



**Generation Interconnection
Feasibility Study Report
for
Queue Project AF2-393
“NELSON-DIXON 138 KV”**

July 2020

1 Introduction

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

2 Preface

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

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

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

3 General

The Interconnection Customer (IC) has proposed a storage generating facility to be located in Lee County, Illinois. The installed facilities will have a total capability of 60 MW with 60 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	AF2-393
Project Name	NELSON-DIXON 138 KV
State	Illinois
County	Lee
Transmission Owner	ComEd
MFO	60
MWE	60
MWC	60
Fuel	Storage
Basecase Study Year	2023

A new service customer with a generating facility that could be commercially operable prior to June 1st of the basecase study year is required to request an interim deliverability analysis from PJM.

4 Point of Interconnection

Queue Position AF2-393 proposes to add 60 MW battery storage to prior queue project AF2-392. The proposed addition will increase output of AF2-392 project from 200 MW to 260 MW. The proposed addition is behind the Point-of-Interconnection between ComEd and AF2-392.

5 Cost Summary

The AF2-393 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$200,000
Total System Network Upgrade Costs	\$45,900,000
Total Costs	\$46,100,000

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 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.

6 Transmission Owner Scope of Work

Attachment Facilities

To accommodate interconnection of AF2-393; the relaying, SCADA, communication, and metering would be reviewed and upgraded if needed.

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

Description	Total Cost
The relaying, SCADA, communication, and metering would be reviewed and upgraded if needed.	\$200,000
Total Physical Interconnection Costs	\$200,000

7 Schedule

ComEd would take approximately 18-months to review and possibly upgrade the relaying, SCADA, Communication and metering after the ISA / ICSA are signed.

8 Transmission Owner Analysis

See Section 6.

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 - Load Flow Analysis - Primary POI

The Queue Project AF2-393 was evaluated as a 60.0 MW (Capacity 60.0 MW) injection tapping the Nelson to Dixon 138 kV line in the ComEd area. Project AF2-393 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-393 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

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

None

11.2 Multiple Facility Contingency

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

None

11.3 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC D C	MW IMPAC T
96707944	271331	DIXON ;8R	138.0	CE	271333	DIXON ;R	138.0	CE	1	COMED_P4_155-38-TR81	breaker	421.0	101.73	109.63	DC	33.27
96707882	271898	LANCASTER; BT	138.0	CE	271897	LANCASTER; R; R	138.0	CE	1	COMED_P4_006-45-BT3-4	breaker	321.0	119.91	120.51	DC	4.25
96707955	272097	NELSON ;RT	138.0	CE	271331	DIXON ;8R	138.0	CE	1	COMED_P4_155-38-TR81	breaker	440.0	101.61	109.17	DC	33.27
96709173	272728	WATERMAN ;B	138.0	CE	272445	SANDWICH; R	138.0	CE	1	COMED_P7_138-L11106_B-R_+ 345-L15502_B-R	tower	331.0	131.36	131.9	DC	3.94
96708462	274768	LEE CO EC;BP	345.0	CE	270678	BYRON ;B	345.0	CE	1	COMED_P1-2_345-L15502_B-R-B	single	1726.0	110.58	111.59	DC	17.47

11.4 Potential Congestion due to Local Energy Deliverability

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

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FRO M BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
96708479	270828	NELSON ; B	345.0	CE	946160	AF1-281 TAP	345.0	CE	1	COMED_P 1-2_345-L15502_B-R-B	operatio n	1479.0	110.05	111.19	DC	17.69
96708546	270890	ESS H471 ;	345.0	CE	270828	NELSON ; B	345.0	CE	1	COMED_P 1-2_345-L15503_B-R	operatio n	2058.0	99.88	100.72	DC	12.22
96708480	271898	LANCASTER; BT	138.0	CE	271897	LANCASTE R; R	138.0	CE	1	COMED_P 1-2_345-L0627__B-R	operatio n	321.0	109.07	109.67	DC	4.25
96708513	272002	MCGIRR RD;	138.0	CE	272365	ESS H440 ;RT	138.0	CE	1	Base Case	operatio n	351.0	104.59	105.22	DC	4.89
96708798	272362	ESS H445 ;3B	138.0	CE	272757	W DEKALB ;7T	138.0	CE	1	COMED_P 2-1_094-L11323__	operatio n	298.0	136.15	136.7	DC	3.64
96708237	272365	ESS H440 ;RT	138.0	CE	272363	ESS H440 ; R	138.0	CE	1	COMED_P 2-1_186-L16914__	operatio n	197.0	155.73	156.65	DC	4.02
96708414	272728	WATERMAN ; B	138.0	CE	272445	SANDWIC H ; R	138.0	CE	1	COMED_P 1-2_138-L11106_B-R	operatio n	309.0	117.56	118.05	DC	3.33
96708732	272757	W DEKALB ;7T	138.0	CE	271558	GLIDDEN ; B	138.0	CE	1	COMED_P 2-1_094-L11323__	operatio n	264.0	146.37	146.99	DC	3.64
96708461	274768	LEE CO EC;BP	345.0	CE	270678	BYRON ; B	345.0	CE	1	COMED_P 1-2_345-L15502_B-R-B	operatio n	1726.0	114.65	115.11	DC	17.47
96708529	930480	AB1-089 TAP	345.0	CE	270916	WAYNE ; B	345.0	CE	1	Base Case	operatio n	1679.0	99.96	100.14	DC	6.65
96708403	946160	AF1-281 TAP	345.0	CE	274768	LEE CO EC;BP	345.0	CE	1	COMED_P 1-2_345-L15502_B-R-B	operatio n	1479.0	118.05	119.03	DC	17.69

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
96707955	3	NELSON ;RT 138.0 kV - DIXON ;8R 138.0 kV Ckt 1	CE_NUN_L15508 (843) : ComEd 138kV L15508 ALDR rating is 319 MVA. The upgrade will be to re-conductor the line. A preliminary estimate for the upgrade is \$15.1M with an estimated construction timeline of 30 months. Upon completion of the upgrade the ratings will be 351/449/459/498/573 MVA (SN/SLTE/SSTE/SLD/ALDR). Project Type : FAC Cost : \$15,100,000 Time Estimate : 30.0 Months	\$15,100,000
96707944	1	DIXON ;8R 138.0 kV - DIXON ; R 138.0 kV Ckt 1		
96709173	4	WATERMAN ; B 138.0 kV - SANDWICH ; R 138.0 kV Ckt 1	ce-007 (881) : L11301 SLD = 331 MVA& ALDR = 381 MVA. The post contingency flow for this event exceeds the rating therefore upgrades are required. The upgrades will be to re-conductor the line, station conductor upgrades. A preliminary estimate is \$ 13.1 M with an estimated construction time of 30 months. Upon completion the ratings will be 292/321/367/433/498 MVA N1:N6SN/SLTE/SSTE/SLD/ALDR). Project Type : FAC Cost : \$13,100,000	\$13,100,000

ID	Idx	Facility	Upgrade Description	Cost
			Time Estimate : 30.0 Months	
96707882	2	LANCASTER;BT 138.0 kV - LANCASTER; R 138.0 kV Ckt 1	CE_NUN_L11902 (925) : Upgrade is to replace the wave trap on the line at a terminal. A preliminary estimate for this upgrade is \$500K with an estimated construction timeline of 24-30 months. Upon completion of the upgrade the ratings will 314/393/421 MVA (SN/SLTE/SLD). Project Type : FAC Cost : \$500,000 Time Estimate : 24-30 Months	\$500,000
96708462	5	LEE CO EC;BP 345.0 kV - BYRON ; B 345.0 kV Ckt 1	CE_NUN_L0627 (917) : ComEd 345kV L0627 SSTE rating is 1837 MVA. The upgrade will be to re-conductor the line and upgrade station conductor at Byron Station. A preliminary estimate for the upgrades is \$17.2M. The preliminary construction timeline is 24-30 months contingent upon outage coordination with Byron Nuclear Station. Note that the preliminary cost estimate does not include the potential for new transmission towers. This unknown will add to this estimate if required. Upon completion of the upgrades the new ratings will be 1679/1904/1944/2088 MVA (SN/SLTE/SSTE/SLD). Project Type : FAC Cost : \$17,200,000 Time Estimate : 24-30 Months	\$17,200,000
			TOTAL COST	\$45,900,000

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

11.6 Flow Gate Details - Primary POI

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

11.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
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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
96707944	271331	DIXON ;8R	CE	271333	DIXON ; R	CE	1	COMED_P4_155-38-TR81__	breaker	421.0	101.73	109.63	DC	33.27

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
276156	O-029 C	0.3192	50/50	0.3192
276157	O-029 C	0.3451	50/50	0.3451
276158	O-029 C	0.6297	50/50	0.6297
293513	O-009 C1	0.5895	50/50	0.5895
293514	O-009 C2	0.2990	50/50	0.2990
293515	O-009 C3	0.3307	50/50	0.3307
293516	O-009 E1	13.6761	50/50	13.6761
293517	O-009 E2	6.9464	50/50	6.9464
293518	O-009 E3	7.6499	50/50	7.6499
293715	O-029 E	14.6213	50/50	14.6213
293716	O-029 E	8.0166	50/50	8.0166
293717	O-029 E	7.3681	50/50	7.3681
294401	BSHIL;1U E	4.5247	Adder	5.32
294410	BSHIL;2U E	4.5247	Adder	5.32
925581	AC1-033 C	0.7411	Adder	0.87
925582	AC1-033 E	4.9617	Adder	5.84
934051	AD1-031 C O1	1.5063	Adder	1.77
934052	AD1-031 E O1	2.4576	Adder	2.89
937531	AD2-214 C	4.2306	50/50	4.2306
937532	AD2-214 E	2.8204	50/50	2.8204
943383	AF1-009 BAT	6.8187	50/50	6.8187
943401	AF1-011 C	1.8670	50/50	1.8670
943402	AF1-011 E	3.1340	50/50	3.1340
943922	AF1-060 BAT	2.0096	50/50	2.0096
946321	AF1-296 C O1	2.3738	Adder	2.79
946322	AF1-296 E O1	11.1134	Adder	13.07
961022	AF2-393 BAT	33.2718	50/50	33.2718
961032	AF2-394 BAT	22.1812	50/50	22.1812
LGEE	LGEE	0.0593	Confirmed LTF	0.0593
CPL	CPL	0.0926	Confirmed LTF	0.0926
G-007A	G-007A	0.0863	Confirmed LTF	0.0863
VFT	VFT	0.2322	Confirmed LTF	0.2322
CBM-W2	CBM-W2	4.2179	Confirmed LTF	4.2179
CBM-W1	CBM-W1	2.5020	Confirmed LTF	2.5020
TVA	TVA	0.5026	Confirmed LTF	0.5026
CBM-S2	CBM-S2	0.9942	Confirmed LTF	0.9942
CBM-S1	CBM-S1	2.6582	Confirmed LTF	2.6582
MADISON	MADISON	1.3810	Confirmed LTF	1.3810
MEC	MEC	2.5742	Confirmed LTF	2.5742

11.6.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
96707882	271898	LANCASTER;BT	CE	271897	LANCASTER;R	CE	1	COMED_P4_006-45-BT3-4__	breaker	321.0	119.91	120.51	DC	4.25

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
293516	O-009 E1	3.5425	Adder	4.17
293517	O-009 E2	1.7993	Adder	2.12
293518	O-009 E3	1.9815	Adder	2.33
293715	O-029 E	3.7873	Adder	4.46
293716	O-029 E	2.0765	Adder	2.44
293717	O-029 E	1.9086	Adder	2.25
938861	AE1-114 C O1	15.0787	50/50	15.0787
938862	AE1-114 E O1	51.4448	50/50	51.4448
943401	AF1-011 C	0.4836	Adder	0.57
943402	AF1-011 E	0.8118	Adder	0.96
943922	AF1-060 BAT	3.1547	50/50	3.1547
959761	AF2-267 C O1	25.7709	50/50	25.7709
959762	AF2-267 E O1	120.6485	50/50	120.6485
961011	AF2-392 C O1	1.1224	Adder	2.49
961012	AF2-392 E O1	5.2549	Adder	11.66
961021	AF2-393 O1	1.9132	Adder	4.25
961031	AF2-394 O1	1.2755	Adder	2.83
LGEE	LGEE	0.0405	Confirmed LTF	0.0405
CPL	CPL	0.0615	Confirmed LTF	0.0615
G-007A	G-007A	0.0839	Confirmed LTF	0.0839
VFT	VFT	0.2257	Confirmed LTF	0.2257
CBM-W2	CBM-W2	2.4242	Confirmed LTF	2.4242
TVA	TVA	0.3010	Confirmed LTF	0.3010
CBM-S2	CBM-S2	0.6358	Confirmed LTF	0.6358
CBM-S1	CBM-S1	1.6018	Confirmed LTF	1.6018
MADISON	MADISON	0.2460	Confirmed LTF	0.2460
MEC	MEC	1.5270	Confirmed LTF	1.5270

11.6.3 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
96707955	272097	NELSON;RT	CE	271331	DIXON;8R	CE	1	COMED_P4_155-38-TR81__	breaker	440.0	101.61	109.17	DC	33.27

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
276156	O-029 C	0.3192	50/50	0.3192
276157	O-029 C	0.3451	50/50	0.3451

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
276158	O-029 C	0.6297	50/50	0.6297
293513	O-009 C1	0.5895	50/50	0.5895
293514	O-009 C2	0.2990	50/50	0.2990
293515	O-009 C3	0.3307	50/50	0.3307
293516	O-009 E1	13.6761	50/50	13.6761
293517	O-009 E2	6.9464	50/50	6.9464
293518	O-009 E3	7.6499	50/50	7.6499
293715	O-029 E	14.6213	50/50	14.6213
293716	O-029 E	8.0166	50/50	8.0166
293717	O-029 E	7.3681	50/50	7.3681
294401	BSHIL;1U E	4.5247	Adder	5.32
294410	BSHIL;2U E	4.5247	Adder	5.32
925581	AC1-033 C	0.7411	Adder	0.87
925582	AC1-033 E	4.9617	Adder	5.84
934051	AD1-031 C O1	1.5063	Adder	1.77
934052	AD1-031 E O1	2.4576	Adder	2.89
937531	AD2-214 C	4.2306	50/50	4.2306
937532	AD2-214 E	2.8204	50/50	2.8204
943383	AF1-009 BAT	6.8187	50/50	6.8187
943401	AF1-011 C	1.8670	50/50	1.8670
943402	AF1-011 E	3.1340	50/50	3.1340
943922	AF1-060 BAT	2.0096	50/50	2.0096
946321	AF1-296 C O1	2.3738	Adder	2.79
946322	AF1-296 E O1	11.1134	Adder	13.07
961022	AF2-393 BAT	33.2718	50/50	33.2718
961032	AF2-394 BAT	22.1812	50/50	22.1812
LGEE	LGEE	0.0593	Confirmed LTF	0.0593
CPL	CPL	0.0926	Confirmed LTF	0.0926
G-007A	G-007A	0.0863	Confirmed LTF	0.0863
VFT	VFT	0.2322	Confirmed LTF	0.2322
CBM-W2	CBM-W2	4.2179	Confirmed LTF	4.2179
CBM-W1	CBM-W1	2.5020	Confirmed LTF	2.5020
TVA	TVA	0.5026	Confirmed LTF	0.5026
CBM-S2	CBM-S2	0.9942	Confirmed LTF	0.9942
CBM-S1	CBM-S1	2.6582	Confirmed LTF	2.6582
MADISON	MADISON	1.3810	Confirmed LTF	1.3810
MEC	MEC	2.5742	Confirmed LTF	2.5742

11.6.4 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
96709173	272728	WATERMAN ; B	CE	272445	SANDWICH ; R	CE	1	COMED_P7_138-L11106_B-R+_345-L15502_B-R	tower	331.0	131.36	131.9	DC	3.94

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
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Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
272364	ESS H440N ;R	1.2190	50/50	1.2190
274850	MENDOTA H;RU	0.2807	50/50	0.2807
274855	GSG-6 ;RU	1.1820	50/50	1.1820
274872	LEE DEKAL;1U	3.1941	50/50	3.1941
290051	GSG-6; E	27.4100	50/50	27.4100
290108	LEEDK;1U E	77.1560	50/50	77.1560
294763	P-046 E	3.5741	Adder	4.2
916221	AB2-191	0.4534	50/50	0.4534
933911	AD1-013 C	4.9916	50/50	4.9916
933912	AD1-013 E	7.9736	50/50	7.9736
934431	AD1-067 C	0.3442	50/50	0.3442
934432	AD1-067 E	1.4472	50/50	1.4472
934651	AD1-096 C	0.4340	Adder	0.51
934652	AD1-096 E	0.7081	Adder	0.83
934701	AD1-098 C O1	17.3573	50/50	17.3573
934702	AD1-098 E O1	12.6727	50/50	12.6727
937001	AD2-134 C	7.1654	50/50	7.1654
937002	AD2-134 E	29.6003	50/50	29.6003
937311	AD2-172 C	0.9382	Adder	1.1
937312	AD2-172 E	1.2956	Adder	1.52
938861	AE1-114 C O1	1.8158	Adder	2.14
938862	AE1-114 E O1	6.1950	Adder	7.29
940501	AE2-035 C	0.9382	Adder	1.1
940502	AE2-035 E	1.2956	Adder	1.52
941131	AE2-107 C	23.9826	50/50	23.9826
941132	AE2-107 E	15.9884	50/50	15.9884
943381	AF1-009 C	1.5015	50/50	1.5015
943382	AF1-009 E	6.0060	50/50	6.0060
943921	AF1-060	0.4619	Adder	0.54
946501	AF1-314 C	1.6670	Adder	1.96
946502	AF1-314 E	7.8044	Adder	9.18
946671	AF1-331	6.4826	50/50	6.4826
959101	AF2-201 C O1	1.2171	Adder	2.7
959102	AF2-201 E O1	3.4949	Adder	7.76
959761	AF2-267 C O1	0.8793	Adder	1.95
959762	AF2-267 E O1	4.1164	Adder	9.14
960382	AF2-329 BAT	9.1266	50/50	9.1266
960721	AF2-363 C O1	16.7331	50/50	16.7331
960722	AF2-363 E O1	11.1554	50/50	11.1554
960751	AF2-366 C O1	21.9976	50/50	21.9976
960752	AF2-366 E O1	14.6651	50/50	14.6651
961011	AF2-392 C O1	1.0422	Adder	2.31
961012	AF2-392 E O1	4.8792	Adder	10.83
961021	AF2-393 O1	1.7764	Adder	3.94
961031	AF2-394 O1	1.1843	Adder	2.63
WEC	WEC	0.3663	Confirmed LTF	0.3663
CBM-W2	CBM-W2	2.9894	Confirmed LTF	2.9894
NY	NY	0.0669	Confirmed LTF	0.0669
CBM-W1	CBM-W1	11.9220	Confirmed LTF	11.9220
TVA	TVA	0.3248	Confirmed LTF	0.3248
O-066	O-066	0.7728	Confirmed LTF	0.7728
CBM-S2	CBM-S2	0.1792	Confirmed LTF	0.1792

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CBM-S1	CBM-S1	1.5166	Confirmed LTF	1.5166
TILTON	TILTON	0.0031	Confirmed LTF	0.0031
G-007	G-007	0.1196	Confirmed LTF	0.1196
MADISON	MADISON	3.2357	Confirmed LTF	3.2357
MEC	MEC	2.9110	Confirmed LTF	2.9110
GIBSON	GIBSON	0.0082	Confirmed LTF	0.0082
BLUEG	BLUEG	0.1180	Confirmed LTF	0.1180
TRIMBLE	TRIMBLE	0.0417	Confirmed LTF	0.0417

11.6.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
96708462	274768	LEE CO EC;BP	CE	270678	BYRON ; B	CE	1	COMED_P1-2_345-L15502_B-R-B	single	1726.0	110.58	111.59	DC	17.47

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274662	QUAD CITI;1U	43.2174	80/20	43.2174
274663	QUAD CITI;2U	43.3023	80/20	43.3023
274699	CORDOVA ;1C	7.6046	80/20	7.6046
274700	CORDOVA ;2C	7.6046	80/20	7.6046
274701	CORDOVA ;1S	8.5552	80/20	8.5552
274715	NELSON EC;1C	11.2932	80/20	11.2932
274716	NELSON EC;1S	8.2401	80/20	8.2401
274717	NELSON EC;2C	11.3805	80/20	11.3805
274718	NELSON EC;2S	8.3139	80/20	8.3139
274760	LEE CO EC;1U	7.2036	80/20	7.2036
274761	LEE CO EC;2U	7.2036	80/20	7.2036
274762	LEE CO EC;3U	7.1032	80/20	7.1032
274763	LEE CO EC;4U	7.1306	80/20	7.1306
274764	LEE CO EC;5U	7.2219	80/20	7.2219
274765	LEE CO EC;6U	7.2219	80/20	7.2219
274766	LEE CO EC;7U	7.1123	80/20	7.1123
274767	LEE CO EC;8U	7.1123	80/20	7.1123
274848	CAMPGROVE;RU	0.6178	80/20	0.6178
274849	CRESCENT ;1U	0.1851	80/20	0.1851
274850	MENDOTA H;RU	0.0460	80/20	0.0460
274851	PROVIDENC;RU	0.2824	80/20	0.2824
274855	GSG-6 ;RU	0.1939	80/20	0.1939
274857	BIG SKY ;U1	2.1912	80/20	2.1912
274858	BIG SKY ;U2	2.1912	80/20	2.1912
274877	BISHOP HL;1U	0.4581	80/20	0.4581
274878	BISHOP HL;2U	0.4581	80/20	0.4581
276156	O-029 C	0.5200	80/20	0.5200
276157	O-029 C	0.5621	80/20	0.5621
276158	O-029 C	1.0259	80/20	1.0259

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
276160	W4-084	0.1503	80/20	0.1503
293513	O-009 C1	0.9603	80/20	0.9603
293514	O-009 C2	0.4872	80/20	0.4872
293515	O-009 C3	0.5387	80/20	0.5387
919221	AA1-146	10.5350	80/20	10.5350
919581	AA2-030	61.0746	80/20	61.0746
925581	AC1-033 C	1.7399	80/20	1.7399
926821	AC1-168 C O1	0.6720	80/20	0.6720
926841	AC1-171 C O1	0.7114	80/20	0.7114
927201	AC1-214 C O1	2.1018	80/20	2.1018
927531	AC1-185 1	0.5478	80/20	0.5478
927541	AC1-185 2	0.5478	80/20	0.5478
927551	AC1-185 3	0.5478	80/20	0.5478
927561	AC1-185 4	0.5478	80/20	0.5478
927571	AC1-185 5	0.5478	80/20	0.5478
927581	AC1-185 6	0.5478	80/20	0.5478
927591	AC1-185 7	0.5478	80/20	0.5478
927601	AC1-185 8	0.5478	80/20	0.5478
934051	AD1-031 C O1	3.5341	80/20	3.5341
934431	AD1-067 C	0.0565	80/20	0.0565
934701	AD1-098 C O1	3.5512	80/20	3.5512
937001	AD2-134 C	1.1752	80/20	1.1752
937531	AD2-214 C	11.7443	80/20	11.7443
938861	AE1-114 C O1	2.6330	80/20	2.6330
939051	AE1-134 1	4.7459	80/20	4.7459
939061	AE1-134 2	4.7459	80/20	4.7459
943381	AF1-009 C	0.3072	80/20	0.3072
943401	AF1-011 C	3.0417	80/20	3.0417
943411	AF1-012 C	40.8418	80/20	40.8418
946151	AF1-280 C O1	66.7039	80/20	66.7039
946161	AF1-281 C	1.4607	80/20	1.4607
946321	AF1-296 C O1	9.8913	80/20	9.8913
946531	AF1-317 C O1	7.7794	80/20	7.7794
946541	AF1-318 C O1	4.1957	80/20	4.1957
951381	J504	6.4395	PJM External (MISO)	6.4395
951421	J514	3.9054	PJM External (MISO)	3.9054
951511	J530 C	6.4260	PJM External (MISO)	6.4260
954901	J963	1.6344	PJM External (MISO)	1.6344
955051	J981 C	4.5702	PJM External (MISO)	4.5702
955971	J1084	37.1040	PJM External (MISO)	37.1040
956411	J1131	19.9460	PJM External (MISO)	19.9460
957471	AF2-041 C	70.0002	80/20	70.0002
957751	AF2-069 C	0.2434	80/20	0.2434
957761	AF2-070 C	0.3429	80/20	0.3429
958341	AF2-128 C O1	1.0223	80/20	1.0223
958911	AF2-182	87.6402	80/20	87.6402
958921	AF2-183 C	15.5805	80/20	15.5805
959081	AF2-199 C	23.3334	80/20	23.3334
959091	AF2-200 C	46.6668	80/20	46.6668
960551	AF2-346 C	17.5036	80/20	17.5036
961011	AF2-392 C O1	10.2478	80/20	10.2478
961021	AF2-393 O1	17.4678	80/20	17.4678

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
961031	AF2-394 O1	11.6452	80/20	11.6452
LGEE	LGEE	0.1940	Confirmed LTF	0.1940
CPL	CPL	0.4214	Confirmed LTF	0.4214
CBM-W2	CBM-W2	23.0139	Confirmed LTF	23.0139
NY	NY	0.0182	Confirmed LTF	0.0182
CBM-W1	CBM-W1	21.5797	Confirmed LTF	21.5797
TVA	TVA	2.8084	Confirmed LTF	2.8084
CBM-S2	CBM-S2	4.8263	Confirmed LTF	4.8263
CBM-S1	CBM-S1	14.4499	Confirmed LTF	14.4499
MADISON	MADISON	9.9228	Confirmed LTF	9.9228
MEC	MEC	17.6109	Confirmed LTF	17.6109

11.7 Queue Dependencies

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

Queue Number	Project Name	Status
AA1-146	Nelson	Active
AA2-030	Nelson	Active
AB2-191	Mendota Hills	In Service
AC1-033	Kewanee	Active
AC1-168	Kewanee-Streator	Active
AC1-171	Powerton	Active
AC1-185	Lee County	Under Construction
AC1-214	Crescent Ridge	Engineering and Procurement
AD1-013	Twombly Road 138kV	Active
AD1-031	Kewanee 138 kV	Active
AD1-067	Mendota Hills	Active
AD1-096	Stillman Valley 34 kV	Active
AD1-098	Dixon-McGirr	Active
AD2-134	Shady Oaks	Active
AD2-172	Lena 138kV	Active
AD2-214	Rock Falls-Garden Plains	Active
AE1-114	Maryland-Lancaster 138 kV	Active
AE1-134	Nelson 345 kV	Active
AE2-035	Lena 138 kV	Active
AE2-107	Haumesser Road 138 kV	Active
AF1-009	Dixon-McGirr	Active
AF1-011	Schauff Road	Active
AF1-012	Electric Junc-Nelson	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

Queue Number	Project Name	Status
AF1-314	Lena 138 kV	Active
AF1-317	Electric Jct-Nelson	Active
AF1-318	Crescent Ridge-Corbin	Active
AF1-331	Twombly Road	Active
AF2-041	Nelson-Electric Junction 345 kV	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
AF2-199	Nelson-Electric Junction 345 kV	Active
AF2-200	Nelson-Electric Junction 345 kV	Active
AF2-201	Lena-Ecogrove 138 kV	Active
AF2-267	Lancaster 138 kV	Active
AF2-329	Sandwich-Plano 138 kV	Active
AF2-346	Electric Junction-Nelson 345 kV	Active
AF2-363	Glidden 138 kV	Active
AF2-366	Glidden-Waterman 345 kV	Active
AF2-392	Nelson-Dixon 138 kV	Active
AF2-393	Nelson-Dixon 138 kV	Active
AF2-394	Nelson-Dixon 138 kV	Active
W4-084	Dixon 12kV	Deactivated
J1084	MISO	MISO
J1131	MISO	MISO
J504	MISO	MISO
J514	MISO	MISO
J530	MISO	MISO
J963	MISO	MISO
J981	MISO	MISO

11.8 Contingency Descriptions - Primary POI

Contingency Name	Contingency Definition
COMED_P1-2_345-L15502_B-R-B	CONTINGENCY 'COMED_P1-2_345-L15502_B-R-B' TRIP BRANCH FROM BUS 957470 TO BUS 270730 CKT 1 / AF1-012 TAP 345 ELEC JUNC; B 345 END
COMED_P2-1_094-L11323__	CONTINGENCY 'COMED_P2-1_094-L11323__' TRIP BRANCH FROM BUS 271680 TO BUS 272756 CKT 1 / HAUME; B 138 W DEK;3T 138 END

Contingency Name	Contingency Definition
COMED_P4_006-45-BT3-4__	CONTINGENCY 'COMED_P4_006-45-BT3-4__' TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1 / LEECO;BP 345 BYRON; B 345 REMOVE UNIT 1 FROM BUS 274656 / BYRON;1U 25 END
COMED_P1-2_345-L0627__B-R	CONTINGENCY 'COMED_P1-2_345-L0627__B-R' TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1 / LEECO;BP 345 BYRON; B 345 END
COMED_P7_138-L11106_B-R+_345-L15502_B-R	CONTINGENCY 'COMED_P7_138-L11106_B-R+_345-L15502_B-R' TRIP BRANCH FROM BUS 271390 TO BUS 271586 CKT 1 / ELECT; B 138 W541 ; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 271558 CKT 1 / GLIDD;BT 138 GLIDD; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 272728 CKT 1 / GLIDD;BT 138 WATER; B 138 TRIP BRANCH FROM BUS 271586 TO BUS 272114 CKT 1 / W541 ; B 138 N AUR; B 138 TRIP BRANCH FROM BUS 272114 TO BUS 272522 CKT 1 / N AUR; B 138 SUGAR; B 138 TRIP BRANCH FROM BUS 272522 TO BUS 271560 CKT 1 / SUGAR; B 138 GLIDD;BT 138 MOVE 100 PERCENT LOAD FROM BUS 271586 TO BUS 271587 / W541 ; B 138 W541 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 272522 TO BUS 272523 / SUGAR; B 138 SUGAR; R 138 CLOSE LINE FROM BUS 272114 TO BUS 272115 CKT 1 / N AUR; B 138 N AUR; R 138 TRIP BRANCH FROM BUS 270828 TO BUS 943410 CKT 1 / NELSON ; B 345 AF1-012 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
Base Case	

Contingency Name	Contingency Definition
COMED_P1-2_138-L11106_B-R	CONTINGENCY 'COMED_P1-2_138-L11106_B-R' TRIP BRANCH FROM BUS 271390 TO BUS 271586 CKT 1 / ELECT; B 138 W541 ; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 271558 CKT 1 / GLIDD;BT 138 GLIDD; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 272728 CKT 1 / GLIDD;BT 138 WATER; B 138 TRIP BRANCH FROM BUS 271586 TO BUS 272114 CKT 1 / W541 ; B 138 N AUR; B 138 TRIP BRANCH FROM BUS 272114 TO BUS 272522 CKT 1 / N AUR; B 138 SUGAR; B 138 TRIP BRANCH FROM BUS 272522 TO BUS 271560 CKT 1 / SUGAR; B 138 GLIDD;BT 138 MOVE 100 PERCENT LOAD FROM BUS 271586 TO BUS 271587 / W541 ; B 138 W541 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 272522 TO BUS 272523 / SUGAR; B 138 SUGAR; R 138 CLOSE LINE FROM BUS 272114 TO BUS 272115 CKT 1 / N AUR; B 138 N AUR; R 138 END
COMED_P4_155-38-TR81__	CONTINGENCY 'COMED_P4_155-38-TR81__' 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 DIXON;7B 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_P1-2_345-L15503_B-R	CONTINGENCY 'COMED_P1-2_345-L15503_B-R' TRIP BRANCH FROM BUS 270828 TO BUS 270700 CKT 1 / NELSO; B 345 CORDO; B 345 END

12 Short Circuit Analysis - Primary POI

The following breakers are overdutied:

None

12.1 System Reinforcements - Short Circuit

None

13 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AF2-393 was evaluated as a 60.0 MW (Capacity 60.0 MW) injection at the Nelson 138 kV substation in the ComEd area. Project AF2-393 was evaluated for compliance with applicable reliability

planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-393 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

13.1 Generation Deliverability

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

None

13.2 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 LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
105019040	271331	DIXON ;8R	138.0	CE	271333	DIXON ;R	138.0	CE	1	COMED_P4_006-45-BT3-4__	breaker	421.0	99.94	105.42	DC	23.04
147726960	271331	DIXON ;8R	138.0	CE	271333	DIXON ;R	138.0	CE	1	COMED_P4_155-45-BT9-10__	breaker	421.0	96.73	104.94	DC	34.56
147726961	271331	DIXON ;8R	138.0	CE	271333	DIXON ;R	138.0	CE	1	COMED_P4_155-45-BT8-9__	breaker	421.0	96.34	104.53	DC	34.48
147726986	272097	NELSON ;RT	138.0	CE	271331	DIXON ;8R	138.0	CE	1	COMED_P4_155-45-BT9-10__	breaker	440.0	96.83	104.68	DC	34.56
147726987	272097	NELSON ;RT	138.0	CE	271331	DIXON ;8R	138.0	CE	1	COMED_P4_155-45-BT8-9__	breaker	440.0	96.45	104.29	DC	34.48

13.3 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
96707944	271331	DIXON ;8R	138.0	CE	271333	DIXON ;R	138.0	CE	1	COMED_P4_155-38-TR81__	breaker	421.0	117.6	121.43	DC	16.11
96707945	271331	DIXON ;8R	138.0	CE	271333	DIXON ;R	138.0	CE	1	COMED_P4_155-38-TR84__	breaker	421.0	102.38	106.89	DC	18.99
96707882	271898	LANCASTER; BT	138.0	CE	271897	LANCASTER; R	138.0	CE	1	COMED_P4_006-45-BT3-4__	breaker	321.0	119.77	120.33	DC	3.95
96707955	272097	NELSON ;RT	138.0	CE	271331	DIXON ;8R	138.0	CE	1	COMED_P4_155-38-TR81__	breaker	440.0	116.82	120.48	DC	16.11
96707957	272097	NELSON ;RT	138.0	CE	271331	DIXON ;8R	138.0	CE	1	COMED_P4_155-38-TR84__	breaker	440.0	102.23	106.55	DC	18.99
96709173	272728	WATERMAN ;B	138.0	CE	272445	SANDWICH; R	138.0	CE	1	COMED_P7_138-L11106_B-R+_345-L15502_B-R	tower	331.0	128.95	129.47	DC	3.82

13.4 Potential Congestion due to Local Energy Deliverability

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

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC/D C	MW IMPAC T
96708479	270828	NELSON ; B	345.0	CE	946160	AF1-281 TAP	345.0	CE	1	COMED_P1-2_345-L15502_B-R-B	operati on	1479.0	109.92	111.02	DC	17.12
96708546	270890	ESS H471 ;	345.0	CE	270828	NELSON ; B	345.0	CE	1	COMED_P1-2_345-L15503_B-R	operati on	2058.0	99.88	100.7	DC	11.74
148106796	271331	DIXON ;8R	138.0	CE	271333	DIXON ; R	138.0	CE	1	COMED_P1-3_TR82_NELSO_B-R	operati on	421.0	95.24	103.45	DC	34.56
96708141	271836	KEWANEE ;11	138.0	CE	271837	KEWANEE ;12	138.0	CE	1	Base Case	operati on	190.0	100.51	101.23	DC	3.07
96708480	271898	LANCASTER; BT	138.0	CE	271897	LANCASTE R; R	138.0	CE	1	COMED_P1-2_345-L0627_B-R	operati on	321.0	108.93	109.49	DC	3.95
96708513	272002	MCGIRR RD;	138.0	CE	272365	ESS H440 ;RT	138.0	CE	1	Base Case	operati on	351.0	104.54	105.15	DC	4.76
148106786	272097	NELSON ;RT	138.0	CE	271331	DIXON ;8R	138.0	CE	1	Base Case	operati on	343.0	99.92	106.39	DC	22.19
148106787	272097	NELSON ;RT	138.0	CE	271331	DIXON ;8R	138.0	CE	1	COMED_P1-3_TR82_NELSO_B-R	operati on	440.0	95.42	103.28	DC	34.56
96708237	272365	ESS H440 ;RT	138.0	CE	272363	ESS H440 ; R	138.0	CE	1	COMED_P2-1_186-L16914__	operati on	197.0	155.65	156.55	DC	3.92
96708389	272505	SCHUAFF R;	138.0	CE	272367	ROCK FALL; R	138.0	CE	1	COMED_P2-1_187-L15508__	operati on	214.0	120.53	123.83	DC	7.07
96708414	272728	WATERMAN ; B	138.0	CE	272445	SANDWIC H; R	138.0	CE	1	COMED_P1-2_138-L11106_B-R	operati on	309.0	114.98	115.45	DC	3.23
96708403	946160	AF1-281 TAP	345.0	CE	274768	LEE CO EC;BP	345.0	CE	1	COMED_P1-2_345-L15502_B-R-B	operati on	1479.0	117.92	118.86	DC	17.12

13.5 Flow Gate Details - Secondary POI

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".

13.5.1 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
96707944	271331	DIXON ;8R	CE	271333	DIXON ; R	CE	1	COMED_P4_155-38-TR81__	breaker	421.0	117.6	121.43	DC	16.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
276156	O-029 C	0.3192	50/50	0.3192
276157	O-029 C	0.3451	50/50	0.3451
276158	O-029 C	0.6297	50/50	0.6297
293513	O-009 C1	0.5895	50/50	0.5895
293514	O-009 C2	0.2990	50/50	0.2990
293515	O-009 C3	0.3307	50/50	0.3307
293516	O-009 E1	13.6761	50/50	13.6761
293517	O-009 E2	6.9464	50/50	6.9464
293518	O-009 E3	7.6499	50/50	7.6499
293715	O-029 E	14.6213	50/50	14.6213
293716	O-029 E	8.0166	50/50	8.0166
293717	O-029 E	7.3681	50/50	7.3681
293771	O-035 E	2.8068	Adder	3.3
294401	BSHIL;1U E	4.5247	Adder	5.32
294410	BSHIL;2U E	4.5247	Adder	5.32
925581	AC1-033 C	0.7411	Adder	0.87
925582	AC1-033 E	4.9617	Adder	5.84
927201	AC1-214 C O1	0.9008	Adder	1.06
927202	AC1-214 E O1	2.8637	Adder	3.37
934051	AD1-031 C O1	1.5063	Adder	1.77
934052	AD1-031 E O1	2.4576	Adder	2.89
937531	AD2-214 C	4.2306	50/50	4.2306
937532	AD2-214 E	2.8204	50/50	2.8204
943383	AF1-009 BAT	6.8187	50/50	6.8187
943401	AF1-011 C	1.8670	50/50	1.8670
943402	AF1-011 E	3.1340	50/50	3.1340
943922	AF1-060 BAT	2.0096	50/50	2.0096
946321	AF1-296 C O1	2.3738	Adder	2.79
946322	AF1-296 E O1	11.1134	Adder	13.07
957751	AF2-069 C	0.0553	Adder	0.12
957752	AF2-069 E	0.1784	Adder	0.4
957761	AF2-070 C	0.0779	Adder	0.17
957762	AF2-070 E	0.3782	Adder	0.84
961011	AF2-392 C O2	9.4508	50/50	9.4508
961012	AF2-392 E O2	44.2472	50/50	44.2472
961021	AF2-393 O2	16.1094	50/50	16.1094
961031	AF2-394 O2	10.7396	50/50	10.7396
990901	L-005 E	5.9435	Adder	6.99

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
LGEE	LGEE	0.0593	Confirmed LTF	0.0593
CPL	CPL	0.0926	Confirmed LTF	0.0926
G-007A	G-007A	0.0863	Confirmed LTF	0.0863
VFT	VFT	0.2322	Confirmed LTF	0.2322
CBM-W2	CBM-W2	4.2179	Confirmed LTF	4.2179
CBM-W1	CBM-W1	2.5020	Confirmed LTF	2.5020
TVA	TVA	0.5026	Confirmed LTF	0.5026
CBM-S2	CBM-S2	0.9942	Confirmed LTF	0.9942
CBM-S1	CBM-S1	2.6582	Confirmed LTF	2.6582
MADISON	MADISON	1.3810	Confirmed LTF	1.3810
MEC	MEC	2.5742	Confirmed LTF	2.5742

13.5.2 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
96707955	272097	NELSON ;RT	CE	271331	DIXON ;8R	CE	1	COMED_P4_155-38-TR81___	breaker	440.0	116.82	120.48	DC	16.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
276156	O-029 C	0.3192	50/50	0.3192
276157	O-029 C	0.3451	50/50	0.3451
276158	O-029 C	0.6297	50/50	0.6297
293513	O-009 C1	0.5895	50/50	0.5895
293514	O-009 C2	0.2990	50/50	0.2990
293515	O-009 C3	0.3307	50/50	0.3307
293516	O-009 E1	13.6761	50/50	13.6761
293517	O-009 E2	6.9464	50/50	6.9464
293518	O-009 E3	7.6499	50/50	7.6499
293715	O-029 E	14.6213	50/50	14.6213
293716	O-029 E	8.0166	50/50	8.0166
293717	O-029 E	7.3681	50/50	7.3681
293771	O-035 E	2.8068	Adder	3.3
294401	BSHIL;1U E	4.5247	Adder	5.32
294410	BSHIL;2U E	4.5247	Adder	5.32
925581	AC1-033 C	0.7411	Adder	0.87
925582	AC1-033 E	4.9617	Adder	5.84
927201	AC1-214 C O1	0.9008	Adder	1.06
927202	AC1-214 E O1	2.8637	Adder	3.37
934051	AD1-031 C O1	1.5063	Adder	1.77
934052	AD1-031 E O1	2.4576	Adder	2.89
937531	AD2-214 C	4.2306	50/50	4.2306
937532	AD2-214 E	2.8204	50/50	2.8204
943383	AF1-009 BAT	6.8187	50/50	6.8187
943401	AF1-011 C	1.8670	50/50	1.8670
943402	AF1-011 E	3.1340	50/50	3.1340
943922	AF1-060 BAT	2.0096	50/50	2.0096
946321	AF1-296 C O1	2.3738	Adder	2.79

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946322	AF1-296 E O1	11.1134	Adder	13.07
957751	AF2-069 C	0.0553	Adder	0.12
957752	AF2-069 E	0.1784	Adder	0.4
957761	AF2-070 C	0.0779	Adder	0.17
957762	AF2-070 E	0.3782	Adder	0.84
961011	AF2-392 C O2	9.4508	50/50	9.4508
961012	AF2-392 E O2	44.2472	50/50	44.2472
961021	AF2-393 O2	16.1094	50/50	16.1094
961031	AF2-394 O2	10.7396	50/50	10.7396
990901	L-005 E	5.9435	Adder	6.99
LGEE	LGEE	0.0593	Confirmed LTF	0.0593
CPL	CPL	0.0926	Confirmed LTF	0.0926
G-007A	G-007A	0.0863	Confirmed LTF	0.0863
VFT	VFT	0.2322	Confirmed LTF	0.2322
CBM-W2	CBM-W2	4.2179	Confirmed LTF	4.2179
CBM-W1	CBM-W1	2.5020	Confirmed LTF	2.5020
TVA	TVA	0.5026	Confirmed LTF	0.5026
CBM-S2	CBM-S2	0.9942	Confirmed LTF	0.9942
CBM-S1	CBM-S1	2.6582	Confirmed LTF	2.6582
MADISON	MADISON	1.3810	Confirmed LTF	1.3810
MEC	MEC	2.5742	Confirmed LTF	2.5742

13.5.3 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
96707882	271898	LANCASTER;BT	CE	271897	LANCASTER;R	CE	1	COMED_P4_006-45-BT3-4_	breaker	321.0	119.77	120.33	DC	3.95

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
293516	O-009 E1	3.5425	Adder	4.17
293517	O-009 E2	1.7993	Adder	2.12
293518	O-009 E3	1.9815	Adder	2.33
293715	O-029 E	3.7873	Adder	4.46
293716	O-029 E	2.0765	Adder	2.44
293717	O-029 E	1.9086	Adder	2.25
938861	AE1-114 C O1	15.0787	50/50	15.0787
938862	AE1-114 E O1	51.4448	50/50	51.4448
943401	AF1-011 C	0.4836	Adder	0.57
943402	AF1-011 E	0.8118	Adder	0.96
943922	AF1-060 BAT	3.1547	50/50	3.1547
959761	AF2-267 C O2	25.7709	50/50	25.7709
959762	AF2-267 E O2	120.6485	50/50	120.6485
961011	AF2-392 C O2	1.0441	Adder	2.32
961012	AF2-392 E O2	4.8881	Adder	10.85
961021	AF2-393 O2	1.7797	Adder	3.95
961031	AF2-394 O2	1.1864	Adder	2.63
LGEE	LGEE	0.0405	Confirmed LTF	0.0405

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CPL	CPL	0.0615	Confirmed LTF	0.0615
G-007A	G-007A	0.0839	Confirmed LTF	0.0839
VFT	VFT	0.2257	Confirmed LTF	0.2257
CBM-W2	CBM-W2	2.4242	Confirmed LTF	2.4242
TVA	TVA	0.3010	Confirmed LTF	0.3010
CBM-S2	CBM-S2	0.6358	Confirmed LTF	0.6358
CBM-S1	CBM-S1	1.6018	Confirmed LTF	1.6018
MADISON	MADISON	0.2460	Confirmed LTF	0.2460
MEC	MEC	1.5270	Confirmed LTF	1.5270

13.5.4 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
96709173	272728	WATERMAN ; B	CE	272445	SANDWICH ; R	CE	1	COMED_P7_138-L11106_B-R_+345-L15502_B-R	tower	331.0	128.95	129.47	DC	3.82

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
272364	ESS H440N ;R	1.2190	50/50	1.2190
274850	MENDOTA H;RU	0.2807	50/50	0.2807
274855	GSG-6 ;RU	1.1820	50/50	1.1820
274872	LEE DEKAL;1U	3.1941	50/50	3.1941
290051	GSG-6; E	27.4100	50/50	27.4100
290108	LEEDK;1U E	77.1560	50/50	77.1560
294763	P-046 E	3.5741	Adder	4.2
916221	AB2-191	0.4534	50/50	0.4534
933911	AD1-013 C	4.9916	50/50	4.9916
933912	AD1-013 E	7.9736	50/50	7.9736
934431	AD1-067 C	0.3442	50/50	0.3442
934432	AD1-067 E	1.4472	50/50	1.4472
934651	AD1-096 C	0.4340	Adder	0.51
934652	AD1-096 E	0.7081	Adder	0.83
934701	AD1-098 C O1	17.3573	50/50	17.3573
934702	AD1-098 E O1	12.6727	50/50	12.6727
937001	AD2-134 C	7.1654	50/50	7.1654
937002	AD2-134 E	29.6003	50/50	29.6003
937311	AD2-172 C	0.9382	Adder	1.1
937312	AD2-172 E	1.2956	Adder	1.52
938861	AE1-114 C O1	1.8158	Adder	2.14
938862	AE1-114 E O1	6.1950	Adder	7.29
940501	AE2-035 C	0.9382	Adder	1.1
940502	AE2-035 E	1.2956	Adder	1.52
941131	AE2-107 C	23.9826	50/50	23.9826
941132	AE2-107 E	15.9884	50/50	15.9884
943381	AF1-009 C	1.5015	50/50	1.5015
943382	AF1-009 E	6.0060	50/50	6.0060

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943921	AF1-060	0.4619	Adder	0.54
946501	AF1-314 C	1.6670	Adder	1.96
946502	AF1-314 E	7.8044	Adder	9.18
946671	AF1-331	6.4826	50/50	6.4826
959101	AF2-201 C O2	1.2171	Adder	2.7
959102	AF2-201 E O2	3.4949	Adder	7.76
959761	AF2-267 C O2	0.8793	Adder	1.95
959762	AF2-267 E O2	4.1164	Adder	9.14
960382	AF2-329 BAT	9.1266	50/50	9.1266
960721	AF2-363 C O2	11.7216	50/50	11.7216
960722	AF2-363 E O2	7.8144	50/50	7.8144
960751	AF2-366 C O2	22.3182	50/50	22.3182
960752	AF2-366 E O2	14.8788	50/50	14.8788
961011	AF2-392 C O2	1.0101	Adder	2.24
961012	AF2-392 E O2	4.7292	Adder	10.5
961021	AF2-393 O2	1.7218	Adder	3.82
961031	AF2-394 O2	1.1479	Adder	2.55
WEC	WEC	0.3663	Confirmed LTF	0.3663
CBM-W2	CBM-W2	2.9894	Confirmed LTF	2.9894
NY	NY	0.0669	Confirmed LTF	0.0669
CBM-W1	CBM-W1	11.9220	Confirmed LTF	11.9220
TVA	TVA	0.3248	Confirmed LTF	0.3248
O-066	O-066	0.7728	Confirmed LTF	0.7728
CBM-S2	CBM-S2	0.1792	Confirmed LTF	0.1792
CBM-S1	CBM-S1	1.5166	Confirmed LTF	1.5166
TILTON	TILTON	0.0031	Confirmed LTF	0.0031
G-007	G-007	0.1196	Confirmed LTF	0.1196
MADISON	MADISON	3.2357	Confirmed LTF	3.2357
MEC	MEC	2.9110	Confirmed LTF	2.9110
GIBSON	GIBSON	0.0082	Confirmed LTF	0.0082
BLUEG	BLUEG	0.1180	Confirmed LTF	0.1180
TRIMBLE	TRIMBLE	0.0417	Confirmed LTF	0.0417

13.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
COMED_P1-2_345-L15502_B-R-B	CONTINGENCY 'COMED_P1-2_345-L15502_B-R-B' TRIP BRANCH FROM BUS 957470 TO BUS 270730 CKT 1 / AF1-012 TAP 345 ELEC JUNC; B 345 END

Contingency Name	Contingency Definition
COMED_P4_155-38-TR84__	CONTINGENCY 'COMED_P4_155-38-TR84__' TRIP BRANCH FROM BUS 275204 TO BUS 270828 CKT 1 / NELSO;4M 138 NELSO; B 345 TRIP BRANCH FROM BUS 275204 TO BUS 272094 CKT 1 / NELSO;4M 138 NELSO; B 138 TRIP BRANCH FROM BUS 275204 TO BUS 275304 CKT 1 / NELSO;4M 138 NELSO;4C 34.5 TRIP BRANCH FROM BUS 272094 TO BUS 271330 CKT 1 / NELSO; B 138 DIXON;7B 138 TRIP BRANCH FROM BUS 272094 TO BUS 272366 CKT 1 / NELSO; B 138 R FAL; B 138 END
COMED_P4_155-45-BT9-10_	CONTINGENCY 'COMED_P4_155-45-BT9-10_' TRIP BRANCH FROM BUS 275203 TO BUS 270828 CKT 1 / NELSO;2M 138 NELSO; B 345 TRIP BRANCH FROM BUS 275203 TO BUS 272095 CKT 1 / NELSO;2M 138 NELSO; R 138 TRIP BRANCH FROM BUS 275203 TO BUS 275303 CKT 1 / NELSO;2M 138 NELSO;2C 34.5 DISCONNECT BUS 274714 REMOVE UNIT C1 FROM BUS 274715 REMOVE UNIT S1 FROM BUS 274716 REMOVE UNIT C2 FROM BUS 274717 REMOVE UNIT S2 FROM BUS 274718 END
COMED_P1-2_345-L0627__B-R	CONTINGENCY 'COMED_P1-2_345-L0627__B-R' TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1 / LEECO;BP 345 BYRON; B 345 END
COMED_P7_138-L11106_B-R+_345-L15502_B-R	CONTINGENCY 'COMED_P7_138-L11106_B-R+_345-L15502_B-R' TRIP BRANCH FROM BUS 271390 TO BUS 271586 CKT 1 / ELECT; B 138 W541 ; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 271558 CKT 1 / GLIDD;BT 138 GLIDD; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 272728 CKT 1 / GLIDD;BT 138 WATER; B 138 TRIP BRANCH FROM BUS 271586 TO BUS 272114 CKT 1 / W541 ; B 138 N AUR; B 138 TRIP BRANCH FROM BUS 272114 TO BUS 272522 CKT 1 / N AUR; B 138 SUGAR; B 138 TRIP BRANCH FROM BUS 272522 TO BUS 271560 CKT 1 / SUGAR; B 138 GLIDD;BT 138 MOVE 100 PERCENT LOAD FROM BUS 271586 TO BUS 271587 / W541 ; B 138 W541 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 272522 TO BUS 272523 / SUGAR; B 138 SUGAR; R 138 CLOSE LINE FROM BUS 272114 TO BUS 272115 CKT 1 / N AUR; B 138 N AUR; R 138 TRIP BRANCH FROM BUS 270828 TO BUS 943410 CKT 1 / NELSON ; B 345 AF1-012 END

Contingency Name	Contingency Definition
COMED_P2-1_187-L15508__	CONTINGENCY 'COMED_P2-1_187-L15508__' TRIP BRANCH FROM BUS 272505 TO BUS 272097 CKT 1 / SCHAUFF ; 138 NELSO;RT 138 END
COMED_P1-3_TR82_NELSO_B-R	CONTINGENCY 'COMED_P1-3_TR82_NELSO_B-R' TRIP BRANCH FROM BUS 275203 TO BUS 270828 CKT 1 / NELSO;2M 138 NELSO; B 345 TRIP BRANCH FROM BUS 275203 TO BUS 272095 CKT 1 / NELSO;2M 138 NELSO; R 138 TRIP BRANCH FROM BUS 275203 TO BUS 275303 CKT 1 / NELSO;2M 138 NELSO;2C 34.5 END
COMED_P4_155-45-BT8-9__	CONTINGENCY 'COMED_P4_155-45-BT8-9__' TRIP BRANCH FROM BUS 270828 TO BUS 270700 CKT 1 / NELSO; B 345 CORDO; B 345 TRIP BRANCH FROM BUS 275203 TO BUS 270828 CKT 1 / NELSO;2M 138 NELSO; B 345 TRIP BRANCH FROM BUS 275203 TO BUS 272095 CKT 1 / NELSO;2M 138 NELSO; R 138 TRIP BRANCH FROM BUS 275203 TO BUS 275303 CKT 1 / NELSO;2M 138 NELSO;2C 34.5 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
COMED_P1-2_138-L11106_B-R	CONTINGENCY 'COMED_P1-2_138-L11106_B-R' TRIP BRANCH FROM BUS 271390 TO BUS 271586 CKT 1 / ELECT; B 138 W541 ; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 271558 CKT 1 / GLIDD;BT 138 GLIDD; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 272728 CKT 1 / GLIDD;BT 138 WATER; B 138 TRIP BRANCH FROM BUS 271586 TO BUS 272114 CKT 1 / W541 ; B 138 N AUR; B 138 TRIP BRANCH FROM BUS 272114 TO BUS 272522 CKT 1 / N AUR; B 138 SUGAR; B 138 TRIP BRANCH FROM BUS 272522 TO BUS 271560 CKT 1 / SUGAR; B 138 GLIDD;BT 138 MOVE 100 PERCENT LOAD FROM BUS 271586 TO BUS 271587 / W541 ; B 138 W541 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 272522 TO BUS 272523 / SUGAR; B 138 SUGAR; R 138 CLOSE LINE FROM BUS 272114 TO BUS 272115 CKT 1 / N AUR; B 138 N AUR; R 138 END
Base Case	

Contingency Name	Contingency Definition
BisonCOMED_P4_006-45-BT3-4__	CONTINGENCY 'COMED_P4_006-45-BT3-4__' TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1 / LEECO;BP 345 BYRON; B 345 REMOVE UNIT 1 FROM BUS 274656 / BYRON;1U 25 END
COMED_P4_155-38-TR81__	CONTINGENCY 'COMED_P4_155-38-TR81__' 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 271330 CKT 1 / NELSO; B 138 DIXON;7B 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_P1-2_345-L15503_B-R	CONTINGENCY 'COMED_P1-2_345-L15503_B-R' TRIP BRANCH FROM BUS 270828 TO BUS 270700 CKT 1 / NELSO; B 345 CORDO; B 345 END

14 Affected Systems

14.1 MISO

MISO Impacts to be determined during later study phases (as applicable).