



**Generation Interconnection
System Impact Study Report
for
Queue Project AF2-394
NELSON-DIXON 138 KV
40 MW Capacity / 40 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 ComEd.

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.

3 General

The Interconnection Customer (IC), has proposed a Storage generating facility located in Lee County, Illinois. The installed facilities will have a total capability of 40 MW with 40 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is September 01, 2024. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-394
Project Name	NELSON-DIXON 138 KV
State	Illinois
County	Lee
Transmission Owner	ComEd
MFO	40
MWE	40
MWC	40
Fuel	Storage
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

Queue Position AF2-394 proposes to add 40 MW battery storage to Bison Meadows Wind Farm built under PJM queue AF2-392. The proposed addition will increase output of Bison Meadows from 260 MW to 300 MW. The proposed addition is behind the Point-of-Interconnection between ComEd and Bison Meadows Wind Farm.

5 Cost Summary

The AF2-394 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$ 200,000
Allocation towards System Network Upgrade Costs*	\$ 0
Total Costs	\$ 200,000

*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

6.1 Attachment Facilities

To accommodate interconnection of AF2-394; the relaying, SCADA, communication, and metering between Bison Meadows Wind Farm and ComEd Interconnection Substation would be reviewed and upgraded if needed. ComEd would take approximately 18-months to review and possibly upgrade the relaying, SCADA, Communication and metering after the ISA / ICSA are signed.

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

Description	Total Cost
The relaying, SCADA, communication, and metering between Bison Meadows Wind Farm and ComEd Interconnection Substation would be reviewed and upgraded if needed.	\$200,000
Total Physical Interconnection Costs	\$200,000

7 Schedule

See Sections 6 and 11.

8 Transmission Owner Analysis

See Sections 6, 11, and 12.

9 Interconnection Customer Requirements

The Interconnection Customer is responsible for all design and construction related activities on the Interconnection Customer's side of the Point of Interconnection.

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:

ComEd interconnection requirements can be found at <https://www.pjm.com/planning/design-engineering/to-tech-standards/private-comed.aspx>

To the extent that these Applicable Technical Requirements and Standards may conflict with the terms and conditions of the Tariff, the Tariff shall control.

11 Summer Peak Analysis

The Queue Project AF2-394 was evaluated as a 40.0 MW (Capacity 40.0 MW) injection tapping the Nelson to Dixon 138 kV line (specifically into the AF2-392 Tap 138 kV substation) in the ComEd area. Project AF2-394 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-394 was studied with a commercial probability of 100%. 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)

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 PROJECT LOADING %	POST PROJECT LOADING %	AC/D C	MW IMPACT
96709930	275204	NELSON ;4M	138.0	CE	272094	NELSON ;B	138.0	CE	1	COMED_P4_155-45-BT2-34_	breaker	442.0	98.41	102.25	AC	17.03

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 PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPAC T
157746435	271331	DIXON ;8R	138.0	CE	271333	DIXON ; R	138.0	CE	1	COMED_P4_155-38-TR81____-A	breaker	421.0	102.87	108.08	AC	22.18
157746436	272097	NELSON ;RT	138.0	CE	271331	DIXON ;8R	138.0	CE	1	COMED_P4_155-38-TR81____-A	breaker	440.0	102.65	107.66	AC	22.18
96709829	272366	ROCK FALL; B	138.0	CE	272094	NELSON ; B	138.0	CE	1	COMED_P4_155-38-L15508_	breaker	426.0	107.42	108.63	AC	5.31

11.4 Steady-State Voltage Requirements

None

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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPAC T
96710094	272365	ESS H440 ;RT	138.0	CE	272363	ESS H440 ; R	138.0	CE	1	COMED_P2-1_186-L16914__	operation	197.0	188.13	189.32	AC	2.68

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-394	Upgrade Number
157746436	3	NELSON ;RT 138.0 kV - DIXON ;8R 138.0 kV Ckt 1	The applicable rating for this contingency is the ADLR rating which is 572 MVA and is sufficient. No upgrade required.	\$0	\$0	N/A
96709930	1	NELSON ;4M 138.0 kV - NELSON ; B 138.0 kV Ckt 1	The applicable rating for this contingency is the SSTE rating which is 493 MVA and is sufficient. No upgrade required.	\$0	\$0	N/A
96709829	4	ROCK FALL; B 138.0 kV - NELSON ; B 138.0 kV Ckt 1	The applicable rating for this contingency is the ADLR rating which is 573 MVA and is sufficient. No upgrade required.	\$0	\$0	N/A
157746435	2	DIXON ;8R 138.0 kV - DIXON ; R 138.0 kV Ckt 1	The applicable rating for this contingency is the ADLR rating which is 573 MVA and is sufficient. No upgrade required.	\$0	\$0	N/A
Total Costs				\$0	\$0	

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
96709930	275204	NELSON ;4M	CE	272094	NELSON ; B	CE	1	COMED_P4_155-45-BT2-34_	breaker	442.0	98.41	102.25	AC	17.03

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274859	EASYR;U1 E	5.6426	Adder	6.64
274860	EASYR;U2 E	5.6426	Adder	6.64
916211	Z1-072 E	-2.3655	Adder	-2.78
916221	Z1-073 E	-4.8263	Adder	-5.68
919581	AA2-030	13.2876	Adder	15.63
925302	AB2-191 E	-1.2386	Adder	-1.46
927201	AC1-214 C O1	-1.0032	Adder	-1.18
939051	AE1-134 1	1.0325	Adder	1.21
939061	AE1-134 2	1.0325	Adder	1.21
943922	AF1-060 BAT	1.0277	Merchant Transmission	1.0277
946151	AF1-280 C O1	9.1239	Adder	10.73
946152	AF1-280 E O1	4.1956	Adder	4.94
946161	AF1-281 C	0.1998	Adder	0.24
946162	AF1-281 E	1.1322	Adder	1.33
958911	AF2-182 C	11.9876	Adder	14.1
958912	AF2-182 E	7.9917	Adder	9.4
958921	AF2-183 C	2.1311	Adder	2.51
958922	AF2-183 E	3.1967	Adder	3.76
961022	AF2-393 BAT	25.5426	50/50	25.5426
961032	AF2-394 BAT	17.0284	50/50	17.0284
WEC	WEC	0.1071	Confirmed LTF	0.1071
GIBSON	GIBSON	0.0409	Confirmed LTF	0.0409
CBM-W2	CBM-W2	1.6626	Confirmed LTF	1.6626
NY	NY	0.0575	Confirmed LTF	0.0575
TVA	TVA	0.2170	Confirmed LTF	0.2170
O-066	O-066	0.6787	Confirmed LTF	0.6787
EDWARDS	EDWARDS	0.3615	Confirmed LTF	0.3615
CBM-S2	CBM-S2	0.0405	Confirmed LTF	0.0405
CBM-S1	CBM-S1	0.9457	Confirmed LTF	0.9457
TILTON	TILTON	0.1134	Confirmed LTF	0.1134
G-007	G-007	0.1050	Confirmed LTF	0.1050
MADISON	MADISON	2.1974	Confirmed LTF	2.1974
MEC	MEC	2.6806	Confirmed LTF	2.6806
BLUEG	BLUEG	0.1545	Confirmed LTF	0.1545
TRIMBLE	TRIMBLE	0.0518	Confirmed LTF	0.0518
CBM-W1	CBM-W1	7.7937	Confirmed LTF	7.7937

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
157746435	271331	DIXON ;8R	CE	271333	DIXON ; R	CE	1	COMED_P4_155-38-TR81__-A	breaker	421.0	102.87	108.08	AC	22.18

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
276156	O-029 C	0.3109	50/50	0.3109
276157	O-029 C	0.3361	50/50	0.3361
276158	O-029 C	0.6134	50/50	0.6134
293513	O-009 C1	0.5742	50/50	0.5742
293514	O-009 C2	0.2913	50/50	0.2913
293515	O-009 C3	0.3221	50/50	0.3221
293516	O-009 E1	13.6744	50/50	13.6744
293517	O-009 E2	6.9456	50/50	6.9456
293518	O-009 E3	7.6489	50/50	7.6489
293715	O-029 E	14.6195	50/50	14.6195
293716	O-029 E	8.0156	50/50	8.0156
293717	O-029 E	7.3673	50/50	7.3673
294401	BSHIL;1U E	4.5234	Adder	5.32
294410	BSHIL;2U E	4.5234	Adder	5.32
916221	Z1-073 E	-9.8490	Adder	-11.59
925302	AB2-191 E	-2.5276	Adder	-2.97
925581	AC1-033 C	0.7409	Adder	0.87
925582	AC1-033 E	4.9602	Adder	5.84
934051	AD1-031 C O1	1.5056	Adder	1.77
934052	AD1-031 E O1	2.4565	Adder	2.89
937531	AD2-214 C	4.2297	50/50	4.2297
937532	AD2-214 E	2.8198	50/50	2.8198
943922	AF1-060 BAT	2.0098	50/50	2.0098
946321	AF1-296 C O1	2.3731	Adder	2.79
946322	AF1-296 E O1	11.1104	Adder	13.07
961022	AF2-393 BAT	33.2736	50/50	33.2736
961032	AF2-394 BAT	22.1824	50/50	22.1824
LGEE	LGEE	0.0576	Confirmed LTF	0.0576
CPL	CPL	0.0906	Confirmed LTF	0.0906
G-007A	G-007A	0.0791	Confirmed LTF	0.0791
VFT	VFT	0.2129	Confirmed LTF	0.2129
CBM-W2	CBM-W2	4.1933	Confirmed LTF	4.1933
TVA	TVA	0.4984	Confirmed LTF	0.4984
CBM-S2	CBM-S2	0.9768	Confirmed LTF	0.9768
CBM-S1	CBM-S1	2.6327	Confirmed LTF	2.6327
MADISON	MADISON	1.3810	Confirmed LTF	1.3810
MEC	MEC	2.5694	Confirmed LTF	2.5694
CBM-W1	CBM-W1	2.4645	Confirmed LTF	2.4645

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
157746436	272097	NELSON ;RT	CE	271331	DIXON ;8R	CE	1	COMED_P4_155-38-TR81__-A	breaker	440.0	102.65	107.66	AC	22.18

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
276156	O-029 C	0.3109	50/50	0.3109
276157	O-029 C	0.3361	50/50	0.3361
276158	O-029 C	0.6134	50/50	0.6134
293513	O-009 C1	0.5742	50/50	0.5742
293514	O-009 C2	0.2913	50/50	0.2913
293515	O-009 C3	0.3221	50/50	0.3221
293516	O-009 E1	13.6744	50/50	13.6744
293517	O-009 E2	6.9456	50/50	6.9456
293518	O-009 E3	7.6489	50/50	7.6489
293715	O-029 E	14.6195	50/50	14.6195
293716	O-029 E	8.0156	50/50	8.0156
293717	O-029 E	7.3673	50/50	7.3673
294401	BSHIL;1U E	4.5234	Adder	5.32
294410	BSHIL;2U E	4.5234	Adder	5.32
916221	Z1-073 E	-9.8490	Adder	-11.59
925302	AB2-191 E	-2.5276	Adder	-2.97
925581	AC1-033 C	0.7409	Adder	0.87
925582	AC1-033 E	4.9602	Adder	5.84
934051	AD1-031 C O1	1.5056	Adder	1.77
934052	AD1-031 E O1	2.4565	Adder	2.89
937531	AD2-214 C	4.2297	50/50	4.2297
937532	AD2-214 E	2.8198	50/50	2.8198
943922	AF1-060 BAT	2.0098	50/50	2.0098
946321	AF1-296 C O1	2.3731	Adder	2.79
946322	AF1-296 E O1	11.1104	Adder	13.07
961022	AF2-393 BAT	33.2736	50/50	33.2736
961032	AF2-394 BAT	22.1824	50/50	22.1824
LGEE	LGEE	0.0576	Confirmed LTF	0.0576
CPL	CPL	0.0906	Confirmed LTF	0.0906
G-007A	G-007A	0.0791	Confirmed LTF	0.0791
VFT	VFT	0.2129	Confirmed LTF	0.2129
CBM-W2	CBM-W2	4.1933	Confirmed LTF	4.1933
TVA	TVA	0.4984	Confirmed LTF	0.4984
CBM-S2	CBM-S2	0.9768	Confirmed LTF	0.9768
CBM-S1	CBM-S1	2.6327	Confirmed LTF	2.6327
MADISON	MADISON	1.3810	Confirmed LTF	1.3810
MEC	MEC	2.5694	Confirmed LTF	2.5694
CBM-W1	CBM-W1	2.4645	Confirmed LTF	2.4645

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
96709829	272366	ROCK FALL; B	CE	272094	NELSON ; B	CE	1	COMED_P4_155-38-L15508_	breaker	426.0	107.42	108.63	AC	5.31

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274848	CAMP GROVE;RU	0.8678	50/50	0.8678
274849	CRESCENT ;1U	0.2720	50/50	0.2720
274851	PROVIDENC;RU	0.4151	50/50	0.4151
274877	BISHOP HL;1U	0.6679	50/50	0.6679
274878	BISHOP HL;2U	0.6679	50/50	0.6679
276156	O-029 C	0.9951	50/50	0.9951
276157	O-029 C	1.0758	50/50	1.0758
276158	O-029 C	1.9633	50/50	1.9633
293513	O-009 C1	1.8378	50/50	1.8378
293514	O-009 C2	0.9323	50/50	0.9323
293515	O-009 C3	1.0309	50/50	1.0309
293516	O-009 E1	43.7675	50/50	43.7675
293517	O-009 E2	22.2305	50/50	22.2305
293518	O-009 E3	24.4819	50/50	24.4819
293715	O-029 E	46.7924	50/50	46.7924
293716	O-029 E	25.6555	50/50	25.6555
293717	O-029 E	23.5803	50/50	23.5803
293771	O-035 E	9.8805	50/50	9.8805
294401	BSHIL;1U E	15.8976	50/50	15.8976
294410	BSHIL;2U E	15.8976	50/50	15.8976
916211	Z1-072 E	7.4771	50/50	7.4771
925581	AC1-033 C	2.6039	50/50	2.6039
925582	AC1-033 E	17.4321	50/50	17.4321
926821	AC1-168 C O1	1.0504	50/50	1.0504
926822	AC1-168 E O1	7.0490	50/50	7.0490
926841	AC1-171 C O1	0.6323	Adder	0.74
926842	AC1-171 E O1	4.2234	Adder	4.97
927201	AC1-214 C O1	3.1711	50/50	3.1711
927202	AC1-214 E O1	10.0808	50/50	10.0808
934051	AD1-031 C O1	5.2929	50/50	5.2929
934052	AD1-031 E O1	8.6357	50/50	8.6357
937531	AD2-214 C	20.2013	50/50	20.2013
937532	AD2-214 E	13.4675	50/50	13.4675
946321	AF1-296 C O1	11.0474	50/50	11.0474
946322	AF1-296 E O1	51.7214	50/50	51.7214
946541	AF1-318 C O1	6.4435	50/50	6.4435
946542	AF1-318 E O1	30.1708	50/50	30.1708
953201	J715 C	1.6004	PJM External (MISO)	1.6004
953202	J715 E	8.6586	PJM External (MISO)	8.6586
957751	AF2-069 C	0.3672	50/50	0.3672
957752	AF2-069 E	1.1850	50/50	1.1850
957761	AF2-070 C	0.5174	50/50	0.5174

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957762	AF2-070 E	2.5118	50/50	2.5118
958341	AF2-128 C O1	1.5786	50/50	1.5786
958342	AF2-128 E O1	7.3906	50/50	7.3906
961022	AF2-393 BAT	7.9578	50/50	7.9578
961032	AF2-394 BAT	5.3052	50/50	5.3052
990901	L-005 E	20.6580	50/50	20.6580
LGEE	LGEE	0.1209	Confirmed LTF	0.1209
CPLE	CPLE	0.1270	Confirmed LTF	0.1270
G-007A	G-007A	0.3141	Confirmed LTF	0.3141
VFT	VFT	0.8449	Confirmed LTF	0.8449
CBM-W2	CBM-W2	4.0704	Confirmed LTF	4.0704
TVA	TVA	0.4424	Confirmed LTF	0.4424
CBM-S2	CBM-S2	1.2080	Confirmed LTF	1.2080
CBM-S1	CBM-S1	2.5304	Confirmed LTF	2.5304
MEC	MEC	0.5895	Confirmed LTF	0.5895

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
AA2-030	Nelson	Active
AB2-191	Mendota Hills	In Service
AC1-033	Kewanee	Active
AC1-168	Kewanee-Streator	Active
AC1-171	Powerton	Active
AC1-214	Crescent Ridge	Partially in Service - Under Construction
AD1-031	Kewanee 138 kV	Active
AD2-214	Rock Falls-Garden Plains	Active
AE1-134	Nelson 345 kV	Active
AF1-060	Lena 138 kV	Active
AF1-280	Nelson-Lee County	Active
AF1-281	Nelson-Lee County	Active
AF1-296	Garden Plain 138 kV	Active
AF1-318	Crescent Ridge-Corbin	Active
AF2-069	Crescent Ridge 138 kV	Active
AF2-070	Crescent Ridge 138 kV	Active
AF2-128	Crescent Ridge-Corbin 138 kV	Active
AF2-182	Nelson-Lee County 345 kV II	Active
AF2-183	Nelson-Lee County 345 kV	Active
AF2-393	Nelson-Dixon 138 kV	Active
AF2-394	Nelson-Dixon 138 kV	Active

Queue Number	Project Name	Status
Z1-072	Crescent Ridge	In Service
Z1-073	Mendota Hills	In Service
J715	MISO	MISO

11.9 Contingency Descriptions

Contingency Name	Contingency Definition
COMED_P4_155-45-BT2-34_	CONTINGENCY 'COMED_P4_155-45-BT2-34_' TRIP BRANCH FROM BUS 270828 TO BUS 943410 CKT 1 / NELSON ; B 345 AF1-012 TAP 345 TRIP BRANCH FROM BUS 270828 TO BUS 272094 TO BUS 275341 CKT 1 / NELSON ; B 345 NELSON ; B 138 NELSON ;1C 34.5 END
COMED_P4_155-38-L15508_	CONTINGENCY 'COMED_P4_155-38-L15508_' TRIP BRANCH FROM BUS 271331 TO BUS 271333 CKT 1 / DIXON;8R 138 DIXON; R 138 TRIP BRANCH FROM BUS 272097 TO BUS 271331 CKT 1 / NELSO;RT 138 DIXON;8R 138 TRIP BRANCH FROM BUS 272097 TO BUS 272095 CKT 1 / NELSO;RT 138 NELSO; R 138 TRIP BRANCH FROM BUS 272097 TO BUS 272505 CKT 1 / NELSO;RT 138 SCHAUFF 138 MOVE 100 PERCENT LOAD FROM BUS 271331 TO BUS 271330 / DIXON;8R 138 DIXON;7B 138 DISCONNECT BUS 272095 / NELSO; R 138 END
COMED_P4_155-38-TR81___-A	CONTINGENCY 'COMED_P4_155-38-TR81___-A' TRIP BRANCH FROM BUS 270828 TO BUS 272094 TO BUS 275341 CKT 1 / NELSO; B 345 NELSO; B 138 NELSO;1C 34.5 TRIP BRANCH FROM BUS 272094 TO BUS 961010 CKT 1 / NELSO; B 138 AF2-392 TAP 138 TRIP BRANCH FROM BUS 272094 TO BUS 272366 CKT 1 / NELSO; B 138 R FAL; B 138 TRIP BRANCH FROM BUS 272094 TO BUS 275204 CKT 1 / NELSO; B 138 NELSO;4M 138 END
COMED_P2-1_186-L16914__	CONTINGENCY 'COMED_P2-1_186-L16914__' TRIP BRANCH FROM BUS 272365 TO BUS 272516 CKT 1 / H440 ;RT 138 STEWA; B 138 END

12 Light Load Analysis

The Queue Project AF2-394 was evaluated as a 40.0 MW injection/withdrawal tapping the Nelson to Dixon 138 kV line (specifically into the AF2-392 Tap 138 kV substation) in the ComEd area. Project AF2-394 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-394 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

12.1 Generation Deliverability

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

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
139891457	270828	NELSON ; B	345.0	CE	943410	AF1-012 TAP	345.0	CE	1	COMED_P1-2_345-L15501_B-R-A	single	1656.0	99.73	100.12	AC	10.89
139891385	943410	AF1-012 TAP	345.0	CE	957470	AF2-041 TAP	345.0	CE	1	COMED_P1-2_345-L15501_B-R-A	single	1656.0	99.79	100.19	AC	10.89
139891395	957470	AF2-041 TAP	345.0	CE	270730	ELECT JCT; B	345.0	CE	1	COMED_P1-2_345-L15501_B-R-A	single	1656.0	99.79	100.19	AC	10.89

12.2 Multiple Facility Contingency

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

None

12.3 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
105383779	272365	ESS H440 ; RT	138.0	CE	272363	ESS H440 ; R	138.0	CE	1	COMED_P2-1_186-L16914__	single	123.0	211.27	213.41	AC	2.67

12.4 Steady-State Voltage Requirements

None

12.5 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 LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
96710094	272365	ESS H440 ;RT	138.0	CE	272363	ESS H440 ; R	138.0	CE	1	COMED_P2 -1_186-L16914	operation	123.0	229.64	231.49	AC	2.67

12.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-394	Upgrade Number
139891457	1	NELSON ; B 345.0 kV - AF1-012 TAP 345.0 kV Ckt 1	The applicable rating is the SSTE rating which is 1837 MVA and is sufficient. No upgrade required.	\$0	\$0	N/A
139891385	2	AF1-012 TAP 345.0 kV - AF2-041 TAP 345.0 kV Ckt 1	The applicable rating is the SSTE rating which is 1837 MVA and is sufficient. No upgrade required.	\$0	\$0	N/A
139891395	3	AF2-041 TAP 345.0 kV - ELECT JCT; B 345.0 kV Ckt 1	The applicable rating is the SSTE rating which is 1837 MVA and is sufficient. No upgrade required.	\$0	\$0	N/A
105383779	4	ESS H440 ;RT 138.0 kV - ESS H440 ; R 138.0 kV Ckt 1	The applicable rating is the SSTE rating which is 459 MVA and is sufficient. No upgrade required.	\$0	\$0	N/A
			TOTAL COST	\$0	\$0	

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.

12.7 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".

12.7.1 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
139891457	270828	NELSON ; B	CE	943410	AF1-012 TAP	CE	1	COMED_P1-2_345-L15501_B-R-A	single	1656.0	99.73	100.12	AC	10.89

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274848	CAMP GROVE;RU	1.2781	80/20	1.2781
274849	CRESCENT ;1U	0.3803	80/20	0.3803
274850	MENDOTA H;RU	0.1599	80/20	0.1599
274851	PROVIDENC;RU	0.5803	80/20	0.5803
274855	GSG-6 ;RU	0.6735	80/20	0.6735
274856	ECOGROVE ;U1	0.5891	80/20	0.5891
274877	BISHOP HL;1U	0.9509	80/20	0.9509
274878	BISHOP HL;2U	0.9509	80/20	0.9509
276156	O-029 C	1.1004	80/20	1.1004
276157	O-029 C	1.1896	80/20	1.1896
276158	O-029 C	2.1710	80/20	2.1710
290051	GSG-6; E	2.6939	80/20	2.6939
293513	O-009 C1	2.0322	80/20	2.0322
293514	O-009 C2	1.0310	80/20	1.0310
293515	O-009 C3	1.1400	80/20	1.1400
293516	O-009 E1	8.1328	80/20	8.1328
293517	O-009 E2	4.1308	80/20	4.1308
293518	O-009 E3	4.5492	80/20	4.5492
293715	O-029 E	8.6949	80/20	8.6949
293716	O-029 E	4.7673	80/20	4.7673
293717	O-029 E	4.3816	80/20	4.3816
293771	O-035 E	2.3211	80/20	2.3211
294401	BSHIL;1U E	3.8035	80/20	3.8035
294410	BSHIL;2U E	3.8035	80/20	3.8035
294763	P-046 E	2.3565	80/20	2.3565
295108	WESTBROOK C	0.2214	80/20	0.2214
295110	SUBLETTE C	0.0969	80/20	0.0969
925301	AB2-191	0.2589	80/20	0.2589
925581	AC1-033 C	1.2459	80/20	1.2459
925582	AC1-033 E	8.3406	80/20	8.3406
926821	AC1-168 C O1	0.4561	80/20	0.4561
926822	AC1-168 E O1	3.0605	80/20	3.0605
926841	AC1-171 C O1	0.4962	80/20	0.4962
926842	AC1-171 E O1	3.3145	80/20	3.3145
927201	AC1-214 C O1	1.4899	80/20	1.4899
927202	AC1-214 E O1	4.7363	80/20	4.7363
934431	AD1-067 C	0.0677	80/20	0.0677
934432	AD1-067 E	0.2845	80/20	0.2845
937001	AD2-134 C	1.4084	80/20	1.4084
937002	AD2-134 E	5.8183	80/20	5.8183
938861	AE1-114 C O1	3.9386	80/20	3.9386

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
938862	AE1-114 E O1	13.4374	80/20	13.4374
943921	AF1-060	0.7614	80/20	0.7614
946321	AF1-296 C O1	7.2334	80/20	7.2334
946322	AF1-296 E O1	33.8648	80/20	33.8648
946501	AF1-314 C	2.1981	80/20	2.1981
946502	AF1-314 E	10.2912	80/20	10.2912
946541	AF1-318 C O1	2.9030	80/20	2.9030
946542	AF1-318 E O1	13.5929	80/20	13.5929
950181	J407 C	2.5924	PJM External (MISO)	2.5924
950182	J407 E	10.3696	PJM External (MISO)	10.3696
950401	J041 C	1.4492	PJM External (MISO)	1.4492
950402	J041 E	5.7967	PJM External (MISO)	5.7967
950471	J438 C	3.0205	PJM External (MISO)	3.0205
950472	J438 E	12.0821	PJM External (MISO)	12.0821
950501	J449 C	2.8110	PJM External (MISO)	2.8110
950502	J449 E	11.2441	PJM External (MISO)	11.2441
950522	J455 E	18.2940	PJM External (MISO)	18.2940
951031	J344 C	2.7030	PJM External (MISO)	2.7030
951032	J344 E	8.1090	PJM External (MISO)	8.1090
951221	J475 C	3.2788	PJM External (MISO)	3.2788
951222	J475 E	13.1152	PJM External (MISO)	13.1152
951301	J495 C	2.9450	PJM External (MISO)	2.9450
951302	J495 E	8.8350	PJM External (MISO)	8.8350
951351	J500 C	5.7220	PJM External (MISO)	5.7220
951352	J500 E	22.8880	PJM External (MISO)	22.8880
951501	J529 C	2.9070	PJM External (MISO)	2.9070
951502	J529 E	11.6280	PJM External (MISO)	11.6280
951511	J530 C	4.9495	PJM External (MISO)	4.9495
951512	J530 E	19.7980	PJM External (MISO)	19.7980
951541	J534 C	3.0175	PJM External (MISO)	3.0175
951542	J534 E	12.0700	PJM External (MISO)	12.0700
951551	J535 C	2.5675	PJM External (MISO)	2.5675
951552	J535 E	10.2698	PJM External (MISO)	10.2698
951821	J541 C	3.7409	PJM External (MISO)	3.7409
951822	J541 E	20.2391	PJM External (MISO)	20.2391
951841	J555 C	1.7902	PJM External (MISO)	1.7902
951842	J555 E	9.6856	PJM External (MISO)	9.6856
952021	J614 C	0.6409	PJM External (MISO)	0.6409
952022	J614 E	3.4676	PJM External (MISO)	3.4676
952191	J583 C	1.8102	PJM External (MISO)	1.8102
952192	J583 E	9.7936	PJM External (MISO)	9.7936
952211	J590 C	0.8562	PJM External (MISO)	0.8562
952212	J590 E	4.6320	PJM External (MISO)	4.6320
953001	J785 C	0.9224	PJM External (MISO)	0.9224
953002	J785 E	4.9902	PJM External (MISO)	4.9902
953011	J885 C	0.6471	PJM External (MISO)	0.6471
953012	J885 E	3.5008	PJM External (MISO)	3.5008
953082	J836 E	12.1900	PJM External (MISO)	12.1900
953571	J720 C	1.0382	PJM External (MISO)	1.0382
953572	J720 E	5.6168	PJM External (MISO)	5.6168
953821	J840 C	1.3605	PJM External (MISO)	1.3605
953822	J840 E	7.3605	PJM External (MISO)	7.3605

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
954091	J873 C	2.9596	PJM External (MISO)	2.9596
954092	J873 E	16.0124	PJM External (MISO)	16.0124
954301	J898 C	0.9592	PJM External (MISO)	0.9592
954302	J898 E	5.1898	PJM External (MISO)	5.1898
954521	J927 C	0.9527	PJM External (MISO)	0.9527
954522	J927 E	5.1543	PJM External (MISO)	5.1543
954702	J844 E	12.5317	PJM External (MISO)	12.5317
954792	J952 E	6.1981	PJM External (MISO)	6.1981
954861	J959 C	2.0391	PJM External (MISO)	2.0391
954862	J959 E	11.0319	PJM External (MISO)	11.0319
954931	J967 C	1.5641	PJM External (MISO)	1.5641
954932	J967 E	8.4619	PJM External (MISO)	8.4619
955051	J981 C	3.5184	PJM External (MISO)	3.5184
955052	J981 E	19.0356	PJM External (MISO)	19.0356
955061	J982 C	2.7210	PJM External (MISO)	2.7210
955062	J982 E	14.7210	PJM External (MISO)	14.7210
955661	J1050 C	2.3889	PJM External (MISO)	2.3889
955662	J1050 E	12.9246	PJM External (MISO)	12.9246
956831	J1181 C	2.6632	PJM External (MISO)	2.6632
956832	J1181 E	14.4088	PJM External (MISO)	14.4088
957751	AF2-069 C	0.1725	80/20	0.1725
957752	AF2-069 E	0.5568	80/20	0.5568
957761	AF2-070 C	0.2431	80/20	0.2431
957762	AF2-070 E	1.1802	80/20	1.1802
958341	AF2-128 C O1	0.7020	80/20	0.7020
958342	AF2-128 E O1	3.2864	80/20	3.2864
959102	AF2-201 E O1	10.3096	80/20	10.3096
961011	AF2-392 C O1	7.6646	80/20	7.6646
961012	AF2-392 E O1	35.8842	80/20	35.8842
961021	AF2-393 O1	16.3308	80/20	16.3308
961031	AF2-394 O1	10.8872	80/20	10.8872
990901	L-005 E	5.1125	80/20	5.1125

12.7.2 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
139891385	943410	AF1-012 TAP	CE	957470	AF2-041 TAP	CE	1	COMED_P1-2_345-L15501_B-R-A	single	1656.0	99.79	100.19	AC	10.89

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274848	CAMP GROVE;RU	1.2781	80/20	1.2781
274849	CRESCENT ;1U	0.3803	80/20	0.3803
274850	MENDOTA H;RU	0.1599	80/20	0.1599
274851	PROVIDENC;RU	0.5803	80/20	0.5803
274855	GSG-6 ;RU	0.6735	80/20	0.6735
274856	ECOGROVE ;U1	0.5891	80/20	0.5891
274877	BISHOP HL;1U	0.9509	80/20	0.9509
274878	BISHOP HL;2U	0.9509	80/20	0.9509
276156	O-029 C	1.1004	80/20	1.1004
276157	O-029 C	1.1896	80/20	1.1896
276158	O-029 C	2.1710	80/20	2.1710
290051	GSG-6; E	2.6939	80/20	2.6939
293513	O-009 C1	2.0322	80/20	2.0322
293514	O-009 C2	1.0310	80/20	1.0310
293515	O-009 C3	1.1400	80/20	1.1400
293516	O-009 E1	8.1328	80/20	8.1328
293517	O-009 E2	4.1308	80/20	4.1308
293518	O-009 E3	4.5492	80/20	4.5492
293715	O-029 E	8.6949	80/20	8.6949
293716	O-029 E	4.7673	80/20	4.7673
293717	O-029 E	4.3816	80/20	4.3816
293771	O-035 E	2.3211	80/20	2.3211
294401	BSHIL;1U E	3.8035	80/20	3.8035
294410	BSHIL;2U E	3.8035	80/20	3.8035
294763	P-046 E	2.3565	80/20	2.3565
295108	WESTBROOK C	0.2214	80/20	0.2214
295110	SUBLETTE C	0.0969	80/20	0.0969
925301	AB2-191	0.2589	80/20	0.2589
925581	AC1-033 C	1.2459	80/20	1.2459
925582	AC1-033 E	8.3406	80/20	8.3406
926821	AC1-168 C O1	0.4561	80/20	0.4561
926822	AC1-168 E O1	3.0605	80/20	3.0605
926841	AC1-171 C O1	0.4962	80/20	0.4962
926842	AC1-171 E O1	3.3145	80/20	3.3145
927201	AC1-214 C O1	1.4899	80/20	1.4899
927202	AC1-214 E O1	4.7363	80/20	4.7363
934431	AD1-067 C	0.0677	80/20	0.0677
934432	AD1-067 E	0.2845	80/20	0.2845
937001	AD2-134 C	1.4084	80/20	1.4084
937002	AD2-134 E	5.8183	80/20	5.8183
938861	AE1-114 C O1	3.9386	80/20	3.9386

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
938862	AE1-114 E O1	13.4374	80/20	13.4374
943921	AF1-060	0.7614	80/20	0.7614
946321	AF1-296 C O1	7.2334	80/20	7.2334
946322	AF1-296 E O1	33.8648	80/20	33.8648
946501	AF1-314 C	2.1981	80/20	2.1981
946502	AF1-314 E	10.2912	80/20	10.2912
946541	AF1-318 C O1	2.9030	80/20	2.9030
946542	AF1-318 E O1	13.5929	80/20	13.5929
950181	J407 C	2.5924	PJM External (MISO)	2.5924
950182	J407 E	10.3696	PJM External (MISO)	10.3696
950401	J041 C	1.4492	PJM External (MISO)	1.4492
950402	J041 E	5.7967	PJM External (MISO)	5.7967
950471	J438 C	3.0205	PJM External (MISO)	3.0205
950472	J438 E	12.0821	PJM External (MISO)	12.0821
950501	J449 C	2.8110	PJM External (MISO)	2.8110
950502	J449 E	11.2441	PJM External (MISO)	11.2441
950522	J455 E	18.2940	PJM External (MISO)	18.2940
951031	J344 C	2.7030	PJM External (MISO)	2.7030
951032	J344 E	8.1090	PJM External (MISO)	8.1090
951221	J475 C	3.2788	PJM External (MISO)	3.2788
951222	J475 E	13.1152	PJM External (MISO)	13.1152
951301	J495 C	2.9450	PJM External (MISO)	2.9450
951302	J495 E	8.8350	PJM External (MISO)	8.8350
951351	J500 C	5.7220	PJM External (MISO)	5.7220
951352	J500 E	22.8880	PJM External (MISO)	22.8880
951501	J529 C	2.9070	PJM External (MISO)	2.9070
951502	J529 E	11.6280	PJM External (MISO)	11.6280
951511	J530 C	4.9495	PJM External (MISO)	4.9495
951512	J530 E	19.7980	PJM External (MISO)	19.7980
951541	J534 C	3.0175	PJM External (MISO)	3.0175
951542	J534 E	12.0700	PJM External (MISO)	12.0700
951551	J535 C	2.5675	PJM External (MISO)	2.5675
951552	J535 E	10.2698	PJM External (MISO)	10.2698
951821	J541 C	3.7409	PJM External (MISO)	3.7409
951822	J541 E	20.2391	PJM External (MISO)	20.2391
951841	J555 C	1.7902	PJM External (MISO)	1.7902
951842	J555 E	9.6856	PJM External (MISO)	9.6856
952021	J614 C	0.6409	PJM External (MISO)	0.6409
952022	J614 E	3.4676	PJM External (MISO)	3.4676
952191	J583 C	1.8102	PJM External (MISO)	1.8102
952192	J583 E	9.7936	PJM External (MISO)	9.7936
952211	J590 C	0.8562	PJM External (MISO)	0.8562
952212	J590 E	4.6320	PJM External (MISO)	4.6320
953001	J785 C	0.9224	PJM External (MISO)	0.9224
953002	J785 E	4.9902	PJM External (MISO)	4.9902
953011	J885 C	0.6471	PJM External (MISO)	0.6471
953012	J885 E	3.5008	PJM External (MISO)	3.5008
953082	J836 E	12.1900	PJM External (MISO)	12.1900
953571	J720 C	1.0382	PJM External (MISO)	1.0382
953572	J720 E	5.6168	PJM External (MISO)	5.6168
953821	J840 C	1.3605	PJM External (MISO)	1.3605
953822	J840 E	7.3605	PJM External (MISO)	7.3605

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
954091	J873 C	2.9596	PJM External (MISO)	2.9596
954092	J873 E	16.0124	PJM External (MISO)	16.0124
954301	J898 C	0.9592	PJM External (MISO)	0.9592
954302	J898 E	5.1898	PJM External (MISO)	5.1898
954521	J927 C	0.9527	PJM External (MISO)	0.9527
954522	J927 E	5.1543	PJM External (MISO)	5.1543
954702	J844 E	12.5317	PJM External (MISO)	12.5317
954792	J952 E	6.1981	PJM External (MISO)	6.1981
954861	J959 C	2.0391	PJM External (MISO)	2.0391
954862	J959 E	11.0319	PJM External (MISO)	11.0319
954931	J967 C	1.5641	PJM External (MISO)	1.5641
954932	J967 E	8.4619	PJM External (MISO)	8.4619
955051	J981 C	3.5184	PJM External (MISO)	3.5184
955052	J981 E	19.0356	PJM External (MISO)	19.0356
955061	J982 C	2.7210	PJM External (MISO)	2.7210
955062	J982 E	14.7210	PJM External (MISO)	14.7210
955661	J1050 C	2.3889	PJM External (MISO)	2.3889
955662	J1050 E	12.9246	PJM External (MISO)	12.9246
956831	J1181 C	2.6632	PJM External (MISO)	2.6632
956832	J1181 E	14.4088	PJM External (MISO)	14.4088
957751	AF2-069 C	0.1725	80/20	0.1725
957752	AF2-069 E	0.5568	80/20	0.5568
957761	AF2-070 C	0.2431	80/20	0.2431
957762	AF2-070 E	1.1802	80/20	1.1802
958341	AF2-128 C O1	0.7020	80/20	0.7020
958342	AF2-128 E O1	3.2864	80/20	3.2864
959102	AF2-201 E O1	10.3096	80/20	10.3096
961011	AF2-392 C O1	7.6646	80/20	7.6646
961012	AF2-392 E O1	35.8842	80/20	35.8842
961021	AF2-393 O1	16.3308	80/20	16.3308
961031	AF2-394 O1	10.8872	80/20	10.8872
990901	L-005 E	5.1125	80/20	5.1125

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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
139891395	957470	AF2-041 TAP	CE	270730	ELECT JCT; B	CE	1	COMED_P1-2_345-L15501_B-R-A	single	1656.0	99.79	100.19	AC	10.89

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274848	CAMP GROVE;RU	1.2781	80/20	1.2781
274849	CRESCENT ;1U	0.3803	80/20	0.3803
274850	MENDOTA H;RU	0.1599	80/20	0.1599
274851	PROVIDENC;RU	0.5803	80/20	0.5803
274855	GSG-6 ;RU	0.6735	80/20	0.6735
274856	ECOGROVE ;U1	0.5891	80/20	0.5891
274877	BISHOP HL;1U	0.9509	80/20	0.9509
274878	BISHOP HL;2U	0.9509	80/20	0.9509
276156	O-029 C	1.1004	80/20	1.1004
276157	O-029 C	1.1896	80/20	1.1896
276158	O-029 C	2.1710	80/20	2.1710
290051	GSG-6; E	2.6939	80/20	2.6939
293513	O-009 C1	2.0322	80/20	2.0322
293514	O-009 C2	1.0310	80/20	1.0310
293515	O-009 C3	1.1400	80/20	1.1400
293516	O-009 E1	8.1328	80/20	8.1328
293517	O-009 E2	4.1308	80/20	4.1308
293518	O-009 E3	4.5492	80/20	4.5492
293715	O-029 E	8.6949	80/20	8.6949
293716	O-029 E	4.7673	80/20	4.7673
293717	O-029 E	4.3816	80/20	4.3816
293771	O-035 E	2.3211	80/20	2.3211
294401	BSHIL;1U E	3.8035	80/20	3.8035
294410	BSHIL;2U E	3.8035	80/20	3.8035
294763	P-046 E	2.3565	80/20	2.3565
295108	WESTBROOK C	0.2214	80/20	0.2214
295110	SUBLETTE C	0.0969	80/20	0.0969
925301	AB2-191	0.2589	80/20	0.2589
925581	AC1-033 C	1.2459	80/20	1.2459
925582	AC1-033 E	8.3406	80/20	8.3406
926821	AC1-168 C O1	0.4561	80/20	0.4561
926822	AC1-168 E O1	3.0605	80/20	3.0605
926841	AC1-171 C O1	0.4962	80/20	0.4962
926842	AC1-171 E O1	3.3145	80/20	3.3145
927201	AC1-214 C O1	1.4899	80/20	1.4899
927202	AC1-214 E O1	4.7363	80/20	4.7363
934431	AD1-067 C	0.0677	80/20	0.0677
934432	AD1-067 E	0.2845	80/20	0.2845
937001	AD2-134 C	1.4084	80/20	1.4084
937002	AD2-134 E	5.8183	80/20	5.8183
938861	AE1-114 C O1	3.9386	80/20	3.9386

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
938862	AE1-114 E O1	13.4374	80/20	13.4374
943921	AF1-060	0.7614	80/20	0.7614
946321	AF1-296 C O1	7.2334	80/20	7.2334
946322	AF1-296 E O1	33.8648	80/20	33.8648
946501	AF1-314 C	2.1981	80/20	2.1981
946502	AF1-314 E	10.2912	80/20	10.2912
946541	AF1-318 C O1	2.9030	80/20	2.9030
946542	AF1-318 E O1	13.5929	80/20	13.5929
950181	J407 C	2.5924	PJM External (MISO)	2.5924
950182	J407 E	10.3696	PJM External (MISO)	10.3696
950401	J041 C	1.4492	PJM External (MISO)	1.4492
950402	J041 E	5.7967	PJM External (MISO)	5.7967
950471	J438 C	3.0205	PJM External (MISO)	3.0205
950472	J438 E	12.0821	PJM External (MISO)	12.0821
950501	J449 C	2.8110	PJM External (MISO)	2.8110
950502	J449 E	11.2441	PJM External (MISO)	11.2441
950522	J455 E	18.2940	PJM External (MISO)	18.2940
951031	J344 C	2.7030	PJM External (MISO)	2.7030
951032	J344 E	8.1090	PJM External (MISO)	8.1090
951221	J475 C	3.2788	PJM External (MISO)	3.2788
951222	J475 E	13.1152	PJM External (MISO)	13.1152
951301	J495 C	2.9450	PJM External (MISO)	2.9450
951302	J495 E	8.8350	PJM External (MISO)	8.8350
951351	J500 C	5.7220	PJM External (MISO)	5.7220
951352	J500 E	22.8880	PJM External (MISO)	22.8880
951501	J529 C	2.9070	PJM External (MISO)	2.9070
951502	J529 E	11.6280	PJM External (MISO)	11.6280
951511	J530 C	4.9495	PJM External (MISO)	4.9495
951512	J530 E	19.7980	PJM External (MISO)	19.7980
951541	J534 C	3.0175	PJM External (MISO)	3.0175
951542	J534 E	12.0700	PJM External (MISO)	12.0700
951551	J535 C	2.5675	PJM External (MISO)	2.5675
951552	J535 E	10.2698	PJM External (MISO)	10.2698
951821	J541 C	3.7409	PJM External (MISO)	3.7409
951822	J541 E	20.2391	PJM External (MISO)	20.2391
951841	J555 C	1.7902	PJM External (MISO)	1.7902
951842	J555 E	9.6856	PJM External (MISO)	9.6856
952021	J614 C	0.6409	PJM External (MISO)	0.6409
952022	J614 E	3.4676	PJM External (MISO)	3.4676
952191	J583 C	1.8102	PJM External (MISO)	1.8102
952192	J583 E	9.7936	PJM External (MISO)	9.7936
952211	J590 C	0.8562	PJM External (MISO)	0.8562
952212	J590 E	4.6320	PJM External (MISO)	4.6320
953001	J785 C	0.9224	PJM External (MISO)	0.9224
953002	J785 E	4.9902	PJM External (MISO)	4.9902
953011	J885 C	0.6471	PJM External (MISO)	0.6471
953012	J885 E	3.5008	PJM External (MISO)	3.5008
953082	J836 E	12.1900	PJM External (MISO)	12.1900
953571	J720 C	1.0382	PJM External (MISO)	1.0382
953572	J720 E	5.6168	PJM External (MISO)	5.6168
953821	J840 C	1.3605	PJM External (MISO)	1.3605
953822	J840 E	7.3605	PJM External (MISO)	7.3605

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
954091	J873 C	2.9596	PJM External (MISO)	2.9596
954092	J873 E	16.0124	PJM External (MISO)	16.0124
954301	J898 C	0.9592	PJM External (MISO)	0.9592
954302	J898 E	5.1898	PJM External (MISO)	5.1898
954521	J927 C	0.9527	PJM External (MISO)	0.9527
954522	J927 E	5.1543	PJM External (MISO)	5.1543
954702	J844 E	12.5317	PJM External (MISO)	12.5317
954792	J952 E	6.1981	PJM External (MISO)	6.1981
954861	J959 C	2.0391	PJM External (MISO)	2.0391
954862	J959 E	11.0319	PJM External (MISO)	11.0319
954931	J967 C	1.5641	PJM External (MISO)	1.5641
954932	J967 E	8.4619	PJM External (MISO)	8.4619
955051	J981 C	3.5184	PJM External (MISO)	3.5184
955052	J981 E	19.0356	PJM External (MISO)	19.0356
955061	J982 C	2.7210	PJM External (MISO)	2.7210
955062	J982 E	14.7210	PJM External (MISO)	14.7210
955661	J1050 C	2.3889	PJM External (MISO)	2.3889
955662	J1050 E	12.9246	PJM External (MISO)	12.9246
956831	J1181 C	2.6632	PJM External (MISO)	2.6632
956832	J1181 E	14.4088	PJM External (MISO)	14.4088
957751	AF2-069 C	0.1725	80/20	0.1725
957752	AF2-069 E	0.5568	80/20	0.5568
957761	AF2-070 C	0.2431	80/20	0.2431
957762	AF2-070 E	1.1802	80/20	1.1802
958341	AF2-128 C O1	0.7020	80/20	0.7020
958342	AF2-128 E O1	3.2864	80/20	3.2864
959102	AF2-201 E O1	10.3096	80/20	10.3096
961011	AF2-392 C O1	7.6646	80/20	7.6646
961012	AF2-392 E O1	35.8842	80/20	35.8842
961021	AF2-393 O1	16.3308	80/20	16.3308
961031	AF2-394 O1	10.8872	80/20	10.8872
990901	L-005 E	5.1125	80/20	5.1125

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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
105383779	272365	ESS H440 ;RT	CE	272363	ESS H440 ; R	CE	1	COMED_P2-1_186-L16914__	single	123.0	211.27	213.41	AC	2.67

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274850	MENDOTA H;RU	1.0550	80/20	1.0550
274855	GSG-6 ;RU	4.4431	80/20	4.4431
290051	GSG-6; E	17.7723	80/20	17.7723
295108	WESTBROOK C	1.4607	80/20	1.4607
295110	SUBLETTE C	0.6391	80/20	0.6391
925301	AB2-191	1.7083	80/20	1.7083
934431	AD1-067 C	0.4463	80/20	0.4463
934432	AD1-067 E	1.8766	80/20	1.8766
937001	AD2-134 C	9.2919	80/20	9.2919
937002	AD2-134 E	38.3849	80/20	38.3849
938861	AE1-114 C O1	1.3973	80/20	1.3973
938862	AE1-114 E O1	4.7671	80/20	4.7671
960382	AF2-329 BAT	2.7348	80/20	2.7348
961011	AF2-392 C O1	1.8828	80/20	1.8828
961012	AF2-392 E O1	8.8148	80/20	8.8148
961021	AF2-393 O1	4.0116	80/20	4.0116
961031	AF2-394 O1	2.6744	80/20	2.6744

12.8 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
AB2-191	Mendota Hills	In Service
AC1-033	Kewanee	Active
AC1-168	Kewanee-Streator	Active
AC1-171	Powerton	Active
AC1-214	Crescent Ridge	Partially in Service - Under Construction
AD1-067	Mendota Hills	In Service
AD2-134	Shady Oaks	Active
AE1-114	Maryland-Lancaster 138 kV	Active

Queue Number	Project Name	Status
AF1-060	Lena 138 kV	Active
AF1-296	Garden Plain 138 kV	Active
AF1-314	Lena 138 kV	Active
AF1-318	Crescent Ridge-Corbin	Active
AF2-069	Crescent Ridge 138 kV	Active
AF2-070	Crescent Ridge 138 kV	Active
AF2-128	Crescent Ridge-Corbin 138 kV	Active
AF2-201	Lena-Ecogrove 138 kV	Active
AF2-329	Sandwich-Plano 138 kV	Active
AF2-392	Nelson-Dixon 138 kV	Active
AF2-393	Nelson-Dixon 138 kV	Active
AF2-394	Nelson-Dixon 138 kV	Active
J041	MISO	MISO
J1050	MISO	MISO
J1181	MISO	MISO
J344	MISO	MISO
J407	MISO	MISO
J438	MISO	MISO
J449	MISO	MISO
J455	MISO	MISO
J475	MISO	MISO
J495	MISO	MISO
J500	MISO	MISO
J529	MISO	MISO
J530	MISO	MISO
J534	MISO	MISO
J535	MISO	MISO
J541	MISO	MISO
J555	MISO	MISO
J583	MISO	MISO
J590	MISO	MISO
J614	MISO	MISO
J720	MISO	MISO
J785	MISO	MISO
J836	MISO	MISO
J840	MISO	MISO
J844	MISO	MISO
J873	MISO	MISO
J885	MISO	MISO
J898	MISO	MISO
J927	MISO	MISO
J952	MISO	MISO
J959	MISO	MISO
J967	MISO	MISO
J981	MISO	MISO
J982	MISO	MISO

12.9 Contingency Descriptions

Contingency Name	Contingency Definition
COMED_P1-2_345-L15501_B-R-A	CONTINGENCY 'COMED_P1-2_345-L15501_B-R-A' TRIP BRANCH FROM BUS 270828 TO BUS 946160 CKT 1 / NELSO; B 345 AF1-281 TAP 345 END
COMED_P2-1_186-L16914__	CONTINGENCY 'COMED_P2-1_186-L16914__' TRIP BRANCH FROM BUS 272365 TO BUS 272516 CKT 1 / H440 ;RT 138 STEWA; B 138 END

13 Short Circuit Analysis

No breakers were identified as overdutied as part of this study.

14 Stability and Reactive Power

Analysis to be run in the Facilities Study Phase.

15 Affected Systems

None

Attachment 1: One Line Diagram

