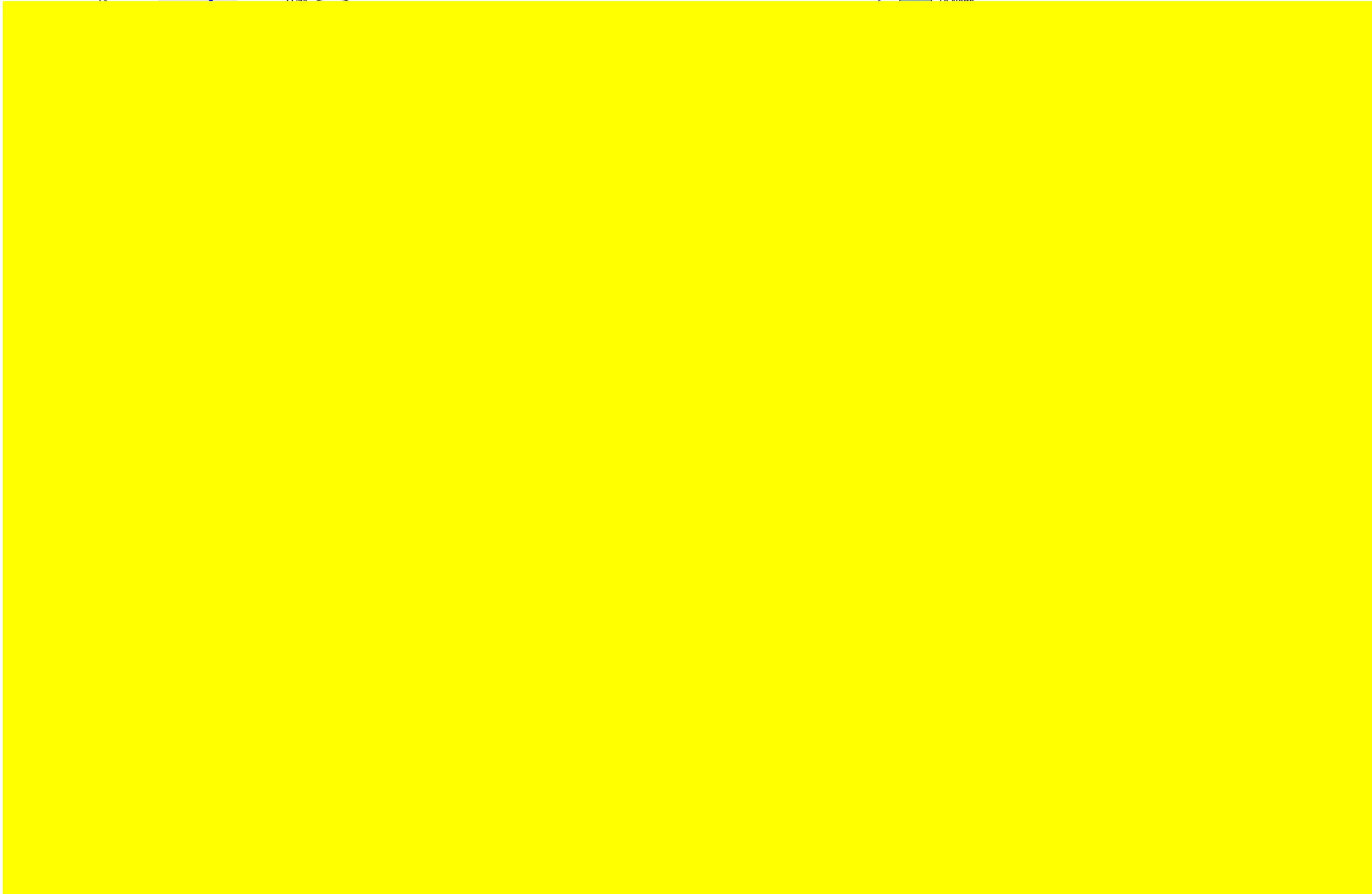
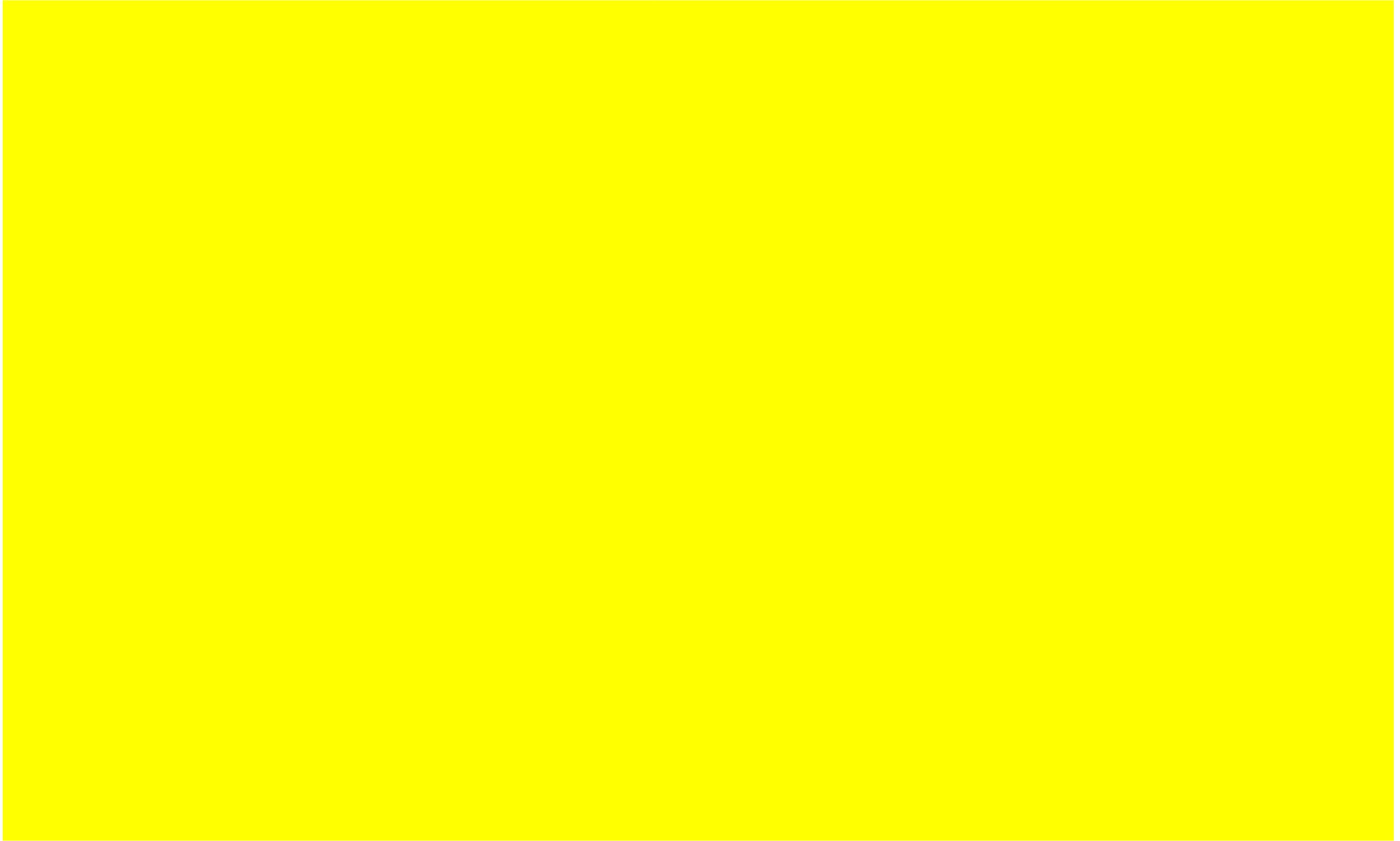


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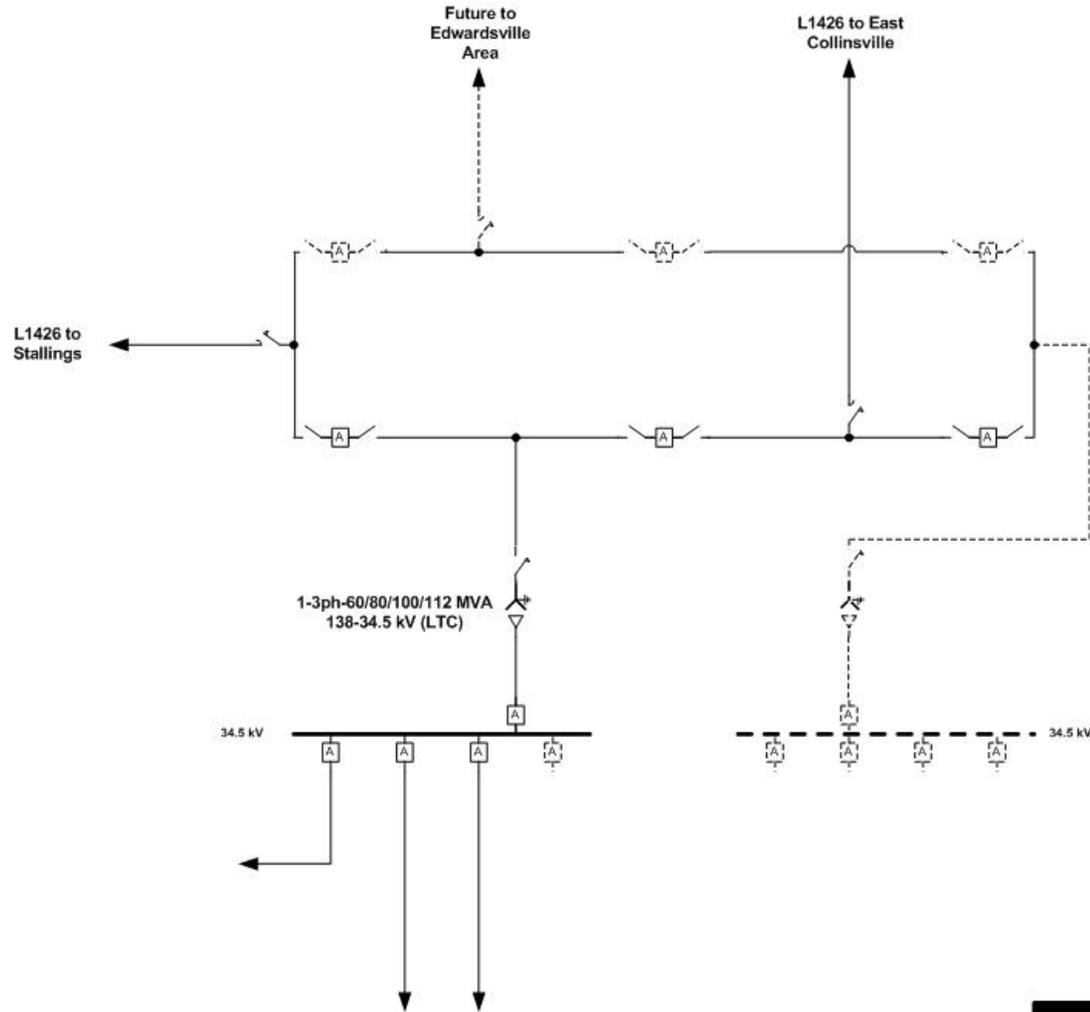


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To Fruit Rd REA

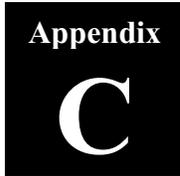


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**Interstate Substation
Ultimate Design**

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Load Area Forecast

Load forecasts include both actual peak loads from the previous year and a future projected forecast. The predicted percent expected growth by substation or metering point is obtained from the coop for their loads. Distribution substation and coop loads are weather normalized to a one-in-ten peak demand load forecast.

The forecasted demands for each substation served from the Maryville area subtransmission and transmission system are shown in the following tables followed by a summary by substation types.

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**Substation Load Forecast - Summer Peaks for Distribution Substations
Maryville Area**

		Projected Weather Normalized Loads																										
Bus	Sub	Substations	HV/LV	MVA ⁽²⁾	Growth	2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		
						P.F. ⁽¹⁾	kV	Rating	Rate (%)	MVA	MW	MVA																
91101	J34	BETHALTO #1	0.98	34/12	10.496	2.0	10.0	9.8	10.2	9.9	10.3	10.1	10.6	10.3	10.8	10.5	11.0	10.8	11.2	11.0	11.4	11.2	11.6	11.4	11.9	11.6	12.1	11.8
91102	J34	BETHALTO #2	0.98	34/12	22.400	1.2	16.1	15.7	16.3	15.9	16.5	16.1	16.7	16.3	16.9	16.5	17.1	16.7	17.3	16.9	17.5	17.1	17.7	17.4	17.9	17.6	18.1	17.8
91103	HA5	CASEYVILLE BETHEL MINE I	0.98	34/12	22.400	2.0	9.1	8.9	10.1	9.9	11.1	10.8	12.1	11.9	12.3	12.1	12.6	12.3	12.8	12.6	13.1	12.8	13.4	13.1	13.6	13.4	13.9	13.6
91160	K11	CASEYVILLE GARDENS #1	0.98	34/12	10.496	4.1	3.1	3.0	3.2	3.1	3.3	3.3	3.5	3.4	3.6	3.6	3.8	3.7	3.9	3.8	4.1	4.0	4.3	4.2	4.4	4.3	4.6	4.5
91161	K11	CASEYVILLE GARDENS #2	0.98	34/12	10.496	2.3	8.7	8.5	8.9	8.7	9.1	8.9	9.3	9.1	9.5	9.3	9.7	9.5	9.9	9.7	10.1	9.9	10.4	10.2	10.6	10.4	10.8	10.6
91164	K43	COLLINSVILLE #1	0.98	34/12	10.496	2.6	7.5	7.3	7.7	7.5	7.9	7.7	8.1	7.9	8.3	8.1	8.5	8.4	8.7	8.6	9.0	8.8	9.2	9.0	9.4	9.3	9.7	9.5
94065	K43	COLLINSVILLE #2	0.98	34/4	6.730	1.5	6.7	6.6	6.8	6.7	6.9	6.8	7.0	6.9	7.1	7.0	7.2	7.1	7.3	7.2	7.4	7.3	7.6	7.4	7.7	7.5	7.8	7.6
91162	K46	COLLINSVILLE CLOVERLEAF	0.98	34/12	10.496	3.0	9.5	9.3	9.8	9.6	10.1	9.9	10.4	10.2	10.7	10.5	11.1	10.8	11.4	11.2	11.7	11.5	12.1	11.9	12.5	12.2	12.9	12.6
91155	K46	COLLINSVILLE CLOVERLEAF	0.98	34/12	14.000	0.9	10.4	10.2	10.5	10.3	10.6	10.4	10.7	10.5	10.8	10.6	10.9	10.7	11.0	10.8	11.2	10.9	11.3	11.0	11.4	11.1	11.5	11.2
94066	K48	COLLINSVILLE GOETHE #1	0.98	34/4	10.496	1.9	5.3	5.2	5.4	5.3	5.5	5.4	5.6	5.5	5.7	5.6	5.8	5.7	5.9	5.8	6.0	5.9	6.2	6.0	6.3	6.1	6.4	6.3
94067	K48	COLLINSVILLE GOETHE #2	0.98	34/4	10.496	1.4	7.1	7.0	7.2	7.1	7.3	7.2	7.4	7.3	7.5	7.4	7.6	7.5	7.7	7.6	7.8	7.7	7.9	7.8	8.1	7.9	8.2	8.0
91168	K52	COLLINSVILLE REESE DRIV	0.98	34/12	22.400	2.5	19.4	19.0	19.8	19.5	20.3	19.9	20.9	20.4	21.4	21.0	21.9	21.5	22.5	22.0	23.0	22.6	23.6	23.2	24.2	23.7	24.8	24.3
94070	K55	COLLINSVILLE TERRACE	0.98	34/4	5.600	1.5	4.8	4.7	4.9	4.8	4.9	4.8	5.0	4.9	5.1	5.0	5.2	5.1	5.2	5.1	5.3	5.2	5.4	5.3	5.5	5.4	5.6	5.5
91123	L90	EASTALTON BELL ST.	0.98	34/12	8.400	0.5	4.2	4.1	4.2	4.1	4.2	4.2	4.3	4.2	4.3	4.2	4.3	4.2	4.3	4.2	4.3	4.3	4.4	4.3	4.4	4.3	4.4	4.3
91175	L99	EAST ST. JACOB	0.98	34/12	10.496	1.9	5.0	4.9	5.1	5.0	5.2	5.1	5.3	5.2	5.4	5.2	5.5	5.3	5.6	5.4	5.7	5.6	5.8	5.7	5.9	5.8	6.0	5.9
91149	M04	EDWARDSVILLE SCHWARZ	0.98	34/12	14.000	1.0	8.0	7.8	8.0	7.9	8.1	7.9	8.2	8.0	8.3	8.1	8.3	8.2	8.4	8.3	8.5	8.3	8.6	8.4	8.7	8.5	8.8	8.6
91146	M05	EDWARDSVILLE SECOND S	0.98	34/12	22.400	3.2	12.3	12.0	12.7	12.4	13.1	12.8	13.5	13.2	13.9	13.6	14.3	14.1	14.8	14.5	15.3	15.0	15.7	15.4	16.2	15.9	16.8	16.4
91147	M05	EDWARDSVILLE SECOND S	0.98	34/12	22.400	3.0	12.7	12.5	13.1	12.9	13.5	13.3	13.9	13.7	14.4	14.1	14.8	14.5	15.2	14.9	15.7	15.4	16.2	15.9	16.7	16.3	17.2	16.8
94077	M15	EXERMONT BERNICE ST.	0.98	34/4	4.687	1.1	4.7	4.6	4.8	4.7	4.8	4.7	4.9	4.8	4.9	4.8	5.0	4.9	5.0	4.9	5.1	5.0	5.1	5.0	5.2	5.1	5.2	5.1
94072	M17	FAIRMONT - COLLINSVILLE	0.98	34/4	3.748	0.5	1.5	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
91151	M49	GLEN CARBON	0.98	34/12	10.560	1.9	10.4	10.2	10.6	10.4	10.8	10.5	11.0	10.7	11.2	10.9	11.4	11.1	11.6	11.4	11.8	11.6	12.0	11.8	12.2	12.0	12.5	12.2
94025	M53	GRANITE CITY 17th ST. #1	0.98	34/4	10.496	1.0	4.1	4.0	4.1	4.0	4.2	4.1	4.2	4.1	4.2	4.2	4.3	4.2	4.3	4.2	4.4	4.3	4.4	4.3	4.5	4.4	4.5	4.4
94026	M53	GRANITE CITY 17th ST. #2	0.98	34/4	7.000	0.5	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1	4.3	4.2	4.3	4.2	4.3	4.2	4.3	4.2	4.3	4.2	4.4	4.3
94027	M54	GRANITE CITY 22nd ST. #1	0.98	34/4	10.496	1.8	5.4	5.2	5.4	5.3	5.5	5.4	5.6	5.5	5.8	5.6	5.9	5.7	6.0	5.8	6.1	5.9	6.2	6.1	6.3	6.2	6.4	6.3
94028	M54	GRANITE CITY 22nd ST. #2	0.98	34/4	10.496	0.0	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6
91154	M54	GRANITE CITY 22nd ST. #3	0.98	34/12	10.496	0.3	3.0	2.9	3.0	2.9	3.0	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.1	3.0	3.1	3.0	3.1	3.0	3.1	3.0
91115	M61	GRANITE CITY BEND ROAD	0.98	69/12	2.170	0.5	2.1	2.0	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.1
94016	M73	GRANITE CITY KATE ST. #1	0.98	34/4	10.496	1.9	5.3	5.2	5.4	5.3	5.5	5.4	5.6	5.5	5.7	5.6	5.8	5.7	5.9	5.8	6.0	5.9	6.2	6.0	6.3	6.1	6.4	6.3
94017	M73	GRANITE CITY KATE ST. #2	0.98	34/4	10.496	1.5	6.7	6.6	6.8	6.7	6.9	6.8	7.0	6.9	7.1	7.0	7.2	7.1	7.3	7.2	7.4	7.3	7.5	7.4	7.6	7.5	7.7	7.6
94018	M78	GRANITE CITY MARYLAND#	0.98	34/4	3.748	1.3	3.9	3.8	3.9	3.9	4.0	3.9	4.0	4.0	4.1	4.0	4.1	4.1	4.2	4.1	4.2	4.2	4.3	4.2	4.4	4.3	4.4	4.3
91119	M78	GRANITE CITY MARYLAND#	0.98	34/12	14.000	1.0	9.8	9.6	9.9	9.7	10.0	9.8	10.1	9.9	10.2	10.0	10.3	10.1	10.4	10.2	10.5	10.3	10.6	10.4	10.8	10.5	10.9	10.6
91138	M81	GRANITE CITY PARKVIEW#1	0.98	34/12	22.400	2.2	9.0	8.8	9.2	9.0	9.4	9.2	9.6	9.4	9.8	9.6	10.0	9.8	10.3	10.1	10.5	10.3	10.7	10.5	10.9	10.7	11.2	11.0
91139	M81	GRANITE CITY PARKVIEW#2	0.98	34/12	22.400	1.1	9.3	9.1	9.4	9.2	9.5	9.3	9.6	9.4	9.7	9.5	9.8	9.6	9.9	9.7	10.0	9.8	10.1	9.9	10.3	10.1	10.4	10.2
94022	M83	GRANITE CITY PONTOON RI	0.98	34/4	10.496	1.2	8.4	8.2	8.5	8.3	8.6	8.4	8.7	8.5	8.8	8.6	8.9	8.7	9.0	8.8	9.1	8.9	9.2	9.0	9.3	9.1	9.4	9.2

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Substation Load Forecast - Summer Peaks for Distribution Substations

Maryville Area

Projected Weather Normalized Loads

Bus	Sub	Substations	P.F. ⁽¹⁾	HV/LV kV	MVA ⁽²⁾ Rating	Growth Rate (%)	2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021			
							MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW
94030	N03	GRANITE CITY WABASH #1	0.98	34/4	10.496	0.4	4.5	4.4	4.6	4.5	4.6	4.5	4.6	4.5	4.6	4.5	4.6	4.5	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6	4.7	4.6		
94031	N03	GRANITE CITY WABASH #2	0.98	34/4	10.496	1.7	5.8	5.6	5.8	5.7	5.9	5.8	6.0	5.9	6.2	6.0	6.3	6.1	6.4	6.2	6.5	6.3	6.6	6.4	6.7	6.6	6.8	6.7		
94124	N19	HAMEL KLEUTER AVE	0.98	34/4	3.000	2.3	2.1	2.1	2.2	2.1	2.2	2.2	2.3	2.2	2.3	2.3	2.4	2.3	2.4	2.4	2.5	2.4	2.5	2.5	2.6	2.6	2.7	2.6		
94034	P09	MADISON #1	0.98	34/4	5.000	0.5	2.5	2.4	2.5	2.4	2.5	2.4	2.5	2.4	2.5	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.5	2.6	2.5		
94033	P09	MADISON #2	0.98	34/4	5.252	0.9	3.4	3.3	3.4	3.3	3.4	3.4	3.5	3.4	3.5	3.4	3.5	3.5	3.6	3.5	3.6	3.5	3.6	3.6	3.7	3.6	3.7	3.6		
91134	P12	MADISON INDUSTRIAL #3	0.98	69/12	10.496	3.0	6.5	6.3	6.6	6.5	6.8	6.7	7.1	6.9	7.3	7.1	7.5	7.3	7.7	7.6	7.9	7.8	8.2	8.0	8.4	8.2	8.7	8.5		
91174	P19	MARINE	0.98	34/12	7.000	1.5	6.8	6.7	6.9	6.8	7.0	6.9	7.1	7.0	7.2	7.1	7.3	7.2	7.4	7.3	7.5	7.4	7.7	7.5	7.8	7.6	7.9	7.7		
94020	P72	NAMEOKI #1	0.98	34/4	5.000	0.5	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.3	2.2	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3		
94021	P72	NAMEOKI #2	0.98	34/4	7.000	1.3	4.7	4.6	4.8	4.7	4.8	4.8	4.9	4.8	5.0	4.9	5.0	4.9	5.1	5.0	5.2	5.1	5.2	5.1	5.3	5.2	5.4	5.2		
91122	Q10	NORTH GRANITE CITY	0.98	34/12	14.000	1.5	6.6	6.5	6.7	6.6	6.8	6.7	6.9	6.8	7.0	6.9	7.1	7.0	7.2	7.1	7.3	7.2	7.4	7.3	7.6	7.4	7.7	7.5		
91110	Q80	ROSEWOOD HEIGHTS #1	0.98	34/12	10.496	2.5	7.7	7.6	7.9	7.8	8.1	7.9	8.3	8.2	8.5	8.4	8.7	8.6	9.0	8.8	9.2	9.0	9.4	9.2	9.7	9.5	9.9	9.7		
91111	Q80	ROSEWOOD HEIGHTS #2	0.98	34/12	10.496	0.0	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.3		
91153	R04	S. EDWARDSVILLE #1	0.98	34/12	22.400	2.2	17.9	17.5	18.3	17.9	18.7	18.3	19.1	18.7	19.5	19.1	19.9	19.5	20.4	19.9	20.8	20.4	21.3	20.8	21.7	21.3	22.2	21.8		
91152	R04	S. EDWARDSVILLE #2	0.98	34/12	22.400	2.4	12.4	12.2	12.7	12.5	13.0	12.8	13.3	13.1	13.6	13.4	14.0	13.7	14.3	14.0	14.6	14.3	15.0	14.7	15.3	15.0	15.7	15.4		
91156	R04	S. EDWARDSVILLE #3	0.98	34/12	22.400	2.2	17.9	17.5	18.3	17.9	18.7	18.3	19.1	18.7	19.5	19.1	20.0	19.6	20.4	20.0	20.8	20.4	21.3	20.9	21.8	21.3	22.2	21.8		
91135	R23	STALLINGS #7	0.98	34/12	11.240	3.0	9.8	9.6	10.1	9.9	10.4	10.2	10.7	10.5	11.0	10.8	11.4	11.1	11.7	11.5	12.0	11.8	12.4	12.1	12.8	12.5	13.1	12.9		
91176	R53	TROY INDUSTRIAL PARK 1	0.98	34/12	14.000	1.9	10.5	10.3	10.7	10.5	10.9	10.6	11.1	10.8	11.3	11.0	11.5	11.3	11.7	11.5	11.9	11.7	12.1	11.9	12.4	12.1	12.6	12.3		
91177	R53	TROY INDUSTRIAL PARK 2	0.98	34/12	22.400	0.0	5.5	5.4	5.5	5.4	5.5	5.4	5.5	5.4	5.5	5.4	5.5	5.4	5.5	5.4	5.5	5.4	5.5	5.4	5.5	5.4	5.5	5.4		
94036	R78	VENICE 4TH ST.	0.98	34/4	5.252	1.1	3.5	3.5	3.6	3.5	3.6	3.5	3.7	3.6	3.7	3.6	3.7	3.7	3.8	3.7	3.8	3.7	3.9	3.8	3.9	3.8	3.9	3.9		
91109	R93	WANDA #2	0.98	34/12	10.496	1.1	9.2	9.0	9.3	9.1	9.4	9.2	9.5	9.3	9.6	9.4	9.7	9.5	9.8	9.6	9.9	9.7	10.0	9.8	10.1	9.9	10.2	10.0		
94007	H11	WOODRIVER 6TH ST. #1	0.98	34/4	8.400	0.5	3.9	3.8	3.9	3.9	4.0	3.9	4.0	3.9	4.0	3.9	4.0	3.9	4.0	4.0	4.1	4.0	4.1	4.0	4.1	4.0	4.1	4.0		
91108	H11	WOODRIVER 6TH ST. #3	0.98	34/12	22.400	1.2	16.7	16.4	16.9	16.6	17.1	16.8	17.3	17.0	17.5	17.2	17.7	17.4	17.9	17.6	18.1	17.8	18.4	18.0	18.6	18.2	18.8	18.4		
91104	H14	WOODRIVER BEN BOW	0.98	34/12	10.496	1.5	6.6	6.5	6.7	6.6	6.8	6.7	6.9	6.8	7.0	6.9	7.1	7.0	7.2	7.1	7.3	7.2	7.4	7.3	7.5	7.4	7.7	7.5		
91105	H22	WOODRIVER PICKER ST. #1	0.98	34/12	14.000	1.5	6.5	6.4	6.6	6.5	6.7	6.6	6.8	6.7	6.9	6.8	7.0	6.9	7.1	7.0	7.2	7.1	7.3	7.2	7.4	7.3	7.6	7.4		
91106	H22	WOODRIVER PICKER ST. #2	0.98	34/12	14.000	1.4	7.1	6.9	7.1	7.0	7.3	7.1	7.4	7.2	7.5	7.3	7.6	7.4	7.7	7.5	7.8	7.6	7.9	7.7	8.0	7.8	8.1	7.9		
94123	H32	WORDEN	0.98	34/4	3.748	1.9	2.8	2.7	2.8	2.8	2.9	2.8	2.9	2.9	3.0	2.9	3.0	3.0	3.1	3.0	3.2	3.1	3.2	3.1	3.3	3.2	3.3	3.3		
Distribution Totals									433.7	442.0	450.4		459.0		466.9		475.1		483.4		491.9		500.6		509.4		518.5			

Notes:

- (1) P.F. is assumed to be 0.98
- (2) Normal MVA rating = Nameplate MVA * 1.15
- (3) W.N. = Weather Normalized

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**Substation Load Forecast - Summer Peaks for Large Customer Substations
 Maryville Area**

			HV/LV MVA ⁽²⁾		Growth Rate (%)	2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021	
Bus	Sub	Substations	P.F. ⁽¹⁾	Rating		MVA	MW																				
					0.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6	3.0
					0.0	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2
					0.0	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2
					0.0	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5
					0.0	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2
					0.0	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5
					0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
					0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
					0.0	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1
					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Large Customer Totals						329.0		326.6		326.6		326.6		326.6		326.6		326.6		326.6		326.6		326.6		326.6	

Notes:
 (1) P.F. is from last year of actual data
 (2) MVA rating = Nameplate MVA
 (3) W.N. = Weather Normalized
 Note 1 - Customer Owned Transformers

PUBLIC VERSION

**Substation Load Forecast - Summer Peaks for REA and Other Substations
 Maryville Area**

Projected Weather Normalized Loads

Bus	Sub	Substations	HV/LV	MVA ⁽²⁾	P.F. ⁽¹⁾	kV	Rating	Growth Rate (%)	2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021						
									MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA	MW	MVA								
							COT(4)	1.8	22.1	19.7	22.5	20.0	22.9	20.4	23.4	20.7	23.8	21.1	24.2	21.5	24.6	21.9	25.1	22.3	25.5	22.7	26.0	23.1	26.4	23.5					
							COT(4)	1.8	8.8	7.7	8.9	7.8	9.1	7.9	9.2	8.1	9.4	8.2	9.6	8.4	9.7	8.5	9.9	8.7	10.1	8.8	10.3	9.0	10.5	9.1					
							COT(4)	1.8	15.1	13.7	15.4	14.0	15.6	14.2	15.9	14.5	16.2	14.7	16.5	15.0	16.8	15.3	17.1	15.5	17.4	15.8	17.7	16.1	18.0	16.4					
							COT(4)	1.4	38.7	38.7	39.2	39.2	39.7	39.7	40.3	40.3	40.8	40.8	41.4	41.4	41.9	41.9	42.5	42.5	43.1	43.1	43.7	43.7	44.3	44.3					
							COT(4)	1.8	15.1	14.0	15.4	14.3	15.6	14.5	15.9	14.8	16.2	15.1	16.5	15.3	16.8	15.6	17.1	15.9	17.4	16.2	17.7	16.5	18.0	16.8					
							COT(4)	1.8	12.9	12.1	13.1	12.3	13.3	12.5	13.6	12.7	13.8	12.9	14.1	13.2	14.3	13.4	14.6	13.7	14.9	13.9	15.1	14.2	15.4	14.4					
							COT(4)	1.9	3.5	3.2	3.5	3.3	3.6	3.3	3.7	3.4	3.7	3.5	3.8	3.5	3.9	3.6	3.9	3.7	4.0	3.7	4.1	3.8	4.2	3.9					
							COT(4)	1.8	12.3	11.1	12.5	11.3	12.7	11.5	12.9	11.8	13.2	12.0	13.4	12.2	13.7	12.4	13.9	12.6	14.2	12.9	14.4	13.1	14.7	13.3					
							COT(4)	1.7	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.7	2.7					
REA & Other Totals									122.4	124.4	126.5	128.6	130.7	132.9	135.1	137.4	139.6	142.0	144.3																

Notes:
 (1) P.F. is from last year of actual data
 (2) MVA rating = Nameplate MVA
 (3) W.N. = Weather Normalized
 Note 1 - Customer Owned Transformers

PUBLIC VERSION

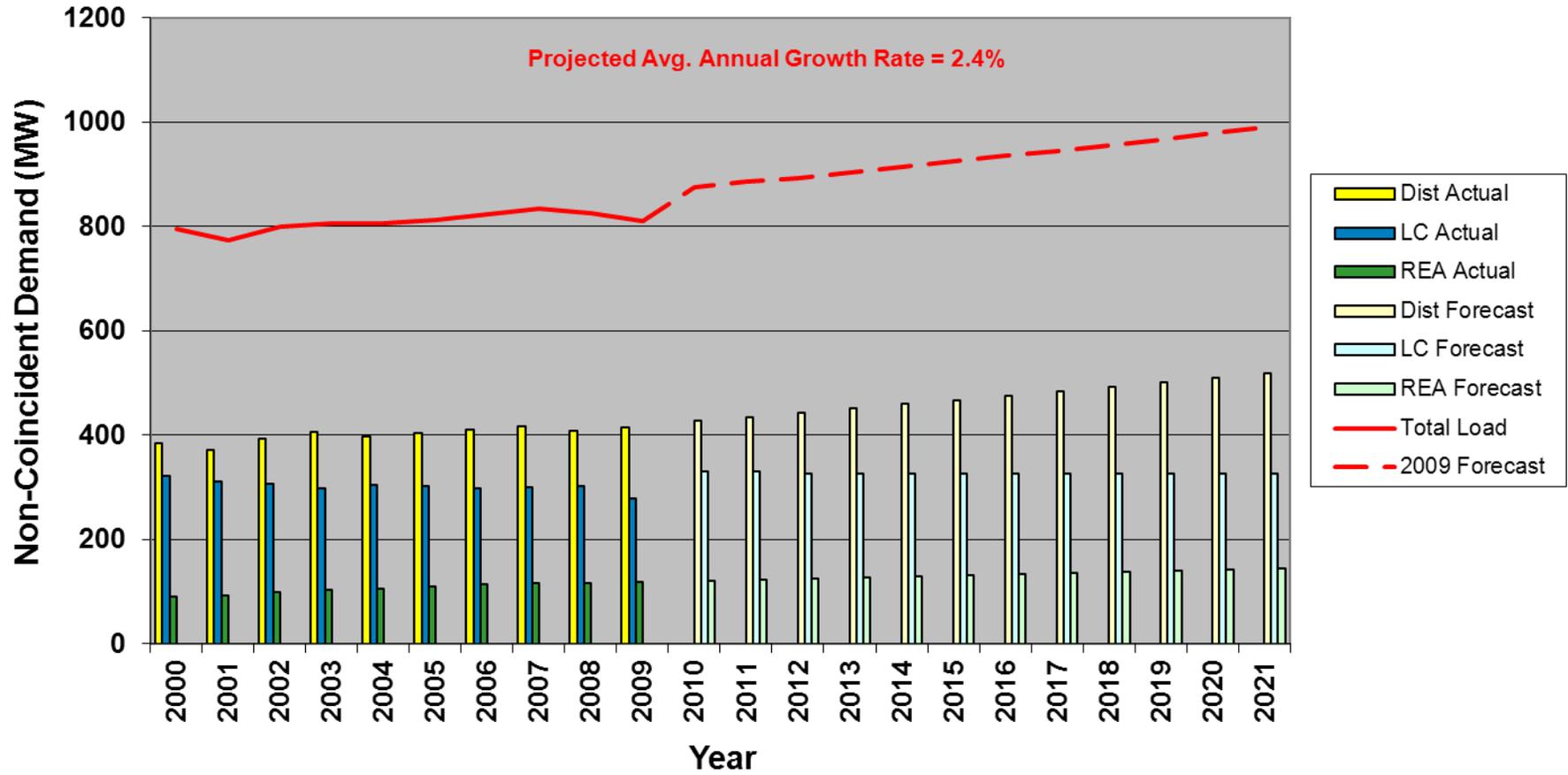
**Substation Load Forecast - Summer Peaks
 Maryville Area
 Projected Loads**

	2011 MW	2012 MW	2013 MW	2014 MW	2015 MW	2016 MW	2017 MW	2018 MW	2019 MW	2020 MW	2021 MW	Growth Rate (%)
Total Distribution Substations	433.7	442.0	450.4	459.0	466.9	475.1	483.4	491.9	500.6	509.4	518.5	1.8%
Total Large Customer Substations	329.0	326.6	326.6	326.6	326.6	326.6	326.6	326.6	326.6	326.6	326.6	-0.1%
Total REA & Other Substations	122.4	124.4	126.5	128.6	130.7	132.9	135.1	137.4	139.6	142.0	144.3	1.7%
Area Total	885.2	893.0	903.5	914.2	924.3	934.6	945.1	955.9	966.8	978.0	989.4	1.1%

Notes:
 (1) Non-coincident totals.

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Maryville Area



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Data Summaries

The following four data summaries are included in this appendix.

1. Transformer Loading Summary
2. Line Terminal Loading Summary
3. Transformer Fixed Tap Settings Summary
4. Contingency Outage Deck Summary

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D.1 Transformer Loading Summary

The following tables list the maximum load expected on each 138/34.5 kV transformer in the study area under normal and outage conditions. The maximum thermal capability listed is that of the transformer circuits.

Normal and long-term emergency conditions are defined as follows:

- Normal Conditions: All components of the system are in-service and operating properly.
- Emergency Conditions: A single line, bus, or other component of the system is out-of-service for a period not exceeding twenty-four hours. A single component of the system (typically a major transformer) is out-of-service for a period that includes a complete summer load period.

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Transformer Loading Summary									
2011									
Transformer	Normal				Emergency				Worst Outage
	Trf Rating (MVA)	Trf + Terminal Rating (MVA)	Flow (MVA)	Trf Percent Loaded	Trf Rating (MVA)	Trf + Terminal Rating (MVA)	Flow (MVA)	Trf Percent Loaded	
E. Collinsville #1	93.1	93.1	49.5	53.2%	112.3	112.3	97.0	86.4%	E. Collinsville #2 138/34 kV (Auto Close Bus Tie)
E. Collinsville #2	111.5	108.8	65.0	58.3%	151.5	119.5	94.7	62.5%	E. Collinsville #1 138/34 kV (Auto Close Bus Tie)
Interstate									
Stallings #3	114.4	105.8	66.9	58.5%	156.0	122.8	121.2	77.7%	Stallings #5 138/34 kV (Auto Close Bus Tie)
Stallings #5	114.9	114.9	79.5	69.2%	149.9	137.4	111.6	74.4%	Stallings #3 138/34 kV (Auto Close Bus Tie)
Wanda #1	55.1	55.1	48.8	88.6%	74.4	70.3	67.7	91.0%	L3425 Stallings to SIU

Transformer Loading Summary									
2013									
Transformer	Normal				Emergency				Worst Outage
	Trf Rating (MVA)	Trf + Terminal Rating (MVA)	Flow (MVA)	Trf Percent Loaded	Trf Rating (MVA)	Trf + Terminal Rating (MVA)	Flow (MVA)	Trf Percent Loaded	
E. Collinsville #1	93.1	93.1	51.5	55.3%	112.3	112.3	100.5	89.5%	E. Collinsville #2 138/34 kV (Auto Close Bus Tie)
E. Collinsville #2	111.5	108.8	67.3	60.3%	151.5	119.5	98.1	64.8%	E. Collinsville #1 138/34 kV (Auto Close Bus Tie)
Interstate									
Stallings #3	114.4	105.8	68.0	59.5%	156.0	137.4	124.5	79.8%	Stallings #5 138/34 kV (Auto Close Bus Tie)
Stallings #5	114.9	114.9	82.2	71.5%	149.9	137.4	114.0	76.1%	Stallings #3 138/34 kV (Auto Close Bus Tie)
Wanda #1	55.1	55.1	49.4	89.6%	74.4	70.3	68.5	92.0%	L3425 Stallings to SIU

PUBLIC VERSION

Transformer Loading Summary									
2016									
Transformer	Normal				Emergency				Worst Outage
	Trf Rating (MVA)	Trf + Terminal Rating (MVA)	Flow (MVA)	Trf Percent Loaded	Trf Rating (MVA)	Trf + Terminal Rating (MVA)	Flow (MVA)	Trf Percent Loaded	
E. Collinsville #1	93.1	93.1	37.2	39.9%	112.3	112.3	71.5	63.7%	E. Collinsville #2 138/34 kV (Auto Close Bus Tie)
E. Collinsville #2	111.5	108.8	53.1	47.6%	151.5	119.5	69.9	46.2%	Interstate 138/34 kV Transformer
Interstate	115.0	115.0	65.3	56.8%	150.0	150.0	86.1	57.4%	L3314 @ E. Collinsville (ATO Troy Load)
Stallings #3	114.4	105.8	71.8	62.8%	156.0	122.8	115.0	73.7%	Stallings #5 138/34 kV (Auto Close Bus Tie)
Stallings #5	114.9	114.9	70.0	60.9%	149.9	137.4	105.3	70.3%	Stallings #3 138/34 kV (Auto Close Bus Tie)
Wanda #1	55.1	55.1	49.9	90.5%	74.4	74.4	71.7	96.4%	L3425 Stallings to SIU

Transformer Loading Summary									
2021									
Transformer	Normal				Emergency				Worst Outage
	Trf Rating (MVA)	Trf + Terminal Rating (MVA)	Flow (MVA)	Trf Percent Loaded	Trf Rating (MVA)	Trf + Terminal Rating (MVA)	Flow (MVA)	Trf Percent Loaded	
E. Collinsville #1	93.1	93.1	39.6	42.6%	112.3	112.3	75.9	67.6%	E. Collinsville #2 138/34 kV (Auto Close Bus Tie)
E. Collinsville #2	111.5	108.8	57.0	51.1%	151.5	119.5	75.3	49.7%	Interstate Transformer
Interstate	115.0	115.0	70.0	60.9%	150.0	150.0	92.5	61.7%	L3314 @ E. Collinsville (ATO Troy Ind)
Stallings #3	114.4	105.8	78.5	68.6%	156.0	122.8	119.8	76.8%	Stallings #5 138/34 kV (Auto Close Bus Tie)
Stallings #5	114.9	114.9	71.5	62.2%	149.9	137.4	108.9	72.6%	Stallings #3 138/34 kV (Auto Close Bus Tie)
Wanda #1	115.0	115.0	70.5	61.3%	150.0	150.0	95.3	63.5%	L3320 @ Cottage Hills

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D.2 Line Terminal Loading Summary

The following tables list the maximum expected line terminal loads under normal and single contingency outage conditions. Single contingency outage conditions include both short-term and long-term emergency conditions. The line terminal capability lists the smallest normal and emergency rating of the following pieces of terminal equipment; relay setting, circuit breakers, disconnect switches, and terminal conductors.

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Line Terminal Loading Summary								
2011								
Line # and Substation	Line Terminal Capability		Maximum Line Terminal Flow (MVA)					
	Normal (MVA)	Emergency (MVA)	Normal		Worst Outage Case			
			Peak Load	Percent of Rated	Peak Load	Percent of Rated	Outage	
L3308 @ Collinsville	42.6	42.6	11.8	27.8%	41.3	96.9%	Porter Rd 138/34 kV Trf	
L3309 @ E Collinsville	68.7	69.1	23.1	33.6%	55.8	80.8%	L3314 @ E Collinsville	
L3309 @ Collinsville	68.7	69.1	23.1	33.6%	55.8	80.8%	L3314 @ E Collinsville	
L3310 @ Collinsville	51.8	57.1	29.6	57.2%	82.2	144.0%	[Redacted]	
L3313 @ Collinsville	51.8	57.1	19.9	38.4%	65.4	114.5%	[Redacted]	
L3313 @ Stallings	38.1	38.1	41.8	109.7%	64.8	170.1%	[Redacted]	
L3314 @ E Collinsville	51.8	51.8	42.2	81.4%	78.0	150.6%	[Redacted]	
L3331 @ Stallings	37.6	37.6	38.1	101.4%	39.4	104.8%	[Redacted]	
L3402 @ Collinsville	68.7	71.7	48.4	70.4%	67.3	93.9%	L3313 @ Stallings	
L3402 @ E Collinsville	68.7	71.7	48.4	70.4%	67.3	93.9%	L3313 @ Stallings	
L3425 @ Stallings	70.1	71.7	29.0	41.4%	63.4	88.4%	L1456 Cottage Hills to Stallings	
L3425 @ Edwardsville SIU	51.8	57.1	27.0	52.1%	61.2	107.2%	[Redacted]	
L3457 @ Edwardsville SIU	47.8	47.8	15.3	32.0%	48.7	101.9%	[Redacted]	
L3459 @ Wanda	51.8	57.1	30.0	58.0%	59.8	104.7%	[Redacted]	

Line Terminal Loading Summary								
2013								
Line # and Substation	Line Terminal Capability		Maximum Line Terminal Flow (MVA)					
	Normal (MVA)	Emergency (MVA)	Normal		Worst Outage Case			
			Peak Load	Percent of Rated	Peak Load	Percent of Rated	Outage	
L3308 @ Collinsville	51.8	51.8	13.8	26.6%	45.1	87.0%	Porter Rd 138/34 kV Trf	
L3309 @ E Collinsville	68.7	69.1	25.3	36.8%	57.9	83.8%	L3314 @ E Collinsville	
L3309 @ Collinsville	68.7	69.1	25.3	36.8%	57.9	83.8%	L3314 @ E Collinsville	
L3310 @ Collinsville	51.8	57.1	31.0	59.9%	84.0	147.1%	[Redacted]	
L3313 @ Collinsville	51.8	57.1	20.1	38.9%	68.7	120.3%	[Redacted]	
L3313 @ Stallings	51.8	57.1	44.3	85.5%	67.9	119.0%	[Redacted]	
L3314 @ E Collinsville	51.8	51.8	43.0	83.0%	80.4	155.3%	[Redacted]	
L3331 @ Stallings	58.6	75.0	38.4	65.6%	39.5	52.6%	GC S Edwardsville #1 Cap Out	
L3402 @ Collinsville	68.7	71.7	50.6	73.7%	70.8	98.8%	L3313 @ Stallings	
L3402 @ E Collinsville	68.7	71.7	50.6	73.7%	70.8	98.8%	L3313 @ Stallings	
L3425 @ Stallings	70.1	71.7	29.5	42.1%	66.7	93.0%	L1456 Cottage Hills to Stallings	
L3425 @ Edwardsville SIU	51.8	57.1	27.5	53.1%	64.4	112.8%	[Redacted]	
L3457 @ Edwardsville SIU	51.8	51.8	15.6	30.0%	51.7	99.9%	L1456 Cottage Hills to Stallings	
L3459 @ Wanda	51.8	57.1	31.9	61.5%	62.2	108.9%	[Redacted]	

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Line Terminal Loading Summary							
2016							
Line # and Substation	Line Terminal Capability		Maximum Line Terminal Flow (MVA)				
	Normal (MVA)	Emergency (MVA)	Normal		Worst Outage Case		
			Peak Load	Percent of Rated	Peak Load	Percent of Rated	Outage
L3308 @ Collinsville	94.8	122.7	24.1	25.4%	55.7	45.4%	Porter Rd 138/34 kV Trf
L3309 @ E Collinsville	68.7	69.1	9.2	13.4%	31.2	45.2%	L3314 @ E Collinsville
L3309 @ Collinsville	68.7	69.1	9.2	13.4%	31.2	45.2%	L3314 @ E Collinsville
L3310 @ Collinsville	51.8	57.1	10.6	20.4%	24.7	43.2%	Interstate 138/34 kV Transformer
L3313 @ Collinsville	51.8	57.1	16.1	31.2%	28.7	50.3%	L3308 Collinsville to Porter Rd
L3313 @ Stallings	51.8	57.1	28.0	54.1%	49.9	87.3%	Interstate 138/34 kV Transformer
L3314 @ E Collinsville	51.8	51.8	44.9	86.8%	54.8	105.7%	
L3331 @ Stallings	58.6	75.0	41.2	70.3%	42.3	56.4%	GC S Edwardsville #1 Cap Out
L3402 @ Collinsville	68.7	71.7	34.4	50.0%	53.0	73.9%	Interstate 138/34 kV Transformer
L3402 @ E Collinsville	68.7	71.7	34.4	50.0%	53.0	73.9%	Interstate 138/34 kV Transformer
L3425 @ Stallings	70.1	71.7	33.7	48.1%	71.5	99.7%	L1456 Cottage Hills to Stallings
L3425 @ Edwardsville SIU	51.8	57.1	31.7	61.2%	69.2	121.3%	
L3457 @ Edwardsville SIU	94.8	122.7	19.7	20.8%	56.6	46.1%	L1456 Cottage Hills to Stallings
L3459 @ Wanda	51.8	57.1	31.4	60.6%	68.2	119.4%	

Line Terminal Loading Summary							
2021							
Line # and Substation	Line Terminal Capability		Maximum Line Terminal Flow (MVA)				
	Normal (MVA)	Emergency (MVA)	Normal		Worst Outage Case		
			Peak Load	Percent of Rated	Peak Load	Percent of Rated	Outage
L3308 @ Collinsville	94.8	122.7	26.6	28.1%	61.6	50.2%	Porter Rd 138/34 kV Trf
L3309 @ E Collinsville	68.7	69.1	9.2	13.4%	33.9	49.1%	L3314 @ E Collinsville
L3309 @ Collinsville	68.7	69.1	9.2	13.4%	33.9	49.1%	L3314 @ E Collinsville
L3310 @ Collinsville	51.8	57.1	11.5	22.2%	26.1	45.8%	Interstate 138/34 kV Transformer
L3313 @ Collinsville	51.8	57.1	15.8	30.4%	31.1	54.5%	L3313 @ Stallings
L3313 @ Stallings	94.8	122.7	34.5	36.4%	58.3	47.5%	Interstate 138/34 kV Transformer
L3314 @ E Collinsville	51.8	51.8	49.3	95.1%	53.0	102.4%	
L3331 @ Stallings	58.6	75.0	46.3	79.0%	47.5	63.3%	GC S Edwardsville #1 Cap Out
L3402 @ Collinsville	68.7	71.7	37.2	54.2%	57.0	79.5%	Interstate 138/34 kV Transformer
L3402 @ E Collinsville	68.7	71.7	37.2	54.2%	57.0	79.5%	Interstate 138/34 kV Transformer
L3425 @ Stallings	70.1	71.7	29.9	42.6%	72.7	101.4%	
L3425 @ Edwardsville SIU	94.8	122.7	28.0	29.5%	70.7	57.6%	L3459 @ Wanda
L3457 @ Edwardsville SIU	94.8	122.7	15.6	16.5%	58.0	47.3%	L3459 @ Wanda
L3459 @ Wanda	94.8	122.7	41.5	43.8%	70.2	57.2%	L3425 Stallings to SIU

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D.3 Substation Transformer Fixed Tap Settings Summary

The transformers at distribution and company-owned substations were included in the system representation used in the load-flow calculations. This provided means for monitoring the voltages for compliance with the voltage criteria. When these criteria could not be met with the existing transformer tap setting, but could be met by changing the fixed tap setting, that change has been recommended.

The following table lists the changes to fixed tap settings used in this study. The data is based on records of actual tap settings. The table lists in-service and recommended new settings for the study period. Tap setting changes beyond that period will be recommended in subsequent system reviews.

The per unit tap setting is defined by the following formula.

$$\text{P.U. Tap Setting} = \frac{\text{System Nominal HV}}{\text{System Nominal LV}} \times \frac{\text{Trf LV Rating}}{\text{Trf HV Tap}}$$

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Transformer Fixed Tap Settings				
Distribution Substations				
Substation	Transformer Voltage (kV)	Tap In Service		
		No.	Voltage	Per Unit
Caseyville Bethel Mine Rd	34.4 - 13.2	2	35300	1.035
Caseyville Gardens #1	34.4 - 13.09	2	35300	1.026
Caseyville Gardens #2	34.4 - 13.09	2	35300	1.026
Cloverleaf #1	34.4 - 13.09	2	35300	1.026
Cloverleaf #2	34.4 - 4.36	2	35300	1.024
Collinsville #1	34.4 - 13.09	2	35300	1.026
Collinsville #2	34.4 - 4.36	2	35300	1.024
East St. Jacob	34.4 - 13.09	3	34400	1.053
Edwardsville Schwarz St.	34.4 - 13.09	2	35300	1.026
Edwardsville Second St. #2	34.4 - 13.09	2	35300	1.026
Edwardsville Second St. #3	34.4 - 13.09	2	35300	1.026
Exermont Bernice	34.4 - 4.36	3	34400	1.051
Fairmount	33.3 - 2.3	D	32173	1.028
Glen Carbon Main St	34.4 - 13.09	2	35300	1.026
Goethe #1	34.4 - 4.36	2	35300	1.024
Goethe #2	34.4 - 4.36	2	35300	1.024
Marine	34.4 - 13.09	3	34400	1.053
Reese Drive	34.4 - 13.09	3	34400	1.053
South Edwardsville #1	34.4 - 13.09	3	34400	1.053
South Edwardsville #2	34.4 - 13.09	3	34400	1.053
South Edwardsville #3	34.4 - 13.09	3	34400	1.053
Terrace	34.4 - 4.36	2	35300	1.024
Troy Industrial Park #1	34.4 - 13.09	2	35300	1.026
Troy Industrial Park #2	34.4 - 13.09	2	35300	1.026
Wanda	34.4 - 13.09	2	35300	1.026

Transformer Fixed Tap Settings				
Customer Substations				
Substation	Transformer Voltage (kV)	Tap In Service		
		No.	Voltage	Per Unit
Collinsville AT& T	34.4 - .48	2	35300	0.977
Collinsville Bridal Originals	34.4 - .48	2	35300	0.977
Collinsville Firement's Hall	34.4 - .48	2	35300	0.977
Collinsville Grandpa Pidgeons	34.4 - .48	3	34400	1.003
Collinsville High School	34.4 - .48	2	35300	0.977
Collinsville Sand Industrial	34.5 - .48	2	35300	0.977
Collinsville Sewage Treatment	34.4 - .48	3	34400	1.003
Edwardsville Hershey	34.5 - .48	*	*	*
Edwardsville Madison Jail	34.4 - .48	2	35300	0.977
Edwardsville SIU #1	34.4 - 13.09	2	35300	1.026
Edwardsville SIU #2	34.4 - 13.09	2	35300	1.026
Highland B-Line #1	34.4 - .48	*	*	*
Highland B-Line #2	34.4 - .48	*	*	*
Troy Triad High School	34.4 - 13.09	*	*	*

* modeled with load on the 34 kV system

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D.4 Contingency Outage Deck Summary

L1302 AMERN 138KV Dupo Ferry to Valmeyer Tap to Buck Knob	L6644 @ MIDWAY
L1322 Mt Vernon 42nd St to CIPS Ina	L6645 @ S. CENTRALIA
L1334 - CIPS Kinmundy to West Salem	L6647 @ S. CENTRALIA
L1336 West Mt Vernon to Mt Vernon 42nd Street	L6648 @ PINCKNEYVILLE
L1402 AMERN 138KV Cahokia to Dupo Ferry & Trf#1(close tie Bk	L6648 @ N. Nashville. Removes transf & leaves cap on line.
L1426 Stallings to E. Collinsville	L6649 @ S. CENTRALIA
L1432 Porter Rd to E Collinsv (Lose Highland Muni)	L6649 @ ASHLEY
L1434 Porter Rd to E Belv(& E Belv Trf #5)	L6651 @ SANDOVAL SW. STA.
L1436 N Stntn to Gllsp Tp to Wd Rvr	L6651 @ VANDALIA
L1446 N Staunton to Litchfield to Midway	L6651 NEAR SANDOVAL JCTN.
L1452 Woodriver to Madison Ind./Granite City Steel	L6658 @ MADISON INDUSTRIAL
L1452 Madison Ind. to Venice (AMERN)	L6659 @ MADISON INDUSTRIAL
L1456 Woodriver to Cottage Hills	L6662 @ ASHLEY
L1456 Cottage Hills to Stallings	L6662 @ ST. JOHNS
L1466 Midway to Schram City to N. Pana	L6668 @ ST. JOHNS
L1472 Turkey Hill to E Bellv (E Belv #1,close tie)	L6673 @ S. CENTRALIA (ATO S Pleasant St)
L1476 Tilden to N Colterville to Steeleville	L6674 @ W. SALEM
L1482 Turkey Hill to Aviston to Ashley (Lose lots of loads)	L6676 @ VANDALIA
L1486 Ashley to W Mt Vernon	L6676 @ BLUFF CITY
L1492 Cahokia to Turkey Hill to Centerville & Centerville Tr	L6682 @ AVISTON
L1502 - Woodriver to Roxford (UE)	L6682 @ SANDOVAL SW. STA.
L1502 & L1506 Woodriver to Roxford Operating Guide	1 Amern 138 kV Line - West MtVernon to West Salem
L1506 - Woodriver to Roxford (UE)	1 L1586 S BV to Cntrvll(Drop 17TH St, ATO 65th St, Close 44
L1526 S Bellv to DutchHill to Tilden to Baldwin	1 L3313 C'VILLE TO GOETHE ST. (RESERVE L3313BCD FROM L3313A)
L1532 Turkey Hill to S Belv & S Belv #3(close 34kV bus tie)	1 L3313 C'VILLE TO GOETHE ST. (RESERVE L3313BD FROM L3313C)
L1536 Ashley to West Frankfort	1 L3313 STALLINGS TO GOETHE ST. (RESERVE L3313A FROM L3313D)
L1542 Midway to S Centralia,	1 L3314 NEAR ST JACOB (MANUAL THRU 3348@HIGHLAND TO ST. JACO
L1546 West MtVernon to S Centralia	1 L3318 W.R. 6TH ST. TO WANDA (RESERVE L3318B)
L1586 S BV to Cntrvll(Drop 17TH St, ATO 65th St)	1 L3332 @ SPARTA - MANUAL THRU RUMA
L1626 Midway to North Coffeen	1 L3338 @ DUPO FERRY RD (MANUAL CLOSE A.B. 2533 TO L3341)
L1632 Baldwin Pwr Sta to Baldwin SIPCO	1 L3338 @ S. BELLEVILLE (MANUAL CLOSE A.B. 2520 TO DUPO FERR
L1636 Steeleville to Grand Tower	
L2303 Cahokia to N Colterville to Pinckneyville, Ameren 230	
L2303 Pinckneyville to St Johns to W Frankfurt, Ameren 230 k	

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L3305 @ LEBANON ROUTE 50	I L3341 @ DUPO FERRY RD (MANUAL CLOSE A.B. 2533 TO L3338)
L3305 @ E. BELLEVILLE	I L3348 @ MCCORD (MANUAL From 3366@ GREENVILLE)
L3305 LEBANON RT 50 TO E BELLEVILLE	I L3369 17TH ST. TO S. BELV. (ATO LINCOLN, LEBANON) Feed St.
L3307 @ 42ND ST.	I L3447 @ VANDALIA (MANUAL THRU RAMSEY)
L3307 @ GENERAL TIRE SW. STA.	I L3447 @ BROWNSTOWN (MANUAL THRU JOHN CRANE)
L3308 @ COLLINSVILLE	I L3452 @ S. BELLEVILLE (CLOSE thru New Athens ATO to DUTCH
L3308 @ PORTER RD	I L3454 @ LITCHFIELD (MANUAL THRU CARLINVILLE, MontCo 10.8 M
L3308 COLLINSVILLE TO PORTER RD (ATO CASEYVILLE GARDENS)	I L3456 @ SCHRAM CITY (MANUAL THRU RAMSEY)
L3309 E. COLLINSVILLE TO COLLINSVILLE	I L3458 @ N STAUNTON (Close 3457@Schwarz AB 2212)
L3311 @ PORTER ROAD	I L3460 @ SPARTA (MANUAL THRU RUMA)
L3311 @ 17TH ST.	I L3475 @ AMOCO (MANUAL CLOSE BKR AT AMOCO)
L3312 @ 17TH ST.	I L3475 W.R. TO AMOCO (ATO OLIN SUB #3, MANUAL CLOSE AMOCO T
L3312 @ CENTERVILLE	I L3478 @ SHILOH VALLEY (MANUAL CLOSE SWITCH 3327)
L3312 @ 74TH ST (ATO 74TH ST TO L3312D)	I L6632 @ VENICE (MANUAL THRU AIR PRODUCTS)
L3313 @ STALLINGS	TURKEY HILL 345/138 KV
L3313 @ COLLINSVILLE	E. BELLEVILLE #1 138/34 KV (AUTO CLOSE BUS TIE)
L3315 @ MACOUPIN ST.	E. BELLEVILLE #5 138/34 KV (AUTO CLOSE BUS TIE)
L3315 @ N. STAUNTON	PORTER RD. 138/34 KV
L3318 @ WANDA	S. BELLEVILLE #1 138/34 KV (AUTO CLOSE BUS TIE)
L3318 @ W.R. 6TH ST.	S. BELLEVILLE #3 138/34 KV (AUTO CLOSE BUS TIE)
L3320 @ W.R. 6TH ST.	17TH ST. #4 138/34 KV (AUTO CLOSE BUS TIE)
L3320 @ COTTAGE HILLS	17TH ST. #6 138/34 KV (AUTO CLOSE BUS TIE)
L3320 W.R. 6TH ST. TO COTTAGE HILLS (ATO BETHALTO)	CENTERVILLE 138/34 KV
L3321 @ W. MT. VERNON	DUPO FERRY RD. #1 138/34 KV (AUTO CLOSE BUS TIE)
L3321 @ 11TH ST.	DUPO FERRY RD. #2 138/34 KV (AUTO CLOSE BUS TIE)
L3322 @ 11TH ST.	VALMEYER 138/34 KV
L3322 @ GENERAL TIRE SW. STA.	DUTCH HILL 138/34 KV
L3324 @ STEELEVILLE - ATO CHESTER	AVISTON 138/69 KV
L3327 @ STALLINGS (ATO BLAST FURNACE)	HORNER PARK 69/34 KV
L3328 @ STALLINGS	STALLINGS #6 345/138 KV
L3328 @ G.C. 23RD ST.	STALLINGS #3 138/34 KV (AUTO CLOSE BUS TIE)
L3328 STALLINGS TO 23RD ST. (ATO PARKVIEW, MARYLAND & KATE)	STALLINGS #5 138/34 KV (AUTO CLOSE BUS TIE)
L3331 @ STALLINGS (ATO S. EDW.)	WOOD RIVER TT1 138/34 KV (AUTO CLOSE BUS TIE)
L3333 @ MIDWAY	WOOD RIVER TT2 138/34 KV (AUTO CLOSE BUS TIE)

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L3333 @ HILLSBORO	COTTAGE HILLS 138/34 KV
L3334 @ MCCORD	WANDA 138/34 KV
L3334 @ VANDALIA	23RD ST. 138/34 KV
L3335 @ MADISON STATE ST.	MADISON IND. #1 138/69 KV
L3335 @ G. C. 23RD ST.	MADISON IND. #2 138/69 KV
L3335 MADISON STATE ST TO SW 3234 (ATO 22ND ST)	VENICE 138/69 KV
L3335 23RD ST TO SW 3234 (ATO NAMEOKI)	MADISON STATE ST. 138/34 KV
L3337 @ E. BELLEVILLE	E. COLLINSVILLE #1 138/34 KV (AUTO CLOSE BUS TIE)
L3337 @ S.BELLEVILLE	E. COLLINSVILLE #2 138/34 KV (AUTO CLOSE BUS TIE)
L3338 @ VALMEYER 138 (To Waterloo Dist)	VENICE#2 34.5/13.8 KV (L3391)
L3340 @ MACOUPIN ST. (ATO CARLINVILLE)	VENICE#1 34.5/13.8 KV (L3392)
L3341 @ VALMEYER 138 (To Valmeyer Dist)	MACOUPIN ST 138/34KV(ADD 7.2CAPS @MONT Coal)
L3341 @ Dupo Ferry	N. STAUNTON #1 138/34KV (34.9MVA)
L3343 @ SPARTA	N. STAUNTON #3 138/34KV (33.8MVA)
L3343 @ STEELEVILLE	LITCHFIELD 138/34KV
L3348 @ MCCORD (ATO GREENVILLE)	MIDWAY #1 138/69KV
L3368 @ 17TH ST.	MIDWAY #3 138/34KV
L3368 @ S.BELLEVILLE	SCHRAM CITY 138/34KV
L3368 17TH ST. TO S. BELV. (ATO 8TH ST.)	MCCORD 138/34KV
L3369 @ 17TH ST.	VANDALIA 69/34KV
L3369 @ S. BELLEVILLE	BLUFF CITY#1 138/69KV
L3369 17TH ST. TO S. BELV. (ATO LINCOLN, LEBANON)	N. COFFEEN 345/138KV
L3391 @ VENICE	WEST MT. VERNON #4 345/138KV
L3391 @ MADISON ST	WEST MT. VERNON #1 138/34KV (25MVA)
L3391 @ MADISON STATE ST.	WEST MT. VERNON #3 138/34KV (28.7MVA)
L3391 MADISON ST TO VENICE (ATO ENG. DEPOT #1)	WEST MT. VERNON #5 138/34KV (54.8MVA)
L3392 @ MADISON STATE ST.	MT. VERNON 42ND ST.#1 138/34KV(DON'T CLOSE BUS TIE SW)
L3392 @ VENICE	MT. VERNON 42ND ST.#3 138/34KV(DON'T CLOSE BUS TIE SW)
L3392 @ MADISON ST	W. SALEM #1 138/69KV (DON'T CLOSE BUS TIE SWITCH)
L3392 MADISON ST TO VENICE (ATO MADISON, 4TH ST.)	W. SALEM #2 138/69KV (ATO SALEM, Texas)
L3402 E. COLLINSVILLE TO COLLINSVILLE	S. CENTRALIA #1 138/69KV (AUTO CLOSE TIE BREAKER)
L3421 @ MADISON STATE ST.	S. CENTRALIA #3 138/69KV (AUTO CLOSE TIE BREAKER)
L3421 @ G.C. 23RD ST.	N. NASHVILLE 138/69KV
L3421 MADISON ST. TO PONTOON RD (ATO 17TH ST.)	ASHLEY 138/69KV
L3421 G.C. 23RD ST. TO PONTOON RD (ATO PARKVIEW)	SPARTA 138/34KV

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L3425 STALLINGS TO SIU	STEELEVILLE #3 138/34KV
L3448 @ DUTCH HILL	STEELEVILLE #4 138/34KV
L3448 @ TILDEN	STEELEVILLE 34/69KV STEP-UP
L3452 @ DUTCH HILL (ATO New Athens to S. BELV.)	TILDEN 138/34KV
L3453 @ LITCHFIELD	BALDWIN 345/138KV
L3453 @ HILLSBORO	St. JOHNS 230/69
L3455 @ LITCHFIELD	N.COULTERVILLE 230/138KV Tr#1
L3455 @ MACOUPIN ST.	BROWNSTOWN 69/34KV (MANUAL THRU CRANE)
L3455 @ MACOUPIN ST. (ATO OAK ST.)	MT. VERNON 42ND ST.#1 138/34KV(MANUAL CLOSE BUS TIE SW)
L3457 @ SIU	MT. VERNON 42ND ST.#3 138/34KV(MANUAL CLOSE BUS TIE SW)
L3459 @ WANDA	W. SALEM #1 138/69KV (MANUAL CLOSE TIE SWITCH)
L3459 EDW. 2ND ST. TO WANDA (ATO SCHWARZ ST.)	BRIGHTON 12.470 SW CAP OUT
L3463 @ W. MT. VERNON	SCHRAM 34.500 SW CAP OUT
L3463 @ 11TH ST.	MACOUPIN 34.500 SW CAP OUT
L3464 @ DUPO FERRY RD.	FLMR CAP 34.500 SW CAP OUT
L3464 @ CENTERVILLE	CARLINVL 34.500 SW CAP OUT
L3465 - 11TH ST. TO 42ND ST.	BUNKER 34.500 SW CAP OUT
L3466 @ MIDWAY	PATOKATP 69.000 SW CAP OUT
L3466 @ MCCORD	VANDALIA 34.5 CAP OUT
L3467 @ TILDEN	N VAND#1 12.5 CAP OUT
L3467 @ SPARTA	VAND 3 12.5 CAP OUT
L3470 @ 17TH ST.	MORRISON 34.5 CAP OUT
L3470 @ E. BELLEVILLE	MONTCOAL 34.5 CAP OUT
L3470 E BELLEVILLE TO 17TH ST (ATO C ST, Mariknoll)	RAMSEY 34.5 CAP OUT
L3471 @ COTTAGE HILLS	PIERRON 34.5 CAP OUT
L3471 @ WOOD RIVER	BRIGHTON 34.5 CAP OUT
L3471 W.R. TO COTTAGE HILLS (ATO ROSEWOOD HEIGHTS & OLIN)	BUNK HL 12.5 CAP OUT
L3472 @ WOOD RIVER (ATO OLIN LOADS)	VAND 2 4.2 CAP OUT
L3473 @ WOOD RIVER	TEXACO 2.4 CAP OUT
L3473 @ W.R. 6TH ST.	MADSTATE 34.5 CAP OUT
L3473 W.R. TO 6TH ST. (ATO BELL ST. & PICKER ST.)	BETHALTO 34.5 CAP OUT
L3474 @ WOOD RIVER	ECOLL #1 34.5 CAP OUT
L3474 W.R. TO AMOCO (ATO W.R. BEN BOW)	6TH ST 34.5 CAP OUT
L3475 @ WOOD RIVER	SIU 34.5 CAP OUT
L3476 - SCHRAM CITY TO HILLSBORO	

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L3477 @ E. BELLEVILLE (ATO SHILOH VALLEY)	TROY 34.5 CAP OUT
L3480 @ HORNER PARK	ECOLL #2 34.5 CAP OUT
L3480 @ LEBANON ROUTE 50	SCHWARZ 34.5 CAP OUT
L3481 @ LEBANON ROUTE 50	COLLV S 34.5 CAP OUT
L3481 (ATO 7 Hills)	23RD ST 34.5 CAP OUT
L3481 @ PORTER ROAD (OFallon remains on 3481)	GC 17TH 34.5 CAP OUT
L4511 Baldwin to Cahokia & Cahokia 345/138 kV Trf	MARINE 34.5 CAP OUT
L4521 Baldwin to Turkey Hill & Trf #1	22ND ST 34.5 CAP OUT
L4531 Baldwin to Stallings & Trf#6	PONTOON 34.5 CAP OUT
L4541 Baldwin to W MtVernon & Trf#4	S ED #1 12.5 CAP OUT
L4551 Roxford to Coffeen (UE)	E ST JCB 34.5 CAP OUT
L4561 Mt Vernon to E West Frankfort	1CLINTON G1 22.000 (1097MW)
L4565 E West Frankfort to Shawnee	1WOOD RIV G3 13.800 (41MW)
L4581 Roxford(UE)to Stallings	1BALDWIN G2 18.000 (626MW)
L4591 Mt Vernon to Xenia	1BALDWIN G1 20.000 (626MW)
L6631 @ G.C. SUB #1	1WOOD RIV G2 13.800 (41MW)
L6631 @ VENICE	1WOOD RIV G5 H&L 20.000 (192MW + 186MW)
L6632 @ G.C. SUB #1 (ATO AIR PRODUCTS)	1BALDWIN G3 24.000 (622MW)
L6633 @ LEBANON HRNR PARK	1WOOD RIV G4 13.800 (93MW)
L6634 @ AVISTON	1WOOD RIV G1 13.800 (41MW)
L6635 @ SANDOVAL SW. STA.	1COFFEN 2 24.000 (590MW)
L6635 @ S. CENTRALIA	1VENICE3 15.000 (165MW)
L6636 @ ASHLEY	1COFFEN 1 22.000 (360MW)
L6636 @ PINCKNEYVILLE	1VENICE5 13.800 (116MW)
L6638 @ PINCKNEYVILLE	1VENICE4 15.000 (165MW)
L6639 @ DUQUOIN	1PICKVL 1 13.800 (44MW)
L6639 @ PINCKNEYVILLE	1PICKVL 4 13.800 (44MW)
L6639 @ ST. JOHNS	1PICKVL 2 13.800 (44MW)
L6640 @ W. SALEM - ATO SALEM, TEXAS	1PICKVL 3 13.800 (44MW)
L6644 @ VANDALIA	Plan B Auto Interstate Trf
	Plan B Auto MCCORD 138/34KV
	Plan B L3310 @ COLLINSVILLE
	Plan B L3314 @ E. COLLINSVILLE (ATO Troy Ind)
	BASE CASE

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Planning Criteria

E.1 Subtransmission Voltage Criteria

The planning criteria for Ameren Illinois require that the voltage limits at the low voltage bus of distribution and customer substations and at customer delivery points be maintained as follows:

Location	Per Unit of Nominal Voltage	
	Minimum	Maximum
Distribution Sub w/ LTC or 10% bus regulation	1.035	1.05
Distribution Sub w/ 10% feeder regulation	.96	1.08
Distribution Sub w/ no feeder regulation	1.035	1.06
Customer Sub > 120 volts	.90	1.08
Customers taking delivery at 138 kV, 69 kV or 34 kV	.90	1.08
Customers taking service at 120 volts	.94	1.06

E.2 Subtransmission Contingency Outage Planning Criteria.

Criteria	Description
Reliability	1) Supply peak load under the following conditions and applicable thermal and voltage limits: <ul style="list-style-type: none"> a) Normal system (no element out of service) - normal limits b) Loss of a single subtransmission or transmission component, 1st contingency outage - emergency limits (Single components shall include single line, <u>bulk</u> transformer, transmission transformer, generating unit, or single element without fault. Single element without fault shall include breaker and capacitor bank. Bus outage not included.) Exception for load presently supplied by a radial line with no alternate supply available.

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Cost Analysis

F.1 Cost Comparison of Plans

The following table is a cost comparison of the plans and their projects that was used for this study. The projects and their estimated cost in 2011 dollars are listed in the first two columns. Inflation factors for years 2012 through 2020 are used to calculate both yearly cash flow and an equivalent investment dollar amount for each of the plans.

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Project	Cost (2011 \$'s)	Year	Plan A	Year	Plan B	Year	Plan C	Year	Plan D	Year	Plan E
Close NO switch between Troy Triad HS and E St Jacob	\$0	2012	x	2012	x	2012	x	2012	x	2012	x
Add 10.8 MVAR capacitor bank at Goethe St Substation	\$450,000	2012	x	2012	x	2012	o	2012	x	2012	x
L3314j - Reconductor 5.3 mi of 4/0 ACSR with 556 AAC	\$2,999,800	2012	x	2012	o	2013	x	2012	o	2012	x
L3331a - Reconductor 3.3 mi of 477 AAC & ACSR with 954 ACSR	\$1,300,200	2012	x	2012	x	2013	x	2012	x	2012	x
L3425b - Reconductor 4.4 mi of 795 AAC with 954 ACSR T2	\$1,733,600	2012	x	2012	x	2016	x	2012	o	2012	x
L3459a - Reconductor 4.56 mi of 795 AAC with 954 ACSR T2 + terminal	\$2,046,640	2012	x	2012	x	2017	x	2012	o	2012	x
Upgrade capacitor bank at Schwartz St to 10.8 MVAR	\$250,000	2012	x	2012	x	2013	x	2012	o	2012	x
L3310a - Reconductor 1.0 mi of 795 AAC with 954 ACSR T2 + terminal	\$644,000	2012	x	2012	o	2012	o	2012	x	2012	o
L3310b - Reconductor 1.98 mi of 795 AAC with 954 ACSR T2	\$780,120	2012	x	2012	o	2012	o	2012	x	2012	o
L3313a - Reconductor 2.69 mi of 795 AAC with 954 ACSR T2	\$1,059,860	2012	x	2012	o	2020	x	2012	x	2012	x
L3313e - Reconductor .99 mi of 795 AAC with 954 ACSR T2	\$390,060	2012	x	2012	o	2012	o	2012	x	2012	x
L3313f - Reconductor 1.16 mi of 795 AAC with 954 ACSR T2 + terminal	\$707,040	2012	x	2012	o	2012	o	2012	x	2012	x
L3314a - Reconductor 4.06 mi of 795 AAC with 954 ACSR T2 + terminal	\$1,849,640	2012	x	2012	o	2012	o	2012	x	2012	o
L3308c - Reconductor .4 mi of 2-2/0 Cu with 954 ACSR T2	\$157,600	2013	x	2013	x	2013	x	2013	x	2013	x
New 34 kV line out of East Collinsville to Troy / Cloverleaf (7 mi of 954 ACSR)	\$2,681,000		o		o		o		o	2013	x
New 34 kV breaker terminal at East Collinsville	\$500,000		o		o		o		o	2013	x
Install new 138 kV ring bus	\$4,200,000		o	2014	x	2014	x	2014	x		o
Install new 138/34 kV substation at Troy / Cloverleaf	\$3,623,000		o	2014	x	2014	x		o		o
Build new 138kv Line from new breaker station to new substation	\$9,840,000		o		o		o	2014	x		o
New 138/34 kV bulk substation at Edwardsville REA	\$3,623,000		o		o		o	2014	x		o
Add 34 kV lines from New Edwardsville bulk to S Edwardsville	\$2,154,000		o		o		o	2014	x		o
Add new 34 kV line from Interstate Sub and Line 3313	\$1,507,800		o	2015	x	2015	x		o		o
L3308c - Reconductor 2.4 mi of 795 AAC with 954 ACSR T2	\$945,600	2018	x	2015	x	2015	x	2018	x	2018	x
L3457a - Reconductor 1.0 mi of 795 AAC with 954 ACSR T2	\$394,000	2015	x	2015	x	2015	x		o	2015	x
L3313d - Reconductor .7 mi of 2-2/0 Cu with 954 ACSR	\$275,800	2015	x	2015	o	2015	o	2015	x	2014	x
Upgrade Wanda Transformer to 112 MVA	\$1,500,000	2017	x	2013	x	2017	x		o	2017	x
Add 14.4 MVAR capacitor bank at Second St Substation	\$550,000		o	2017	x	2017	x		o	2017	x
Add 14.4 MVAR capacitor bank at Cloverleaf	\$550,000	2013	x	2013	o		o	2017	x		o
L3402 - Reconductor 2.3 mi of 1272 ACSR with 954 ACSR T2 + terminal	\$1,406,200	2017	x	2017	o		o	2019	x	2017	x
L3313d - Reconductor 1.25 mi of 795 AAC with 954 ACSR T2	\$492,500	2019	x	2019	o		o		o	2019	x
Upgrade E Collinsville Trf #1 to 112 MVA	\$1,500,000	2020	x	2020	o		o		o	2020	x
L3457h - Reconductor .5 mi of 795 AAC with 954 ACSR T2	\$197,000		o		o		o	2020	x		o
L3314o - Reconductor 2.2 mi of 795 AAC with 954 ACSR T2	\$866,800	2012	x	2012	o		o		o		o
Upgrade capacitor bank at Troy Industrial Park	\$250,000	2014	x	2014	o		o		o		o
Upgrade capacitor bank at Goethe St Substation	\$250,000	2018	x	2018	o		o		o		o
Upgrade capacitor bank at SIU to 14.4 MVAR	\$250,000	2018	x	2018	o		o		o		o
Add 14.4 MVAR capacitor bank at Stallings #3	\$550,000	2018	x	2018	o		o		o		o
Add 14.4 MVAR capacitor bank at Stallings #5	\$550,000	2018	x	2018	o		o		o		o
L3313b - Reconductor .3 mi of 795 AAC with 954 ACSR T2	\$118,200	2020	x	2020	o		o		o		o
L3313c - Reconductor 2 mi of 795 AAC with 954 ACSR T2	\$788,000	2020	x	2020	o		o		o		o
Build a new line to Edwardsville REA from Wanda with 556 AAC	\$3,769,500		o	2013	x		o		o		o
Add a second Transformer at Wanda	\$2,000,000		o	2017	x		o		o		o
Inflation factor		2011 \$'s	Inflation \$'s	2011 \$'s	Inflation \$'s	2011 \$'s	Inflation \$'s	2011 \$'s	Inflation \$'s	2011 \$'s	Inflation \$'s
1.02500	2012	\$15,077,760	\$15,454,704	\$5,780,440	\$5,924,951	\$0	\$0	\$7,180,920	\$7,360,443	\$10,937,200	\$11,210,630
1.05063	2013	\$707,600	\$743,426	\$5,427,100	\$5,701,874	\$4,707,600	\$4,945,946	\$157,600	\$165,579	\$3,338,600	\$3,507,633
1.07689	2014	\$250,000	\$269,223	\$7,823,000	\$8,424,510	\$7,823,000	\$8,424,510	\$19,817,000	\$21,340,729	\$275,800	\$297,006
1.10381	2015	\$669,800	\$739,332	\$2,847,400	\$3,142,989	\$2,847,400	\$3,142,989	\$275,800	\$304,431	\$394,000	\$434,901
1.13141	2016	\$0	\$0	\$0	\$0	\$1,733,600	\$1,961,412	\$0	\$0	\$0	\$0
1.15969	2017	\$2,906,200	\$3,370,291	\$2,550,000	\$2,957,210	\$4,096,640	\$4,750,832	\$550,000	\$637,830	\$3,456,200	\$4,008,121
1.18869	2018	\$2,545,600	\$3,025,929	\$0	\$0	\$0	\$0	\$945,600	\$1,124,025	\$945,600	\$1,124,025
1.2184	2019	\$492,500	\$600,062	\$0	\$0	\$0	\$0	\$1,406,200	\$1,713,314	\$492,500	\$600,062
1.24886	2020	\$2,406,200	\$3,005,007	\$0	\$0	\$1,059,860	\$1,323,617	\$197,000	\$246,025	\$1,500,000	\$1,873,290
Ameren Total Cost 2011 \$'s			\$25,055,660	\$24,427,940	\$22,268,100	\$30,530,120	\$21,339,900				
PWFRR 2011 to Perpetuity			\$30,538,868	\$30,325,692	\$25,615,730	\$37,345,108	\$26,249,175				
Equivalent Investment			\$20,596,832	\$20,453,056	\$17,276,439	\$25,187,277	\$17,703,664				
x	Project needs to be performed (under both old and new criteria)										
x	Project is within old criteria in 2016 (outside of new criteria prior to 2016) and can be delayed until 2016+ (until it breaks new criteria)										
o	Project is within new criteria in 2016 -2021 (outside of new criteria prior to 2016) and does not need to be performed										
o	Not required for this plan										