Generation Interconnection

System Impact Study Report

for

Queue Project AF2-076

SUFFOLK-NUCOR STEEL 230 KV

30 MW Capacity / 50 MW Energy

February 2021

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1 Introduction

This System Impact Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 205, as well as the System Impact Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is Dominion.

2 Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. 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 System Impact Study is performed.

The System Impact 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.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in City of Suffolk County, Virginia. The installed facilities will have a total capability of 50 MW with 30 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 01, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-076
Project Name	SUFFOLK-NUCOR STEEL 230 KV
State	Virginia
County	City of Suffolk
Transmission Owner	Dominion
MFO	50
MWE	50
MWC	30
Fuel	Solar
Basecase Study Year	2023

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

AF2-076 will interconnect with the Dominion transmission system. The POI is a single line tap between Earleys 230 kV substation and Suffolk 230 kV substation. The IC is responsible for securing right-of-way, permits and constructing the proposed attachment line from the solar facility site to the proposed new substation. Attachment 1 shows a one-line diagram of the proposed interconnection facilities. The IC may not install any facilities on Dominion's right-of-way without first obtaining the necessary approval from Dominion Energy.

5 Cost Summary

The AF2-076 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$10,400,000
Allocation towards System Network Upgrade Costs*	$7,082,311
Total Costs	**$17,482,311**

*As your project progresses through the study process and other projects modify their request or withdraw, then your cost allocation could change.

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 88-129. 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.

Note 1: PJM Open Access Transmission Tariff (OATT) section 217.3A outline cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. The allocation of costs for a network upgrade will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than 5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.

Note 2: For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

6 Transmission Owner Scope of Work

Dominion assessed the impact of the proposed Queue Project AF2-076 was evaluated as a 30 MW Capacity (50.0 MW Energy) injection at a single line tap between Nucor Steel 230 kV substation and Suffolk 230 kV substation in the Dominion Transmission System, for compliance with NERC Reliability Criteria on Dominion Transmission System. The system was assessed using the summer 2023 AF2 case provided to Dominion by PJM. When performing a generation analysis, Dominion's main analysis will be load flow study results under single contingency (both normal and stressed system conditions). Dominion Criteria considers a transmission facility overloaded if it exceeds 94% of its emergency rating under normal and stressed system conditions. A full listing of Dominion's Planning Criteria and interconnection requirements can be found in the Company's Facility Connection Requirements which are publicly available at: http://www.dominionenergy.com.

The results of these studies evaluate the system under a limited set of operating conditions and do not guarantee the full delivery of the capacity and associated energy of this proposed generation facility under all operating conditions. NERC Planning and Operating Reliability Criteria allow for the re-dispatch of generating units to resolve projected and actual deficiencies in real time and planning studies. Specifically, in Planning Studies, NERC Planning Event 3 and 6 Contingency Conditions (Loss of generator, transmission circuit, transformer, shunt device, or Single Pole of a DC line followed by the loss of a generator, transmission circuit, transformer, shunt device or single pole of a DC line) allow for re-dispatch of generating units to resolve potential reliability deficiencies. For Dominion Planning Criteria the re-dispatch of generating units for these contingency conditions is allowed as long as the projected loading does not exceed 100% of a facility Load Dump Rating.

The required Attachment Facilities, Direct Connection and Non-Direct Connection work for the interconnection of the AF2-076 generation project to the Dominion Transmission System is detailed in the following sections. The associated one-line with the generation project attachment facilities and primary direct and non-direct connection are shown in Attachment 1.

Note that the ITO findings were made from a conceptual review of this project. A more detailed review of the connection facilities and their cost will be identified in a future study phases. Further note that the cost estimate data contained in this document should be considered high level estimates since it was produced without a detailed engineering review. The applicant will be responsible for the actual cost of construction. ITO herein reserves the right to return to any issues in this document and, upon appropriate justification, request additional monies to complete any reinforcements to the transmission systems.

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

Description	Total Cost
Attachment Facilities	$2,100,000
New three breaker ring-bus substation	$6,500,000

Description	Total Cost
Re-arrange transmission line to cut-in new substation	$1,800,000
Total Physical Interconnection Costs	**$10,400,000**

It is estimated to take 24-30 months to complete this work upon execution of an Interconnection Construction Service Agreement (ICSA). These preliminary cost estimates are based on typical engineering costs. A more detailed engineering cost estimates are normally done when the IC provides an exact site plan location for the generation substation during the Facility Study phase. See Attachment One.

Remote Terminal Work: During the Facilities Study, ITO's System Protection Engineering Department will review transmission line protection as well as anti-islanding required to accommodate the new generation and interconnection substation. System Protection Engineering will determine the minimal acceptable protection requirements to reliably interconnect the proposed generating facility with the transmission system. The review is based on maintaining system reliability by reviewing ITO's protection requirements with the known transmission system configuration which includes generating facilities in the area. This review may determine that transmission line protection and communication upgrades are required at remote substations.

7 Schedule

It is estimated to take 24-30 months to complete this work upon execution of an Interconnection Construction Service Agreement (ICSA).

The schedule for the required Network Impact Reinforcements will be more clearly identified in future study phases. The estimate elapsed time to complete each of the required reinforcements is identified in the "System Reinforcements" section of the report.

8 Transmission Owner Analysis

8.1 Power Flow Analysis

PJM performed a power flow analysis of the transmission system using a 2023 summer peak load flow model and the results were verified by Dominion. Additionally, Dominion performed an analysis of its transmission system and no further deficiencies were identified.

9 Interconnection Customer Requirements

9.1 System Protection

The IC must design its Customer Facilities in accordance with all applicable standards, including the standards in Dominion's "Dominion Energy Electric Transmission Generator Interconnection Requirements" documented in Dominion's Facility Interconnection Requirements "Exhibit C" located at: https://www.dominionenergy.com/company/moving-energy/electric-transmission-access. Preliminary Protection requirements will be provided as part of the Facilities Study. Detailed Protection Requirements will be provided once the project enters the construction phase.

9.2 Compliance Issues and Interconnection Customer Requirements

The proposed Customer Facilities must be designed in accordance with Dominion's "Dominion's Facility Interconnection Requirements" document located at: https://www.dominionenergy.com/company/moving-energy/electric-transmission-access. In particular, the IC is responsible for the following:

1. The purchase and installation of a fully rated protection device (circuit breaker, circuit switcher, fuse) to protect the IC's GSU transformer(s).

2. The purchase and installation of the minimum required Dominion generation interconnection relaying and control facilities as described in the System Protection noted above. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.

3. The purchase and installation of supervisory control and data acquisition ("SCADA") equipment to provide information in a compatible format to the Dominion Transmission System Control Center.

4. Compliance with the Dominion and PJM generator power factor and voltage control requirements.

The GSU(s) associated with the IC queue request shall meet the grounding requirements as noted in Dominion's "Dominion's Facility Interconnection Requirements" document located at: https://www.dominionenergy.com/company/moving-energy/electric-transmission-access.

The IC will also be required to meet all PJM, SERC, and NERC reliability criteria and operating procedures for standards compliance. For example, the IC will need to properly locate and report the over and under voltage and over and under frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and SERC audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the Dominion system.

9.3 Power Factor Requirements

The IC shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading (absorbing VARs) to 0.95 lagging (supplying VARs) measured at the high-side of the facility substation transformer(s) connected to the Dominion transmission system.

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 Meteorological Data Reporting Requirements

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter2) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)
- Wind direction (decimal degrees from true north) - (Accepted, not required)

10.3 Interconnected Transmission Owner Requirements

See Section 3.4.6 “Metering and telecommunications” of Dominion’s “Dominion’s Facility Interconnection Requirements” document located at: https://www.dominionenergy.com/company/moving-energy/electric-transmission-access.

11 Summer Peak Analysis

The Queue Project AF2-076 was evaluated as a 50.0 MW (Capacity 30.0 MW) injection tapping the Suffolk to Nucor Tap 230 kV line in the Dominion area. Project AF2-076 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-076 was studied with a commercial probability of 100.0 %. 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	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC| DC	MW IMPACT
15788719 3	31456 1	6CAROLN A	230. 0	DVP	31458 3	6LAKEVEW	230. 0	DVP	1	DVP_P4-2: 246T247-A	breake r	459.0	122.44	125.78	AC	13.75
15788755 5	31458 3	6LAKEVE W	230. 0	DVP	92451 0	AB2-100 TAP	230. 0	DVP	1	DVP_P1-2: LN 246-A	single	375.06	123.62	125.19	AC	5.9
15788700 9	31463 8	6ELIZ CT	230. 0	DVP	31464 7	6SHAWBR O	230. 0	DVP	1	DVP_P4-2: 246T247-A	breake r	699.0	229.72	231.18	DC	10.21
97718870	95782 0	AF2-076 TAP	230. 0	DVP	31453 7	6SUFFOLK	230. 0	DVP	1	DVP_P4-2: 209222-2	breake r	699.0	201.32	207.39	DC	42.41
97718871	95782 0	AF2-076 TAP	230. 0	DVP	31453 7	6SUFFOLK	230. 0	DVP	1	DVP_P4-2: 209222-1	breake r	699.0	201.32	207.39	DC	42.41
97912480	95782 0	AF2-076 TAP	230. 0	DVP	31453 7	6SUFFOLK	230. 0	DVP	1	DVP_P1-2: LN 2092	single	571.52	134.17	138.43	AC	25.45
97912481	95782 0	AF2-076 TAP	230. 0	DVP	31453 7	6SUFFOLK	230. 0	DVP	1	DVP_P1-2: LN 2131	single	571.52	133.15	137.4	AC	25.45
15788703 1	95782 0	AF2-076 TAP	230. 0	DVP	31453 7	6SUFFOLK	230. 0	DVP	1	DVP_P4-2: 2020T214 4	breake r	699.0	196.96	203.02	DC	42.33

11.4 Steady-State Voltage Requirements

To be determined in the Facilities Study phase.

11.5 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 PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
157887644	314563	6CLUBHSE	230.0	DVP	940480	AE2-033 TAP	230.0	DVP	1	DVP_P1-2: LN 246-A	operation	678.68	149.7	150.99	AC	10.3
157887548	314583	6LAKEVEW	230.0	DVP	924510	AB2-100 TAP	230.0	DVP	1	DVP_P1-2: LN 246-A	operation	375.06	181.21	183.83	AC	9.83
97912475	957820	AF2-076 TAP	230.0	DVP	314537	6SUFFOLK	230.0	DVP	1	DVP_P1-2: LN 2092	operation	571.52	240.13	247.55	DC	42.41
97912482	957820	AF2-076 TAP	230.0	DVP	314537	6SUFFOLK	230.0	DVP	1	Base Case	operation	571.52	120.21	127.51	AC	42.78

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-076	Upgrade Number
157887193	1	**6CAROLNA 230.0 kV - 6LAKEVEW 230.0 kV Ckt 1**	**DVP** **ProjectId : n6052 (dom-220)** **Description : Rebuild 1.37 miles of 230 kV Line 2141 from Carolina to Lakeview with 2-636 ACSR.** **Type : FAC** **Total Cost : $2,055,000** **Time Estimate : 30-36 Months** **Ratings : 602.0/627.0/639.0** **Queue Project AF2-076 presently does not receive cost allocation for this upgrade.** **Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AF2-076 could receive cost allocation.** **Note 2: Although Queue Project AF2-076 may not have cost responsibility for this upgrade, Queue Project AF2-076 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-076 comes into service prior to completion of the upgrade, Queue Project AF2-076 will need an interim study**	$2,055,000	$0	n6052
157887555	2	**6LAKEVEW 230.0 kV - AB2-100 TAP 230.0 kV Ckt 1**	**DVP** **ProjectId : b3121** **Description : PJM Baseline Upgrade b3121. Rebuild Clubhouse-Lakeview 230 kV Line #254 with single-circuit wood pole equivalent structures at the current 230 kV standard with a minimum rating of 1047 MVA.** **Type : FAC** **Time Estimate : The baseline project has an projected in-service date of 12/31/2024.** **Ratings : 1047.0/1047.0/1204.0** **Note: Although Queue Project AF2-076 may not have cost responsibility for this upgrade, Queue Project AF2-076 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-076 comes into service prior to completion of the upgrade, Queue Project AF2-076 will need an interim study**	$0	$0	b3121

<table>
<tr><th>ID</th><th>Idx</th><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocated to AF2-076</th><th>Upgrade Number</th></tr>
<tr>
<td>97912480,157887031,977188711,97718870,97912481</td>
<td>4</td>
<td>AF2-076 TAP 230.0 kV - 6SUFFOLK 230.0 kV Ckt 1</td>
<td>
<u>DVP</u>
ProjectId : n7158 (dom-243)
Description : Rebuild 2.8 miles of 230 kV Line 246 from AF2-076 Tap to Suffolk with 2-768 ACSS.
Type : FAC
Total Cost : $4,200,000
Time Estimate : 36-40 Months
Ratings : 1195.0/1195.0/1593.0
<table>
<tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr>
<tr><td>AF2-046</td><td>30.67</td><td>24.27%</td><td>$1,019,340</td></tr>
<tr><td>AF2-047</td><td>53.29</td><td>42.17%</td><td>$1,771,132</td></tr>
<tr><td>AF2-076</td><td>42.41</td><td>33.56%</td><td>$1,409,528</td></tr>
</table>
ProjectId : n6849 (dom-221)
Description : Rebuild 30.6 miles of 230 kV Line 246 from Nuco TP to Suffolk with 2-636 ACSR.
Type : FAC
Total Cost : $45,900,000
Time Estimate : 48-60 Months
Ratings : 1047.0/1047.0/1204.0
Notes : Driver TBD
<table>
<tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr>
<tr><td>AF1-000</td><td>34.05</td><td>9.17%</td><td>$4,210,499</td></tr>
<tr><td>AE2-034</td><td>14.83</td><td>4.00%</td><td>$1,833,824</td></tr>
<tr><td>AE2-260</td><td>8.32</td><td>2.24%</td><td>$1,028,821</td></tr>
<tr><td>AF1-059</td><td>8.35</td><td>2.25%</td><td>$1,032,531</td></tr>
<tr><td>AF1-236</td><td>163.38</td><td>44.02%</td><td>$20,202,974</td></tr>
<tr><td>AF1-266</td><td>15.89</td><td>4.28%</td><td>$1,964,899</td></tr>
<tr><td>AF2-046</td><td>30.67</td><td>8.26%</td><td>$3,792,540</td></tr>
<tr><td>AF2-047</td><td>53.29</td><td>14.36%</td><td>$6,589,647</td></tr>
<tr><td>AF2-076</td><td>42.41</td><td>11.43%</td><td>$5,244,266</td></tr>
</table>
</td>
<td>$50,100,000</td>
<td>$6,653,793</td>
<td>n6849, n7158</td>
</tr>
</table>

<table>
<tr><th>ID</th><th>Idx</th><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocated to AF2-076</th><th>Upgrade Number</th></tr>
<tr><td>157887009</td><td>3</td><td>6ELIZ CT 230.0 kV - 6SHAWBRO 230.0 kV Ckt 1</td><td><u>DVP</u>
ProjectId : n6218 (dom-011)
Description : Rebuild 10.28 miles of 230 kV Line 2021 from Elizabeth City to Shawboro with 2-636 ACSR.
Type : FAC
Total Cost : $15,420,000
Time Estimate : 30-36 Months
Ratings : 1047.0/1047.0/1204.0
<table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AD1-076</td><td>143.87</td><td>14.73%</td><td>$2,271,841</td></tr><tr><td>AD2-051</td><td>15.59</td><td>1.60%</td><td>$246,181</td></tr><tr><td>AE2-034</td><td>27.61</td><td>2.83%</td><td>$435,988</td></tr><tr><td>AE2-147</td><td>101.02</td><td>10.35%</td><td>$1,595,200</td></tr><tr><td>AF1-152</td><td>33.71</td><td>3.45%</td><td>$532,312</td></tr><tr><td>AF1-236</td><td>558.31</td><td>57.17%</td><td>$8,816,234</td></tr><tr><td>AF2-046</td><td>16.99</td><td>1.74%</td><td>$268,288</td></tr><tr><td>AF2-047</td><td>69.2</td><td>7.09%</td><td>$1,092,732</td></tr><tr><td>AF2-076</td><td>10.21</td><td>1.05%</td><td>$161,225</td></tr></table>
ProjectId : n6874 (dom-255)
Description : Rebuild 10.28 miles of 230 kV Line 2021 from Elizabeth City to Shawboro with 2-768.2 ACSS 250C. Replace Breaker, Breaker Lead, Wave Trap and Line lead at Elizabeth City 230 kV. Replace Wavetrap, relay (Secondary CT), Line Lead at Shawboro 230 kV.
Type : FAC
Total Cost : $17,140,000
Time Estimate : 36-40 Months
Ratings : 1315.0/1434.0/1745.0
<table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AF1-236</td><td>558.31</td><td>85.28%</td><td>$14,616,293</td></tr><tr><td>AF2-046</td><td>16.99</td><td>2.60%</td><td>$444,790</td></tr><tr><td>AF2-047</td><td>69.2</td><td>10.57%</td><td>$1,811,623</td></tr><tr><td>AF2-076</td><td>10.21</td><td>1.56%</td><td>$267,293</td></tr></table></td><td>$32,560,000</td><td>$428,518</td><td>n6218, n6874</td></tr>
<tr><td></td><td></td><td></td><td>TOTAL COST</td><td>$84,715,000</td><td>$7,082,311</td><td></td></tr>
</table>

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

11.7 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".

11.7.1 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
157887193	314561	6CAROLNA	DVP	314583	6LAKEVEW	DVP	1	DVP_P4-2: 246T247-A	breaker	459.0	122.44	125.78	AC	13.75

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314539	3UNCAMP	1.4053	Adder	1.65
314541	3WATKINS	0.5711	50/50	0.5711
314574	6EVERETS	0.2169	50/50	0.2169
314582	3KELFORD	0.6127	50/50	0.6127
314589	3MURPHYS	0.1201	50/50	0.1201
315115	1S HAMPT1	1.3064	50/50	1.3064
315126	1ROARAP2	2.5437	50/50	2.5437
315128	1ROARAP4	2.4273	50/50	2.4273
315292	1DOMTR78	1.4356	50/50	1.4356
315294	1DOMTR10	11.0717	50/50	11.0717
315602	1HOLLOMANSOL	2.4770	50/50	2.4770
315606	3AA2-053SOLA	2.5847	50/50	2.5847
315607	3AA1-063SOLA	2.2468	50/50	2.2468
315608	3AA2-088SOLA	1.2494	50/50	1.2494
315611	6Z1-036WIND	3.8033	Adder	4.47
315614	AA2-178 C	1.4938	50/50	1.4938
900672	V4-068 E	0.3918	50/50	0.3918
901082	W1-029 E	14.4727	Adder	17.03
907092	X1-038 E	3.5132	Adder	4.13
916042	**Z1-036 E (Suspended)**	**25.4821**	**Adder**	**29.98**
917122	Z2-027 E	0.3785	Adder	0.45
917332	Z2-043 E	1.5854	50/50	1.5854
918492	AA1-063AE OP	6.3046	50/50	6.3046
918512	AA1-065 E OP	6.6002	50/50	6.6002
918532	AA1-067 E	0.5533	50/50	0.5533
919692	AA2-053 E OP	6.6047	50/50	6.6047
919702	AA2-057 E OP	1.4685	Adder	1.73
920042	AA2-088 E OP	12.1315	50/50	12.1315
920592	AA2-165 E	0.2018	Adder	0.24
920671	AA2-174 C OP	0.1184	50/50	0.1184
920672	AA2-174 E OP	0.7632	50/50	0.7632
920692	AA2-178 E	3.8098	50/50	3.8098
923572	AB1-173 C OP	1.6126	50/50	1.6126
923573	AB1-173 E OP	0.7525	50/50	0.7525
923582	AB1-173AC OP	1.6126	50/50	1.6126
923583	AB1-173AE OP	0.7525	50/50	0.7525
923801	AB2-015 C OP	6.6245	50/50	6.6245
923802	AB2-015 E OP	5.4321	50/50	5.4321
923911	AB2-031 C O1	1.6006	50/50	1.6006
923912	AB2-031 E O1	0.7884	50/50	0.7884
923991	AB2-040 C O1	5.2558	50/50	5.2558

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
923992	AB2-040 E O1	4.3002	50/50	4.3002
924501	AB2-099 C (Suspended)	0.8753	50/50	0.8753
924502	AB2-099 E (Suspended)	0.3751	50/50	0.3751
925121	AB2-169 C	1.0195	50/50	1.0195
925122	AB2-169 E	5.4450	50/50	5.4450
925172	AB2-174 E O1	2.5943	Adder	3.05
925781	AC1-054 C O1	6.8250	50/50	6.8250
925782	AC1-054 E O1	3.1441	50/50	3.1441
926201	AC1-098 C	6.3394	50/50	6.3394
926202	AC1-098 E	3.7766	50/50	3.7766
926211	AC1-099 C	2.1244	50/50	2.1244
926212	AC1-099 E	1.2476	50/50	1.2476
927141	AC1-208 C	8.9621	50/50	8.9621
927142	AC1-208 E	3.9795	50/50	3.9795
932631	AC2-084 C	9.0370	50/50	9.0370
932632	AC2-084 E	4.4510	50/50	4.4510
933991	AD1-023 C	16.1927	50/50	16.1927
933992	AD1-023 E	8.8153	50/50	8.8153
934521	AD1-076 C	59.2750	50/50	59.2750
934522	AD1-076 E	30.1827	50/50	30.1827
936361	AD2-046 C O1	4.4782	Adder	5.27
936362	AD2-046 E O1	2.0593	Adder	2.42
936401	AD2-051 C O1	14.9094	50/50	14.9094
936402	AD2-051 E O1	6.4019	50/50	6.4019
938221	AE1-035 C	3.6851	50/50	3.6851
938222	AE1-035 E	1.8151	50/50	1.8151
938771	AE1-103 C O1	2.1079	Adder	2.48
938772	AE1-103 E O1	2.9109	Adder	3.42
939181	AE1-148 C O1	4.3151	Adder	5.08
939182	AE1-148 E O1	2.8767	Adder	3.38
940491	AE2-034 C	6.6671	50/50	6.6671
940492	AE2-034 E	2.8573	50/50	2.8573
940542	AE2-040 BAT	1.4667	Merchant Transmission	1.4667
940661	AE2-053 O1	1.5982	Adder	1.88
941501	AE2-147 C	7.1964	Adder	8.47
941502	AE2-147 E	4.7976	Adder	5.64
941541	AE2-151 C	1.6871	50/50	1.6871
941542	AE2-151 E	0.9085	50/50	0.9085
942851	AE2-304 C (Withdrawn : 10/26/2020)	0.3142	Adder	0.37
942852	AE2-304 E (Withdrawn : 10/26/2020)	0.1222	Adder	0.14
943171	AE2-346 C	2.1008	50/50	2.1008
943172	AE2-346 E	0.9004	50/50	0.9004
944871	AF1-152 C	2.3988	Adder	2.82
944872	AF1-152 E	1.5992	Adder	1.88
945711	AF1-236 C O1	72.9887	50/50	72.9887
945712	AF1-236 E O1	119.0867	50/50	119.0867
946012	AF1-266 BAT	7.7860	Merchant Transmission	7.7860
957521	AF2-046 C	22.6277	50/50	22.6277
957522	AF2-046 E	11.3818	50/50	11.3818
957531	AF2-047 C	15.8423	50/50	15.8423
957532	AF2-047 E	7.9687	50/50	7.9687

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957821	AF2-076 C	8.2503	50/50	8.2503
957822	AF2-076 E	5.5002	50/50	5.5002
959511	AF2-242 C	6.4616	50/50	6.4616
959512	AF2-242 E	5.0257	50/50	5.0257
961091	AF2-400 C	0.3577	50/50	0.3577
961092	AF2-400 E	0.5869	50/50	0.5869
WEC	WEC	0.0466	Confirmed LTF	0.0466
LGEE	LGEE	0.0873	Confirmed LTF	0.0873
CPLE	CPLE	0.5715	Confirmed LTF	0.5715
CBM-W2	CBM-W2	1.7772	Confirmed LTF	1.7772
NY	NY	0.0498	Confirmed LTF	0.0498
TVA	TVA	0.3654	Confirmed LTF	0.3654
O-066	O-066	0.7190	Confirmed LTF	0.7190
CBM-S2	CBM-S2	3.2079	Confirmed LTF	3.2079
CBM-S1	CBM-S1	2.0533	Confirmed LTF	2.0533
G-007	G-007	0.1123	Confirmed LTF	0.1123
MADISON	MADISON	0.0927	Confirmed LTF	0.0927
MEC	MEC	0.2749	Confirmed LTF	0.2749
CBM-W1	CBM-W1	1.7514	Confirmed LTF	1.7514

11.7.2 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
157887555	314583	6LAKEVEW	DVP	924510	AB2-100 TAP	DVP	1	DVP_P1-2: LN 246-A	single	375.059997559	123.62	125.19	AC	5.9

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314574	6EVERETS	0.1406	80/20	0.1406
314582	3KELFORD	0.2459	80/20	0.2459
314589	3MURPHYS	0.0381	80/20	0.0381
314623	3WITAKRS	0.1182	80/20	0.1182
315115	1S HAMPT1	0.3633	80/20	0.3633
315126	1ROARAP2	0.7108	80/20	0.7108
315128	1ROARAP4	0.6783	80/20	0.6783
315136	1ROSEMG1	2.2431	80/20	2.2431
315137	1ROSEMS1	1.3910	80/20	1.3910
315138	1ROSEMG2	1.0513	80/20	1.0513
315139	1GASTONA	3.4405	80/20	3.4405
315141	1GASTONB	3.4405	80/20	3.4405
315158	1KERR 1	0.0700	80/20	0.0700
315159	1KERR 2	0.1961	80/20	0.1961
315160	1KERR 3	0.1961	80/20	0.1961
315161	1KERR 4	0.1961	80/20	0.1961
315162	1KERR 5	0.1961	80/20	0.1961
315163	1KERR 6	0.1961	80/20	0.1961
315164	1KERR 7	0.1961	80/20	0.1961
315292	1DOMTR78	0.5766	80/20	0.5766
315294	1DOMTR10	8.7642	80/20	8.7642
315601	1CONETOE2SOL	0.7935	80/20	0.7935
315602	1HOLLOMANSOL	0.8987	80/20	0.8987
315606	3AA2-053SOLA	0.7548	80/20	0.7548
315607	3AA1-063SOLA	0.6374	80/20	0.6374
315608	3AA2-088SOLA	0.3643	80/20	0.3643
315611	6Z1-036WIND	2.1177	80/20	2.1177
315612	3AA2-057SOLA	0.6334	80/20	0.6334
315614	AA2-178 C	0.4828	80/20	0.4828
920591	AA2-165 C	0.0751	80/20	0.0751
920671	AA2-174 C OP	0.0346	80/20	0.0346
922922	AB1-081 C OP	9.2949	80/20	9.2949
923262	**AB1-132 C OP (Suspended)**	**30.8162**	**80/20**	**30.8162**
923801	AB2-015 C OP	3.5570	80/20	3.5570
924151	AB2-059 C OP	0.9340	80/20	0.9340
924501	**AB2-099 C (Suspended)**	**0.6038**	**80/20**	**0.6038**
925121	AB2-169 C	0.4729	80/20	0.4729
925591	AC1-034 C	7.0956	80/20	7.0956
925781	AC1-054 C O1	3.6766	80/20	3.6766
926071	AC1-086 C	45.3806	80/20	45.3806
926201	AC1-098 C	6.4367	80/20	6.4367

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
926211	AC1-099 C	2.1570	80/20	2.1570
927021	AC1-189 C	8.7159	80/20	8.7159
927141	AC1-208 C	9.2895	80/20	9.2895
932631	AC2-084 C	9.1758	80/20	9.1758
933991	AD1-023 C	11.3908	80/20	11.3908
934331	AD1-057 C O1	15.9055	80/20	15.9055
934521	AD1-076 C	41.3350	80/20	41.3350
936401	AD2-051 C O1	10.5366	80/20	10.5366
938221	AE1-035 C	2.6352	80/20	2.6352
938771	AE1-103 C O1	1.2963	80/20	1.2963
940491	AE2-034 C	4.2475	80/20	4.2475
940571	AE2-044 C	4.6474	80/20	4.6474
941541	AE2-151 C	1.1943	80/20	1.1943
943171	AE2-346 C	1.4492	80/20	1.4492
944141	AF1-082	2.9876	80/20	2.9876
945711	AF1-236 C O1	46.4996	80/20	46.4996
957521	AF2-046 C	14.4520	80/20	14.4520
957531	AF2-047 C	10.0928	80/20	10.0928
957821	AF2-076 C	5.8983	80/20	5.8983
957861	AF2-080 C	7.9162	80/20	7.9162
959511	AF2-242 C	6.6452	80/20	6.6452
960331	**AF2-324 C O1 (Withdrawn : 10/01/2020)**	**8.5488**	**80/20**	**8.5488**
961091	AF2-400 C	0.1921	80/20	0.1921
WEC	WEC	0.2693	Confirmed LTF	0.2693
LGEE	LGEE	0.5043	Confirmed LTF	0.5043
CPLE	CPLE	3.1699	Confirmed LTF	3.1699
CBM-W2	CBM-W2	10.6306	Confirmed LTF	10.6306
NY	NY	0.2726	Confirmed LTF	0.2726
TVA	TVA	2.2148	Confirmed LTF	2.2148
CBM-S2	CBM-S2	19.4150	Confirmed LTF	19.4150
CBM-S1	CBM-S1	12.3796	Confirmed LTF	12.3796
MADISON	MADISON	0.6088	Confirmed LTF	0.6088
MEC	MEC	1.6176	Confirmed LTF	1.6176
AA2-074	AA2-074	2.1604	LTF	2.1604
CBM-W1	CBM-W1	10.1206	Confirmed LTF	10.1206

11.7.3 Index 3

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
157887009	314638	6ELIZ CT	DVP	314647	6SHAWBRO	DVP	1	DVP_P4-2: 246T247-A	breaker	699.0	229.72	231.18	DC	10.21

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314574	6EVERETS	0.2850	50/50	0.2850
314582	3KELFORD	0.4125	50/50	0.4125
314589	3MURPHYS	0.0562	50/50	0.0562
314638	6ELIZ CT	0.9897	50/50	0.9897
314639	6TANGLEW	1.7395	50/50	1.7395
315292	1DOMTR78	2.7497	50/50	2.7497
315294	1DOMTR10	21.2071	50/50	21.2071
315601	1CONETOE2SOL	1.1911	50/50	1.1911
315602	1HOLLOMANSOL	1.8389	50/50	1.8389
315605	6W1-029WIND	3.0584	50/50	3.0584
315606	3AA2-053SOLA	0.9206	50/50	0.9206
315611	6Z1-036WIND	23.6391	50/50	23.6391
315614	AA2-178 C	4.3415	50/50	4.3415
900672	V4-068 E	0.1834	50/50	0.1834
901082	W1-029 E	122.0121	50/50	122.0121
913392	Y1-086 E	9.6098	50/50	9.6098
916042	**Z1-036 E (Suspended)**	**158.3818**	**50/50**	**158.3818**
917122	Z2-027 E	4.4365	50/50	4.4365
917332	Z2-043 E	1.0674	50/50	1.0674
917512	Z2-088 E OP1	3.0379	50/50	3.0379
918512	AA1-065 E OP	4.9001	50/50	4.9001
918532	AA1-067 E	0.7269	50/50	0.7269
919692	AA2-053 E OP	2.3524	50/50	2.3524
919702	AA2-057 E OP	1.7582	Adder	2.07
920592	AA2-165 E	0.2416	Adder	0.28
920671	AA2-174 C OP	0.0422	50/50	0.0422
920672	AA2-174 E OP	0.2718	50/50	0.2718
920692	AA2-178 E	11.0726	50/50	11.0726
923262	**AB1-132 C OP (Suspended)**	**7.1007**	**Adder**	**8.35**
923263	**AB1-132 E OP (Suspended)**	**3.0432**	**Adder**	**3.58**
923831	AB2-022 C	10.0747	50/50	10.0747
923832	AB2-022 E	5.4249	50/50	5.4249
924501	**AB2-099 C (Suspended)**	**0.5432**	**50/50**	**0.5432**
924502	**AB2-099 E (Suspended)**	**0.2328**	**50/50**	**0.2328**
925121	AB2-169 C	1.7980	50/50	1.7980
925122	AB2-169 E	9.6026	50/50	9.6026
926071	AC1-086 C	10.4567	Adder	12.3
926072	AC1-086 E	4.7592	Adder	5.6
926201	AC1-098 C	4.4391	50/50	4.4391

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
926202	AC1-098 E	2.6445	50/50	2.6445
926211	AC1-099 C	1.4876	50/50	1.4876
926212	AC1-099 E	0.8736	50/50	0.8736
927021	AC1-189 C	7.3676	50/50	7.3676
927022	AC1-189 E	3.6700	50/50	3.6700
927141	AC1-208 C	5.6752	50/50	5.6752
927142	AC1-208 E	2.5200	50/50	2.5200
932631	AC2-084 C	6.3280	50/50	6.3280
932632	AC2-084 E	3.1168	50/50	3.1168
933991	AD1-023 C	25.7001	50/50	25.7001
933992	AD1-023 E	13.9911	50/50	13.9911
934521	AD1-076 C	120.4453	50/50	120.4453
934522	AD1-076 E	61.3306	50/50	61.3306
936401	AD2-051 C O1	10.5476	50/50	10.5476
936402	AD2-051 E O1	4.5290	50/50	4.5290
938221	AE1-035 C	2.7359	50/50	2.7359
938222	AE1-035 E	1.3475	50/50	1.3475
940491	AE2-034 C	19.3771	50/50	19.3771
940492	AE2-034 E	8.3045	50/50	8.3045
941501	AE2-147 C	60.6690	50/50	60.6690
941502	AE2-147 E	40.4460	50/50	40.4460
941541	AE2-151 C	1.1190	50/50	1.1190
941542	AE2-151 E	0.6026	50/50	0.6026
942851	AE2-304 C (Withdrawn : 10/26/2020)	2.3248	50/50	2.3248
942852	AE2-304 E (Withdrawn : 10/26/2020)	0.9041	50/50	0.9041
943171	AE2-346 C	1.3036	50/50	1.3036
943172	AE2-346 E	0.5587	50/50	0.5587
944871	AF1-152 C	20.2230	50/50	20.2230
944872	AF1-152 E	13.4820	50/50	13.4820
945711	AF1-236 C O1	212.1333	50/50	212.1333
945712	AF1-236 E O1	346.1123	50/50	346.1123
957521	AF2-046 C	11.3063	50/50	11.3063
957522	AF2-046 E	5.6872	50/50	5.6872
957531	AF2-047 C	46.0437	50/50	46.0437
957532	AF2-047 E	23.1603	50/50	23.1603
957821	AF2-076 C	6.1242	50/50	6.1242
957822	AF2-076 E	4.0828	50/50	4.0828
957861	AF2-080 C	6.6915	50/50	6.6915
957862	AF2-080 E	2.9664	50/50	2.9664
959511	AF2-242 C	10.4810	50/50	10.4810
959512	AF2-242 E	8.1519	50/50	8.1519
WEC	WEC	0.1928	Confirmed LTF	0.1928
LGEE	LGEE	0.3606	Confirmed LTF	0.3606
CPLE	CPLE	2.2676	Confirmed LTF	2.2676
CBM-W2	CBM-W2	7.5512	Confirmed LTF	7.5512
NY	NY	0.1836	Confirmed LTF	0.1836
TVA	TVA	1.5680	Confirmed LTF	1.5680
O-066	O-066	2.6813	Confirmed LTF	2.6813
CBM-S2	CBM-S2	13.7102	Confirmed LTF	13.7102
CBM-S1	CBM-S1	8.7671	Confirmed LTF	8.7671
G-007	G-007	0.4191	Confirmed LTF	0.4191

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
MADISON	MADISON	0.4254	Confirmed LTF	0.4254
MEC	MEC	1.1536	Confirmed LTF	1.1536
AA2-074	AA2-074	1.5453	LTF	1.5453
CBM-W1	CBM-W1	7.2558	Confirmed LTF	7.2558

11.7.4 Index 4

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
97718871	957820	AF2-076 TAP	DVP	314537	6SUFFOLK	DVP	1	DVP_P4-2: 209222-1	breaker	699.0	201.32	207.39	DC	42.41

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314574	6EVERETS	0.4537	50/50	0.4537
314582	3KELFORD	0.7640	50/50	0.7640
314589	3MURPHYS	0.1005	50/50	0.1005
314623	3WITAKRS	0.2299	50/50	0.2299
315136	1ROSEMG1	2.2907	50/50	2.2907
315137	1ROSEMS1	1.4204	50/50	1.4204
315138	1ROSEMG2	1.0736	50/50	1.0736
315139	1GASTONA	3.3501	50/50	3.3501
315141	1GASTONB	3.3501	50/50	3.3501
315292	1DOMTR78	2.7989	50/50	2.7989
315294	1DOMTR10	21.5862	50/50	21.5862
315601	1CONETOE2SOL	1.9402	50/50	1.9402
315602	1HOLLOMANSOL	3.4651	50/50	3.4651
315606	3AA2-053SOLA	1.6814	50/50	1.6814
315611	6Z1-036WIND	13.8540	50/50	13.8540
315612	3AA2-057SOLA	1.2947	50/50	1.2947
315614	AA2-178 C	3.3430	50/50	3.3430
900672	V4-068 E	0.3279	50/50	0.3279
916042	**Z1-036 E (Suspended)**	**92.8216**	**50/50**	**92.8216**
917332	Z2-043 E	1.9767	50/50	1.9767
917342	Z2-044 E	0.5863	50/50	0.5863
917512	Z2-088 E OP1	4.9483	50/50	4.9483
918492	AA1-063AE OP	3.0023	Adder	3.53
918512	AA1-065 E OP	9.2333	50/50	9.2333
918532	AA1-067 E	1.1571	50/50	1.1571
919692	AA2-053 E OP	4.2964	50/50	4.2964
919702	AA2-057 E OP	3.6368	50/50	3.6368
920042	AA2-088 E OP	6.0152	Adder	7.08
920591	AA2-165 C	0.1535	50/50	0.1535
920592	AA2-165 E	0.4998	50/50	0.4998
920671	AA2-174 C OP	0.0770	50/50	0.0770
920672	AA2-174 E OP	0.4965	50/50	0.4965
920692	AA2-178 E	8.5260	50/50	8.5260
922922	AB1-081 C OP	7.3056	Adder	8.59
922923	AB1-081 E OP	3.1310	Adder	3.68
923262	**AB1-132 C OP (Suspended)**	**15.2242**	**50/50**	**15.2242**
923263	**AB1-132 E OP (Suspended)**	**6.5246**	**50/50**	**6.5246**
923572	AB1-173 C OP	1.5321	Adder	1.8
923573	AB1-173 E OP	0.7150	Adder	0.84

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
923582	AB1-173AC OP	1.5321	Adder	1.8
923583	AB1-173AE OP	0.7150	Adder	0.84
923911	AB2-031 C O1	1.5208	Adder	1.79
923912	AB2-031 E O1	0.7490	Adder	0.88
923991	AB2-040 C O1	4.9936	Adder	5.87
923992	AB2-040 E O1	4.0857	Adder	4.81
924152	AB2-059 E OP	4.4356	Adder	5.22
924501	**AB2-099 C (Suspended)**	**1.0075**	**50/50**	**1.0075**
924502	**AB2-099 E (Suspended)**	**0.4318**	**50/50**	**0.4318**
924512	AB2-100 E	3.0729	Adder	3.62
925121	AB2-169 C	2.0241	50/50	2.0241
925122	AB2-169 E	10.8101	50/50	10.8101
925172	AB2-174 E O1	4.1108	Adder	4.84
925591	AC1-034 C	5.5771	Adder	6.56
925592	AC1-034 E	4.2073	Adder	4.95
925781	AC1-054 C O1	3.8763	Adder	4.56
925782	AC1-054 E O1	1.7857	Adder	2.1
926071	AC1-086 C	22.4194	50/50	22.4194
926072	AC1-086 E	10.2038	50/50	10.2038
926201	AC1-098 C	8.0381	50/50	8.0381
926202	AC1-098 E	4.7887	50/50	4.7887
926211	AC1-099 C	2.6936	50/50	2.6936
926212	AC1-099 E	1.5820	50/50	1.5820
927021	AC1-189 C	11.8965	50/50	11.8965
927022	AC1-189 E	5.9259	50/50	5.9259
927141	AC1-208 C	10.1482	50/50	10.1482
927142	AC1-208 E	4.5062	50/50	4.5062
932631	AC2-084 C	11.4586	50/50	11.4586
932632	AC2-084 E	5.6438	50/50	5.6438
933991	AD1-023 C	28.2020	50/50	28.2020
933992	AD1-023 E	15.3532	50/50	15.3532
934331	AD1-057 C O1	10.1868	50/50	10.1868
934332	AD1-057 E O1	5.4341	50/50	5.4341
934521	AD1-076 C	113.9319	50/50	113.9319
934522	AD1-076 E	58.0140	50/50	58.0140
935111	AD1-144 C	-0.7749	Adder	-0.91
936401	AD2-051 C O1	19.8659	50/50	19.8659
936402	AD2-051 E O1	8.5302	50/50	8.5302
937541	AD2-215 C	-0.7829	Adder	-0.92
938221	AE1-035 C	5.1552	50/50	5.1552
938222	AE1-035 E	2.5392	50/50	2.5392
940491	AE2-034 C	14.9205	50/50	14.9205
940492	AE2-034 E	6.3945	50/50	6.3945
940571	AE2-044 C	3.6528	Adder	4.3
940572	AE2-044 E	1.5655	Adder	1.84
941541	AE2-151 C	2.0905	50/50	2.0905
941542	AE2-151 E	1.1256	50/50	1.1256
942131	AE2-225 C	-1.0770	Adder	-1.27
942171	AE2-229 C	-1.0770	Adder	-1.27
942471	AE2-260 C O1	7.0710	Adder	8.32
942472	AE2-260 E O1	10.0293	Adder	11.8
943171	AE2-346 C	2.4179	50/50	2.4179

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943172	AE2-346 E	1.0363	50/50	1.0363
943911	AF1-059	7.0881	Adder	8.34
944141	AF1-082	2.3482	Adder	2.76
945711	AF1-236 C O1	163.3440	50/50	163.3440
945712	AF1-236 E O1	266.5086	50/50	266.5086
946281	AF1-292 C	0.8381	Adder	0.99
946282	AF1-292 E	0.5650	Adder	0.66
957521	AF2-046 C	20.4071	50/50	20.4071
957522	AF2-046 E	10.2649	50/50	10.2649
957531	AF2-047 C	35.4540	50/50	35.4540
957532	AF2-047 E	17.8336	50/50	17.8336
957821	AF2-076 C	25.4472	50/50	25.4472
957822	AF2-076 E	16.9648	50/50	16.9648
957861	AF2-080 C	10.8048	50/50	10.8048
957862	AF2-080 E	4.7898	50/50	4.7898
959511	AF2-242 C	13.0437	50/50	13.0437
959512	AF2-242 E	10.1451	50/50	10.1451
960081	AF2-299 C	1.4126	Adder	1.66
960082	AF2-299 E	0.9417	Adder	1.11
960331	**AF2-324 C O1 (Withdrawn : 10/01/2020)**	**6.4688**	**Adder**	**7.61**
960332	**AF2-324 E O1 (Withdrawn : 10/01/2020)**	**3.4730**	**Adder**	**4.09**
WEC	WEC	0.3330	Confirmed LTF	0.3330
LGEE	LGEE	0.6218	Confirmed LTF	0.6218
CPLE	CPLE	3.7752	Confirmed LTF	3.7752
CBM-W2	CBM-W2	12.8583	Confirmed LTF	12.8583
NY	NY	0.2865	Confirmed LTF	0.2865
TVA	TVA	2.6600	Confirmed LTF	2.6600
O-066	O-066	4.2403	Confirmed LTF	4.2403
CBM-S2	CBM-S2	22.9697	Confirmed LTF	22.9697
CBM-S1	CBM-S1	14.9100	Confirmed LTF	14.9100
G-007	G-007	0.6635	Confirmed LTF	0.6635
MADISON	MADISON	0.7056	Confirmed LTF	0.7056
MEC	MEC	1.9783	Confirmed LTF	1.9783
AA2-074	AA2-074	2.5726	LTF	2.5726
CBM-W1	CBM-W1	12.5475	Confirmed LTF	12.5475

11.8 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
AA1-063	Huntsville (Cabin Creek) 69kV	Withdrawn
AA1-063A	Carolina–Seaboard 115kV	In Service
AA1-065	Earleys 230kV	In Service
AA1-067	Everetts 34.5kV	In Service
AA2-053	Carolina-Jackson 115kV	In Service
AA2-057	Hornertown-Whitakers 115kV	In Service
AA2-074	CPLE-PJM	Confirmed
AA2-088	Boykins-Handsome 115kV	In Service
AA2-165	Hornertown-Whitakers 115kV	In Service
AA2-174	Carolina-Jackson 115kV	In Service
AA2-178	Mackeys 230kV	Under Construction
AB1-081	Anaconda-Mayo Dunbar 115kV	Under Construction
AB1-132	Thelma 230kV	Suspended
AB1-173	Brink-Trego 115kV	Engineering and Procurement
AB1-173A	Brink-Trego 115kV	Engineering and Procurement
AB2-015	Franklin 115kV	Engineering and Procurement
AB2-022	Elizabeth City 34.5kV	Engineering and Procurement
AB2-031	Brink-Trego 115kV	Engineering and Procurement
AB2-040	Brink 115kV	Engineering and Procurement
AB2-059	Benson-Dunbar 115kV	Partially in Service - Under Construction
AB2-099	Ahoskie 34.5kV	Suspended
AB2-100	Clubhouse-Lakeview 230kV	Under Construction
AB2-169	Pantago-Five Points 115kV	Partially in Service - Under Construction
AB2-174	Emporia-Trego 115kV	Under Construction
AC1-034	Heartsease DP - Mayo Dunbar 115kV	Engineering and Procurement
AC1-054	Kerr Dam–Eatons Ferry 115 kV	Engineering and Procurement
AC1-086	Thelma 230kV	Active
AC1-098	Dawson-South Justice 115kV	Engineering and Procurement
AC1-099	Dawson-South Justice 115kV	Engineering and Procurement
AC1-189	Chinquapin-Everetts 230kV	Active
AC1-208	Cox-Whitakers 115kV	Engineering and Procurement
AC2-084	Dawson-South Justice 115kV	Active
AD1-023	Cashie-Trowbridge 230 kV	Active
AD1-057	Hornertown-Hathaway 230 kV	Active
AD1-076	Trowbridge 230 kV	Active
AD1-144	Kings Fork 34.5 kV	Partially in Service - Under Construction
AD2-046	Boydton DP-Kerr Dam 115 kV	Active
AD2-051	Earleys – Northampton 230kV	Active
AD2-215	Kings Fork 34.5 kV	Engineering and Procurement

Queue Number	Project Name	Status
AE1-035	Earleys 230 kV	Partially in Service - Under Construction
AE1-103	Holland-Union Camp 115 kV	Active
AE1-148	Kerr Dam-Ridge Rd 115 kV	Active
AE2-034	Mackeys 230 kV	Active
AE2-040	Sapony 34.5 kV	Active
AE2-044	Anaconda-Dunbar 115 kV	Active
AE2-053	Kerr Dam-Ridge Road 115 kV	Active
AE2-147	Swamp 230 kV	Active
AE2-151	Earleys 34.5kV	Under Construction
AE2-225	Suffolk 34 kV	Engineering and Procurement
AE2-229	Suffolk 34 kV	Engineering and Procurement
AE2-260	Clubhouse 230 kV	Active
AE2-304	South Hertford 34 kV	Withdrawn
AE2-346	Ahoskie 34.5 kV	Active
AF1-059	Brodnax-South Hill 115 kV	Active
AF1-082	Heartsease-Mayo Dunbar DP	Active
AF1-152	Swamp 230 kV	Active
AF1-236	Mackeys 230 kV	Active
AF1-266	Clubhouse-Sapony 230 kV	Active
AF1-292	Fields 34.5kV	Active
AF2-046	Tunis-Mapleton 115 kV	Active
AF2-047	Creswell-Riders Creek 115 kV	Active
AF2-076	Suffolk-Nucor Steel 230 kV	Active
AF2-080	Chinquapin-Everetts 230 kV	Active
AF2-242	Wharton 115 kV	Active
AF2-299	Fields 34.5 kV	Active
AF2-324	Edgecombe 230 kV	Withdrawn
AF2-400	Franklin 13.2 kV	Engineering and Procurement
V4-068	Murphy's 34.5kV	In Service
W1-029	Winfall 230kV	In Service
X1-038	Union Camp 115kV	In Service
Y1-086	Morgans Corner	In Service
Z1-036	WinFall-Chowan 230kV	Suspended
Z2-027	Pasquotank 34.5kV	In Service
Z2-043	Kelford 34.5kV	In Service
Z2-044	Whitakers 34.5kV	In Service
Z2-088	Tarboro-Everetts 230kV	In Service

11.9 Contingency Descriptions

Contingency Name	Contingency Definition
DVP_P1-2: LN 246-A	CONTINGENCY 'DVP_P1-2: LN 246-A' OPEN BRANCH FROM BUS 314537 TO BUS 957820 CKT 1 /* 6SUFFOLK 230.00 - AF2-076 230.00 END
DVP_P4-2: 2020T2144	CONTINGENCY 'DVP_P4-2: 2020T2144' /* WINFALL 230 KV OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1 /* 6ECITYDP2 230.00 - 6ELIZ CT 230.00 OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1 /* 6ECITYDP2 230.00 - 6TANGLEW 230.00 OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1 /* 6TANGLEW 230.00 - 6WINFALL 230.00 OPEN BUS 313851 /* ISLAND: 6ECITYDP2 230.00 OPEN BUS 314639 /* ISLAND: 6TANGLEW 230.00 OPEN BUS 917122 /* ISLAND: Z2-027 E 230.00 OPEN BRANCH FROM BUS 313713 TO BUS 314651 CKT 1 /* 6SWAMP 230.00 - 6WINFALL 230.00 END
DVP_P1-2: LN 2092	CONTINGENCY 'DVP_P1-2: LN 2092' OPEN BRANCH FROM BUS 313714 TO BUS 314662 CKT 1 /* 6PERQUIMANS 230.00 - 6S HERTFORD 230.00 OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00 OPEN BUS 314662 /* ISLAND: 6S HERTFORD 230.00 END
DVP_P4-2: 246T247-A	CONTINGENCY 'DVP_P4-2: 246T247-A' /* SUFFOLK 230 KV OPEN BRANCH FROM BUS 314537 TO BUS 957820 CKT 1 /* 6SUFFOLK 230.00 - AF-076 230.00 OPEN BRANCH FROM BUS 313713 TO BUS 314648 CKT 1 /* 6SWAMP 230.00 - 6SUNBURY 230.00 OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00 OPEN BUS 314648 /* ISLAND: 6SUNBURY 230.00 END
DVP_P4-2: 209222-1	CONTINGENCY 'DVP_P4-2: 209222-1' /* WINFALL 230 KV OPEN BRANCH FROM BUS 313714 TO BUS 314662 CKT 1 /* 6PERQUIMANS 230.00 - 6S HERTFORD 230.00 OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00 OPEN BUS 314662 /* ISLAND: 6S HERTFORD 230.00 OPEN BUS 314204 /* 6WINFA_1 230.00 KV END

Contingency Name	Contingency Definition
Base Case	
DVP_P1-2: LN 2131	CONTINGENCY 'DVP_P1-2: LN 2131' OPEN BRANCH FROM BUS 313714 TO BUS 313885 CKT 1 /* 6PERQUIMANS 230.00 - 6WALBMRL 230.00 OPEN BRANCH FROM BUS 313885 TO BUS 314637 CKT 1 /* 6WALBMRL 230.00 - 6EDENTON 230.00 OPEN BRANCH FROM BUS 314203 TO BUS 314637 CKT 1 /* 6MACKEYS 230.00 - 6EDENTON 230.00 OPEN BUS 313885 /* ISLAND: 6WALBMRL 230.00 OPEN BUS 314637 /* ISLAND: 6EDENTON 230.00 END
DVP_P4-2: 209222-2	CONTINGENCY 'DVP_P4-2: 209222-2' /* WINFALL 230 KV OPEN BRANCH FROM BUS 313714 TO BUS 314662 CKT 1 /* 6PERQUIMANS 230.00 - 6S HERTFORD 230.00 OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00 OPEN BUS 314662 /* ISLAND: 6S HERTFORD 230.00 END

12 Light Load Analysis

Not required for solar projects.

13 Short Circuit Analysis

The following Breakers are overdutied:

None.

13.1 System Reinforcements - Short Circuit

None.

14 Stability and Reactive Power

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be determined in the Facilities Study Phase.

15 Affected Systems

15.1 TVA

None.

15.2 Duke Energy Progress

Customer may need to enter into an affected systems study with DEP. This will be confirmed in the Facilities Study phase.

16 Attachment 1: One Line Diagram