

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

2016 Summer Reliability Assessment

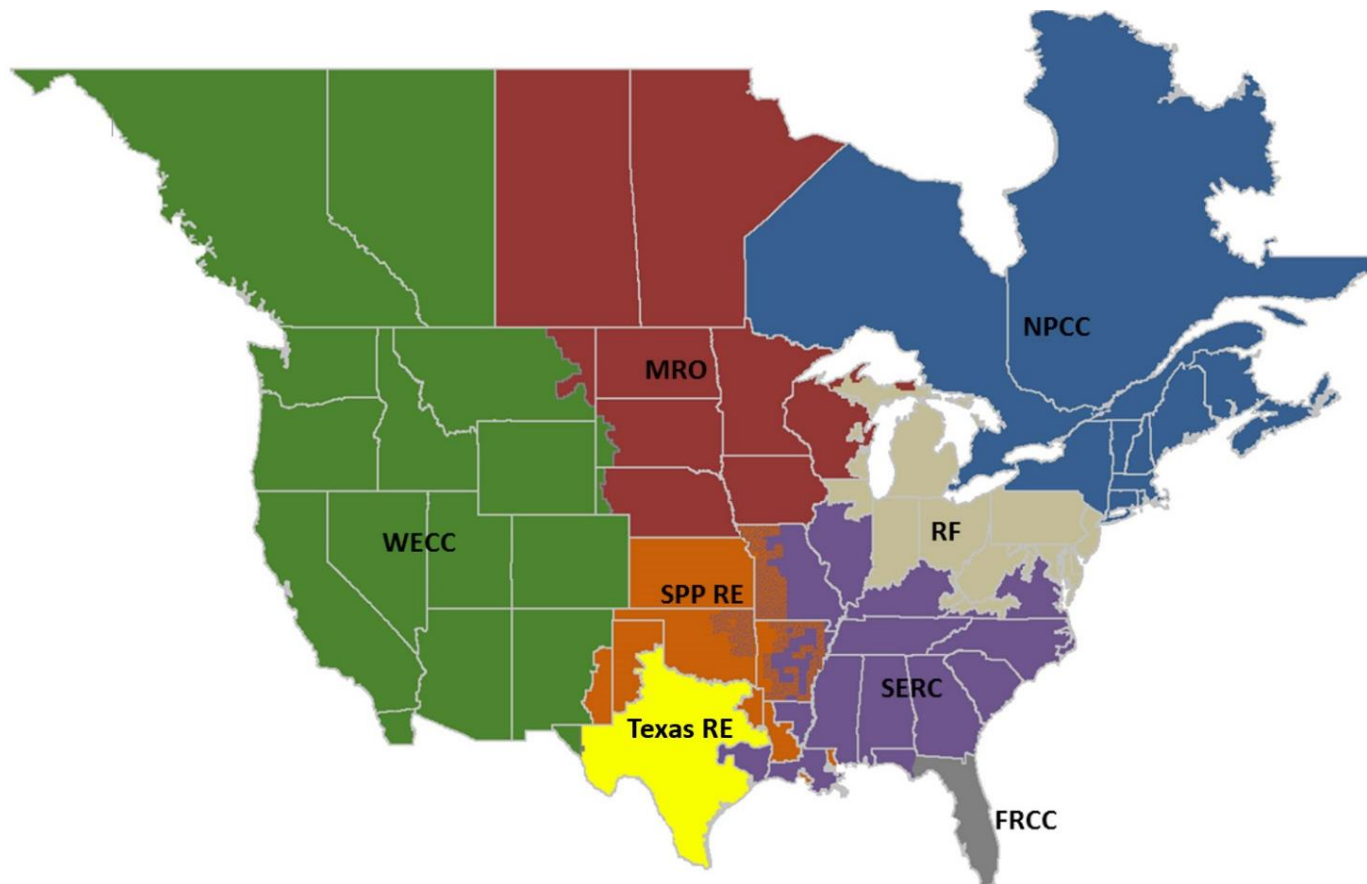


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Preface

The North American Electric Reliability Corporation (NERC) is a not-for-profit international regulatory authority whose mission is to assure the reliability of the bulk power system (BPS) in North America. NERC develops and enforces Reliability Standards; annually assesses seasonal and long-term reliability; monitors the BPS through system awareness; and educates, trains, and certifies industry personnel. NERC's area of responsibility spans the continental United States, Canada, and the northern portion of Baja California in Mexico. NERC is the electric reliability organization (ERO) for North America, subject to oversight by the Federal Energy Regulatory Commission (FERC) and governmental authorities in Canada. NERC's jurisdiction includes users, owners, and operators of the BPS, which serve more than 334 million people. The North American BPS is divided into eight Regional Entity (RE) boundaries as shown in the map below. The assessment areas are shown on page 4. Refer to the [Data Concepts and Assumptions Guide](#) for more information.





FRCC—Florida Reliability Coordinating Council

FRCC

MRO—Midwest Reliability Organization

- MRO-SaskPower
- MRO-Manitoba Hydro
- MISO

SPP RE—Southwest Power Pool Regional Entity

SPP

Texas RE—Texas Reliability Entity

Texas RE-ERCOT

NPCC—Northeast Power Coordinating Council

- NPCC-New England
- NPCC-Maritimes
- NPCC-New York
- NPCC-Ontario
- NPCC-Québec

RF—ReliabilityFirst

PJM

WECC—Western Electricity Coordinating Council

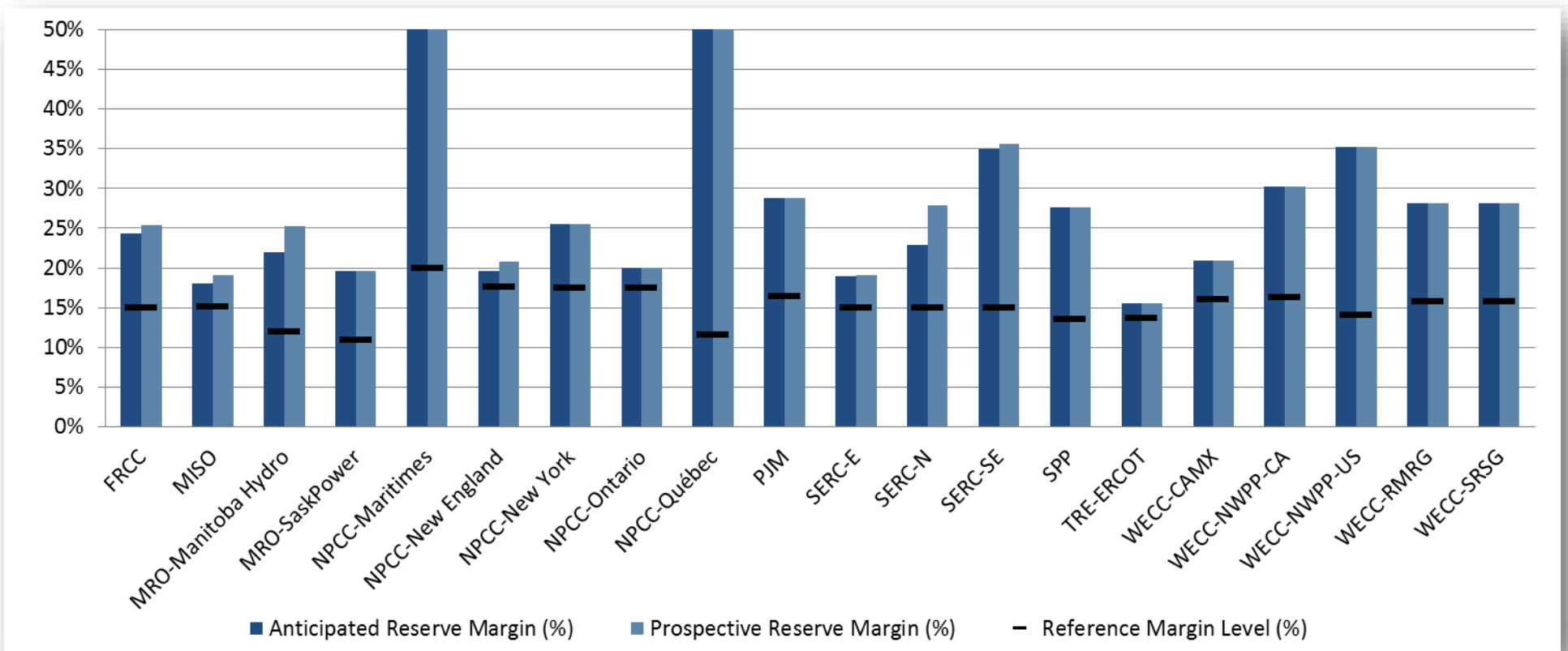
- WECC-NWPP-CA
- WECC-RMRG
- WECC-CA/MX
- WECC-SRSG
- WECC-NWPP-US

SERC—SERC Reliability Corporation

- SERC-East
- SERC-North
- SERC-Southeast

Overview

Anticipated resources meet the reference margin level in all assessment areas for Summer 2016 as illustrated below. Refer to [Data Concepts and Assumptions Guide](#) for additional information.



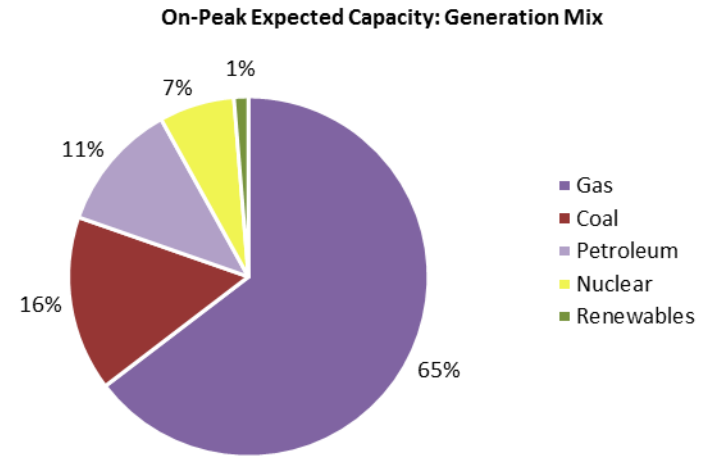
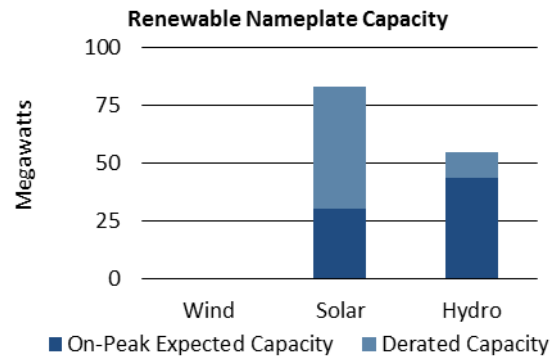
2016 Anticipated/Prospective Reserve Margins Compared to Reference Margin Level



FRCC

The Florida Reliability Coordinating Council's (FRCC) membership includes 30 Regional Entity Division members and 23 Member Services Division members composed of investor-owned utilities (IOUs), cooperative systems, municipal utilities, power marketers, and independent power producers. FRCC is divided into 10 Balancing Authorities with 70 registered entities (both members and nonmembers) performing the functions identified in the NERC Reliability Functional Model and defined in the NERC Reliability Standards. The Region contains a population of over 16 million people and has a geographic coverage of about 50,000 square miles over Florida.

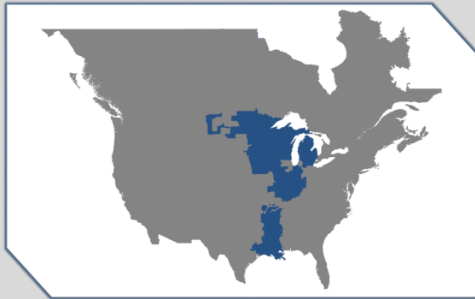
FRCC's [2016 Summer Assessment](#) provides more information



FRCC Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	46,452	47,654	2.59%
Demand Response: Available	3,101	2,924	-5.71%
Net Internal Demand	43,351	44,730	3.18%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	53,673	53,110	-1.05%
Tier 1 Planned Capacity	0	1,237	-
Net Firm Capacity Transfers	2,026	1,260	-37.81%
Anticipated Resources	55,699	55,607	-0.16%
Existing-Other Capacity	492	505	2.75%
Prospective Resources	56,190	56,112	-0.14%
Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	28.48%	24.32%	-4.17
Prospective Reserve Margin	29.62%	25.45%	-4.17
Reference Margin Level	15.00%	15.00%	0.00

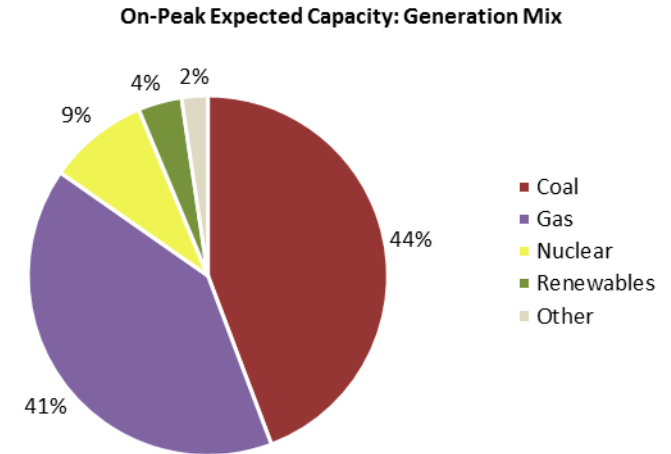
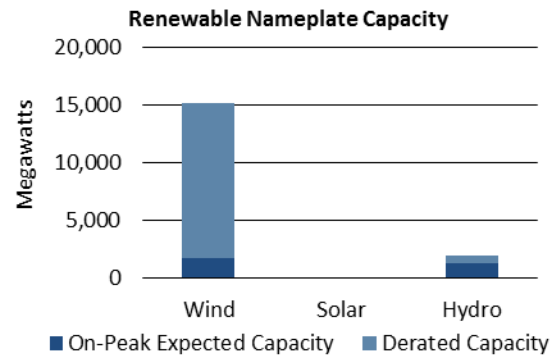
Highlights

- The anticipated reserve margin is forecasted to be 24 percent, which is above the reference margin level of 15 percent.



MISO

The Midcontinent Independent System Operator, Inc. (MISO) is a not-for-profit, member-based organization administering wholesale electricity markets that provide customers with valued service; reliable, cost-effective systems and operations; dependable and transparent prices; open access to markets; and planning for long-term efficiency. MISO manages energy, reliability, and operating reserve markets that consist of 36 local Balancing Authorities and 394 market participants, serving approximately 42 million customers. Although parts of MISO fall in three NERC Regions, MRO is responsible for coordinating data and information submitted for NERC’s reliability assessments.

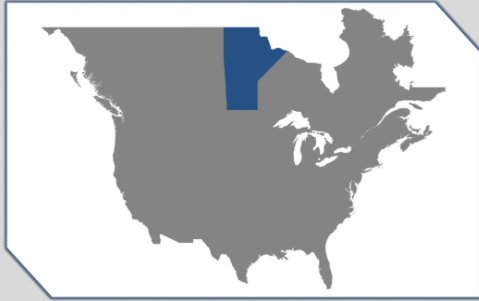


MISO Resource Adequacy Data*			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	127,319	126,081	-0.97%
Demand Response: Available	5,031	4,923	-2.15%
Net Internal Demand	122,288	121,158	-0.92%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	144,388	142,343	-1.42%
Tier 1 Planned Capacity	0	0	-
Net Firm Capacity Transfers	-56	627	1217.11%
Anticipated Resources	144,332	142,970	-0.94%
Existing-Other Capacity	2,354	1,351	-42.60%
Prospective Resources	146,686	144,321	-1.61%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	18.03%	18.00%	-0.02
Prospective Reserve Margin	19.95%	19.12%	-0.83
Reference Margin Level	14.30%	15.20%	0.90

Highlights

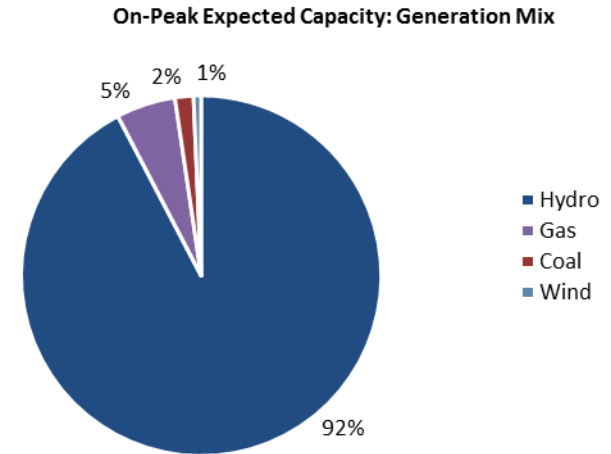
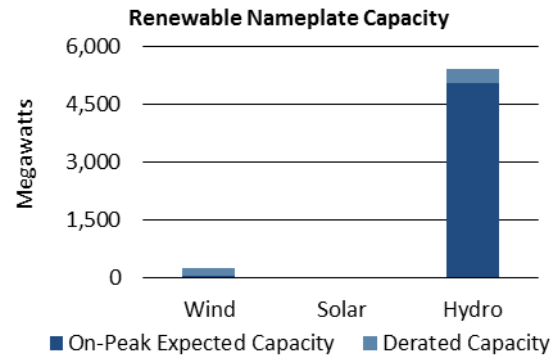
- The anticipated reserve margin is forecasted to be 18 percent, which is above the reference margin level of 15.2 percent.
- MISO will be holding a [summer readiness workshop](#) that reviews resource and transmission adequacy, operating procedures, and overall reliability of the BPS.

*The load and resources in the Mid-continent Area Power Pool (MAPP) Assessment Area, previously part of MRO, have been integrated primarily into SPP, with smaller portions integrated into MISO and WECC (WAPA). This development should be considered when comparing 2015 and 2016 SRA data.



MRO-Manitoba Hydro

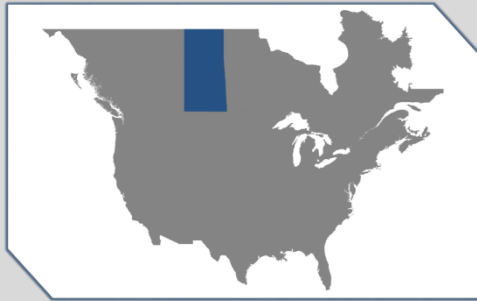
Manitoba Hydro is a provincial crown corporation that provides electricity to 556,000 customers throughout Manitoba and natural gas service to 272,000 customers in various communities throughout southern Manitoba. The Province of Manitoba is 250,946 square miles. Manitoba Hydro is winter peaking. No change in the footprint area is expected during the assessment period. Manitoba Hydro is its own Planning Coordinator and Balancing Authority. Manitoba Hydro is a coordinating member of MISO. MISO is the Reliability Coordinator for Manitoba Hydro



MRO-Manitoba Hydro Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	3,151	3,312	5.11%
Demand Response: Available	0	0	-
Net Internal Demand	3,151	3,312	5.11%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	5,396	5,435	0.73%
Tier 1 Planned Capacity	0	0	-
Net Firm Capacity Transfers	-1,095	-1,396	-27.49%
Anticipated Resources	4,301	4,039	-6.08%
Existing-Other Capacity	155	109	-29.94%
Prospective Resources	4,456	4,148	-6.91%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	36.00%	21.96%	-14.04
Prospective Reserve Margin	41.00%	25.24%	-15.76
Reference Margin Level	12.00%	12.00%	0.00

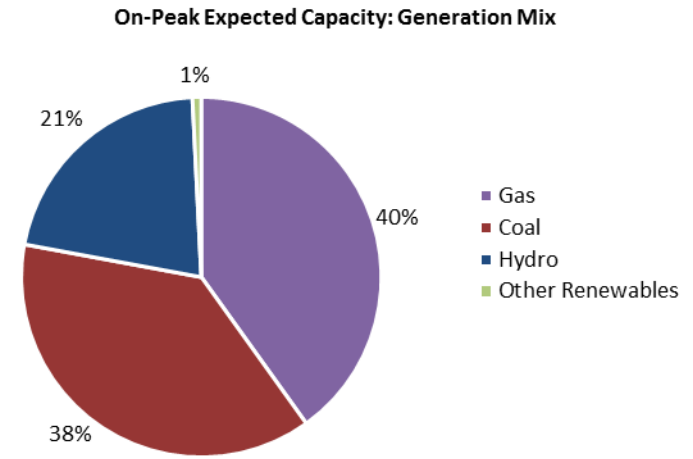
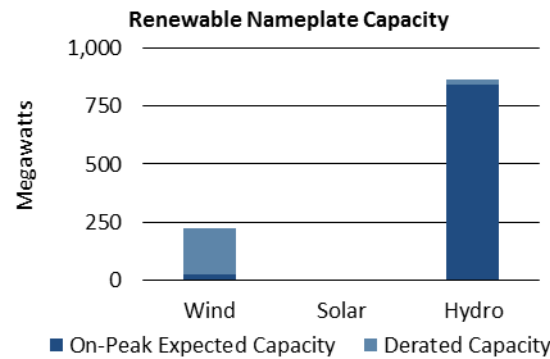
Highlights

- The anticipated reserve margin is forecasted to be 22 percent, which is above the reference margin level of 12 percent.
- No significant operational challenges to the BPS’s reliability for Summer 2016 are anticipated.



MRO-SaskPower

Saskatchewan is a province of Canada and comprises a geographic area of 651,900 square kilometers (251,700 square miles) with approximately 1.1 million people. Peak demand is experienced in the winter. The Saskatchewan Power Corporation (SaskPower) is the Planning Coordinator and Reliability Coordinator for the province of Saskatchewan and is the principal supplier of electricity in the province. SaskPower is a provincial crown corporation and, under provincial legislation, is responsible for the reliability oversight of the Saskatchewan bulk electric system and its interconnections.



MRO-SaskPower Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	3,237	3,482	7.57%
Demand Response: Available	165	205	24.24%
Net Internal Demand	3,072	3,277	6.67%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	3,654	3,894	6.57%
Tier 1 Planned Capacity	0	0	-
Net Firm Capacity Transfers	0	25	-
Anticipated Resources	3,654	3,919	7.25%
Existing-Other Capacity	0	0	-
Prospective Resources	3,654	3,919	7.25%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	18.95%	19.59%	0.64
Prospective Reserve Margin	18.95%	19.59%	0.64
Reference Margin Level	11.00%	11.00%	0.00

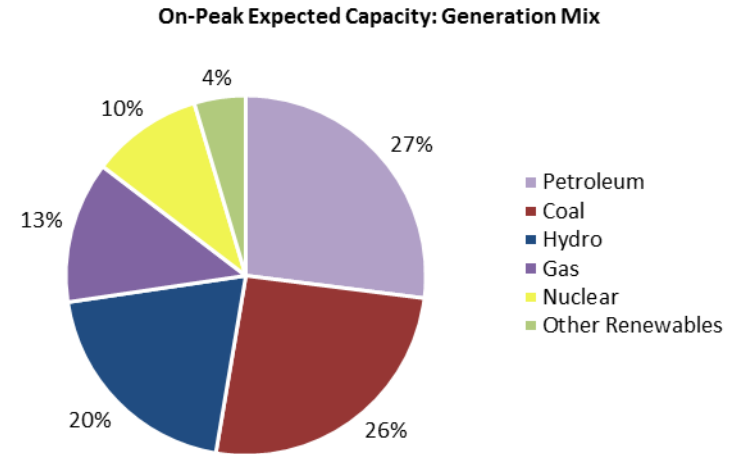
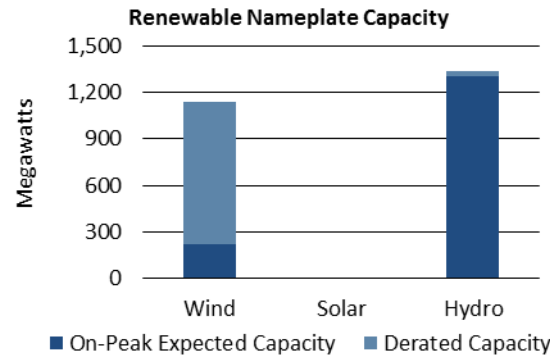
Highlights

- The anticipated reserve margin is forecasted to be 19.59 percent, which is above the reference margin level of 11 percent.
- The seasonal operating reserve margins for Summer 2016 are expected to be adequate and no significant seasonal constraints have been identified.



NPCC-Maritimes

The Maritimes Assessment Area is a winter-peaking NPCC subregion that contains two Balancing Authorities. It is comprised of the Canadian provinces of New Brunswick, Nova Scotia, and Prince Edward Island, and the northern portion of Maine, which is radially connected to the New Brunswick power system. The area covers 58,000 square miles, with a total population of 1.9 million people.



NPCC-Maritimes Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	3,748	3,307	-11.77%
Demand Response: Available	312	362	16.03%
Net Internal Demand	3,436	2,945	-14.29%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	5,485	5,398	-1.59%
Tier 1 Planned Capacity	163	0	-100.00%
Net Firm Capacity Transfers	0	0	-
Anticipated Resources	5,648	5,398	-4.43%
Existing-Other Capacity	0	0	-
Prospective Resources	5,648	5,398	-4.43%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	64.38%	83.29%	18.92
Prospective Reserve Margin	64.38%	83.29%	18.92
Reference Margin Level	15.00%	20.00%	5.00

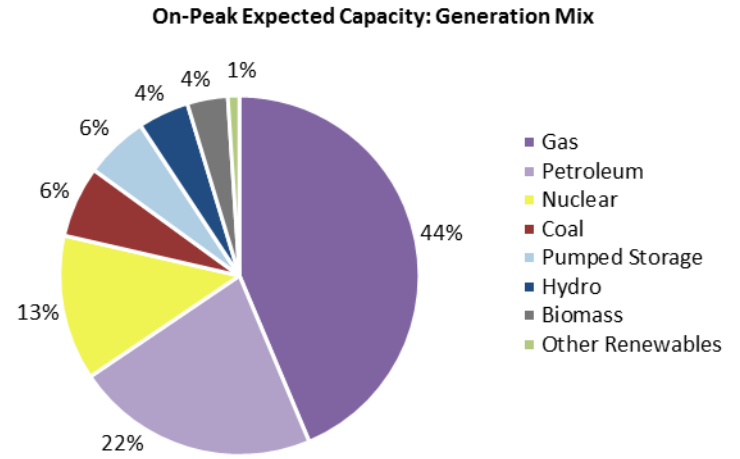
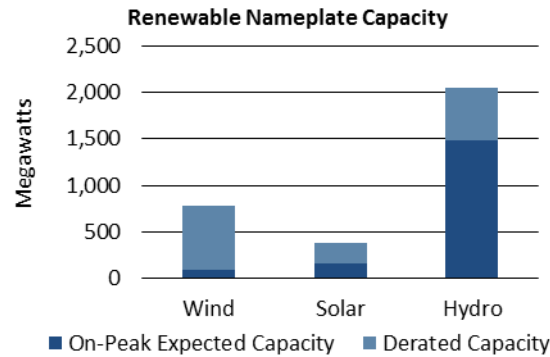
Highlights

- The anticipated reserve margin is forecasted to be 83 percent, which is above the reference margin level of 20 percent.
- Maritimes is predominantly a winter-peaking area with summer load accounting for 65 percent of total winter peak load.
- No system reliability challenges are anticipated during Summer 2016.



NPCC-New England

ISO New England (ISO-NE) Inc. is a regional transmission organization that serves Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. It is responsible for the reliable day-to-day operation of New England’s bulk power generation and transmission system and also administers the area’s wholesale electricity markets and manages the comprehensive planning of the regional BPS. The New England regional electric power system serves approximately 14.5 million people over 68,000 square miles.



NPCC-New England Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	26,710	26,704	-0.02%
Demand Response: Available	638	557	-12.70%
Net Internal Demand	26,072	26,147	0.29%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	30,239	30,196	-0.14%
Tier 1 Planned Capacity	87	33	-62.07%
Net Firm Capacity Transfers	1,237	1,062	-14.15%
Anticipated Resources	31,563	31,291	-0.86%
Existing-Other Capacity	262	290	10.69%
Prospective Resources	31,825	31,581	-0.77%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	21.06%	19.67%	-1.39
Prospective Reserve Margin	22.07%	20.78%	-1.28
Reference Margin Level	15.00%	17.60%	2.60

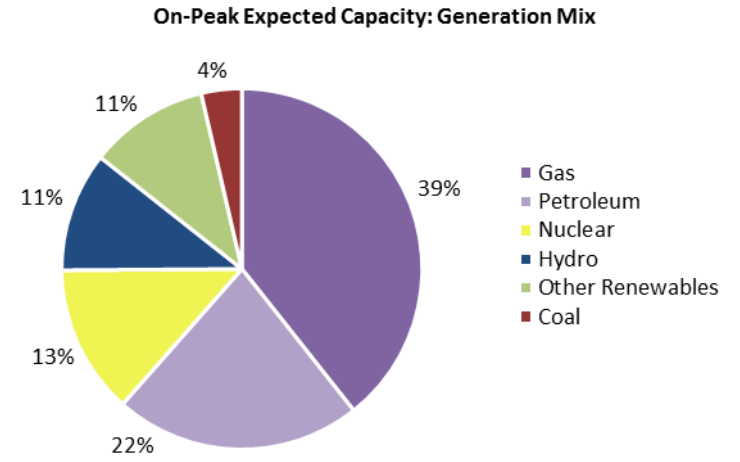
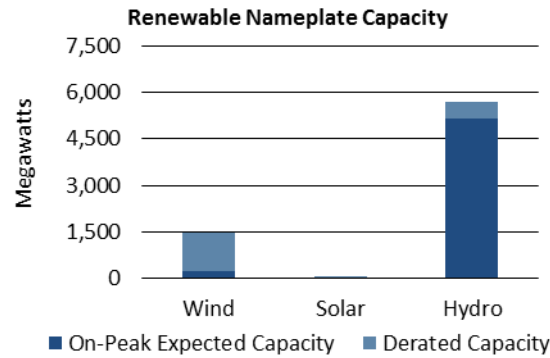
Highlights

- The anticipated reserve margin is forecasted to be 19.67 percent, which is above the reference margin level of 17.6 percent.
- New England is experiencing accelerated integration of rooftop solar photovoltaic (PV) generation, which presents unique demand forecasting challenges.
- Natural gas remains the predominant source of fuel, and fuel deliverability will be monitored throughout the summer.



NPCC-New York

The New York Independent System Operator (NYISO) is the only Balancing Authority within the state of New York (NYBA). NYISO is a single-state ISO that was formed as the successor to the New York Power Pool—a consortium of the eight IOUs—in 1999. NYISO manages the New York State transmission grid, encompassing approximately 11,000 miles of transmission lines over 47,000 square miles and serving the electric needs of 19.5 million people. New York experienced its all-time peak load of 33,956 MW in the summer of 2013.



NPCC-New York Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	33,567	33,360	-0.62%
Demand Response: Available	1,124	1,248	11.02%
Net Internal Demand	32,443	32,112	-1.02%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	38,700	38,535	-0.43%
Tier 1 Planned Capacity	0	0	-
Net Firm Capacity Transfers	2,522	1,769	-29.87%
Anticipated Resources	41,222	40,304	-2.23%
Existing-Other Capacity	0	0	-
Prospective Resources	41,222	40,304	-2.23%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	27.06%	25.51%	-1.55
Prospective Reserve Margin	27.06%	25.51%	-1.55
Reference Margin Level	17.00%	17.50%	0.50

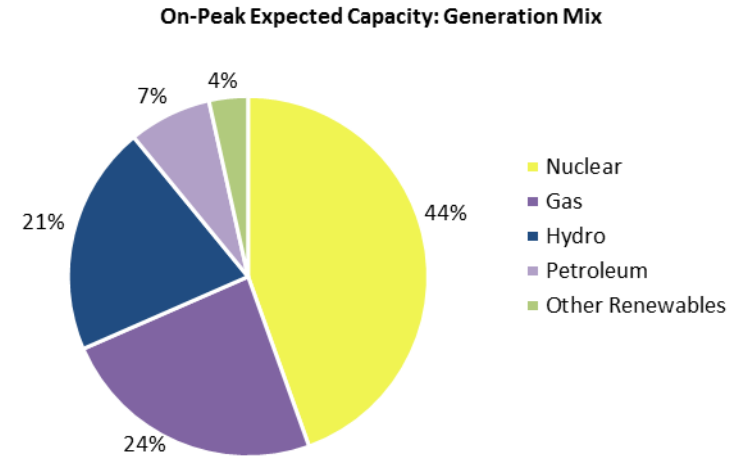
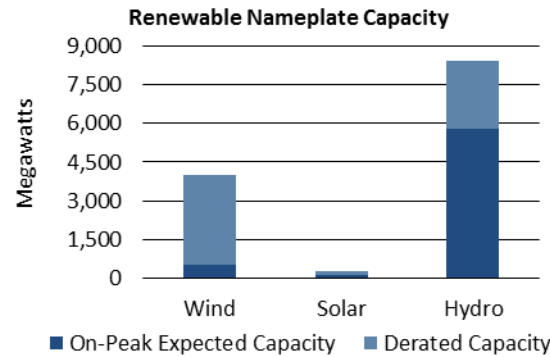
Highlights

- The anticipated reserve margin is forecasted to be 25.51 percent, which is above the reference margin level of 17.5 percent.
- New York anticipates three transmission projects to be completed in Summer 2016 to support transfer capability into southeast New York.
- Congestion in western New York is expected to increase, restricting imports from Ontario;



NPCC-Ontario

Ontario’s electrical power system covers an area of 415,000 square miles and serves the power needs of more than 13 million people. Ontario is interconnected electrically with Québec, MRO-Manitoba, states in MISO (Minnesota and Michigan), and NPCC-New York.



NPCC-Ontario Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	22,991	22,587	-1.76%
Demand Response: Available	591	674	14.06%
Net Internal Demand	22,400	21,913	-2.17%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	27,477	25,940	-5.59%
Tier 1 Planned Capacity	218	370	70.21%
Net Firm Capacity Transfers	0	0	-
Anticipated Resources	27,695	26,310	-5.00%
Existing-Other Capacity	0	0	-
Prospective Resources	27,695	26,310	-5.00%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	23.64%	20.07%	-3.57
Prospective Reserve Margin	23.64%	20.07%	-3.57
Reference Margin Level	19.50%	17.55%	-1.95

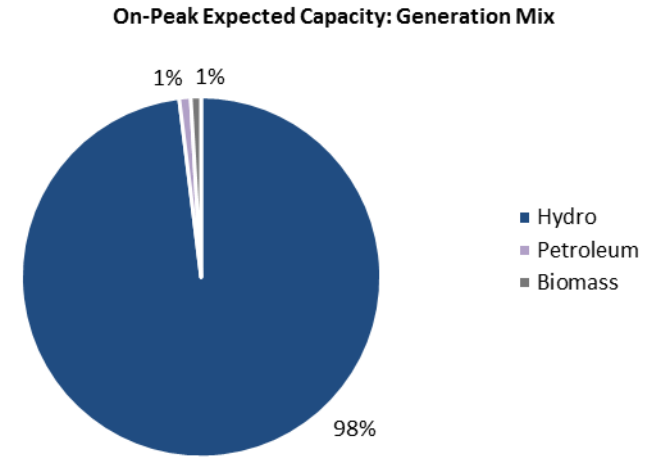
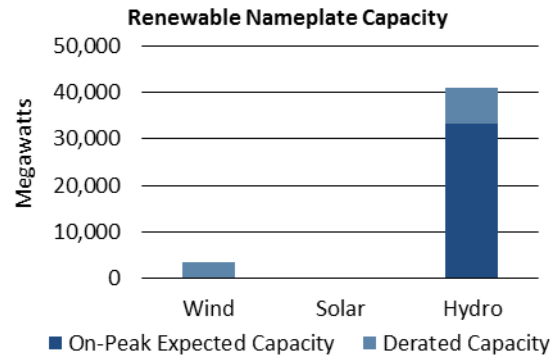
Highlights

- The anticipated reserve margin is forecasted to be 20.07 percent, which is above the reference margin level of 17.55 percent.



NPCC-Québec

The Québec Assessment Area (Province of Québec) is a winter-peaking NPCC subregion that covers 595,391 square miles with a population of eight million. Québec is one of the four NERC interconnections in North America, with ties to Ontario, New York, New England, and the Maritimes, consisting either of HVdc ties or radial generation or load to and from neighboring systems.



NPCC-Québec Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	21,203	20,833	-1.74%
Demand Response: Available	0	0	-
Net Internal Demand	21,203	20,833	-1.74%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	33,645	34,048	1.20%
Tier 1 Planned Capacity	5	0	-100.00%
Net Firm Capacity Transfers	-1,955	-1,947	0.41%
Anticipated Resources	31,696	32,101	1.28%
Existing-Other Capacity	0	0	-
Prospective Resources	31,696	32,101	1.28%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	49.49%	54.08%	4.60
Prospective Reserve Margin	49.49%	54.08%	4.60
Reference Margin Level	11.70%	11.60%	-0.10

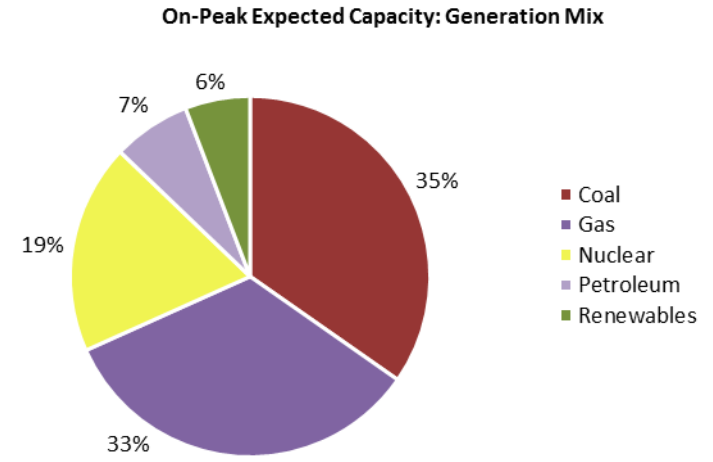
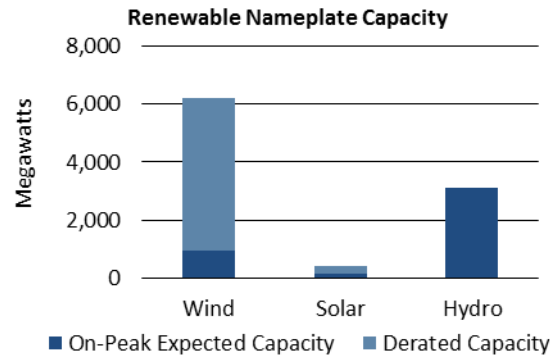
Highlights

- The anticipated reserve margin is forecasted to be 54.08 percent, which is above the reference margin level of 11.6 percent.
- No particular resource adequacy problems are forecasted since the system is winter-peaking.



PJM

PJM Interconnection is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. PJM serves 61 million people and covers 243,417 square miles. PJM is a Balancing Authority, Planning Coordinator, Transmission Planner, Resource Planner, Interchange Authority, Transmission Operator, Transmission Service Provider, and Reliability Coordinator.



PJM Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	155,544	152,131	-2.19%
Demand Response: Available	7,780	8,777	12.81%
Net Internal Demand	147,764	143,354	-2.98%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	173,612	179,360	3.31%
Tier 1 Planned Capacity	0	0	-
Net Firm Capacity Transfers	2,624	5,353	104.00%
Anticipated Resources	176,236	184,713	4.81%
Existing-Other Capacity	0	0	-
Prospective Resources	176,236	184,713	4.81%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	19.27%	28.85%	9.58
Prospective Reserve Margin	19.27%	28.85%	9.58
Reference Margin Level	15.60%	16.40%	0.80

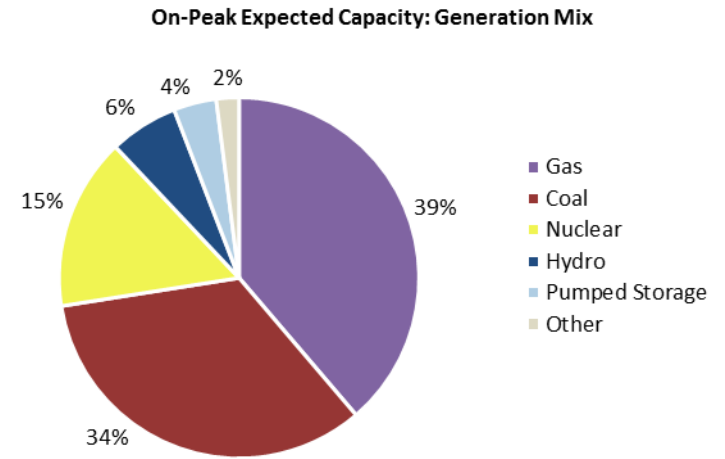
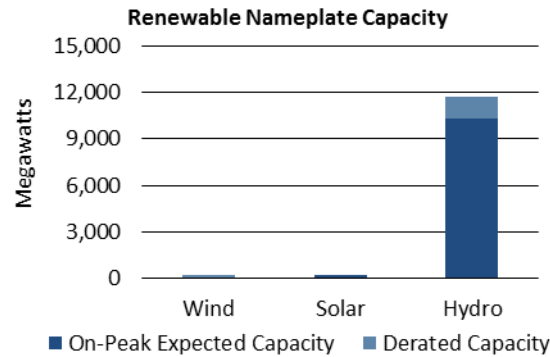
Highlights

- The anticipated reserve margin is forecasted to be 28.85 percent, which is above the reference margin level of 16.4 percent.
- Sufficient capacity and demand response resources has been secured to cover reserve requirements.
- Sufficient future reserve requirements are expected and no anticipated reliability concerns exist.



SERC

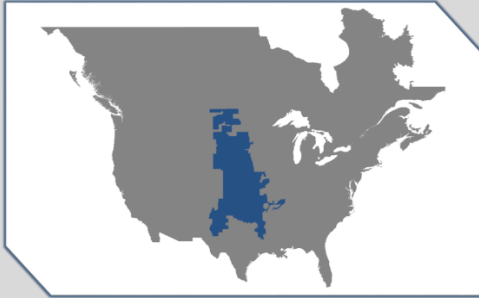
SERC is a summer-peaking assessment area that covers approximately 308,900 square miles and serves a population estimated at 39.4 million. SERC is divided into three assessment areas: SERC-E, SERC-N, and SERC-SE. The SERC Region includes 11 Balancing Authorities: Alcoa Power Generating, Inc.–Yadkin Division (Yadkin), Associated Electric Cooperative, Inc. (AECI), Duke Energy Carolinas and Duke Energy Progress (Duke), Electric Energy, Inc. (EEI), LG&E and KU Services Company (as agent for Louisville Gas and Electric (LG&E) and Kentucky Utilities (KU)), PowerSouth Energy Cooperative (PowerSouth), South Carolina Electric & Gas Company (SCE&G), South Carolina Public Service Authority (Santee Cooper, SCPSA), Southern Company Services, Inc. (Southern), and Tennessee Valley Authority (TVA).



SERC Resource Adequacy Data						
Demand, Resource, and Reserve Margins	SERC-E	SERC-N	SERC-SE	2015 SRA SERC Total	2016 SRA SERC Total	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts	Megawatts	Megawatts	Megawatts	Megawatts	Net Change (%)
Total Internal Demand (50/50)	42,755	42,148	47,091	131,395	131,994	0.46%
Demand Response: Available	637	1,787	2,216	4,718	4,640	-1.65%
Net Internal Demand	42,118	40,361	44,875	126,677	127,354	0.53%
Resource Projections	Megawatts	Megawatts	Megawatts	Megawatts	Megawatts	Net Change (%)
Existing-Certain Capacity	50,606	49,549	61,377	163,748	161,532	-1.35%
Tier 1 Planned Capacity	0	1,148	727	672	1,875	179.17%
Net Firm Capacity Transfers	-504	-1,108	-1,521	-2,636	-3,133	-18.85%
Anticipated Resources	50,102	49,589	60,583	161,784	160,274	-0.93%
Existing-Other Capacity	42	2,023	296	1,319	2,361	79.02%
Prospective Resources	50,144	51,612	60,878	163,103	162,635	-0.29%
Planning Reserve Margins	Percent (%)	Percent (%)	Percent (%)	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	18.96%	22.86%	35.00%	27.71%	25.85%	-1.86
Prospective Reserve Margin	19.06%	27.88%	35.66%	28.75%	27.70%	-1.05
Reference Margin Level	15.00%	15.00%	15.00%	15.00%	15.00%	0.00

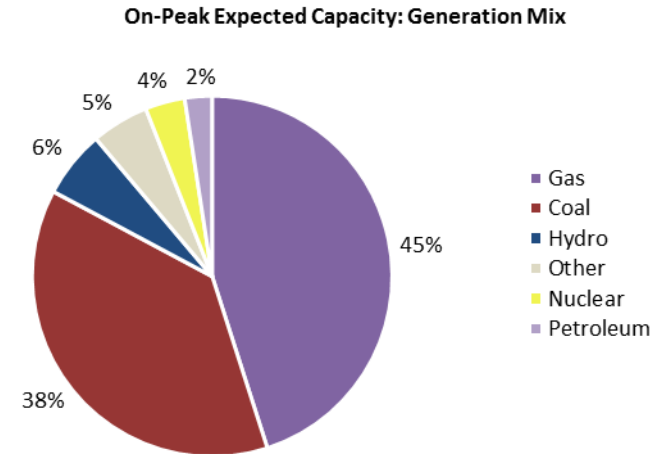
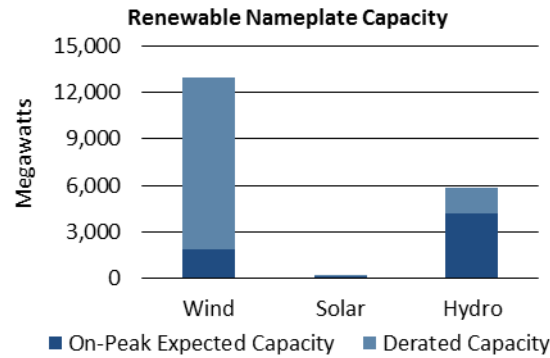
Highlights

- All areas are above the reference reserve margin of 15 percent:
 - SERC-E forecasts anticipated reserve margins of 19 percent.
 - SERN-N forecasts anticipated reserve margins of 22.86 percent.



SPP

Southwest Power Pool (SPP) Planning Coordinator footprint covers 575,000 square miles and encompasses all or parts of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas and Wyoming. The SPP Long-Term Assessment is reported based on the Planning Coordinator footprint, which touches parts of the Southwest Power Pool Regional Entity, Midwest Reliability Organization Regional Entity, and Western Electricity Coordinating Council. The SPP Assessment Area footprint has approximately 61,000 miles of transmission lines, 756 generating plants, and 4,811 transmission-class substations, and it serves a population of 18 million people.



SPP Resource Adequacy Data*			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	50,529	53,430	5.74%
Demand Response: Available	1,284	785	-38.86%
Net Internal Demand	49,245	52,645	6.90%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	63,605	67,649	6.36%
Tier 1 Planned Capacity	1,293	0	-100.00%
Net Firm Capacity Transfers	1,533	-447	-129.18%
Anticipated Resources	66,431	67,202	1.16%
Existing-Other Capacity	0	0	-
Prospective Resources	66,431	67,202	1.16%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	34.90%	27.65%	-7.25
Prospective Reserve Margin	34.90%	27.65%	-7.25
Reference Margin Level	13.60%	13.60%	0.00

Highlights

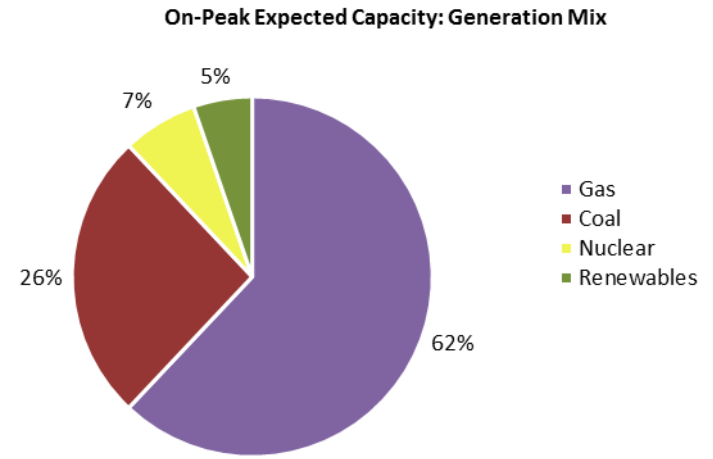
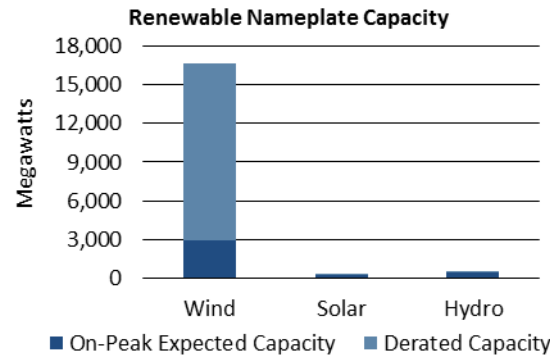
- The anticipated reserve margin is forecasted to be 28 percent, which is above the reference margin level of 13.6 percent.
- The SPP footprint now includes the former MRO-MAPP, affecting their overall reserve margins.

*The load and resources in the MAPP Assessment Area, previously part of MRO, has been integrated primarily into SPP, with smaller portions integrated into MISO and WECC (WAPA). This development should be considered when comparing 2015 and 2016 SRA data.



Texas RE-ERCOT

The Electric Reliability Council of Texas (ERCOT) is the ISO for the ERCOT Interconnection and is located entirely in the state of Texas; it operates as a single Balancing Authority. ERCOT is a summer-peaking Region that covers approximately 200,000 square miles, connects 40,530 miles of transmission lines and 566 generation units, and serves 23 million customers. The Texas Reliability Entity (Texas RE) is responsible for the RE functions described in the *Energy Policy Act of 2005* for the ERCOT Region.



Texas RE-ERCOT Resource Adequacy Data			
Demand, Resource, and Reserve Margins	2015 SRA	2016 SRA	2015 SRA vs. 2016 SRA
Demand Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Total Internal Demand (50/50)	69,057	70,588	2.22%
Demand Response: Available	2,343	2,525	7.78%
Net Internal Demand	66,714	68,063	2.02%
Resource Projections	Megawatts (MW)	Megawatts (MW)	Net Change (%)
Existing-Certain Capacity	75,419	76,247	1.10%
Tier 1 Planned Capacity	1,357	1,248	-8.00%
Net Firm Capacity Transfers	776	1,122	44.59%
Anticipated Resources	77,551	78,617	1.37%
Existing-Other Capacity	517	0	-100.00%
Prospective Resources	78,068	78,617	0.70%
Planning Reserve Margins	Percent (%)	Percent (%)	Annual Difference
Anticipated Reserve Margin	15.64%	15.51%	-0.13
Prospective Reserve Margin	16.41%	15.51%	-0.91
Reference Margin Level	13.75%	13.75%	0.00

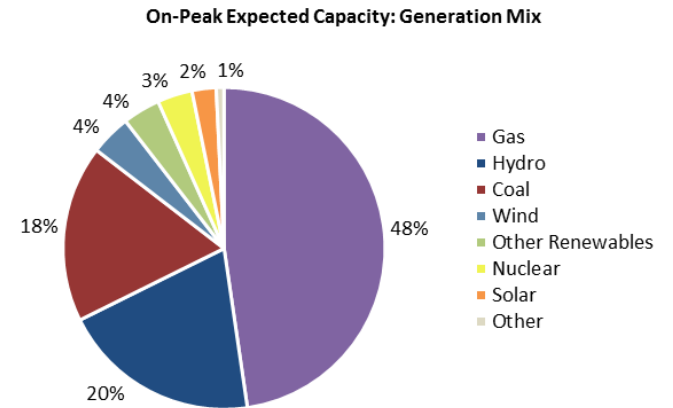
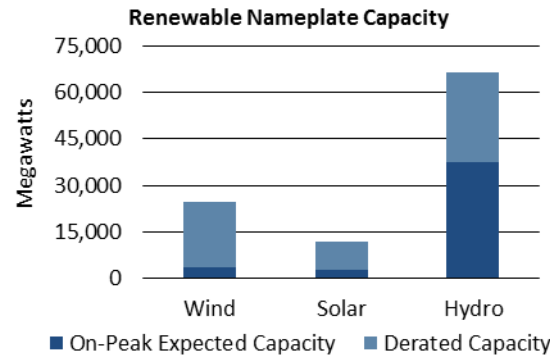
Highlights

- The anticipated reserve margin is forecasted to be 15.51 percent, which is above the reference margin level of 13.75 percent.
- Texas peak load is forecasted to increase 2.2 percent from the forecasted number in Summer 2015.



WECC

The Western Electricity Coordinating Council (WECC) is responsible for coordinating and promoting Bulk Electric System reliability in the Western Interconnection. WECC's 329 members, which include 38 Balancing Authorities, representing a wide spectrum of organizations with an interest in the BES. Serving an area of nearly 1.8 million square miles and approximately 82.2 million people, it is geographically the largest and most diverse of the NERC Regional Entities. WECC's service territory extends from Canada to Mexico. It includes the provinces of Alberta and British Columbia in Canada, the northern portion of Baja California in Mexico, and all or portions of the 14 western states in between. The WECC Assessment Area is divided into five subregions: Rocky Mountain Reserve Group (RMRG), Southwest Reserve Sharing Group (SRSG), California/Mexico (CA/MX), and the Northwest Power Pool (NWPP), which is further divided into the NW-Canada and NW-US areas. These subregional divisions are used for this study as they are structured around reserve sharing groups that have similar annual demand patterns and similar operating practices.



WECC Resource Adequacy Data*								
Demand, Resource, and Reserve Margins	CA/MX	NWPP CA	NWPP US	RMRG	SRSG	2015 SRA WECC Total	2016 SRA WECC Total	2015 vs. 2016 SRA
Demand Projections	MW	MW	MW	MW	MW	MW	MW	Net Change (%)
Total Internal Demand (50/50)	54,696	19,352	49,420	12,195	23,219	153,956	154,480	0.34%
Demand Response: Available	1,749	0	981	518	488	4,074	3,736	-8.30%
Net Internal Demand	52,947	19,352	48,439	11,677	22,731	149,882	150,744	0.58%
Resource Projections	MW	MW	MW	MW	MW	MW	MW	Net Change (%)
Existing-Certain Capacity	59,340	24,597	56,147	18,181	32,153	186,415	188,506	1.12%
Tier 1 Planned Capacity	355	282	785	358	151	1,757**	1,900	8.14%
Net Firm Capacity Transfers	4,339	0	6,160	-2,752	-3,177	0	0	-
Anticipated Resources	64,034	24,879	63,092	15,787	29,127	188,172	190,406	1.19%
Existing-Other Capacity	0	0	0	0	0	0	0	-
Prospective Resources	64,034	24,879	63,092	15,787	29,127	188,172	190,406	1.19%
Planning Reserve Margins	%	%	%	%	%	%	%	Annual Difference
Anticipated Reserve Margin	20.94%	28.56%	30.25%	35.20%	28.14%	25.55%	26.31%	0.76
Prospective Reserve Margin	20.94%	28.56%	30.25%	35.20%	28.14%	25.55%	26.31%	0.76
Reference Margin Level	16.12%	10.96%	16.30%	14.16%	15.82%	17.70%	15.37%	-2.33

Highlights

- The loss of Aliso Canyon Natural Gas Storage Facility in Los Angeles Basin is a concern for reliability of the BPS. The California Independent System Operator Corporation is working with relevant entities to ensure the expected days of load shedding are minimized.
- The existing and anticipated reserve margins for WECC, its five subregions, and all zones within the subregions, are expected to exceed their respective NERC reference reserve margin levels for the upcoming summer season.

*The load and resources in the MAPP Assessment Area, previously part of MRO, have been integrated primarily into SPP, with smaller portions integrated into MISO and WECC (WAPA). This development should be considered when comparing 2015 and 2016 SRA data.

**The total Tier 1 resources reported in the 2015 Summer Reliability Assessment were incorrect and should have been 1,757 MW. The 7,077 MW reported was the total for all Tier 1 resources, not only the resources expected to be available for the summer peak of 2015.

Data Concepts and Assumptions Guide

The table below explains data concepts and important assumptions used throughout this assessment.

General Assumptions	
The reserve margin calculation is an important industry planning metric used to examine future resource adequacy.	
All data in this assessment are based on existing federal, state, and provincial laws and regulations.	
Differences in data collection periods for each assessment area should be considered when comparing demand and capacity data between the 2015 and 2016 SRA.	
Demand Assumptions	
Electricity demand projections, or load forecasts, are provided by each assessment area.	
Load forecasts include peak hourly load, ¹ or total internal demand, for the summer and winter of each year. ²	
Total internal demand projections are based on normal weather (50/50 distribution) ³ and are provided on a coincident ⁴ basis for most assessment areas.	
Net internal demand, used in all reserve margin calculations, is equal to total internal demand, reduced by the amount of controllable and dispatchable demand response projected to be available during the peak hour.	
Resource Assumptions	
Resource planning methods vary throughout the North American BPS. NERC uses the following categories to provide a consistent approach for collecting and presenting resource adequacy:	
<u>Anticipated Resources</u>	
<ul style="list-style-type: none"> Existing-certain capacity: Included in this category are commercially operable generating units, or portions of generating units, that meet at least one of the following requirements when examining the period of peak demand for the summer season: (1) unit must have a firm capability and have a power purchase agreement (PPA) with firm transmission must be in effect for the unit; (2) unit must be classified as a designated network resource; (3) where energy-only markets exist, unit must be a designated market resource eligible to bid into the market. Tier 1 capacity additions: includes capacity that is either under construction or has received approved planning requirements. Net firm capacity transfers (imports minus exports): transfers with firm contracts. 	
<u>Prospective Resources</u> : Includes all anticipated resources, plus:	
<ul style="list-style-type: none"> Existing-other capacity: included in this category are commercially operable generating units, or portions of generating units, that are expected to be available to serve load for the period of peak demand for the summer season, but do not meet the requirements of existing-certain. 	
Reserve Margins	
<u>Reserve Margins</u> : the primary metric used to measure resource adequacy, defined as the difference in resources (anticipated, or prospective) and net internal demand, divided by net internal demand, shown as a percentile.	

$$\text{Anticipated Reserve Margin} = \frac{(\text{Anticipated Resources} - \text{Net Internal Demand})}{\text{Net Internal Demand}}$$

$$\text{Prospective Reserve Margin} = \frac{(\text{Prospective Resources} - \text{Net Internal Demand})}{\text{Net Internal Demand}}$$

¹ [Glossary of Terms](#) Used in NERC Reliability Standards

² The summer season represents June–September and the winter season represents December–February.

³ Essentially, this means that there is a 50% probability that actual demand will be higher and a 50% probability that actual demand will be lower than the value provided for a given season/year.

⁴ Coincident: The sum of two or more peak loads that occur in the same hour. Noncoincident: The sum of two or more peak loads on individual systems that do not occur in the same time interval. Meaningful only when considering loads within a limited period of time, such as a day, a week, a month, a heating or cooling season, and usually for not more than one year. SERC and FRCC calculate total internal demand on a noncoincidental basis.

Reference Margin Level: the assumptions of this metric vary by assessment area. Generally, the reference margin level is typically based on load, generation, and transmission characteristics for each assessment area and, in some cases, the reference margin level is a requirement implemented by the respective state(s), provincial authorities, ISO/RTO, or other regulatory bodies. If such a requirement exists, the respective assessment area generally adopts this requirement as the reference margin level. In some cases, the reference margin level will fluctuate over the duration of the assessment period, or may be different for the summer and winter seasons. If one is not provided by a given assessment area, NERC applies a 15% reference margin level for predominately thermal systems and 10% for predominately hydro systems.

On-Peak Expected Capacity Generation Mix – Generation mix is aggregated from 2015 LTRA data. Fuel types with nominal quantities were aggregated together as fuel types, renewables, other renewables, and other.

Renewable Nameplate Capacities – These charts include renewable on-peak and nameplate (de-rated and expected on-peak added together) capacities.
