AG1-529 E	2.0336	Adder	4.51
CALDERWOOD	CALDERWOOD	0.0924	Confirmed LTF	0.0924
NY	NY	0.0586	Confirmed LTF	0.0586
PRAIRIE	PRAIRIE	0.4779	Confirmed LTF	0.4779
O-066	O-066	0.4576	Confirmed LTF	0.4576
CHEOAH	CHEOAH	0.0931	Confirmed LTF	0.0931
COTTONWOOD	COTTONWOOD	0.3906	Confirmed LTF	0.3906
G-007	G-007	0.0378	Confirmed LTF	0.0378
HAMLET	HAMLET	0.1091	Confirmed LTF	0.1091
GIBSON	GIBSON	0.1010	Confirmed LTF	0.1010
BLUEG	BLUEG	0.3212	Confirmed LTF	0.3212
TRIMBLE	TRIMBLE	0.1030	Confirmed LTF	0.1030
CATAWBA	CATAWBA	0.0658	Confirmed LTF	0.0658

11.6.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
166664389	232107	TOWNSEND	DP&L	232106	MIDLNT P	DP&L	1	DPL_P7_1_DBL_1NCB_FS A	tower	348.0	183.0	187.53	DC	16.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
232405	W1-003 E	2.1162	Adder	2.49
232407	W1-004 E	2.1162	Adder	2.49
232409	W1-005 E	2.1162	Adder	2.49
232411	W1-006 E	2.1162	Adder	2.49
232412	X1-032 E	0.6923	Adder	0.81
232417	X3-008 C	0.3001	50/50	0.3001
232418	X3-008 E	3.1031	50/50	3.1031
232422	X3-066 C	0.1518	50/50	0.1518
232423	X3-066 E	1.2321	50/50	1.2321
232424	Y1-079 C	0.2221	50/50	0.2221
232425	Y1-079 E	2.2972	50/50	2.2972
232426	Y1-080 FULL	0.0468	50/50	0.0468
232427	Y1-080 E	0.4865	50/50	0.4865
232428	Y3-058 C	0.1887	50/50	0.1887
232429	Y3-058 E	1.2800	50/50	1.2800
232433	Z2-076 E	0.3195	Adder	0.38
232435	Z2-077 E	0.3195	Adder	0.38
232813	VAUGHN	0.1051	50/50	0.1051
232851	DUP-SFR1	1.6269	Adder	1.91
232902	EASTMUNI	3.3846	50/50	3.3846
232907	VN8	5.4177	50/50	5.4177
232910	NRG_G1	1.6595	50/50	1.6595
232911	NRG_G2	1.6595	50/50	1.6595
232919	VN10	0.4103	50/50	0.4103
232922	MR3 (Deactivation : 01/06/2021)	9.0454	Adder	10.64
232926	CRISFLD1	0.3223	50/50	0.3223
233912	AB1-137 E (Withdrawn : 12/07/2020)	0.2813	Adder	0.33
233915	AB1-141 C	0.9820	50/50	0.9820
233916	AB1-141 E	2.9046	50/50	2.9046
233918	AB1-142 C	0.9820	50/50	0.9820
233919	AB1-142 E	2.9046	50/50	2.9046
233923	AA1-102 C	1.8373	50/50	1.8373
233931	AB2-179 C	27.1217	50/50	27.1217
293670	O-025 C	0.1942	50/50	0.1942
917082	CHERRYDALE E	2.1143	Adder	2.49
918835	AA1-102 E	19.0008	50/50	19.0008
919831	AA2-069 (Suspended)	39.9949	Adder	47.05
923921	AB2-032 C	6.2703	50/50	6.2703
923922	AB2-032 E	2.9507	50/50	2.9507
923951	AB2-036 C	12.6635	50/50	12.6635

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
923952	AB2-036 E	20.7187	50/50	20.7187
924681	AB2-120 C	6.4703	Adder	7.61
924682	AB2-120 E	10.5569	Adder	12.42
924781	AB2-130 C O1	5.4550	Adder	6.42
924782	AB2-130 E O1	8.9003	Adder	10.47
924801	AB2-133 C O1	11.5421	50/50	11.5421
924802	AB2-133 E O1	14.6387	50/50	14.6387
924821	AB2-135 C	12.2976	50/50	12.2976
924822	AB2-135 E	14.0250	50/50	14.0250
924831	AB2-136 C	5.9562	50/50	5.9562
924832	AB2-136 E	6.3165	50/50	6.3165
924971	AB2-153 C	3.5040	50/50	3.5040
924972	AB2-153 E	5.7170	50/50	5.7170
925151	AB2-172 C	4.7548	50/50	4.7548
925152	AB2-172 E	7.7578	50/50	7.7578
925254	AB2-179 E	8.8503	50/50	8.8503
925261	AB2-180 C	2.9378	50/50	2.9378
925262	AB2-180 E	1.2590	50/50	1.2590
925271	AB2-185 C	5.1871	50/50	5.1871
925272	AB2-185 E	2.2231	50/50	2.2231
927031	AC1-190 C	8.6961	50/50	8.6961
927032	AC1-190 E	3.7269	50/50	3.7269
927191	AC1-213 C	0.6564	50/50	0.6564
927192	AC1-213 E	0.4308	50/50	0.4308
930201	AB1-056 C	9.8959	Adder	11.64
930202	AB1-056 E	28.1818	Adder	33.16
931261	AB1-176 C	0.6372	50/50	0.6372
931262	AB1-176 E	1.0507	50/50	1.0507
932161	AC2-023 C	5.6437	50/50	5.6437
932162	AC2-023 E	4.1103	50/50	4.1103
933641	AC2-186 C	3.1389	Adder	3.69
933642	AC2-186 E	5.1214	Adder	6.03
936611	AD2-076 C O1	8.1710	50/50	8.1710
936612	AD2-076 E O1	13.3317	50/50	13.3317
938651	AE1-087 C	4.0040	50/50	4.0040
938652	AE1-087 E	1.0010	50/50	1.0010
938895	AE1-117 C	7.5027	Adder	8.83
938896	AE1-117 E	20.0072	Adder	23.54
939151	AE1-145	3.4061	Adder	4.01
941021	AE2-093 C	5.0565	50/50	5.0565
941022	AE2-093 E	8.2500	50/50	8.2500
941181	AE2-112 C	2.8348	50/50	2.8348
941182	AE2-112 E	4.6253	50/50	4.6253
942441	AE2-257 C	5.1449	Adder	6.05
942442	AE2-257 E	13.5639	Adder	15.96
943361	AF1-007 C	0.2920	Adder	0.34
943362	AF1-007 E	0.8298	Adder	0.98
943441	AF1-015 C	1.9052	50/50	1.9052
943442	AF1-015 E	2.6311	50/50	2.6311
943651	AF1-036 C	3.6862	50/50	3.6862
943652	AF1-036 E	5.0904	50/50	5.0904
945661	AF1-231 C	1.2961	Adder	1.52

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
945662	AF1-231 E	1.9442	Adder	2.29
945791	AF1-244	1.6345	50/50	1.6345
945931	AF1-258	0.6715	50/50	0.6715
945941	AF1-259	0.3376	50/50	0.3376
957611	AF2-055 C	5.9678	Adder	7.02
957612	AF2-055 E	2.5577	Adder	3.01
957661	AF2-060	1.5328	Adder	1.8
957671	AF2-061 O1	6.8122	Adder	8.01
959021	AF2-193 C	18.2859	Adder	21.51
959022	AF2-193 E	49.3258	Adder	58.03
959031	AF2-194 C	18.2859	Adder	21.51
959032	AF2-194 E	49.3258	Adder	58.03
959051	AF2-196 C	1.4032	Adder	1.65
959052	AF2-196 E	3.2740	Adder	3.85
959161	AF2-207 C O1	3.4920	Adder	4.11
959162	AF2-207 E O1	6.1623	50/50	6.1623
959571	AF2-248 C	0.6946	50/50	0.6946
959572	AF2-248 E	0.7763	50/50	0.7763
959581	AF2-249 C	0.1226	50/50	0.1226
959582	AF2-249 E	0.4903	50/50	0.4903
959591	AF2-250 C	0.2247	50/50	0.2247
959592	AF2-250 E	0.1736	50/50	0.1736
960221	AF2-313 C	5.3589	50/50	5.3589
960222	AF2-313 E	3.0381	50/50	3.0381
960341	AF2-325 C	1.0239	50/50	1.0239
960342	AF2-325 E	1.4139	50/50	1.4139
960671	AF2-358 C O1	13.8072	50/50	13.8072
960672	AF2-358 E O1	9.2048	50/50	9.2048
960871	AF2-378 C	0.2684	50/50	0.2684
960872	AF2-378 E	0.3724	50/50	0.3724
960881	AF2-379 C	0.3375	50/50	0.3375
960882	AF2-379 E	0.4650	50/50	0.4650
960941	AF2-385 C	9.7407	50/50	9.7407
960942	AF2-385 E	5.5428	50/50	5.5428
960961	AF2-387 C O1	21.7542	50/50	21.7542
960962	AF2-387 E O1	10.9098	50/50	10.9098
961181	AF2-409 O1	22.4440	50/50	22.4440
962161	AG1-061 C O1	13.7777	50/50	13.7777
962162	AG1-061 E O1	9.1851	50/50	9.1851
962261	AG1-072	16.3320	50/50	16.3320
962302	AG1-079 E	0.4867	50/50	0.4867
962381	AG1-087 C O1	8.5411	Adder	18.96
962382	AG1-087 E O1	23.0393	Adder	51.14
963001	AG1-149	0.6129	50/50	0.6129
963011	AG1-150	3.6105	Adder	8.01
964551	AG1-318 C	0.0249	Adder	0.06
964552	AG1-318 E	0.0581	Adder	0.13
964962	AG1-360 E	0.8026	Adder	1.78
965321	AG1-397 C	0.3777	Adder	0.84
965322	AG1-397 E	0.5210	Adder	1.16
965611	AG1-429 C O1	3.1865	Adder	7.07
965612	AG1-429 E O1	2.1237	Adder	4.71

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
965821	AG1-450	5.7923	50/50	5.7923
965921	AG1-461 C O1	1.7145	Adder	3.81
965922	AG1-461 E O1	0.9232	Adder	2.05
965951	AG1-464 C O1	1.7512	Adder	3.89
965952	AG1-464 E O1	2.6268	Adder	5.83
966281	AG1-497 C O1	3.9481	Adder	8.76
966282	AG1-497 E O1	1.6920	Adder	3.76
966601	AG1-529 C	3.8100	Adder	8.46
966602	AG1-529 E	2.0336	Adder	4.51
CALDERWOOD	CALDERWOOD	0.0924	Confirmed LTF	0.0924
NY	NY	0.0586	Confirmed LTF	0.0586
PRAIRIE	PRAIRIE	0.4779	Confirmed LTF	0.4779
O-066	O-066	0.4576	Confirmed LTF	0.4576
CHEOAH	CHEOAH	0.0931	Confirmed LTF	0.0931
COTTONWOOD	COTTONWOOD	0.3906	Confirmed LTF	0.3906
G-007	G-007	0.0378	Confirmed LTF	0.0378
HAMLET	HAMLET	0.1091	Confirmed LTF	0.1091
GIBSON	GIBSON	0.1010	Confirmed LTF	0.1010
BLUEG	BLUEG	0.3212	Confirmed LTF	0.3212
TRIMBLE	TRIMBLE	0.1030	Confirmed LTF	0.1030
CATAWBA	CATAWBA	0.0658	Confirmed LTF	0.0658

11.7 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AA1-102	Kings Creek-Loretto 138kV	Partially in Service - Under Construction
AA2-069	Cartanza 230kV	Suspended
AB1-056	Indian River 230kV I	Engineering and Procurement
AB1-137	Frankford 25kV	Withdrawn
AB1-141	Church-Wye Mills 138 kV I	Engineering and Procurement
AB1-142	Church-Wye Mills 138 kV II	Engineering and Procurement
AB1-176	Price 25kV II	Active
AB2-032	Church-Wye Mills 138 kV	Engineering and Procurement
AB2-036	Church-Steele 138kV	Active
AB2-037	Keeney-Steele 230kV	Active
AB2-120	Piney Grove-New Church 138kV	Active
AB2-130	Laurel 69kV	Active
AB2-133	Chestertown-Church 69kV	Engineering and Procurement
AB2-135	Church-Kent 69kV	Active
AB2-136	West Cambridge-Vienna 69kV	Active
AB2-153	Church-Wye Mills 138 kV	Engineering and Procurement
AB2-172	Todd 69kV	Engineering and Procurement
AB2-179	Townsend 138kV	Engineering and Procurement
AB2-180	Rockawalkin 69kV	Engineering and Procurement
AB2-185	Wye Mills 25kV	Active
AC1-091	Cedar Creek 138kV I	Active
AC1-092	Cedar Creek 138kV II	Active
AC1-093	Cedar Creek 138kV III	Active
AC1-094	Cedar Creek 138kV IV	Active
AC1-190	East New Market 69kV	Active
AC1-213	North Salisbury 25kV	Active
AC2-023	Hebron 69kV	Active
AC2-185	Cedar Creek 138kV II	Active
AC2-186	Harrington 25kV	Engineering and Procurement
AD2-059	Chapel Street 138 kV	Active
AD2-076	Centreville 69 kV	Active
AE1-087	Todd 69 kV	Engineering and Procurement
AE1-107	Mt. Pleasant-Lums Pond 138 kV	Active
AE1-117	Bethany 138 kV	Active
AE1-145	Wallops Island 69 kV	Active
AE2-093	Easton-Steele 138 kV	Active
AE2-112	Carville 138 kV	Active
AE2-257	Cedar Neck 69 kV	Active
AF1-007	Indian River 230 kV I	Active

Queue Number	Project Name	Status
AF1-015	Easton-Steele 138 kV	Active
AF1-036	Carville 138 kV	Active
AF1-231	New Church 138 kV	Active
AF1-244	Kingston 12 kV	Active
AF1-258	Rockawalkin 69 kV	Engineering and Procurement
AF1-259	Price 25 kV	Engineering and Procurement
AF2-055	Plaintation Creek 69 kV	Active
AF2-060	Wattsville 12 kV	Active
AF2-061	Wattsville 69kV	Active
AF2-193	Indian River 230 kV I	Active
AF2-194	Indian River 230 kV II	Active
AF2-196	Cedar Neck 69 kV II	Active
AF2-207	Nelson 69 kV	Active
AF2-248	Edgewood 12 kV I	Active
AF2-249	Edgewood 12 kV II	Active
AF2-250	Edgewood 12 kV III	Active
AF2-313	Price 69 kV	Active
AF2-325	Jacktown 12 kV	Active
AF2-358	Airey-Vienna 69 kV	Active
AF2-378	Cambridge 12 kV	Active
AF2-379	Princess Anne 25 kV	Engineering and Procurement
AF2-385	Nelson 69 kV	Active
AF2-387	Hillsboro-Steele 138 kV	Active
AF2-409	Vienna 138 kV	Active
AG1-061	Laurel-Sharptown 69 kV	Active
AG1-072	Hillsboro-Steele 138 kV II	Active
AG1-079	New Meredith 69 kV	Active
AG1-087	Milford-Cartanza 230 kV	Active
AG1-149	Kingston 12 kV II	Active
AG1-150	Wattsville 69 kV II	Active
AG1-318	Ocean Bay 12 kV	Active
AG1-360	Costen 25 kV	Active
AG1-397	Walston 12 kV	Active
AG1-429	Tasley 69 kV	Active
AG1-450	Airey-Vienna 69 kV II	Active
AG1-461	Mumford 69 kV	Active
AG1-464	Harrington 69 kV	Active
AG1-497	Cartanza 230 kV	Active
AG1-529	Farmview 138 kV	Active
W1-003	Oak Hall	In Service
W1-004	Oak Hall	In Service
W1-005	Oak Hall	In Service
W1-006	Oak Hall	In Service
W3-032A	Cartanza 230kV	In Service
X1-032	Costen 25kV	In Service
X2-083	Newark 12kV	In Service
X3-008	Todd 69kV	Under Construction
X3-066	Church Hill 69kV	In Service
Y1-079	Wye Mills 69kV	In Service
Y1-080	Dorchester 12kV	In Service
Y3-058	Rockawalkin 69kV	In Service
Z2-076	Worcester South 25kV	In Service

Queue Number	Project Name	Status
Z2-077	Worcester North 25kV	In Service

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
PECO_P1-2_220-84	CONTINGENCY 'PECO_P1-2_220-84' /* \$ DELCO \$ 220-84 \$ LB TRIP BRANCH FROM BUS 214235 TO BUS 231000 CKT 1 /* LINWOOD 230.00 CLAY_230 230.00 \$ DELCO \$ 220-84 \$ L END
DPL_P1_2_CKT 23031	CONTINGENCY 'DPL_P1_2_CKT 23031' OPEN LINE FROM BUS 232002 TO BUS 232004 CIRCUIT 1 /CEDAR CREEK - MILFORD 230 END
PECO_P1-2_220-85/* \$ DELCO \$ PECO_P1-2_220-85 \$ L	CONTINGENCY 'PECO_P1-2_220-85/* \$ DELCO \$ PECO_P1-2_220-85 \$ L' DISCONNECT BUS 214236 /* LINWOOD85 230.00 \$ DELCO \$ PECO_P1-2_220-85 \$ L END
CKT 23032B	CONTINGENCY 'CKT 23032B' OPEN LINE FROM BUS 232013 TO BUS 232003 CIRCUIT 1 /SILVER RUN - CARTANZA 230 END
DPL_P1_2_AB2-037 KEENEY	CONTINGENCY 'DPL_P1_2_AB2-037 KEENEY' OPEN LINE FROM BUS 923960 TO BUS 231003 CIRCUIT 2 END
DPL_P1_2_CKT 23001	CONTINGENCY 'DPL_P1_2_CKT 23001' OPEN LINE FROM BUS 231003 TO BUS 232000 CIRCUIT 1 /#1 KEENEY EHV - STEELE 230 END
PECO_P1-2_220-85/* \$ DELCO \$ 220-85 \$ LC	CONTINGENCY 'PECO_P1-2_220-85/* \$ DELCO \$ 220-85 \$ LC' TRIP BRANCH FROM BUS 214236 TO BUS 231001 CKT 1 /* LINWOOD 230.00 EDGEMR5 230.00 \$ DELCO \$ 220-85 \$ L END
Base Case	

Contingency Name	Contingency Definition
DPL_P7_1_DBL_1NCB_FSA	CONTINGENCY 'DPL_P7_1_DBL_1NCB_FSA' /* #1 & #2 KEENEY-STEELE 230 OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1 OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2 OPEN LINE FROM BUS 232000 TO BUS 923960 CKT 2 DISCONNECT BUS 923961 DISCONNECT BUS 923962 END
PECO_P1-2_5014/* \$ CHESCO \$ PECO_P1-2_5014 \$ L PECO_P1-2_5014 \$ L	CONTINGENCY 'PECO_P1-2_5014/* \$ CHESCO \$ PECO_P1-2_5014 \$ L' TRIP BRANCH FROM BUS 200065 TO BUS 200051 CKT 1 /* PCHBTM2S 500.00 ROCKSPGS 500.00 \$ CHESCO \$ PECO_P1-2_5014 \$ L END
PJM500_PS_P1-2_HOPE-SILVER	CONTINGENCY 'PJM500_PS_P1-2_HOPE-SILVER' /* HOPE CREEK TO SILVER RUN DISCONNECT BUS 232012 DISCONNECT BUS 232014 END

12 Short Circuit Analysis

The following Breakers are overdutied:

None

12.1 System Reinforcements - Short Circuit

None

13 Affected Systems

None