

## APPENDIX III: PROJECTED TRANSMISSION AND TRANSFORMERS TABLES

### TRANSMISSION

The transmission lines below represent all transmission projects greater than 200kV expected to be in-service by year-end 2019. Lines lengths are in terms of net change. Refurbishment and upgrading projects will usually result in a zero line length. A comprehensive list, including detailed information about each project, will be published in the 2010 NERC Electricity Supply and Demand Database (ES&D).

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
<b>FRCC</b>						
Levy - Central FL South	Levy	50	400-599	AC	2870	2017
Levy - Crystal River	Levy	10	400-599	AC	2870	2017
Levy - Citrus #1	Levy	10	400-599	AC	2870	2017
Levy - Citrus #2	Levy	10	400-599	AC	2870	2017
Manatee - Bob White	Manatee	30	200-299	AC	1190	2012
Greenland Energy Center - Nocatee	Greenland Energy Center	4.4	200-299	AC	668	2013
Stanton - Bithlo	Stanton	7	200-299	AC	800	2010
Kathleen - Lake Tarpon	Kathleen	45	200-299	AC	1195	2017
Crystal River - Brookridge	Crystal River	35	200-299	AC	1195	2017
Intercession City - West Lake Wales #2	Intercession City	30	200-299	AC	1195	2010
Hines Energy Complex - West Lake Wales #2	Hines Energy Complex	21	200-299	AC	925	2011
Avalon - Gifford	Avalon	8	200-299	AC	1195	2010
Bithlo - Stanton (OUC)	Bithlo	6	200-299	AC	1141	2010
230 Loop Phase II	Sub 5 230	12.8	200-299	AC	458	2016
Hopkins-Crawfordville 230 Tap - Sub 5 230	Hopkins-Crawfordville 230 Tap	8	200-299	AC	458	2011
Polk - FishHawk	Polk	30.5	200-299	AC	1013	2019
Big Bend - State Road 60	Big Bend	13.8	200-299	AC	749	2011
Polk - Pebbledale (1)	Polk	13.5	200-299	AC	749	2019
Polk - Pebbledale (2)	Polk	9.9	200-299	AC	1013	2019

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Bayside Power Station - Bayside (Future CT 5)	Bayside Power Station	0.7	200-299	AC	749	2014
Bayside Power Station - Bayside (Future CT 6)	Bayside Power Station	0.7	200-299	AC	749	2016
Big Bend Station - Big Bend (Future CT 4)	Big Bend Station	0.7	200-299	AC	749	2013
Big Bend (SS) - Big Bend (CT 5, 6, 7)	Big Bend (SS)	0.1	200-299	AC	478	2013
Brookridge - Brooksville West	Brookridge	0	200-299	AC	1195	2017
Intercession City - West Lake Wales #1	Intercession City	0	200-299	AC	1195	2010
St. Johns - Pringle	St. Johns	0	200-299	AC	759	2013
<b>MRO</b>						
St Joseph Wind	Letellier	4.8	200-299	AC	514.6	2011
Wuskwatim S.S.	Herblet Lake	85.2	200-299	AC	564.5	2011
Wuskwatim S.S.	Herblet Lake	85.2	200-299	AC	564.5	2011
Wuskwatim G.S.	Wuskwatim S.S.	0.7	200-299	AC	564.5	2011
Wuskwatim G.S.	Wuskwatim S.S.	0.7	200-299	AC	564.5	2011
Wuskwatim G.S.	Wuskwatim S.S.	0.7	200-299	AC	564.5	2011
Herblet Lake	Rall's Island	102.5	200-299	AC	564.5	2011
St Vital	Letellier	77.7	200-299	AC	564.5	2012
D54C tap	Neepawa 230/66 station	1	200-299	AC	564.5	2012
R32V tap	Transcona	1	200-299	AC	658.1	2013
R33V tap	Transcona	1	200-299	AC	658.1	2013
Henday	Conawapa Constr Power	18.2	200-299	AC	768.8	2013
LaVerendrye	St Vital	21.1	200-299	AC	658.1	2014
Dorsey	Portage	43.5	200-299	AC	564.5	2014
Conawapa	Riel	833.3	400-599	DC	2000	2017
Conawapa	Henday	18.2	200-299	AC	768.8	2017
Conawapa	Henday	18.2	200-299	AC	768.8	2017
Conawapa	Henday	18.2	200-299	AC	768.8	2017
Conawapa	Long Spruce	34.7	200-299	AC	1029.2	2017
Dorsey	Maple River	80	400-599	AC	3746.4	2018

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Dorsey	Riel	30.9	400-599	AC	3746.4	2019
Poplar River Switching Station	Pasqua Switching Station	100	200-299	AC	765	2010
Regina Switching Station	Pasqua Switching Station	40	200-299	AC	765	2013
Peebles Switching Station	Tantallon Switching Station	84	200-299	AC	765	2013
QE East Switching Station	Wolverine Switching Station	65	200-299	AC	765	2013
Beatty Switching Station	Wolverine Switching Station	96	200-299	AC	765	2013
ROCKDALE	CARDINAL	32.14	300-399	AC	1463	2013
SPRING GREEN	CARDINAL	28	300-399	AC	2110	2017
NORTH LACROSSE	SPRING GREEN	130	300-399	AC	2110	2017
BAIN	ZION ENERGY CENTER	6	300-399	AC	1096	2019
ROCKDALE	CONCORD	29.75	300-399	AC	815	2019
CONCORD	BARK RIVER	19	300-399	AC	815	2019
BARK RIVER	MILL RD	10.8	300-399	AC	815	2019
Belfield (BN)	Rhame, ND (New)	74	200-299	AC	Unknown	2010
Dalbo	Milaca	24.5	200-299	AC	513	2020
Dalbo	Rush City	31.35	200-299	AC	513	2020
Salem	Hazleton	27	300-399	AC	1195	2012
Salem	Hazleton	54	300-399	AC	1195	2012
Raun	Sioux City	23	300-399	AC	1195	2014
Wilton	Cass Lake	19	200-299	AC	465	2011
Cass Lake	Boswell	50	200-299	AC	465	2011
Bison	Square Butte	22.2	200-299	AC	629	2010
Boswell	Essar Mine Substation	10	200-299	AC	423	2012
Essar Mine Substation	Essar Steel Substation	2	200-299	AC	632	2011
Essar Steel Substation	Shannon	8	200-299	AC	423	2013
Essar Steel Substation	Blackberry	18	200-299	AC	470	2011
Axtell	Post Rock	125	300-399	AC	1792	2013
Brookings County Sub	Lyon County Sub	58	300-399	AC	Unknown	2015
Lyon County Sub	Cedar Mountain Sub	52	300-399	AC	Unknown	2015

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year	
Cedar Mountain Sub	Helena Switch Station	62	300-399	AC	Unknown	2015	
Helena Switch Station	Lake Marion	28	300-399	AC	Unknown	2015	
Lake Marion	Hampton Corners	19	300-399	AC	Unknown	2015	
Lyon County Sub	Hazel Creek Sub	25	300-399	AC	Unknown	2015	
Hazel Creek Sub	MN Valley Sub	5	300-399	AC	Unknown	2015	
Bison 345 kV Sub	Alexandria Switch Station	150	300-399	AC	Unknown	2015	
Alexandria Switch Station	Quarry (St. Cloud) Sub	90	300-399	AC	Unknown	2015	
Quarry (St. Cloud) Sub	Monticello 345 kV Sub	40	300-399	AC	Unknown	2015	
Big Bend	Lower Brule	4.1	200-299	AC	Unknown	2014	
Fort Thompson	Lower Brule	4.1	200-299	AC	Unknown	2014	
<b>NPCC</b>							
<b>New England</b>	Vernon S/S	Newfane S/S	18	300-399	AC	1275	2011
	Newfane S/S	Coolidge S/S	35	300-399	AC	1275	2011
	West Farnum S/S	CT/RI Border	17.7	300-399	AC	2172	2014
	Millbury S/S	West Farnum S/S	20.7	300-399	AC	2172	2014
	Kent County S/S	West Farnum S/S	0.1	300-399	AC	1353	2012
	Berry St. S/S	303 Taps	21.4	300-399	AC	1545	2012
	Card S/S	Lake Road S/S	29.3	300-399	AC	2420	2014
	Lake Road S/S	CT/RI Border	7.6	300-399	AC	2420	2014
	Frost Bridge S/S	North Bloomfield S/S	35.4	300-399	AC	2420	2014
	North Bloomfield S/S	CT/MA Border	11.9	300-399	AC	2420	2014
	Agawam S/S	CT/MA Border	6	300-399	AC	2420	2014
	Agawam S/S	Ludlow S/S	16.8	300-399	AC	2420	2014
	Orrington S/S	Albion Road S/S	59	300-399	AC	2151	2013
	Albion Road S/S	Coopers Mills S/S	21	300-399	AC	2151	2013
	Larrabee Road S/S	Coopers Mills S/S	34.3	300-399	AC	2151	2013
Larrabee Road S/S	Surowiec S/S	17	300-399	AC	2151	2013	

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
	Surowiec S/S	Raven Farm S/S	12.4	300-399	AC	2151	2013
	Maguire Road S/S	South Gorham S/S	21	300-399	AC	2151	2013
	Maguire Road S/S	Three Rivers Switchyard	19.2	300-399	AC	2151	2013
	Granite S/S	Middlesex S/S	16	200-299	AC	496	2015
NY	Farragut	East 13th Street	1.98	300-399	AC	Unknown	2010
	Farragut	East 13th Street	1.98	300-399	AC	Unknown	2010
Ontario	Ingersoll TS	Kam TS	15	200-299	AC	964	2011
	Allanburg TS	Middleport TS	93	200-299	AC	964	Unknown
	Bruce Complex	Milton TS	218	400-599	AC	5656	2011
	Nipigon	Wawa TS	82	200-299	AC	Unknown	2015
	London	Sarnia	43.5	400-599	AC	Unknown	2016
Québec	Chénier	Outaouais	142	300-399	AC	4464	2010
	Jacques-Cartier tap	Anne-Hébert	8.2	300-399	AC	Unknown	2010
	Les Méchins	Les Méchins tap	2.5	200-299	AC	Unknown	2010
	La Sarcelle	Eastmain 1	62.8	300-399	AC	Unknown	2011
	Goemon	Gros-Morne	66	200-299	AC	Unknown	2011
	Des Moulins	Des Moulins tap	1.9	200-299	AC	Unknown	2011
	Unknown	Unknown	0.1	300-399	AC	Unknown	2012
	Francheville	Francheville tap	0.7	200-299	AC	Unknown	2012
	Lac-Alfred	Lac-Alfred tap	30	300-399	AC	Unknown	2013
	Seigneurie-de-Beaupré	Seigneurie-de-Beaupré tap	14.3	300-399	AC	Unknown	2013
	Rive-Sud	Boucherville	0	300-399	AC	Unknown	2013
	Charlesbourg	Laurentides	3.7	200-299	AC	Unknown	2013
	Blainville	Chomedey tap	6.2	300-399	AC	Unknown	2013
	Viau	Duvernay tap	5	300-399	AC	Unknown	2013
	Chaudière	St-Agapit	11.7	300-399	AC	Unknown	2013
	Lanaudière	Mauricie tap	3.1	300-399	AC	Unknown	2014
	Dufournel	Dufournel tap	2.5	300-399	AC	Unknown	2014
Rivière-du-Moulin	Rivière-du-Moulin tap	15.5	300-399	AC	Unknown	2014	

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Alcoa Deschambault	Alcoa Deschambault tap	14.9	300-399	AC	Unknown	2015
Clermont	Clermont tap	6.2	300-399	AC	Unknown	2015
De Lorimier	Viger	7.5	300-399	AC	Unknown	2015
Fleury	Fleury tap	7.5	300-399	AC	Unknown	2015
Vimont	Vimont tap	0.4	300-399	AC	Unknown	2017
Chamouchouane	Bout-de-l'Ile	230	600+	AC	Unknown	2015
New Richmond	Matapédia tap	9	200-299	AC	Unknown	2012
<b>RFC</b>						
Crescent	Brunot Island	17.1	300-399	AC	1244/1411	2010
Brunot Island	Arsenal	6.4	300-399	AC	Unknown	2010
Collier	Brunot Island	7.33	300-399	AC	1244/1411	2010
Burtonsville	Sandy Spring	12	200-299	AC	Unknown	2010
Delta (IPP P04)	Peach Bottom	4	400-599	AC	2338	2010
Prexy	502 Junction	20	400-599	AC	Unknown	2010
Nottingham/PB	Cooper	-0.05	200-299	AC	528	2010
Cooper	Graceton	-0.05	200-299	AC	379	2010
Gibson	Brown	37	300-399	AC	1400	2010
Arsenal	Logans Ferry	12	300-399	AC	Unknown	2011
Island Road	Penrose	0.1	200-299	AC	1207	2011
Penrose	Grays Ferry	0.1	200-299	AC	1207	2011
Grays Ferry	Peltz	0.06	200-299	AC	1088	2011
Grays Ferry/Penrose	Peltz	0.1	200-299	AC	1207	2011
Whitpain	Center Point	0	400-599	AC	2338	2011
Center Point	Elroy	0	400-599	AC	2338	2011
Upper Providence/Perkiomen	Center Point	-0.05	200-299	AC	1245	2011
Center Point	North Wales	-0.05	200-299	AC	1245	2011
Glade	Forest	1.72	200-299	AC	Unknown	2011
Athenia	Bergen	9.7	200-299	AC	Unknown	2011

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Roseland	Kearny	22	200-299	AC	Unknown	2011
Meadowbrook	Loudoun	26	400-599	AC	Unknown	2011
Mt. Storm	502 Junction	60	400-599	AC	Unknown	2011
Mt. Storm	Meadowbrook	59.28	400-599	AC	Unknown	2011
Orchard	Cumberland	2	200-299	AC	Unknown	2011
Piney Grove	Mt. Olive	6	200-299	AC	Unknown	2012
Monocacy	Catoctin	20.6	200-299	AC	Unknown	2012
Ringgold	Catoctin	9.8	200-299	AC	Unknown	2012
Cranberry	Cabot	0.1	400-599	AC	2800/3600	2012
Cranberry	Wylie Ridge	0.1	400-599	AC	2800/3600	2012
G689	Sammis	7.25	300-399	AC	1559/1899	2012
G689	Highland	44.8	300-399	AC	1559/1899	2012
Keystone	Jacks Mountain	85.52	400-599	AC	Unknown	2012
Jacks Mountain	Juniata	32.82	400-599	AC	Unknown	2012
Conemaugh	Jacks Mountain	89.48	400-599	AC	Unknown	2012
Richie	Benning	2	200-299	AC	Unknown	2012
Susquehanna	Roseland	146	400-599	AC	Unknown	2012
Hudson	South Waterfront	3.5	200-299	AC	514	2012
Hudson	Essex	6.3	200-299	AC	Unknown	2012
Montville	Jefferson	15.1	400-599	AC	3005	2012
Jefferson	Bushkill	22.3	400-599	AC	3005	2012
Reid	Brown	24.5	300-399	AC	1400	2012
Calvert Cliffs	Vienna	35	400-599	AC	1828	2012
Vienna	Indian River	35.1	400-599	AC	1828	2012
Brunner Island	West Shore	16	200-299	AC	653	2013
Carroll	Catoctin	12.7	200-299	AC	Unknown	2013
Chalk Point	Calvert Cliffs	18.4	400-599	AC	Unknown	2013
Brady	Carson	1.5	300-399	AC	Unknown	2013
Brunot Island	Brady	5	300-399	AC	Unknown	2013

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Vienna	Loretto	16	200-299	AC	Unknown	2013
Loretto	Piney Grove	6	200-299	AC	Unknown	2013
Chamberlin	Hanna	26	300-399	AC	1380/1646	2013
Hanna	Mansfield	52	300-399	AC	1380/1646	2013
Bradford/Clay Tap	Clay	6.95	200-299	AC	166	2013
Colora/Clay Tap	Clay	0	200-299	AC	166	2013
Calvert Cliffs	Salem	45	400-599	AC	Unknown	2013
Possum Point	Calvert Cliffs	24	400-599	AC	Unknown	2013
Roseland	Hudson	20	400-599	AC	3005	2013
Bergen	Marion	10.2	200-299	AC	Unknown	2013
Branchburg	Roseland	29.9	400-599	AC	Unknown	2013
Sewaren	Woodbridge	3.4	200-299	AC	Unknown	2013
Don Marquis	North Fork	0	300-399	AC	1219	2014
North Fork	Bixby	0	300-399	AC	1235	2014
Elko	Carbon Center Jct	5.79	200-299	AC	Unknown	2014
Bear Run	Carbon Center Jct	4	200-299	AC	Unknown	2014
Carbon Center	Carbon Center Jct	0.1	200-299	AC	Unknown	2014
Conastone	Graceton	8.6	200-299	AC	Unknown	2014
Graceton	Bagley	13.8	200-299	AC	Unknown	2014
Raphael Road	Bagley	5.9	200-299	AC	Unknown	2014
Vienna	Steele	28	200-299	AC	Unknown	2014
Amos	Welton Spring	175	600+	AC	6500	2014
Welton Spring	Kempton	100	600+	AC	6500	2014
West Orange	Roseland	4.5	200-299	AC	Unknown	2014
West Orange	Roseland	4.5	200-299	AC	Unknown	2014
Roseland	Sewaren	29.8	200-299	AC	Unknown	2014
Camden	Burlington	13.7	200-299	AC	Unknown	2014
Camden	Cuthbert Blvd.	4.5	200-299	AC	Unknown	2014

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year	
Jenkins	Stanton	8.55	200-299	AC	653	2014	
Indian River	Salem	80	400-599	AC	1828	2014	
Vienna	Sharptown	12	200-299	AC	Unknown	2015	
Calvert Cliffs	Calvert Cliffs (new)	1	400-599	AC	Unknown	2015	
Allen Junction	Fulton	14.63	300-399	AC	1370/1646	2017	
Fulton	Midway	24.28	300-399	AC	1370/1646	2017	
Beaver	Hayes	32.9	300-399	AC	1542/1878	2018	
Davis Besse	Hayes	32	300-399	AC	1542/1878	2018	
Byron Station 6	Wayne TSS144	0	300-399	AC	Unknown	2019	
Byron Station 6	Wayne TSS144	0	300-399	AC	Unknown	2019	
Byron Station 6	Nelson TSS155	0	300-399	AC	Unknown	2019	
Kewanee	Nelson TSS155	51	300-399	AC	Unknown	2019	
Kewanee	Collins	0	300-399	AC	Unknown	2019	
<b>SERC</b>							
<b>Central</b>	Maury	Rutherford	27	400-599	AC	2598	2010
	Mill Creek	Hardin County	42	300-399	AC	1195	2010
	Browns Ferry	West Point	0	400-599	AC	1732	2011
	Choctaw	French Camp	0	400-599	AC	2598	2012
	Clay	Choctaw	37.38	400-599	AC	2598	2012
	Cordova	Freeport	0	400-599	AC	2598	2012
	Cumberland	Davidson	0	400-599	AC	2598	2012
	Cumberland	Johnsonville	0	400-599	AC	2598	2012
	Davidson	Pin Hook	0	400-599	AC	2598	2012
	J.K. Smith	J.K. Smith CFB	1	300-399	AC	1195	2012
	Madison	Limestone	0	400-599	AC	2598	2011
	Shelby	Lagoon Creek	0	400-599	AC	2598	2012
	Watts Bar	Bull Run	0	400-599	AC	2598	2010
	West Point	Clay	0.08	400-599	AC	2598	2012

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
	Wilson	Pin Hook	0	400-599	AC	2598	2012
Delta	Baxter Wilson	Ray Braswell	0	400-599	AC	2598	2010
	Blackberry	Morgan	52	300-399	AC	870	2012
	Blackberry	Neosho	8.49	300-399	AC	870	2012
	Blackberry	Sportsman Acres	92.5	300-399	AC	1369	2012
	GRDA	Sportsman Acres	3.23	300-399	AC	1369	2011
	Addis	Cajun	0	200-299	AC	637	2011
	Bayou Laboutte	Iberville	1.5	200-299	AC	800	2012
	Bayou Steel	Tezcuco	10	200-299	AC	520	2012
	Church Rd	Getwell	16	200-299	AC	520	2013
	Getwell	Senatobia Industrial	26	200-299	AC	520	2015
	Hartburg	McLewis	0	200-299	AC	785	2011
	Jacinto	Lewis Creek	0	200-299	AC	501	2011
	Labbe	Sellers Road	15	200-299	AC	829	2012
	Loblolly	Hammond	23	200-299	AC	779	2012
	McAdams	Pickens	0	200-299	AC	883	2011
	Nelson	Moss Bluff	7	200-299	AC	704	2012
	Oakville	Alliance	10	200-299	AC	515	2012
	Segura	Moril	1	200-299	AC	497	2011
	Sellers Road	Meaux	10	200-299	AC	829	2011
	Tillatoba	South Grenada	19	200-299	AC	500	2012
Willow Glen	Conway	15	200-299	AC	711	2014	
Bogue Chitto	Bogalusa	10	400-599	AC	1800	2013	
Gateway	Baldwin Power Plant Substation	Rush Island Plant Substation	26	300-399	AC	1793	2010
	Baldwin	Grand Tower	45	300-399	AC	1793	2016
	Campbell	Mason	17	300-399	AC	1793	2019
	Fargo	Maple Ridge	20	300-399	AC	1793	2016
	Grand Tower	NW Cape	24	300-399	AC	1793	2016

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Hutsonville	Merom	12	300-399	AC	1793	2018
Labadie	Mason	25	300-399	AC	1793	2019
Labadie	Tyson	0	300-399	AC	1195	2010
Labadie	Tyson	0	300-399	AC	1200	2010
Lutesville	NW Cape	11	300-399	AC	1793	2016
Montgomery	Spencer Creek	0	300-399	AC	1072	2015
Mt. Vernon West	West Frankfort East	0	300-399	AC	1793	2012
Oreana	Clinton-Latham Tap	8	300-399	AC	1793	2014
Page	Sioux	0	300-399	AC	1195	2019
Palmyra	Quincy	10	300-399	AC	1793	2016
Sidney	Rising	27	300-399	AC	1793	2017
South Bloomington	Brokaw	5	300-399	AC	1793	2014
Stallings	Prairie State	0	300-399	AC	1793	2012
Thomas Hill	Ottumwa	105	300-399	AC	1793	2014
Turkey Hill	Cahokia	0	300-399	AC	1793	2017
Albion	Norris City	26	300-399	AC	1793	2020
Cahokia	Dupo Ferry	8	300-399	AC	1793	2019
Fargo	Galesburg	35	300-399	AC	1793	2018
Galesburg	Oak Grove (MEC)	35	300-399	AC	1793	2018
Grand Tower	Joppa	50	300-399	AC	1793	2020
Grand Tower	West Frankfort East	41	300-399	AC	1793	2018
Kansas West	Breed-Eugene Tap	35	300-399	AC	1793	2020
LaSalle	Oglesby	22	300-399	AC	1793	2020
Loose Creek	Kingdom City	25	300-399	AC	1793	2019
Loose Creek	Pleasant Hill	138	300-399	AC	1793	2019
Meredosia	Ipava	43	300-399	AC	1793	2018
Meredosia	Pawnee	55	300-399	AC	1793	2018
Mt. Zion	Kansas	50	300-399	AC	1793	2017
Newton	Hutsonville	40	300-399	AC	1793	2018

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
	Palmyra	Fairport	122	300-399	AC	1793	2020
	Pana North	Mt. Zion	32	300-399	AC	1793	2017
	Quincy	Meredosia	45	300-399	AC	1793	2018
	Roxford	Campbell	13	300-399	AC	1793	2019
	Rush Island	Dupo Ferry	27	300-399	AC	1793	2019
	Tazewell	South Bloomington	35	300-399	AC	1793	2020
Southeastern	Bethabara	Clarksboro	15	200-299	AC	602	2009
	East Lake Road	Jackson Creek	9	200-299	AC	602	2010
	East Lake Road	Ola	0	200-299	AC	602	2010
	Jim Moore Road	Sharon Church	11	200-299	AC	602	2010
	Kiln	Carriere SW	0	200-299	AC	602	2011
	Kiln	Carriere SW	0	200-299	AC	602	2011
	Autaugaville 6	Autaugaville 8	1	200-299	AC	1814	2013
	Barry	Chickasaw	0	200-299	AC	1243	2009
	Bethabara	East Walton	8	200-299	AC	602	2014
	Bostwick	East Walton	4	200-299	AC	602	2014
	Cornish Moutain	East Social Circle	20	200-299	AC	602	2014
	Cumming	Sharon Springs	7	200-299	AC	602	2013
	East Walton	Jack's Creek	9	200-299	AC	602	2014
	East Walton	Rockville	40	400-599	AC	3464	2014
	Gaston	Bessemer	1	200-299	AC	502	2009
	Gaston	East Pelham	0	200-299	AC	502	2011
	Gaston	Stoney Point	0	200-299	AC	485	2014
	Gorgas	Miller Scrubber	0	200-299	AC	807	2009
	Holt	Tuscaloosa	0	200-299	AC	807	2017
	Jack McDonough	Northwest	0	200-299	AC	602	2012
Jack McDonough	Northwest	0	200-299	AC	602	2012	
Jack's Creek	Cornish Mountain	15	200-299	AC	602	2015	

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Montg SS	South Montg	0	200-299	AC	403	2013
North Selma	Autaugaville	0	200-299	AC	251	2013
Pegamore	Huntsville	2	200-299	AC	866	2010
Plant McDonough CC	Plant McDonough (black)	1	200-299	AC	1205	2011
Plant McDonough CC	Plant McDonough (white)	1	200-299	AC	1205	2011
Snowdoun TS	Pike Co	0	200-299	AC	251	2014
Thomson	Middlefork	100	400-599	AC	3429	2016
Adamsville	Bakers Ferry	0	200-299	AC	509	2017
Adamsville	Douglasville	0	200-299	AC	509	2017
Alpharetta	Kimble Bridge	0	200-299	AC	596	2014
Arkwright	West Milledgeville	35	200-299	AC	602	2019
Barry	Crist	0	200-299	AC	693	2013
Berkeley Lake	Spruill Road	0	200-299	AC	682	2018
Bessemer	Magella	7	200-299	AC	602	2018
Bessemer	South Bessemer	0	200-299	AC	807	2020
Bethbara	East Walton (black)	13	200-299	AC	820	2014
Blanford/Meldrim	McIntosh (black)	0	200-299	AC	1018	2013
Blanford/Meldrim	McIntosh (white)	0	200-299	AC	1018	2013
Boulevard	Dean Forest	0	200-299	AC	866	2015
Boulevard	Lindberg	0	200-299	AC	807	2014
Branch	West Milledgeville	0	200-299	AC	580	2014
Co Line Rd	Elmore Co	0	200-299	AC	403	2019
Cornelia	Middle Fork	10	200-299	AC	490	2014
Dean Forest	GSW	5	200-299	AC	1018	2015
Dean Forest	Kraft	0	200-299	AC	866	2015
Dering Circle	Norcross	0	200-299	AC	596	2018
Dorchester	Little Ogeechee	0	200-299	AC	1205	2017
Dorchester	West Brunswick	45	200-299	AC	1018	2017
East Walton	South Hall	35	400-599	AC	3429	2017

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Freeport 230	Freeport 115	1	200-299	AC	586	2013
Gaston	Boyles	1	200-299	AC	502	2020
Gaston	Turf Club	0	200-299	AC	502	2020
Gordon	North Dublin	32	200-299	AC	290	2016
Hatch	Offerman	0	200-299	AC	290	2014
Hopewell	McGrauFord (black)	11	200-299	AC	602	2013
Jacks Creek (Monroe)	Str. 31 (Cornish Mountain)	4	200-299	AC	602	2014
Jonesboro	O'Hara	0	200-299	AC	807	2017
Kemper IGCC	Lauderdale East	18	200-299	AC	752	2013
Kemper IGCC	Lauderdale West	20	200-299	AC	752	2013
Klondike	Smyrna Church	0	200-299	AC	596	2019
Kraft	McIntosh (black)	0	200-299	AC	1018	2011
Kraft	McIntosh (white)	0	200-299	AC	1018	2011
Laguna Beach	Santa Rosa	0	200-299	AC	602	2012
Laguna Beach	Santa Rosa	21.4	200-299	AC	602	2012
Lansing Smith	Laguna Beach	0	200-299	AC	602	2010
Lauderdale East	Vimville	6	200-299	AC	602	2013
Lawrenceville	Winder	0	200-299	AC	833	2015
Madison Park	Elmore Co	29	200-299	AC	403	2019
McDonough	Ola	10	200-299	AC	602	2020
McGrau Ford	Middlefork	10	400-599	AC	2350	2020
Miller	Boyles	0	200-299	AC	693	2018
Norcross	Berkeley Lake	0	200-299	AC	682	2012
O'Hara	McDonough Primary	20	200-299	AC	602	2013
Orange Grove	Moss Point East	0	200-299	AC	752	2017
Parkaire	Roswell	5	200-299	AC	602	2015
Plant Daniel	Moss Point East	0	200-299	AC	865	2015
Porterdale	Kirkland	0	200-299	AC	596	2019

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
	Porterdale	North Monticello	0	200-299	AC	602	2017
	Sharon Springs	Suwanee	15	200-299	AC	602	2018
	Shoal River	Laguna Beach	73.3	200-299	AC	602	2015
	South Hall	Suwanee	19	200-299	AC	664	2013
	Vimville	Sweatt	14	200-299	AC	602	2013
	Vogtle	Thomson	60	400-599	AC	2701	2016
VACAR	Aquia Harbor	Garrisonville	10	200-299	AC	800	2010
	Arlington	Idylwood	0	200-299	AC	797	2009
	Asheboro	Pleasant Garden	22	200-299	AC	1195	2011
	Asheville	Enka	0	200-299	AC	566	2010
	Bear Garden	Bremo	1	200-299	AC	800	2010
	Carson	Suffolk	50	400-599	AC	3450	2011
	Clinton	Lee	26	200-299	AC	615	2011
	Denny Terrace	Pineland	8	200-299	AC	950	2010
	Harrisonburg	Valley	11	200-299	AC	797	2011
	Richmond	Ft. Bragg Woodruff St	65	200-299	AC	1195	2011
	Rockingham	West End	38	200-299	AC	1195	2011
	Suffolk	Fentress	26	200-299	AC	1047	2011
	A M Williams	Cainhoy	0	200-299	AC	352	2012
	AM Williams	Goose Creek	0	200-299	AC	952	2013
	Bremo	Bear Garden	1.3	200-299	AC	800	2010
	Burke	Sideburn	2.2	200-299	AC	500	2014
	Canadys	Church Creek	38	200-299	AC	950	2013
	Canadys	Pepperhill	35	200-299	AC	950	2013
	Canadys	St. George	0	200-299	AC	352	2018
	Canadys	St. George	8	200-299	AC	950	2018
	Chickahominy	Lanexa	14	200-299	AC	722	2011
	Chickahominy	Old Church	16	200-299	AC	797	2010
Denny Terrace	Lyles	3	200-299	AC	950	2015	

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Dickerson	Pleasant View	0	200-299	AC	1300	2011
Dooms	Lexington	0	400-599	AC	2600	2012
Elizabeth City	Shawboro	10	200-299	AC	1047	2019
Gainesville	Louden	0	200-299	AC	800	2012
Gallows	Ox	13	200-299	AC	1047	2010
Hamilton	Pleasant View	12	200-299	AC	800	2010
Harris	RTP	22	200-299	AC	1195	2014
Horse Gap Sub	New Watauga 230kV Sub	0	200-299	AC	402.4	2016
Iron Bridge	Southwest	0	200-299	AC	706	2011
Iron Bridge	Walmsley	0	200-299	AC	706	2011
Landstown	Virginia Beach	0	200-299	AC	800	2014
Loudoun	Middleburg	0	200-299	AC	1047	2013
Meadowbrook	Loudoun	65	400-599	AC	3500	2011
North Anna	Ladysmith	15	400-599	AC	3500	2018
Pepperhill	Summerville	7	200-299	AC	950	2012
Pleasant Garden (Duke)	Asheboro (Progress)	20	200-299	AC	0	2011
Pomaria	Sandy Run	55	200-299	AC	956	2019
Pomaria	V C Summer	8	200-299	AC	956	2019
Possum Point	Calvert Cliffs	0	400-599	AC	3500	2011
Remington	Sowego	0	200-299	AC	1047	2012
Richburg	Flat Creek	32	200-299	AC	956	2015
Sandy Run	Orangeburg	34	200-299	AC	956	2019
Shiloh Sw Sta	Pisgah Tie	0	200-299	AC	0	2013
Sowego	Gainesville	14	200-299	AC	1047	2012
St. George	Summerville	0	200-299	AC	352	2018
St. George	Summerville	29	200-299	AC	950	2018
St. George	Varnville	38	200-299	AC	956	2019
Thelma	Carolina	10	200-299	AC	1047	2011

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Urquhart	Graniteville	18	200-299	AC	950	2016
V C Summer	Winnsboro	14	200-299	AC	956	2015
VC Summer	Killian	38	200-299	AC	950	2015
VC Summer	Parr	0	200-299	AC	475	2013
VC Summer	Parr	0	200-299	AC	475	2013
VC Summer	VC Summer #2	1	200-299	AC	950	2018
VC Summer	VC Summer #2	1	200-299	AC	950	2013
VC Summer	VC Summer #2	1	200-299	AC	950	2013
VC Summer #2	Lake Murray	23	200-299	AC	950	2015
VC Summer #2	St. George	135	200-299	AC	950	2018
Walmsley	Southwest	0	200-299	AC	706	2011
Winnsboro	Richburg	27	200-299	AC	956	2015
Yorktown	Hayes	8	200-299	AC	1047	2012
Central Tie	Shady Grove Tie Tap	0	200-299	AC	0	2017
Greenville	Kinston DuPont	30	200-299	AC	615	2017
Orangeburg	St. George	26	200-299	AC	956	2019
Riverview Sw Sta	Peach Valley Tie	0	200-299	AC	0	2015
Rockingham	Lilesville	14	200-299	AC	1195	2019
<b>SPP</b>						
Bonin 6 (502403)	Labbe (502421)	1.4	200-299	AC	655	2012
Sportsman Acres	GRDA (constructed by AECI)	3	300-399	AC	Unknown	2011
Shipe Road	E. Rogers	9	300-399	AC	1336	2016
Hugo	Valiant	19	300-399	AC	Unknown	2012
Flint Creek	Shipe Road	21	300-399	AC	1336	2014
Wells	Labbe	30	200-299	AC	829	2013
Iatan	Nashua*	30	300-399	AC	Unknown	2015
E. Rogers	Osage	32	300-399	AC	1336	2016
Hitchland	Ochiltree Intg.	32	200-299	AC	452	2011

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Turk	NW Texarkana	34	300-399	AC	1336	2011
Hitchland	Pringle Intg.	35	200-299	AC	452	2011
Sooner	Cleveland	35.2	300-399	AC	1793	2012
Rose Hill	Sooner	43	300-399	AC	1611	2012
Seminole	Hobbs Plt	43	200-299	AC	452	2015
Hitchland	Moore County	50	200-299	AC	452	2011
<b>TRE</b>						
Killeen Switch	Salado	15.7	300-399	AC	Unknown	2010
San Miguel	Lobo	41.8	300-399	AC	Unknown	2010
Lobo	Lobo	0	300-399	AC	Unknown	2010
Lobo	San Miguel	72	300-400	AC	Unknown	2010
Henderson Ranch	Switching Station	0	300-401	AC	Unknown	2010
Hutto Switch	Salado Switch	73.8	300-399	AC	Unknown	2010
W. Levee	Norwood	6.5	300-399	AC	Unknown	2010
Twin Buttes	Coleman/Brown County Line	88	300-399	AC	2988	2010
CenterPoint Energy/TNMP Alvin interconn.	CenterPoint Energy/TNMP Alvin interconnection	0.1	300-399	AC	Unknown	2010
Krum West Switch	NW Carrollton	37.1	300-399	AC	Unknown	2010
Roanoke Tap	West Denton	9.8	300-399	AC	Unknown	2010
Bell County East	TNP One	82.6	300-399	AC	Unknown	2011
Tonkawa	Sweetwater East	64	300-399	AC	Unknown	2011
Sweetwater East Switch	Sweetwater East Switch	0	300-399	AC	Unknown	2011
Elm Mott Switch circuit breaker	Elm Mott Switch circuit breaker	0	300-399	AC	Unknown	2011
Oklunion	Bowman	0	300-399	AC	Unknown	2011
Zenith 345kV Switching Station	Zenith 345kV Switching Station	0	300-399	AC	Unknown	2011
Burwick Switching Station	Burwick Switching Station	0	300-399	AC	Unknown	2011
Dermott Switch (Central B)	Scurry County South Switch (Central A)	56	300-399	AC	Unknown	2011

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Scurry County South Switch (Central A)	Tonkawa	30	300-399	AC	Unknown	2011
New Bowman	Riley	0	300-399	AC	Unknown	2011
Zorn/Clear Springs	Gilleland Creek-Hutto Switch	165	300-399	AC	Unknown	2011
Zorn/Clear Springs	Gilleland Creek-Hutto Switch	7.5	300-399	AC	Unknown	2011
Twin Buttes	Brown	0.2	300-399	AC	Unknown	2011
Bowman	Riley	98	300-399	AC	Unknown	2011
Sweetwater East	Central Bluff	68	300-399	AC	Unknown	2011
Central Bluff	Bluff Creek	8.5	300-399	AC	Unknown	2011
Riley	Oklaunion	3.55	300-399	AC	Unknown	2012
Bluff Creek	Brown	81	300-399	AC	Unknown	2012
Central Bluff	Brown	89	300-399	AC	Unknown	2012
Silverton	Cottonwood	63	300-399	AC	Unknown	2012
LS01 Silverton	Nazareth	48	300-399	AC	Unknown	2012
LS02 Nazareth	Hereford	33	300-399	AC	Unknown	2012
Kendall (7046)	Gillespie (7131)	29	300-399	AC	1678	2012
Twin Buttes	Big Hill	31	300-399	AC	2988	2012
Grelton	Long Draw	31.3	300-399	AC	Unknown	2012
Grelton	Odessa	46.2	300-399	AC	Unknown	2012
Long Draw	Scurry County	47.9	300-399	AC	Unknown	2012
Brown	Newton 3	92	300-399	AC	Unknown	2012
Newton	Killeen	30.9	300-399	AC	Unknown	2012
Brown	Killeen S	122.9	300-399	AC	Unknown	2012
Gillespie	Newton	105	300-399	AC	1678	2012
Cotttonwood	Dermott	65.4	300-399	AC	Unknown	2012
West Krum	Riley	0	300-399	AC	Unknown	2012
Bakersfield	Big Hill	113	300-399	AC	Unknown	2013

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Sand Bluff	Divide	30.2	300-399	AC	Unknown	2013
Bearkat	Sand Bluff	28.3	300-399	AC	Unknown	2013
Sand Bluff	Long Draw	53.9	300-399	AC	Unknown	2013
White Deer	Hereford	92	300-399	AC	Unknown	2013
Scurry County	West Shackelford	181	300-399	AC	Unknown	2013
West Shackelford	Sam Switch/Navarro	407.7	300-399	AC	Unknown	2013
Gray	Tesla	220	300-399	AC	Unknown	2013
Gray	White Deer	80	300-399	AC	Unknown	2013
Silverton	White Deer	76	300-399	AC	Unknown	2013
North McCamey	Bakersfield	12	300-399	AC	1678	2013
Gilleland	Techridge	8	300-399	AC	Unknown	2013
Krum West Switch	Unknown	0	300-399	AC	Unknown	2013
Silverton	Tesla	170	300-399	AC	Unknown	2013
Silverton	Tesla	0	300-399	AC	Unknown	2013
North McCamey	Odessa EHV	50	300-399	AC	1678	2013
Big Hill	Kendall	274	300-399	AC	2988	2013
Zenith	Fayetteville	120	300-399	AC	Unknown	2014
Lobo	Rio Bravo	30	300-399	AC	Unknown	2015
Sol	Rio Bravo	122.4	300-399	AC	Unknown	2016
N. Edinburg	Sol	15	300-399	AC	Unknown	2016
Frontera	Sol	12.4	300-399	AC	Unknown	2016
Frontera	South McAllen	12.18	300-399	AC	Unknown	2016
Loma Alta	la Palma	20	300-399	AC	Unknown	2017
Loma Alta	Rio Hondo	25	300-399	AC	Unknown	2017
Ranchito	South McAllen	38	300-399	AC	600	2017
Lavon 345/138 kV Switching Station	Unknown	0	300-399	AC	Unknown	2018

Terminal From Location		Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
LaPalma		Ranchito	10	300-399	AC	600	2018
Cagnon to Hill Country		Hill Country	19.5	300-399	AC	Unknown	2020
Hill Country		Skyline	11	300-399	AC	Unknown	2020
Anna Switch		Krum W.	150	300-399	AC	Unknown	2013
Willow Creek		Dermott Switch (Central B)	216	300-399	AC	Unknown	2013
Krum West		Riley	236	300-399	AC	Unknown	2013
Hicks Switch		Willow Creek	78	300-399	AC	Unknown	2013
Brown Switch		Unknown	0	300-399	AC	Unknown	2012
Silverton Collection Station		Silverton Collection Station	0	300-399	AC	Unknown	2012
Newton Switch		Newton Switch	0	300-399	AC	Unknown	2012
Hereford Collection Station		Hereford Collection Station	0	300-399	AC	Unknown	2012
Nazareth Collection Station		Unknown	0	300-399	AC	Unknown	2012
Riley		Unknown	0	300-399	AC	Unknown	2012
Riley		Unknown	0	300-399	AC	Unknown	2012
White Deer Collection Station		Unknown	0	300-399	AC	Unknown	2013
Gray Substation (Panhandle B-B)		Unknown	0	300-399	AC	Unknown	2013
Gray Substation (Panhandle B-B)		Unknown	0	300-399	AC	Unknown	2013
Hicks Switch		Unknown	0	300-399	AC	Unknown	2012
<b>WECC</b>							
<b>Basin</b>	Dayton NV	Reno NV	15	300-399	AC	600	2013
	Robinson Summit 500 kV	Harry Allen 500 kV	280	400-599	AC	2000	2012
	Midpoint 500 kV	Robinson Summit 500 kV	235	400-599	AC	2000	2013
	Chugwater	Midpoint 500 kV	560	400-599	DC	2000	2015

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Desert SW	Phoenix AZ	Phoenix AZ	15	400-599	AC	1000	2012
	Phoenix AZ	Phoenix AZ	4	200-299	AC	1200	2012
	Phoenix AZ	Phoenix AZ	12	200-299	AC	1200	2012
	Table Mesa AZ	Phoenix AZ	26	400-599	AC	1000	2010
	Table Mesa AZ	Table Mesa AZ	1	400-599	AC	2728	2010
	Phoenix AZ	Phoenix AZ	21	200-299	AC	1200	2014
	Phoenix AZ	Phoenix AZ	6	200-299	AC	1200	2014
	West Phoenix AZ	West Phoenix AZ	15	200-299	AC	1200	2014
	Peoria AZ	Pioneer AZ	9	200-299	AC	1200	2010
	Palo Verde AZ	Phoenix AZ	28	400-599	AC	600	2014
	Wintersburg AZ	Yuma AZ	115	400-599	AC	1200	2014
	West Phoenix AZ	West Phoenix AZ	12	200-299	AC	1200	2015
	West Phoenix AZ	West Phoenix AZ	12	200-299	AC	1200	2015
	Northwest of Phoenix AZ	Peoria AZ	40	400-599	AC	1200	2016
	Four Corners NM	Red Mesa AZ	189	400-599	AC	1300	2014
	Moenkopi AZ	Marketplace NV	218	400-599	AC	1300	2014
	Red Mesa AZ	Moenkopi AZ	62	400-599	AC	1300	2014
	Coolidge, AZ	Mesa, AZ	0	400-599	AC	1405	2011
	Coolidge, AZ	Florence, AZ	30	200-299	AC	875	2011
	Florence, AZ	Queen Creek, AZ	13	200-299	AC	875	2011
	Maricopa AZ	Mesa AZ	87	200-299	AC	1405	2011
	Maricopa AZ	Mesa AZ	-87	200-299	AC	1405	2013
	Maricopa AZ	Mesa AZ	87	400-599	AC	1405	2013
	Queen Creek AZ	Florence AZ	10	200-299	AC	875	2011
	Gilbert AZ	Queen Creek AZ	8	200-299	AC	875	2012
	Queen Creek AZ	Florence AZ	12	200-299	AC	875	2012
Casa Grande, AZ	Coolidge AZ	21	200-299	AC	833	2013	
Maricopa AZ	Coolidge, AZ	0	400-599	AC	1405	2013	

Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
Mobile AZ	Maricopa AZ	13	400-599	AC	1500	2013
Corona, NM	Coolidge AZ	500	400-599	AC	3000	2014
Stirling Mountain NV	Northwest NV	41	200-299	AC	320	2011
Vista NV	Pahrump NV	11	200-299	AC	320	2012
Harry Allen 500 kV	Eldorado 500 kV	60	400-599	AC	2000	2013
Las Vegas NV	Las Vegas NV	1	400-599	AC	3585	2011
Las Vegas NV	Mercury NV	75	200-299	AC	1200	2012
Las Vegas NV	Las Vegas NV	1	200-299	AC	1200	2018
Las Vegas NV	Las Vegas NV	1	200-299	AC	1200	2018
Las Vegas NV	Las Vegas NV	18	200-299	AC	810	2018
Las Vegas NV	Las Vegas NV	18	200-299	AC	810	2018
Las Vegas NV	Las Vegas NV	4	200-299	AC	810	2018
Las Vegas NV	Las Vegas NV	8	400-599	AC	3000	2018
Las Vegas NV	Las Vegas NV	8	400-599	AC	3000	2018
Las Vegas NV	Las Vegas NV	28	400-599	AC	3000	2013
Las Vegas NV	Las Vegas NV	16	200-299	AC	810	2018
Las Vegas NV	Las Vegas NV	1	200-299	AC	810	2018
Las Vegas NV	Las Vegas NV	16	200-299	AC	810	2018
Boulder City NV	Lathrop WellsNV	110	400-599	AC	3000	2012
Las Vegas NV	Lathrop WellsNV	75	400-599	AC	3000	2012
Las Vegas NV	Las Vegas NV	0	400-599	AC	TBD	2015
Las Vegas NV	Las Vegas NV	0	400-599	AC	TBD	2016
Las Vegas NV	Las Vegas NV	5	200-299	AC	810	2018
Cochise, AZ	Benson, AZ	16	200-299	AC	TBD	2016
Benson, AZ	Sahuarita, AZ	68.7	200-299	AC	TBD	2017
Vail, AZ	Tucson, AZ	11	300-399	AC	1195	2019
Tucson, AZ	Sahuarita, AZ	16	300-399	AC	1195	2019
Red Rock, AZ	Marana, AZ	15	300-399	AC	1195	2019

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
CAL-N	Collinsvills, CA	Pittsburg, CA	8	200-299	AC	800 and 2146	2016
	Rio Oso	Gold Hill	28.5	200-299	AC	TBD	2012
	Table Mountain Substation (Oroville, CA)	Rio Oso Substation (Rio Oso, CA)	136	200-299	AC	604	2011
	Embarcadero	Potrero	3	200-299	AC	TBD	2012
	Selkirk BC	Collinsville CA	2500	400-599	AC/DC	3000	2016
	Midway	San Luis Obispo Solar Switching Station	68	200-299	AC	TBD	2012
	Vaca Dixon Substation (Vacaville, CA)	Lakeville Substation (Petaluma, CA)	80	200-299	AC	658	2014
	Telsa Substation (Livermore, CA)	Newark Substation (Fremont, CA)	54	200-299	AC	1366	2013
	Bakersfield, Ca	Fresno, Ca	280	400-599	AC	2146	2017
	Vaca Dixon Substation (Vacaville, CA)	Birds Landing Switching Station (Rio Vista)	50	200-299	AC	754	2011
	Birds Landing Switching Station (Rio Vista)	Contra Costa Substation (Antioch, CA)	18	200-299	AC	754	2010
	Newark Substation (Fremont, CA)	Ravenswood Substation (Menlo Park, CA)	18	200-299	AC	1366	2014
	Pittsburg Substation (Pittsburg, CA)	Telsa Substation (Livermore, CA)	62	200-299	AC	683	2014
	Contra Costa Substation (Antioch, CA)	Moraga Substation (Orinda, CA)	54	200-299	AC	683	2014
	Lakeville Substation (Petaluma, CA)	Lakeville Substation (Petaluma, CA)	0.5	200-299	AC	658	2011
O'Banion CA	Elverta CA	26	200-299	AC	600	2012	
CAL-S	Palm Springs CA	Coachella CA	0.8	200-299	AC	494	2012
	Boulder City NV	Primm NV	35	200-299	AC	TBD	2013
	Rosamond CA	Rosamond CA	4	200-299	AC	1287	2011
	Rosamond CA	Rosamond CA	4	200-299	AC	1287	2011
	Lancaster CA	Vincent CA	18	400-599	AC	3421	2011
	Irwindale CA	Lancaster CA	27	200-299	AC	988	2012
	Mira Loma CA	Vincent CA	5	400-599	AC	3421	2012
	Mira Loma CA	Vincent CA	16	400-599	AC	3421	2012
	Monterey Park CA	Orange CA	40	400-599	AC	TBD	2011
	Rosamond CA	Mohave CA	17	400-599	AC	342	2011
	Monterey Park CA	Vincent CA	19	400-599	AC	TBD	2013
	Tehachapi CA	Saugus CA	82.7	400-599	AC	3950	2010

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
	Desert Center CA	Blythe CA	66	200-299	AC	3950	2010
	Palm Springs CA	Mirage CA	15	200-299	AC	1240	2019
	Rector CA	Springville CA	38	200-299	AC	3230	2012
	Tehachapi CA	Mira Loma CA	250	400-599	AC	3950	2013
	Colorado River CA	Devers CA	115	400-599	AC	2700	2013
	Valley CA	Devers CA	42	400-599	AC	Unknown	2013
	Lancaster CA	Mohave CA	26	200-299	AC	3421	2011
	Tehachapi CA	Mohave CA	10	200-299	AC	1287	2011
	Victor CA	Lugo CA	10	200-299	AC	TBD	2010
	SG&E/IID's, Imperial Valley Substation	IID's El Centro Switching Station	8	200-299	AC	654	2011
	IID's Midway station	8.5 miles west of Midway station	8.5	200-299	AC	654	2011
	Eagle Mtn. CA	Devers	70	400-599	AC	2000	2015
	Eldorado, NV	Iron Mtn, CA	170	400-599	AC	1200	2015
	Iron Mtn. CA	Devers, CA	100	400-599	AC	1200	2015
	Devers, CA	M. Loma, CA	60	400-599	DC	2000	2015
	Intermountain UT	Adelanto CA	0	400-599	DC	2400	2010
	Haskell CA	Castaic CA	12	200-299	AC	950	2013
	Barren Ridge CA	Haskell CA	61	200-299	AC	950	2013
	Barren Ridge CA	Rinaldi CA	76	200-299	AC	650	2013
	Scattergood Generating Station	Olympic Receiving Station K	12	200-299	AC	500	2014
	Encina	Penasquitos	11	200-299	AC	600	2010
	Suncrest	Sycamore Canyon	28	200-299	AC	1326	2012
Suncrest	Sycamore Canyon	28	200-299	AC	1326	2012	
Imperial Valley	Suncrest	91	400-599	AC	2598	2012	
Northwest	Sedro Woolley WA	Snohomish WA	38.5	200-299	AC	831	2010
	Sumner WA	Puyallup WA	5	200-299	AC	733	2011
	Douglas Switchyard	Rapids Switchyard	15	200-299	AC	1000	2013
	Blue Lake	Gresham	5	200-299	AC	418	2017
	Horizon	Keeler	1	200-299	AC	697	2012

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
	Pearl	Sherwood OR	5	200-299	AC	1194	2015
	Coyote Springs	Bethel	200	400-599	AC	1500	2015
	Great Falls	U. S Border	135	200-299	AC	534	2010
	Umatilla, OR	Rufus, OR	79	400-599	AC	3949	2012
	Clyde, WA	Central Ferry, WA	40	400-599	AC	TBD	2013
	The Dalles, OR	Goldendale, WA	28	400-599	AC	TBD	2013
	Castle Rock, WA	Troutdale, OR	75	400-599	AC	TBD	2015
	Townsend MT	Midpoint, ID	460	400-599	AC	1500	2015
	Snohomish, WA	Beverly Park, WA	4.78	200-299	AC	694	2013
Rockies	Chambers CO	Spruce CO	8	200-299	AC	500	2011
	Chambers CO	Tower CO	8	200-299	AC	500	2011
	Spruce CO	Tower CO	-8	200-299	AC	500	2011
	Midway CO	Waterton CO	82	300-399	AC	1200	2011
	Pawnee CO	Smoky Hill CO	96	300-399	AC	735	2013
	Osage WY	Rapid City SD	65	200-299	AC	558	2015
	Teckla WY	Osage WY	70	200-299	AC	558	2013
	Pumpkin Buttes WY	Windstar WY	69	200-299	AC	558	2010
	Longmont CO	Platteville CO	21	200-299	AC	398	2011
	Fort Collins CO	Loveland CO	10	200-299	AC	472	2011
	Alamosa County, CO	Huerfano County, CO	93	200-299	AC	613	2013
	Huerfano County, CO	Pueblo, CO	43	300-399	AC	1700	2013
	Huerfano County, CO	Pueblo, CO	7	200-299	AC	613	2013
	Burlington, CO	Wray, CO	56	200-299	AC	613	2012
	Archuleta County, CO	Durango CO	29	200-299	AC	613	2012
	Shiprock, NM	La Plata County, CO	40	200-299	AC	613	2012
	Cheyenne, WY	Cheyenne, WY	10	200-299	AC	613	2013
Cheyenne WY	Ault CO	35	200-299	AC	407	2010	
Boyd (Larimer county), CO	Weld County, Co	12.7	200-299	AC	478	2011	

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
WECC CAN	Genesee AB	Langdon AB	225	400-599	DC	3000	2014
	Heartland AB	28S	310	400-599	DC	3000	2013
	Genesee AB	Thickwoods AB	304	400-599	AC	3500	2016
	Heartland AB	Ellerslie AB	50	400-599	AC	3500	2013
	Heartland AB	Deerland	17	200-299	AC	754	2013
	Chapelrock	103S	24	200-299	AC	1275	2013
	103S	'Sub C'	19	200-299	AC	1103	2015
	'Sub C'	MATL	32	200-299	AC	1103	2014
	'Sub C'	Whitla	60	200-299	AC	1103	2014
	Whitla	Medicine Hat	55	200-299	AC	1275	2013
	West Brooks	Medicine Hat	85	200-299	AC	1275	2013
	650S	932S	37	200-299	AC	1103	2012
	932S	959S	42	200-299	AC	1103	2012
	959S	946S	54	200-299	AC	1103	2012
	946S	963S	22	200-299	AC	1103	2012
	28S	132S	23	200-299	AC	1275	2012
	946S	801S	4	200-299	AC	1103	2012
	Ingledow, BC	Custer, WA	14	400-599	AC	3000	2010
	Nicola BC	Meridian BC	153	400-599	AC	300	2014
	Malaspina, BC	East Toba, BC	107	200-299	AC	800	2010
	Bridge River, BC	ROSEDALE, BC	0	300-399	AC	960	2010
	V. Lake Terminal BC	R.G. Anderson BC	17	200-299	AC	506	2011
	V. Lake Terminal BC (2nd circuit)	R.G. Anderson BC	17	200-299	AC	506	2011
V. Lake Terminal BC	Bentley BC	7	200-299	AC	506	2011	

	Terminal From Location	Terminal To Location	Line Length (Circuit Miles)	Voltage Operating (kV)	Voltage Type (AC/DC)	Capacity Rating (MVA)	Expected In-Service Year
WECC Mexico	La Jovita MX	Presidente Juarz MX	38	200-299	AC	430	2012
	La Jovita MX	El Ciprés MX	35	200-299	AC	430	2012
	La Jovita MX	Lomas MX	30	200-299	AC	430	2012
	Mexicali MX	Tecnologico MX	10	200-299	AC	388	2013
	El Centenario MX	La Rosita MX	8	200-299	AC	388	2010
	El Centenario MX	Sanchez Taboada MX	8	200-299	AC	388	2010
	La Jovita MX	La Herradura MX	50	200-299	AC	430	2015
	El Cañon MX	El Ciprés MX	52	200-299	AC	430	2016

## TRANSFORMERS

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
<b>FRCC</b>				
Sub 7 230/115 Auto #2	230	115	09-2010	Under Construction
Sub 5 230/115 Auto	230	115	12-2011	Conceptual
Sub 4 230/115 Auto	230	115	06-2016	Conceptual
500/230 Brookridge #2	500	230	06-2021	Planned
Central Florida S 500/230 kV TX #1	500	230	06-2021	Planned
500/230 Citrus #1	500	230	06-2021	Planned
500/230 Citrus #2	500	230	06-2021	Planned
500/230 Crystal River Plant #1	500	230	06-2021	Planned
500/230 Crystal River Plant #2	500	230	06-2021	Planned
<b>MRO</b>				
Kewaunee Transformer #2	345	05-1900	05-2011	Install a 2nd 345/138kV transformer at Kewaunee / Planned
Monroe Co-Council Creek	161	05-1900	06-2013	Install a Council Creek 161/138kV transformer / Planned
Rockdale-Cardinal	345	05-1900	06-2013	Install a 345/138kV transformer at Cardinal / Planned
North LaCrosse-West Middleton	345	05-1900	06-2017	Install a 345/138kV transformer at Spring Green / Conceptual
Mill Rd Substation	345	05-1900	06-2019	Install a 345/138kV transformer at a new Mill Rd SS / Conceptual
Rockdale-Mill Rd	345	05-1900	06-2019	Install a 345/138kV transformer at Concord / Conceptual
Rockdale-Mill Rd	345	05-1900	06-2019	Install a 345/138kV transformer at Bark River / Conceptual
North Randolph Transformer	345	05-1900	12-2021	Install a 345/138kV transformer at North Randolph / Conceptual
Pleasant Valley#2	345	06-1900	03-2010	500 MVA transformer needed for wind outlet
Macville	230	04-1900	11-2016	300 MVA transformer, this is expected to be delayed due to the economy
Orrock	345	04-1900	06-2017	336 MVA transformer, this is expected to be delayed due to the economy
Hazleton #1	345	06-1900	06-2010	Replacement
Salem #2	345	06-1900	07-2010	
Fernald	161	04-1900	12-2010	
Salem #1	345	06-1900	06-2011	Replacement

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Lewis Field	161	04-1900	12-2012	
Morgan Valley	345	06-1900	12-2012	
Mandan	230	04-1900	12-2010	
Glenham	230	04-1900	12-2013	
Sub 39 Add 2nd 345-161 kV Xfmr	345	06-1900	06-2014	Provide additional 345-161 kV capacity in area. In-service date subject to change upon need identified in annual reliability study
Hills Add 2nd 345-161 kV Xfmr	345	06-1900	06-2019	Provide additional 345-161 kV capacity in area. In-service date subject to change upon need identified in annual reliability study
Grimes Add 2nd 345-161 kV Xfmr	345	06-1900	06-2019	Provide additional 345-161 kV capacity in area. In-service date subject to change upon need identified in annual reliability study
Page County 345-161 kV Xfmr	345	06-1900	06-2017	Provide additional 345-161 kV capacity in area. In-service date subject to change upon need identified in annual reliability study
Wind Jct 345-161 kV Xfmr	345	06-1900	12-2012	Variable/Renewable integration
North Platte 230/115 T-9	230	04-1900	06-2010	Replaces existing 187 MVA T9 with 336 MVA
Cass Lake	230	04-1900	12-2011	In conjunction with Wilton - Cass Lake - Boswell 230 kV line, a new 230/115 kV transformer at Cass Lake , MN.
New Underwood	230	04-1900	01-2014	Date not firm, replacement
Belfield	345	08-1900	01-2014	Date not firm, replacement
Oahe	230	04-1900	01-2014	Date not firm, replacement
Bismarck	230	04-1900	01-2015	Date not firm, replacement
CAPX Group 1	345	08-1900	07-1905	Install two, 345/230kv transformers at Hazel Creek Substation as part of the CAPX group 1 projects
CAPX Group 1	345	08-1900	07-1905	Install two, 345/230kv transformers at Hazel Creek Substation as part of the CAPX group 1 projects
Rockwood	230	04-1900	11-2013	150/200/250 MVA
Brandon Cornwallis	230	04-1900	05-2014	120/160/176 MVA
Riel	500	08-1900	05-2014	720/960/1200 MVA; Associated with Bipole 3 / Conawapa project
Riel	500	08-1900	05-2019	720/960/1200 MVA; Associated with 5th Manitoba - US tie project
Pasqua Switching Station	230	05-1900	06-2010	Associated with new 230kV line from the Poplar River Switching Station to the Pasqua Switching Station.
Tantallon Switching Station	230	05-1900	06-2013	Associated with new 230kV line from the Peebles Switching Station to the Tantallon Switching Station.

Transformer Project Name		High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
<b>NPCC</b>					
<b>New England</b>	Deerfield Autotransformer Project	345	115	12-2012	Under Construction
	NEEWS - GSRP Project - Agawam	345	115	12-2013	Planned
	NEEWS - GSRP Project - Agawam	345	115	12-2013	Planned
	NEEWS - GSRP Project - North Bloomfield	345	115	12-2013	Planned
	NEEWS - CCRP Project - Frost Bridge	345	115	12-2013	Planned – Under Review
	LSP Hotel Road Substation	115	115	11-2010	Planned
	MPRP - Albion Rd - Larabee Rd	345	115	12-2012	Planned
	MPRP - South Gorham	345	115	11-2010	Under Construction
	MPRP - Raven Farm and Maguire Rd	345	115	12-2012	Planned
	Vermont Southern Loop - Vernon	345	115	09-2010	Under Construction
	Vermont Southern Loop - Newfane	345	115	09-2010	Under Construction
	Lower South East Massachusetts Upgrades	345	115	12-2012	Planned
	Auburn Area Transmission Upgrades	345	115	09-2012	Planned
	Central/Western MA Upgrades Wachusett	345	115	12-2011	Planned
	Central/Western MA Bear Swamp Upgrades	230	115	05-2012	Planned
	NEEWS Rhode Island	345	115	06-2012	Planned
	Keene Rd	345	115	12-2010	Proposed
	Greater RI Transmission Reinforcements - Kent County	345	115	06-2011	Planned
	Greater RI Transmission Reinforcements - Berry St.	345	115	12-2011	Planned
	Greater Boston Reliability Project - Waltham	345	230	12-2012	Planned
<b>Ontario</b>	Oshawa Area TS	500	230	2016	Conceptual

Transformer Project Name		High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Quebec	Anne-Hébert T1	315	25	10-2010	New station
	Anne-Hébert T2	315	25	10-2010	New station
	Turcotte T1	120	25	05-2010	New station
	Turcotte T2	120	25	05-2010	New station
	La Sarcelle T22	315	12	11-2011	New hydro generation integration
	La Sarcelle T21	315	12	11-2011	New hydro generation integration
	La Sarcelle T23	315	12	11-2011	New hydro generation integration
	Waconichi T1	161	25	11-2011	New station
	Waconichi T2	161	25	11-2011	New station
	Rivière-des-Prairies T1	120	25	01-2011	New operating voltage (69 kV --> 120 kV)
	Rivière-des-Prairies T1	120	25	01-2011	New operating voltage (69 kV --> 120 kV)
	Limbou T1	120	25	11-2014	New transformer in station
	Limoilou T1	230	25	10-2012	New station
	Limoilou T2	230	25	10-2012	New station
	Neubois T1	120	25	12-2012	New station
	Neubois T2	120	25	12-2012	New station
	Anse-Pleureuse T1	230	25	12-2012	New station
	Anse-Pleureuse T2	230	25	12-2012	New station
	Lachenaie T1	315	25	10-2013	New station
	Lachenaie T2	315	25	10-2013	New station
	Rive-Sud T1	315	25	11-2013	New station
	Rive-Sud T2	315	25	11-2013	New station
	Rive-Sud T3	315	25	10-2017	New transformer in existing station
	Charlesbourg T1	230	25	09-2013	New station
	Charlesbourg T2	230	25	09-2013	New station
	Charlesbourg T3	230	25	09-2013	New station
	Blainville T1	315	25	10-2013	New station
	Blainville T2	315	25	10-2013	New station
	Bout-de-l'Île T11	735	315	11-2013	New station
	Bout-de-l'Île T12	735	315	11-2013	New station
	Viau T1	315	25	12-2013	New station

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Viau T2	315	25	12-2013	New station
Dufournel T1	315	25	09-2014	New station
Dufournel T2	315	25	09-2014	New station
Pierre-le-Gardeur T1	315	120	11-2014	New station
Pierre-le-Gardeur T2	315	120	11-2014	New station
Fleury T1	315	25	10-2015	New station
Fleury T2	315	25	10-2015	New station
Fleury T3	315	25	10-2015	New station
De Lorimier T1	315	25	11-2015	New station
De Lorimier T2	315	25	11-2015	New station
De Lorimier T3	315	25	11-2015	New station
La Lièvre T1	120	25	10-2015	New station
La Lièvre T2	120	25	10-2015	New station
Vimont T1	315	25	10-2017	New station
Vimont T2	315	25	10-2017	New station
Duvernay TX	735	315	08-2011	New transformer in existing station
Duvernay TX	735	315	01-2025	New transformer in existing station
Antoine-Lemieux T4	230	25	12-2014	New transformer in existing station
Hauterive T10	161	69	10-2010	New transformer in existing station
Micmac T1	161	25	11-2011	New transformation level in existing station
Micmac T2	161	25	11-2011	New transformation level in existing station
Matapédia T1	230	25	11-2012	New transformation level in existing station
Matapédia T2	230	25	11-2012	New transformation level in existing station
Dubuc T4	161	25	10-2013	New transformer in existing station
Saraguay T23	315	25	11-2010	New transformer in existing station
Saguenay T4	735	161	09-2014	New transformer in existing station
Landry T4	120	25	12-2010	New transformer in existing station
Mont-Royal T20	120	25	11-2011	New transformer in existing station
Ste-Thérèse-Ouest T4	120	25	11-2011	New transformer in existing station
Saint-Lin T3	120	25	10-2012	New transformer in existing station

RFC

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Wattsville	138	69	05-2009	Add a 200 MVA transformer at Wattsville
Bunce Creek	220	220	12-2009	Replace PAR with 800MVA (Summer Normal) 1 PARS in Series at Bunce Creek.
Bedington	500	138	06-2009	install 4th transformer
Stacy	138	36	06-2012	New Sub - 75/100 MVA Transformer
Wye Mills	138	69	06-2010	Add 2nd 138/69 Transformer at Wye Mills
Hubbell	138	69	06-2010	Reliability Improvement
Fayette	138	69	12-2010	New 60/80/100 MVA Transformer
Henrietta	138	69	06-2011	New Sub - Add 100/134 MVA transformer
Berlin Lake Area	138	69	06-2013	New Sub - 100/134MVA
West Medina	138	69	06-2014	Add 90/120 MVA Transformer
Galion	138	69	06-2015	Replace transformer #3 with 100/134 MVA transformer
Broadview	138	69	06-2015	New 138 kV Sub - Add 100/134 MVA transformer #1
Broadview	138	69	06-2015	New 138 kV Sub - Add 100/134 MVA transformer #2
Curliss	138	69	06-2016	New Substation
Newton Falls	138	69	06-2016	Replace transformer #3 with 100/134 MVA transformer
Worthington	161	138	09-2009	Capacity Upgrade
Decatur Switch Station	161	138	12-2009	Serve Load
Hancock	230	120	05-2011	
Indian River	230	138	06-2011	Add a 3rd 230/138kV auto
Plymouth	230	138	06-2011	Install 2nd Plymouth transformer
Cool Springs	230	69	05-2010	Add Autotransformer at new 230/69kV substation
Durbin	230	69	06-2014	New Substation
Dresser	345	138	06-2010	Add 3rd Transformer at Dresser Sub.
Brown	345	138	10-2010	Connect to new 345 kV bus
Logans Ferry	345	138	06-2011	
Murphy 4	345	138	06-2011	
Green Acres	345	138	12-2011	Add 1st Transformer Bank
Petersburg	345	138	06-2012	Replace existing 150 MVA transformer with 300MVA unit
Goodings Grove	345	138	06-2013	Install 3rd 345/138KV autotransformer
Plano	345	138	06-2013	Install 1st 345/138kV autotransformer
East Frankfort	345	138	06-2013	Install 2nd 345/138kV autotransformer

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Qualitech	345	138	06-2013	New Substation
Brady	345	138	06-2013	
Weeds Lake	345	138	06-2013	
North Fork	345	138	06-2014	Construct new 345/138 kV station in Marquis - Bixby 345 kV
Canton Central	345	138	06-2014	Install new 345/138 kV T-3
Crescent	345	138	06-2014	Add 3rd 345/138 kV Autotransformer
Chamberlin	345	138	06-2016	Add 2nd transformer - 240/320/400 MVA
Lisle	345	138	05-2017	Install 4th 345/138kV autotransformer - Deferred.
Fulton	345	138	06-2017	New Sub - 180/240/336 MVA Transformer
Hayes	345	138	06-2018	New Sub - 269/358/448 MVA transformer
Frances Creek	345	69	06-2014	New Transformer
Cabot	500	138	06-2011	install 4th transformer
Cranberry	500	138	06-2012	New Sub - 333/448/560 MVA transformer #1
Cranberry	500	138	06-2012	New Sub - 333/448/560 MVA transformer #2
Waugh Chapel	500	230	12-2009	Install a 4th 500/230kV transformer
Juniata	500	230	07-2010	Spare Transformer; 650 MVA nameplate.
Doubs	500	230	06-2011	replace existing #2 bank
Doubs	500	230	06-2011	replace existing #3 bank
Doubs	500	230	06-2011	replace existing #4 bank
Center Point	500	230	06-2011	Install transformer at new substation
Burches Hill	500	230	06-2011	Add 2nd 1000 MVA 500/230kV Transformer
Burches Hill	500	230	12-2011	3rd Transformer
Brighton	500	230	06-2012	Replace Existing Transformer
Roseland	500	230	06-2012	
Hudson	500	230	06-2013	
Hudson	500	230	06-2013	Transformer 2 (added the line)
Lackawanna	500	230	05-2014	In-service date changed; 750 MVA nameplate.
Kammer (AEP)	765	500	06-2012	replace existing transformer
Welton Spring	765	500	06-2014	new substation
Kemptown	765	500	06-2014	new substation

Transformer Project Name		High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
<b>SERC</b>					
Central	Bull Run	500	161	05-2010	Install a single phase 500-161-26.4-13.2 kV to replace failed transformer
	Moss Lake, GA	230	115	12-2010	Install a three phase 230-115-13 kV autotransformer
	Rutherford	500	161	06-2010	Install four, single phase 500-161 kV transformers
	West Ringgold, GA	230	115	06-2011	Install three phase 230-115-26 kV transformer
	Clay	500	161	06-2012	Install four single phase 500-161 kV transformers
	Guntersville Hydro Plant	161	115	03-2011	Retire six, single phase 154-115-11.5 kV transformers
	Guntersville Hydro Plant	161	115	03-2011	Install four, single phase 161-115-11.5, kV transformers
	Jackson	500	161	06-2011	Install three single phase 500-kV transformer bank
	Montgomery	500	161	06-2013	Install three, single phase 500-161 kV transformers
	Phipps Bend	500	161	12-2012	Install one, single phase 500-161 kV transformers (spare)
4th Middletown 345/138kV	345	138	05-2019	Add 4th 345/138kV @ Middletown	
Delta	Magee sub	161	115	06-2010	Upgrade Magee Auto 1 to 336 MVA
	Magee sub	161	115	06-2010	Upgrade Magee auto 2 to 336 MVA
	Sarepta Project	345	115	06-2011	New auto at Sarepta
	Acadiana Area Improvement Project	230	138	06-2011	Add auto at Meaux – Phase I
	Acadiana Area Improvement Project	500	230	06-2011	Add new auto at Richard – Phase I
	Acadiana Area Improvement Project	500	230	06-2012	Add a second auto at Wells – Phase II
	Add auto at Alliance	230	115	06-2012	Add new 230/115 auto at Alliance
	Add auto at Lewis Creek	230	138	06-2011	Add a 230/138 auto at Lewis Creek
	Add auto at new Bayou Laboutte	500	230	06-2012	Add new 500/230 auto at new Bayou Laboutte station
	Blackberry	345	161	06-2012	Transformer #1
	Enon	345	161	07-2018	Transformer # 2
	Getwell Area Improvement	230	115	06-2015	Add auto at Senatobia
	Grenada - Winoda - Greenwood	230	115	06-2012	Add auto at S. Grenada – Area Improvement
	Holland bottoms Phase 1	500	115	06-2011	Add new Holland Bottoms station and transformer
	Holland Bottoms Phase 2	500	161	06-2012	Add second auto at Holland Bottoms
	Huben	345	161	07-2014	Transformer #2
	McAdams Area Upgrades	500	230	06-2011	Add second auto at McAdams at 560 MVA
	Sportsman Acres	345	161	06-2010	Transformer #1
	Sportsman Acres	345	161	06-2010	Transformer #2

Transformer Project Name		High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Gateway	Page area	345	138	06-2019	Install 2-560MVA Xfmrs supplied from Campbell, Mason, and Sioux
	Belleau Sub	345	138	06-2013	Add 2nd Xfmr 560MVA
	Camden Sub	161	138	06-2016	Install 300MVA autotransformer to supply Ullman
	Carrier Mills 161/69 Transformer	161	99	06-2013	Transformer located at the new Carrier Mills Substation site
	Fargo Sub	345	138	12-2016	New 560MVA Xfmr supplied from Duck Creek - Tazewell
	Grand Tower Sub	345	138	12-2016	Install 560MVA Xfmr supplied from Baldwin and NW Cape
	Hutsonville Sub	345	138	06-2018	Install 560MVA Xfmr supplied from Merom
	Joppa Switching Station	345	161	06-2015	Add 2nd Xfmr 560MVA
	Kansas	345	138	06-2015	Add 2nd 448MVA Xfmr
	Kelso Sub	345	161	06-2014	Replace existing 336MVA with 450MVA
	Mascoutah Area Sub	345	138	06-2015	Install 560MVA Xfmr supplied from Baldwin-Prairie State
	Mason Sub	345	138	06-2014	Replace existing 560MVA Xfmr #2 with 700MVA
	Miller Sub	161	138	06-2015	Install 300MVA Xfmr to convert Miller-Zion to 161kV
	NW Cape Sub (new)	345	161	06-2016	Install 560MVA Xfmr supplied from Lutesville
	Overton Sub	345	161	06-2014	Add 2nd Xfmr 450MVA
	Quincy Area Sub	345	138	06-2016	Install 450MVA Xfmr supplied from Palmyra
	Rising Sub	345	138	06-2014	Replace existing transformer with 560MVA unit
	Sidney Sub	345	138	06-2014	Replace existing 560MVA with 700MVA
	South Bloomington Sub	345	138	12-2014	Install 560MVA Xfmr
	Stallings Sub	345	138	06-2012	Replace existing 500MVA unit with 700MVA unit
	West Adair	345	161	06-2014	Install 560MVA Xfmr supplied from Thomas Hill - Ottumwa
	Barnett Sub	345	138	06-2019	Install 560MVA Xfmr supplied from Loose Creek - Pleasant Hill
	Bunsonville Sub	345	138	06-2019	Add 2nd 560MVA Xfmr
	Campbell Sub	345	138	06-2019	Add 2nd 560MVA Xfmr
	Dupo Area Sub	345	138	06-2019	Install 560MVA Xfmr supplied from Cahokia
	Galesburg Sub	345	138	06-2018	Install 560MVA Xfmr supplied from Fargo and Oak Grove
	Latham Sub	345	138	06-2019	Add 2nd 448MVA Xfmr
	Marion South Sub	161	138	12-2019	Add 2nd Xfmr 300MVA
Meredosia Sub	345	138	06-2018	New 450MVA Xfmr supplied from Quincy	
Mt. Zion (Decatur area)	345	138	06-2017	Install 560MVA Transformer supplied from Pana and Kansas	

Transformer Project Name		High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Southeastern	Carriere SW	230	115	05-2011	New Substation / Under Construction
	Evans Primary	230	115	06-2010	replace 125 MVA, 230/230-kV xfr W/ 300 MVA xfr
	Logtown West	230	115	10-2010	Replace transformer / On order
	Ola	230	115	06-2010	Expand existing 115 kV substation for 230 kV operations.
	Purvis Bulk Transformer Replacement	230	161	06-2010	upgrading tie transformer at Purvis bulk
	Thomson	500	230	06-2010	new 1344 MVA, 500/230-kV xfr -- under construction
	Thomson	230	115	06-2010	replace 140 MVA, 230/230-kV xfr W/ 300 MVA xfr
	2nd 230/115kV Auto @ Co Line Rd	230	115	05-2014	Planned
	Autaugaville 500/230kV Auto	500	230	05-2013	Planned
	Brentwood	230	115	12-2010	400 MVA Bank #2
	Corn Crib 230/115 kV Project	230	115	06-2012	New 230/115-kV substation with a 300MVA bank
	East Social Circle	230	115	06-2014	Second 400 MVA transformer
	East Walton	500	230	06-2014	New 500 kV and 230 kV substation
	Factory Shoals 230/115kV	230	115	05-2011	New 230/115-kV substation with a 300MVA bank
	Farley 500/230kV #1 & #2 Autos	500	230	05-2016	Planned
	Greene County AutoBank	230	115	05-2013	Add 400MVA 230/115kV Autobank#2 at Plant Greene County
	Holt TS - Tuscaloosa TS AutoBank	230	115	05-2018	Install 230/115kV AutoBank at Tuscaloosa TS and convert the Holt TS - Tuscaloosa TS Transmission Line to 230kV operation.
	Hopewell	230	115	06-2013	Re-rate to 336 MVA
	Meldrim	230	115	06-2012	new 300 MVA, 230/230-kV xfr
	Sharon Springs	230	115	06-2013	
	Silverhill	230	115	06-2021	Install a third autobank (400MVA unit)
	South Bessemer AUTO #2	230	115	05-2018	Planned
	South Duncanville AutoBank	230	115	05-2016	Add 400MVA 230/115kV Autobank at South Duncanville
	2nd 230/115kV Auto @ N. Opelika	230	115	05-2019	Planned
	Boulevard	230	115	06-2015	New 300 MVA, 230/230-kV xfr
	Dorchester	230	115	06-2017	2nd 400 MVA, 230/230-kV xfr
East Carrollton 230/115kV transformer	230	115	05-2017	New 230/115-kV substation with a 300MVA bank	
Gainesville #2 230/115 kV Bank B	230	115	06-2015	Bundle LS jumpers and main bus, and raise the relay settings on the LSBUOC to	

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status	
				allow for the Bank bonus rating of 339 MVA.	
Gainesville #2 230/115 kV Bank B	230	115	06-2018	Replace the existing autobank with a 400 MVA autobank.	
Gainesville #2 230/115kV Bank C	230	115	06-2018	Replace the existing autobank with a 400 MVA autobank.	
Gainesville #2 230/115kV Bank C	230	115	06-2015	Replace LS switches and jumpers, and raise the relay setting on the LSBUOC to allow a Bank bonus rating of 330 MVA.	
Laguna Beach	230	115	06-2013	400 MVA Bank#2	
McIntosh	230	115	06-2018	replace 280 MVA, 230/230-kV xfr W/ 400 MVA xfr	
Middle Fork 500/230 kV Project	500	230	06-2018	2016 MVA	
O'Hara 500/230 - kV Tfm#2 Addition	500	230	06-2016	Add a second 2000 MVA, 500/230-kV tfm. at O'Hara	
Offerman Third 230/115 kV Transformer	230	115	06-2017	140 MVA	
Orange Grove	230	115	06-2017	New Substation	
Plant McDon. Network Impvmts-P'tree Tfm. Removal	230	100	06-2012	Plant McDon. Network Impvmts-P'tree Tfm. Removal	
Rosewell 230/115 kV Transformer Project	230	115	05-2015	Install a 230/115kV transformer in the Roswell substation	
S. Macon 230/115kV TFM Replacement	230	115	06-2016	Replace existing autobanks w/ 400MVA autobanks	
Santa Rosa BK1	230	115	06-2015	400 MVA Bank#1	
Santa Rosa BK2	230	115	06-2015	400 MVA Bank#2	
Scottdale 230/115kV Transformer	230	115	05-2018	Add a 2nd 230/115kV transformer at Scottdale	
Shoal River	230	115	06-2017	400 MVA Bank#2	
Snellville 230/115 kV Transformer	230	115	05-2013	Replace 1600A low-side breaker with 2000A breaker	
South Metro Atlanta Project Phase-3	230	115	06-2017	Install 1- 400 MVA Tfm. at McDonough Primary substation	
Turf Club	230	115	05-2021	Conceptual	
Vimville	230	115	06-2014	New Substation	
Waynesboro	230	115	06-2019	replace 280 MVA, 230/230-kV xfr W/ 400 MVA xfr	
VACAR	Asheboro 230 kV Transformer Replacement	230	115	06-2011	Replace two existing 200 MVA Transformers with 300 MVA transformers.
	b0770	230	115	05-2010	Second transformer at Lanexa
	Enka 230 kV Substation	230	115	12-2010	Install 1- 300 MVA 230 /115 kV Transformer at existing 115 kV Substation
	b0325	230	115	06-2011	second Everetts transformer

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
b0329	500	230	05-2011	second Suffolk transformer
b0342	230	115	05-2010	Trowbridge second transformer
b0756	500	115	11-2013	second Chancellor transformer
b0758	230	115	06-2013	second Fredericksburg transformer
b0772	230	115	06-2010	second Transformer at Elmont
b1058	230	115	06-2014	third Suffolk transformer
Barnwell 230/115kV 336MVA #1	230	115	05-2016	Planned
Cainhoy 230/115kV 336MVA #1	230	115	05-2012	Planned
Carolina Forest	230	115	12-2010	Planned 230/115 kV Substation
Columbia Ind 230/115kV 336MVA #2	230	115	05-2015	Planned
DennyTerrace 230/115kV 36MVA#3	230	115	04-2015	Planned
Folkstone 230 kV Substation	230	115	06-2013	Instal 1-200 MVA 230/115 kV Transformer
Horse Gap to Watauga Transformer Relocation	230	100	12-2016	Move three single phase transformers from Horse Gap Substation to new Watauga 230KV Substation
Lake Murray 230/115kV 336MVA #2	230	115	05-2011	Planned
Lake Murray 230/115kV 336MVA #3	230	115	05-2011	Planned
Mt Olive 230 kV Substation	230	115	12-2011	Install 1-200MVA 230/115 kV Transformer.
Okatee 230/115kV 336MVA #1	230	115	12-2014	Planned
Orangeburg	230	115	06-2012	Planned 230/115 kV Substation
West End 230 kV Transformer	230	115	06-2012	Replace existing 200 MVA transformers with new 300 MVA transformers
Bucksville	230	115	06-2014	Planned 230/115 kV Substation
Fayetteville 230/115 Replace Transformers	230	115	06-2014	Replace both 200 MVA transformer banks with 300 MVA banks.
Selma 230/115 kV Add 2nd bank	230	115	06-2013	Add a 200 MVA Transformer Bank #2
Wassamaw	230	115	06-2016	Planned 230/115 kV Sub.
<b>SPP</b>				
Tonnece 345/161	345	161	12-2011	Source for the 161 kV transmission line from Tonnece to Siloam Springs
Acadiana Load Pocket Upgrade	230	138	06-2012	180 MVA base rating, Auto transformer
Fort Smith	500	161	06-2017	Install 500/161kV bus tie transformer at Ft. Smith/On Time
Gracemont	345	138	12-2011	Install 345/138kV bus tie transformer at new Gracemont substation near Anadarko/On Time

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Johnston County	345	138	05-2011	Install 345/138kV bus tie transformer at new Johnston County substation near Coalgate/On Time
Sunnyside	345	138	04-2012	Install 345/138kV bus tie transformer at Sunnyside near Ardmore/On Time
Woodward EHV	345	138	03-2010	Install 345/138kV bus tie transformer at new Woodward EHV substation near Woodward Ok/On Time
Woodward EHV	345	138	05-2014	Install 345/138kV bus tie transformer at existing Woodward EHV substation near Woodward Ok/On Time
Hitchland Project	345	230	04-2010	Project in final design - transformer on order
Hitchland Project	230	115	06-2010	Project in final design - transformer on order
Ochiltree	230	115	06-2012	
Legacy	115	69	06-2011	
Eagle Creek	115	69	04-2011	
Wheeler	230	115	06-2010	
Howard	115	69	06-2010	
Medicine Lodge 138/115kV Transformer	138	115	06-2013	Required by SPP
Rose Hill	345	115	01-2013	
87th Street	345	115	12-2012	
Auburn	230	115	06-2013	
Summit	345	115	06-2014	
Baldwin Creek	230	115	06-2014	
Ring Bus	115	13.8	05-2012	In Work, part of our distribution network.
Segura Auto	230	138	08-2011	Autotransformer at Segura substation
Richard Auto	500	230	08-2011	Autotransformer at Richard substation
Wells Auto #2	500	230	08-2012	Second Autotransformer at Wells Substation
<b>TRE</b>				
10TPIT0112	345	138	03-2010	Sandow Switch Third 345/138 kV autotransformer
09TPIT0013	345	138	03-2010	Skyline - Install a Third 345kV Autotransformer
09TPIT0086	345	138	03-2010	Rothwood 345/138 kV substation
10TPIT0008	345	138	05-2010	Hutto Switch and 345/138 kV autotransformer
10TPIT0058	345	138	05-2010	Lytton Springs Autotransformer Addition
10TPIT0125	345	138	12-2010	Killeen Switch

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
10TPIT0113	345	138	12-2010	Odessa EHV Third 345/138 kV autotransformer
10TPIT0115	345	138	05-2011	Gibbons Creek Substation Upgrade Project
12TPIT0023	345	138	05-2011	Gillespie Autotransformer Addition
12TPIT0040	345	138	09-2011	Scurry County South Switch (Central A)
12TPIT0041	345	138	09-2011	Dermott Switch (Central B)
08TPIT0032	345	138	12-2011	Gilleland 345/138kV autotransformer
11TPIT0063	345	138	12-2011	Central Bluff Switch
10TPIT0031	345	138	03-2012	Dunlap Autotransformer
11TPIT0034	345	138	05-2012	Sargent Road 345/138 kV autotransformer
12TPIT0046	345	138	05-2012	Zenith 138kV
07TPIT0042	345	138	06-2012	2nd Lewisville Auto
13TPIT0012	345	138	12-2012	Zorn Autotransformer Addition
13TPIT0062	345	138	05-2013	Cedar Hill Switch second 345/138 kV autotransformer
13TPIT0044	345	138	06-2013	Hill Country - Install Fourth 345/138 kV Autotransformer
12TPIT0022	345	138	06-2013	North McCamey Autotransformer Addition
11TPIT0026	345	138	06-2014	Cagnon - Install a Third 345kV Autotransformer
11TPIT0003	345	138	03-2016	Rio Bravo, 345 kV SS with 345/138 kV autotransformer
13TPIT0005	345	138	03-2016	Sol, Build 345 KV SS
08TPIT0006	345	138	05-2016	South McAllen, new SS with 345/138 kV autotransformer
00TPITno10	345	138	07-2017	Loma Alta 345kV station and autotransformer
00TPITno15	345	138	12-2017	Ranchito, New SS with 345/138 kV autotransformer
07TPIT0002	345	138	05-2018	Trinity Switch 345/138 kV autotransformer
08TPIT0071	345	138	05-2018	North Lake 345/138 kV autotransformer
09TPIT0042	345	138	05-2018	Collin 345/138 kV autotransformer
08TPIT0005	345	138	03-2016	Frontera, add SS with 345/138 kV autotransformer
13TPIT0001	345	138	12-2017	Build 138 KV station with 138 KV Auto and Ring Bus
<b>WECC</b>				
Keephills 3	500	240	09-2010	
Sun Valley 500/230 kV	500	230	05-2014	A new 500/230kV substation, old name was TS5.
TS1 230/69 kV	230	69	12-2012	A new 230/69kV substation.
Flagstaff Interconnection	345	69	06-2010	A 345/69kV xfmr interconnected into WAPA's Flagstaff substation.

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Raceway 500kV	500	230	06-2010	Navajo - Westwing 500 kV will be looped into Raceway. The new 500kV bus will have xfmr's into the existing 230kV Raceway substation.
Selkirk Transformer Addition	500	230	09-2011	Add transformer T4
Saltery Bay substation	230	138	06-2010	One new transformer, one from Malaspina.
Central Vancouver Island	230	138	10-2010	
Minnekhata	230	69	12-2011	
Lower Valley Reinforcement Project (Hooper Springs)	138	115	Fall 2012	A 138/115 kV transformer. Part of the Lower Valley Project. Joint project with PAC.
Picante 345/115 kV Autotransformer	345	115	05-2010	New Substation to feed growing load in the Ft. Bliss area
Bentley Terminal Station	230	138	12-2011	
Bentley Terminal Station	230	138	12-2011	One existing 230/138 kV transformer moved to Bentley from R.G. Anderson
Bentley Terminal Station	138	63	12-2011	One 138/63 kV transformer to connect line 43L
Bentley Terminal Station	161	63	12-2011	One 161/63 kV transformer to connect line 11L.
Okanagan Transmission Reinforcement	230	63	12-2011	230/63 kV transformer to replace the one relocated to Bentley Terminal
King Substation	230	138	10-2011	
Mora Substation	230	138	05-2013	230/138 kV auto-transformer.
Bowmont Substation	230	138	06-2010	230/138 kV auto-transformer.
Gateway West Transm.	500	230	06-2010	
Gateway West Transm.	500	345	06-2016	
Century Receiving Station B Transformer G	287	138	12-2010	Transformer Upgrade
Century Receiving Station B Transformer F	287	138	06-2011	Transformer Upgrade
McDonald 230/138kV Transformer	230	138	06-2014	Load service to McDonald
Northwest 500/230 kV Transformer	500	230	06-2014	
Harry Allen 345/230 kV Transformer	345	230	12-2010	Red Butte Backup
Sunrise 500/230 kV Transformer	500	230	06-2018	
Thunderbird 230/138kV Transformer	230	138	06-2018	
Amaragosa 500/230kV Transformer	500	230	06-2016	Renewable
Brooks 230/138 kV Transformer	230	138	06-2017	
Thunderbird 500/230 kV Transformer	500	230	06-2020	
Clover 500-345 kV #1&#2	500	345	2017-2019	Energy Gateway
Sigurd 500/345 kV #1	500	345	2017-2019	Energy Gateway

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Red Butte 500/345 kV #1 Transformer	500	345	2017-2019	Energy Gateway
Pilot Butte 500-230 kV New Sub	500	230	09-2017	Load Growth
Pilot Butte New 230-115 kV Sub/ Convert Bend Redmond 69 kV line	230	115	09-2017	Load Growth
Syracuse -Install 2nd 345-138 kV	345	138	05-2015	Improve capability for potential load growth
Terminal 3rd 345-138 kV transformer	345	138	05-2015	Improve capability for potential load growth. Maybe at installed Oquirrh.
Yellowtail Substation-Install	230	161	05-2018	Improve transmission capacity with load growth
Klamat Falls 500-230 kV New substation	230	115	09-2018	Load Growth
Three Mile Knoll-Install 2nd 345-138 kV	345	138	05-2018	Improves transmission capability with load growth.
Herndon 230/115kV Transformer (T1003)	230	115	05-2011	
Cooley Landing 115/60kv	115	60	05-2011	Transformer Replacement (T1033)
Humboldt 115/60kV Transformer (945B)	115	60	12-2012	
Rio Os 115kV Transformers (T985B)	230	115	05-2012	
Laporte 230 kV Substation Expansion	230	115	05-2012	Expansion of existing substation
Maxwelton Substation	115	12.5	11-2010	New substation to increase reliability at Whidbey Island.
Alderton Substation Transformer	230	115	11-2011	New 230/115-kV transformer at Alderton to feed load growth in Pierce County.
Lake Tradition Substation Transformer	230	115	11-2013	New 230/115-kV transformer at Lake Tradition to feed load growth in King County.
St. Clair Substation Transformer	230	115	11-2013	New 230/115-kV transformer at Alderton to feed load growth in Thurston County.
Sedro Woolley Substation Transformer #2	230	115	11-2014	New 230/115-kV transformer at Alderton to feed load growth in Skagit County.
Skagit Substation	115	12.5	11-2015	New substation to feed load growth in Skagit County.
Lakeside Substation Transformer	230	115	11-2016	New transformer at Lakeside to feed load growth in King County.
Berrydale Transformer	230	115	11-2017	New transformer at Berrydale to feed load growth in southeast King County.
Christopher Transformer	230	115	11-2017	New transformer at Christopher to feed load growth in south King County.
Lugo Bank 3AA	500	230	12-2010	
Beverly Park 230-115 kV Capacity Addition	230	115	11-2013	This project includes the addition of two 230-115 kV 300 MVA power transformers.
Adonis Substation	115	24.9	06-2011	115/24.9 kV substation
San Rafael 230/69 kV Transformer	230	69	06-2012	2nd Transformer
Bicknell 345/230 kV Transformer	345	230	06-2014	Transformer replacement
Greenlee 345/230 kV Transformer	345	230	06-2015	2nd Transformer
Erie 230-115 kV Sub	230	115	03-2010	
Gladstone 230-115 kV Sub	230	115	06-2010	

Transformer Project Name	High-Side Voltage (kV)	Low-Side Voltage (kV)	In-Service Date(s)	Description/Status
Arrow-Archer-Cheyenne Transmission	345	230	12-2013	
Burlington Substation Upgrade	230	115	12-2016	
Kiffen Canyon Sub & Phase Shifters	230	115	09-2012	Located between Glade Tap & Coyote Gulch Subs
Torrington transformer additions	115	34.5	03-2010	
Weld transformer additions	230	115	10-2011	Adding additional 200 MVA
Ault 230/115 kV transformer additions.	230	115	10-2010	
Cheyenne 2nd 230/115 kV additions	230	115	10-2013	
GEET 1	500	230	01-2015	Belongs to owner 73
GEET 2	500	230	06-2015	Belongs to owner 73
GEET 2	500	230	06-2015	Belongs to owner 73
Sunrise Powerlink	500	230	06-2011	New substation, 500/230kV.
Sunrise Powerlink	500	230	06-2011	New substation, 500/230kV 500/230/12 kV xfmr banks.
Sunrise Powerlink	500	230	06-2011	New substation, 500/230kV 500/230/12 kV xfmr banks.
Sunrise Powerlink	230	69	06-2011	San Luis Rey substation Add 3rd 230/69 xfmr bank.
Rapids 115/230-kV Transformer	230	115	12-2013	Transformer for new switchyard.
Horizon Auto-transformer 1	230	115	06-2012	Install a 230/115 kV, 320 MVA auto transformer at Horizon Substation and construct a new 230 kV line from Keeler Sub to Horizon Sub. Formerly Sunset Substation.
Harborton Auto-transformer	230	115	06-2018	Install a 230/115 kV, 320 MVA auto transformer at Harborton Substation and loop in Rivergate -Trojan 230 kV line
Horizon Auto-transformer 2	230	115	06-2018	Install a second 230/115 kV, 320 MVA auto transformer at Horizon Substation
Ft. Sage 345/120kV Transformer	345	120	06-2011	
Blackhawk 345/120kV Transformer	345	120	06-2012	
Bordertown 345/120kV Transformer	345	120	06-2012	
Robinson 345/500kV Transformer	500	345	06-2012	
Robinson 345/500kV Transformer #2	500	345	06-2012	
Blackhawk 345/120kV Transformer #2	345	120	06-2014	
Springerville #4	500	345	03-2010	
Southeast Valley Project	500		06-2011	
Abel Moody Project	230	69	06-2016	Load Service
Kyrene Transformer Add'n	500	230	06-2016	Load Service

## RELIABILITY ASSESSMENTS SUBCOMMITTEE ROSTER

<b>Chair</b>	Mark J. Kuras Senior Engineer	PJM Interconnection, L.L.C. 955 Jefferson Ave Valley Forge Corporate Center Norristown, Pennsylvania 19403	610-666-8924 610-666-4779 Fx <a href="mailto:kuras@pjm.com">kuras@pjm.com</a>
<b>Regional Entity Representatives — Members of the <i>Electric Reliability Organization: Reliability Assessment and Performance Analysis Group</i> (ERO-RAPA Group)</b>			
<b>Vice Chair, FRCC</b>	Vince Ordax Manager of Planning	Florida Reliability Coordinating Council 1408 N. Westshore Blvd Tampa, Florida 33607	813-207-7988 813-289-5646 Fx <a href="mailto:vordax@frcc.com">vordax@frcc.com</a>
<b>MRO</b>	John Seidel Principal Engineer	Midwest Reliability Organization 1970 Oakcrest Avenue Roseville, Minnesota 55113	651-855-1716 651-855-1712 Fx <a href="mailto:ja.seidel@midwestreliability.org">ja.seidel@midwestreliability.org</a>
<b>NPCC</b>	John G. Mosier, Jr. AVP-System Operations	Northeast Power Coordinating Council, Inc. 1040 Avenue of the Americas-10th floor New York, New York 10018	212-840-4907 212-302-2782 Fx <a href="mailto:jmosier@npcc.org">jmosier@npcc.org</a>
<b>RFC</b>	Jeffrey Mitchell, P.E. Director, Engineering	ReliabilityFirst Corporation 320 Springside Dr. Suite 300 Akron, Ohio 44333	330-247-3043 330-456-3648 Fx <a href="mailto:jeff.mitchell@rfirst.org">jeff.mitchell@rfirst.org</a>
<b>SERC</b>	Herbert Schrayshuen Director, Reliability Assessment	SERC Reliability Corporation 2815 Coliseum Centre Drive Charlotte, North Carolina 28217	704-940-8223 315-439 1390 Fx <a href="mailto:hschrayshuen@serc1.org">hschrayshuen@serc1.org</a>
<b>SPP</b>	David Kelley, P.E. Manager, Engineering Administration	Southwest Power Pool 16101 La Grande Drive Little Rock, Arkansas 72223	501-688-1671 501-821-3245 Fx <a href="mailto:dkelly@spp.org">dkelly@spp.org</a>
<b>TRE</b>	William C. Crews, P.E. Regional Planning Assessment Engineer, Sr.	Texas Regional Entity 2700 Via Fortuna Suite 225 Austin, Texas 78746	512-275-7533 <a href="mailto:curtis.crews@texasre.org">curtis.crews@texasre.org</a>
<b>WECC</b>	David J. Godfrey Director, Standards Development and Planning Services	Western Electricity Coordinating Council 155 North 400 West, Suite 200 Salt Lake City, Utah 84103	801-883-6863 801-582-3918 Fx <a href="mailto:dgodfrey@wecc.biz">dgodfrey@wecc.biz</a>

<b>TRE, ISO/RTO</b>	Dan M. Woodfin Director, System Planning	Electric Reliability Council of Texas, Inc. 2705 West Lake Dr. Taylor, Texas 76574	512-248-3115 512-248-4235 Fx <a href="mailto:dwoodfin@TRE.com">dwoodfin@TRE.com</a>
<b>MRO</b>	Hoa V. Nguyen Resource Planning Coordinator	Montana-Dakota Utilities Co. 400 North 4th Street Bismarck, North Dakota 58501	701-222-7656 701-222-7872 Fx <a href="mailto:hoa.nguyen@mdu.com">hoa.nguyen@mdu.com</a>
<b>ISO/RTO</b>	Peter Wong Manager, Resource Adequacy	ISO New England, Inc. One Sullivan Road Holyoke, Massachusetts 01040- 2841	413-535-4172 413-540-4203 Fx <a href="mailto:pwong@iso-ne.com">pwong@iso-ne.com</a>
<b>RFC</b>	Bernie M. Pasternack, P.E. Managing Director - Transmission Asset Management	American Electric Power 700 Morrison Road Gahanna, Ohio 43230-8250	614-552-1600 614-552-1602 Fx <a href="mailto:bmpasternack@aep.com">bmpasternack@aep.com</a>
<b>RFC, IOU</b>	Esam A. F. Khadr Manager - Delivery Planning	Public Service Electric and Gas Co. 80 Park PlazaT-14A Newark, New Jersey 07102	973-430-6731 973-622-1986 Fx <a href="mailto:Esam.Khadr@pseg.com">Esam.Khadr@pseg.com</a>
<b>SERC</b>	Hubert C. Young Manager of Transmission Planning	South Carolina Electric & Gas Co. 220 Operations Way MC J37 Cayce, South Carolina 29033	803-217-2030 803-933-7264 Fx <a href="mailto:cyoung@scana.com">cyoung@scana.com</a>
<b>SERC, DCWG Chair</b>	K. R. Chakravarthi Manager, Interconnection and Special Studies	Southern Company Services, Inc. Southern Company Services, Birmingham, Alabama 35203	205-257-6125 205-257-1040 Fx <a href="mailto:krchakra@southernco.com">krchakra@southernco.com</a>
<b>WECC, State/ Municipal Utility</b>	James Leigh-Kendall Regulatory Compliance Officer	Sacramento Municipal Utility District 6002 S Street b303 Sacramento, California 95852	916-732-5357 916-732-7527 Fx <a href="mailto:jleighk@smud.org">jleighk@smud.org</a>
<b>ISO/RTO</b>	Jesse Moser Manager, Regulatory Studies	Midwest ISO, Inc. P.O. Box 4202 Carmel, Indiana 46082-4202	612-718-6117 <a href="mailto:jmoser@midwestiso.org">jmoser@midwestiso.org</a>
<b>ISO/RTO</b>	John Lawhorn, P.E. Director, Regulatory and Economic Standards Transmission Asset Management	Midwest ISO, Inc. 1125 Energy Park Drive St. Paul, Minnesota 55108	651-632-8479 651-632-8417 Fx <a href="mailto:jlawhorn@midwestiso.org">jlawhorn@midwestiso.org</a>
<b>Canada-At- Large, ISO/RTO</b>	Dan Rochester, P. Eng. Manager, Reliability Standards and Assessments	Independent Electricity System Operator Station A, Box 4474 Toronto, Ontario M5W 4E5	905-855-6363 905-403-6932 Fx <a href="mailto:dan.rochester@ieso.ca">dan.rochester@ieso.ca</a>
<b>FERC</b>	Keith N. Collins	Federal Energy Regulatory	202-502-6383

	Manager, Electric Analysis Group	Commission 888 First Street, NE Washington, D.C. 20426	202-219-6449 Fx <a href="mailto:keith.collins@ferc.gov">keith.collins@ferc.gov</a>
<b>FERC</b>	Sedina Eric Electrical Engineer	Federal Energy Regulatory Commission 888 First Street, NE, 92-77 Washington, D.C. 20426	202-502-6441 202-219-1274 Fx <a href="mailto:sedina.eric@ferc.gov">sedina.eric@ferc.gov</a>
<b>RFC, LFWG Chair</b>	Bob Mariotti Supervisor – Short Term Forecasting	DTE Energy 2000 Second Avenue 787WCB Detroit, Michigan 48226-1279	313-235-6057 313-235-9583 Fx <a href="mailto:mariottir@dteenergy.com">mariottir@dteenergy.com</a>
<b>FRCC Alternate</b>	John Odom, Jr. Vice President of Planning and Operations	Florida Reliability Coordinating Council 1408 N. Westshore Blvd., Suite 1002 Tampa, Florida 33607-4512	813-207-7985 813-289-5646 Fx <a href="mailto:jodom@frcc.com">jodom@frcc.com</a>
<b>MRO Alternate</b>	Salva R. Andiappan Manager – Reliability Assessment and Performance Analysis	Midwest Reliability Organization 2774 Cleveland Avenue N. Roseville, Minnesota 55113	651-855-1719 651-855-1712 Fx <a href="mailto:sr.andiappan@midwestreliability.org">sr.andiappan@midwestreliability.org</a>
<b>RFC Alternate</b>	Paul Kure Senior Consultant, Resources	ReliabilityFirst Corporation 320 Springside Drive Suite 300 Akron, Ohio 44333	330-247-3057 330-456-3648 Fx <a href="mailto:paul.kure@rfirst.org">paul.kure@rfirst.org</a>
<b>SPP Alternate</b>	Alan C Wahlstrom Lead Engineer, Compliance	16101 La Grande Dr. Suite 103 Littlerock, Arkansas 72223	501-688-1624 501-664-6923 Fx <a href="mailto:awahlstrom@spp.org">awahlstrom@spp.org</a>
<b>WECC Alternate</b>	Richard H. Simons Staff Engineer	Western Electricity Coordinating Council 155 North 400 West, Suite 200 Salt Lake City, Utah 84103	(801) 883-6880 (801) 582-3918 Fx <a href="mailto:dick@wecc.biz">dick@wecc.biz</a>
<b>OC Liaison</b>	Jerry Rust President	Northwest Power Pool Corporation 7505 NE Ambassador Place, St R Portland, Oregon 97035	503-445-1074 503-445-1070 Fx <a href="mailto:jerry@nwpp.org">jerry@nwpp.org</a>
<b>OC Liaison</b>	James Useldinger Manager, T&D System Operations	Kansas City Power & Light Co. PO Box 418679 Kansas City, Missouri 64141	816-654-1212 816-654-1189 Fx <a href="mailto:jim.useldinger@kcpl.com">jim.useldinger@kcpl.com</a>
<b>Observer DOE</b>	Patricia Hoffman Acting Director Research and Development	Department of Energy 1000 Independence Avenue SW 6e-069 Washington, D.C. 20045	202-586-1411 <a href="mailto:patricia.hoffman@hq.doe.gov">patricia.hoffman@hq.doe.gov</a>

<b>Observer DOE</b>	Peter Balash Senior Economist	U.S. Department of Energy 626 Cochrans Mill Road P.O. Box 10940 Pittsburgh, Pennsylvania 15236	412-386-5753 412-386-5917 Fx <a href="mailto:balash@netl.doe.gov">balash@netl.doe.gov</a>
<b>Observer DOE</b>	Erik Paul Shuster Engineer	U.S. Department of Energy 626 Cochrans Mill Road P.O. Box 10940 Pittsburgh, Pennsylvania 15236	412-386-4104 <a href="mailto:erik.shuster@netl.doe.gov">erik.shuster@netl.doe.gov</a>
<b>Observer DOE</b>	Maria A. Hanley Program Analyst	U.S. Department of Energy 626 Cochrans Mill Road MS922-342C P.O. Box 10940 Pittsburgh, Pennsylvania 15236	412-386-5373 412-386-5917 Fx <a href="mailto:maria.hanley@netl.doe.gov">maria.hanley@netl.doe.gov</a>
<b>Observer</b>	C. Richard Bozek Director, Environmental Policy	Edison Electric Institute 701 Pennsylvania Avenue, NW Washington, D.C. 20004	202-508-5641 <a href="mailto:rbozek@eei.org">rbozek@eei.org</a>
<b>Observer</b>	Erick Hasegawa Engineer	Midwest ISO, Inc. Carmel Office PO Box 4202 Carmel, Indiana 46082	317-910-8626 <a href="mailto:ehasegawa@midwestiso.org">ehasegawa@midwestiso.org</a>

## NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION STAFF

### North American Electric Reliability Corporation

116-390 Village Boulevard

Princeton, NJ 08540-5721

Telephone: (609) 452-8060

Fax: (609) 452-9550

#### *RELIABILITY ASSESSMENT AND PERFORMANCE ANALYSIS GROUP*

Mark G. Lauby	Director of Reliability Assessment and Performance Analysis	<a href="mailto:mark.lauby@nerc.net">mark.lauby@nerc.net</a>
Jessica Bian	Manager of Benchmarking	<a href="mailto:jessica.bian@nerc.net">jessica.bian@nerc.net</a>
John Moura	Technical Analyst, Reliability Assessment	<a href="mailto:john.moura@nerc.net">john.moura@nerc.net</a>
Eric Rollison	Engineer of Reliability Assessments	<a href="mailto:eric.rollison@nerc.net">eric.rollison@nerc.net</a>
Rhaiza Villafranca	Technical Analyst, Benchmarking	<a href="mailto:rhaiza.villafranca@nerc.net">rhaiza.villafranca@nerc.net</a>
Matt Turpen	Intern, Reliability Assessment and Performance Analysis	<a href="mailto:matt.turpen@nerc.net">matt.turpen@nerc.net</a>

## ERRATA

**November 12, 2010**

*Pg 30-35: Figure 5a-5f: Summer and Winter Demand, Resources, and Reserve Margins*

All values for the NPCC-New York subregion were corrected.

*Pg 16: Footnote 26*

A link to the *2010 Special Reliability Assessment Scenario: Resource Adequacy Impacts of Potential U.S. Environmental Regulations* was added. [http://www.nerc.com/files/EPA\\_Scenario\\_Final.pdf](http://www.nerc.com/files/EPA_Scenario_Final.pdf)

*Pg 22: Table 3: Transmission Plans by Circuit Mile Additions >100kV*

- A correction was made to the 2009 Existing Transmission Circuit Miles for SERC-Southeastern. This correction also affected the SERC 2009 Existing Transmission Circuit Miles and the Total Transmission by 2019 Transmission Circuit Miles.
- A correction was made to the WECC US Transmission Circuit Mile projections (“Under Construction”, “2010-2014 Planned Additions”, “2010-2014 Conceptual Additions”, “2015-2019 Planned Additions”, “2015-2019 Conceptual Additions”, and “Total by 2019”). The values of the subregions now sum to the WECC US total values.

to ensure  
the **reliability** of the  
bulk power system

