

2015 STATE OF THE INTERCONNECTION



RELIABILITY



INTRODUCTION

The Western Interconnection is one of four major electric system networks in North America. Serving a population of approximately 82.2 million, the Western Interconnection spans more than 1.8 million square miles in all or part of 14 states, the Canadian provinces of British Columbia and Alberta, and the northern portion of Baja California in Mexico. The Western Interconnection is characterized by its geographic expanse, abundance and diversity of resources, range of climates, and load configuration.

WECC is geographically and by consumption the largest of eight Regional Entities that, together with the North American Electric Reliability Corporation (NERC), comprise the Electric Reliability Organization Enterprise. Operating under the oversight of the Federal Energy Regulatory Commission and equivalent organizations in Canada and Mexico, the Enterprise works to ensure the reliable generation and delivery of electric power to customers across North America.

The 2015 State of the Interconnection Report provides a high-level look at the general state of the Western Interconnection. The report is one tool WECC uses to share information with its stakeholders pertinent to the continuing reliability of the Western Interconnection. WECC uses the information in this report—along with other information and analysis—to track and evaluate historical system performance, highlight areas for additional in-depth analysis, and identify reliability risks.



USING THIS REPORT

The 2015 State of the Interconnection Report shares historical information across five areas:

- » Events and Outages
- » Load
- » Generation
- » Transmission
- » Compliance

This report presents information at the Interconnection-wide and, in some cases, subregional levels.

Data

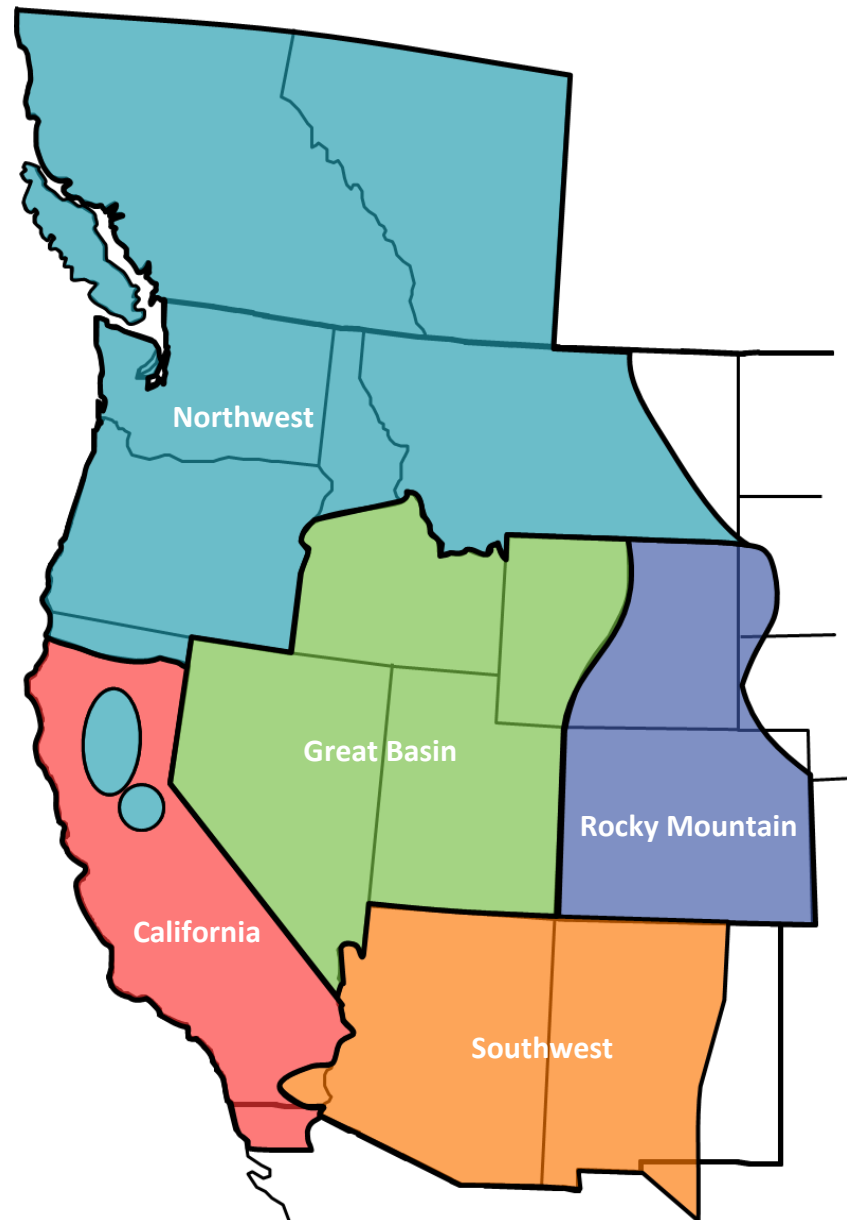
The information in this report is derived from a number of sources, including data submitted by Western entities. WECC would like to thank those entities in the West that provided information used in this document.

Endnotes

The superscript numbers in the text and figure titles indicate endnotes that provide additional or clarifying information regarding the topic. The endnotes can be found at the end of each section.

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Western Subregions Used in the 2015 State of the Interconnection Report



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EVENTS & OUTAGES

- » Disturbance Events
- » Loss-of-Load Events
- » Protection System Misoperations
- » Generation Outages
- » Transmission Outages

EVENTS & OUTAGES

EVENTS & OUTAGES

While major outages of the Bulk Electric System (BES) are rare, minor events and outages are a common occurrence in a system as complex as the Western Interconnection. Many factors contribute to these disturbances, including the multitude of elements required to operate the system, the line exposure resulting from serving such a vast geographical area, and misoperations related to the numerous protection devices in the Interconnection.

2014 in Brief

Events Reported: 110

Protection System Misoperations: 320

Unplanned Generation Outages: 8,378

Unplanned Transmission Outages: 2,289

This section provides information about disturbance events, misoperations of protection systems, and unplanned outages of generation and transmission elements of the Bulk Electric System.

OBSERVATIONS

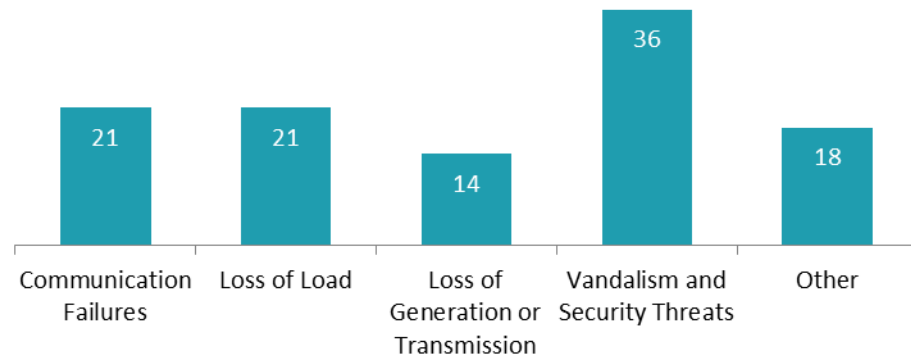
- » Although vandalism and security threats were the largest contributing factors to disturbances, the majority were minor offenses that bore no significant impact on the system.
- » Increases in the number of loss-of-load events coincided with seasonal peaks in demand in 2014. The largest loss of load was less than 0.4 percent of peak demand.
- » Misoperations caused by incorrect settings increased in both 2013 and 2014. Entities should develop programs to periodically review relays associated with BES elements to help reduce the number of misoperations due to incorrect settings.
- » From 2013 to 2014, for those gas units reported in both years, the number of unplanned outages decreased by almost 10 percent.
- » Approximately 29 percent of transmission outages in 2014 were due to unknown causes. Identifying and correcting the unknown outages may help entities detect and address systemic outages that could have a larger impact on system reliability.
- » Most automatic transmission outages caused by equipment failure and human error were sustained outages lasting one minute or more, and 42 percent lasted one hour or more.

DISTURBANCE EVENTS

Disturbances threatening the reliability of the Bulk Electric System are reported to WECC through several channels.¹ Events that meet quantitative as well as qualitative criteria must be reported. However, many small events do not meet these criteria and go unreported. Consequently, the events described in this section make up only a portion of the total number of events.

In 2014, there were 110 disturbance events reported to WECC. This report has these events organized into five categories² with severity ranging from suspicious activity (e.g., the discovery of a geocache attached to a transmission structure) to the shedding of 126 MW of firm load affecting more than 25,000 customers.

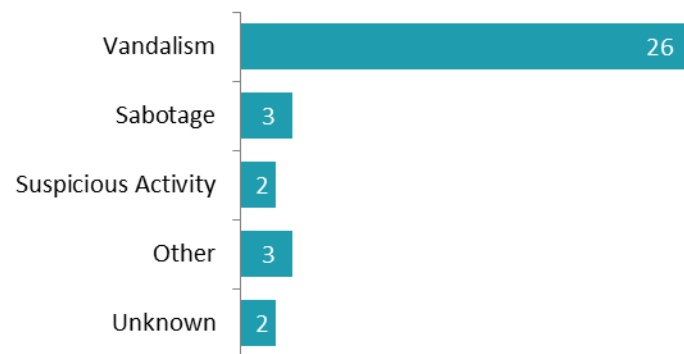
Disturbance Events Reported in 2014



Observation

While accounting for the largest portion of events, the majority (72 percent) of the Vandalism and Security Threat events were relatively minor acts of vandalism. However, three of these events were considered sabotage—deliberate damage to a facility with intent to undermine the performance of the electrical system. Fortunately, in all three cases, the damage was minor and without degraded operation of the facilities involved.

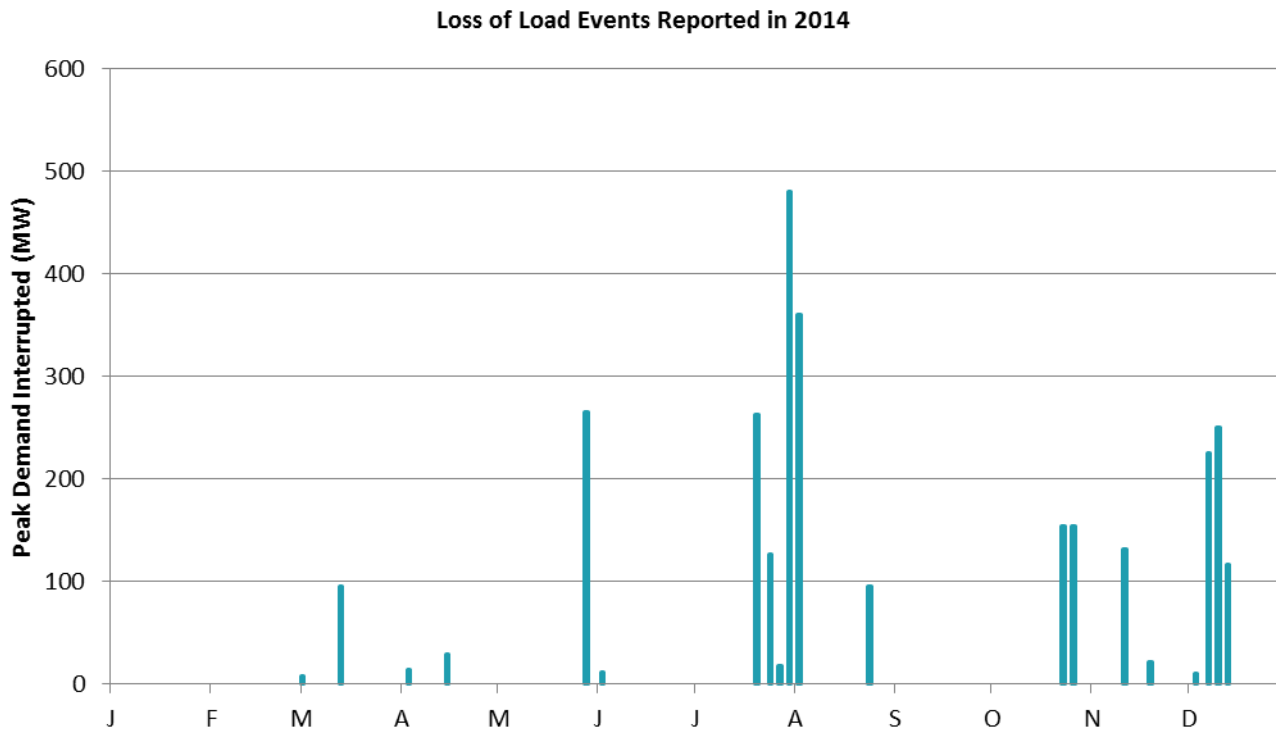
Vandalism and Security Threats Reported in 2014



EVENTS & OUTAGES

LOSS-OF-LOAD EVENTS

There were 21 loss-of-load events reported to WECC in 2014, ranging from 4 to 480 MW.

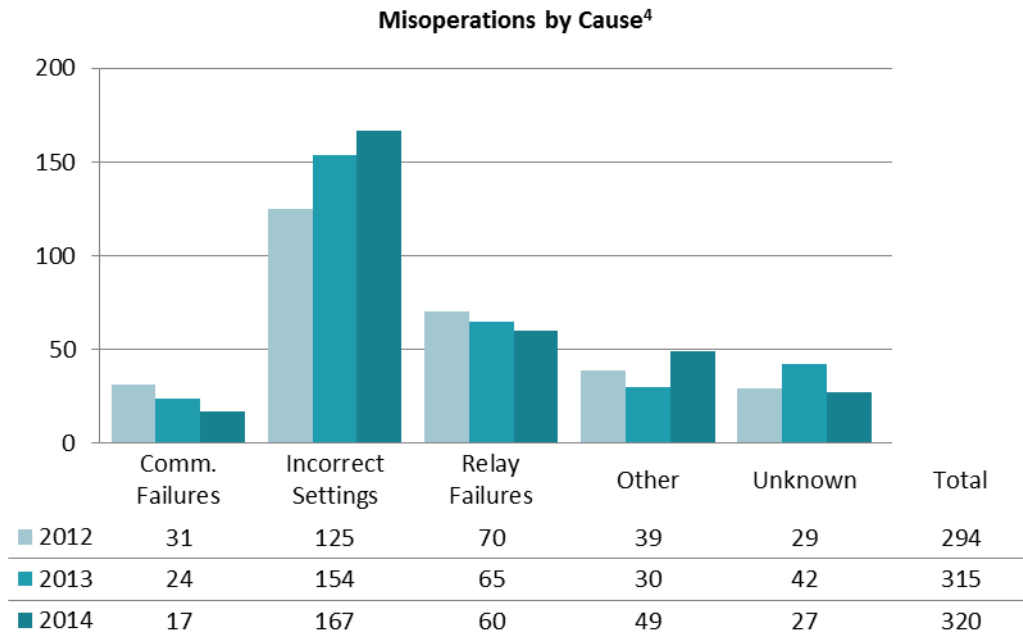


Observation

An increase in loss-of-load events coincides with the summer and winter peaks, when the system is most stressed. The Interconnection-wide coincident peak occurred on July 30, when demand neared 147,500 MW. The event with the highest interrupted demand in 2014 occurred on July 27, with a loss of 480 MW.

PROTECTION SYSTEM MISOPERATIONS

A misoperation can be either the failure of a protection system to successfully operate as required or an unintended operation. For the Balancing Authorities from which WECC received data in 2014,³ misoperations represented 8.7 percent of all operations, comparable to rates reported by other NERC Regions.



Observation

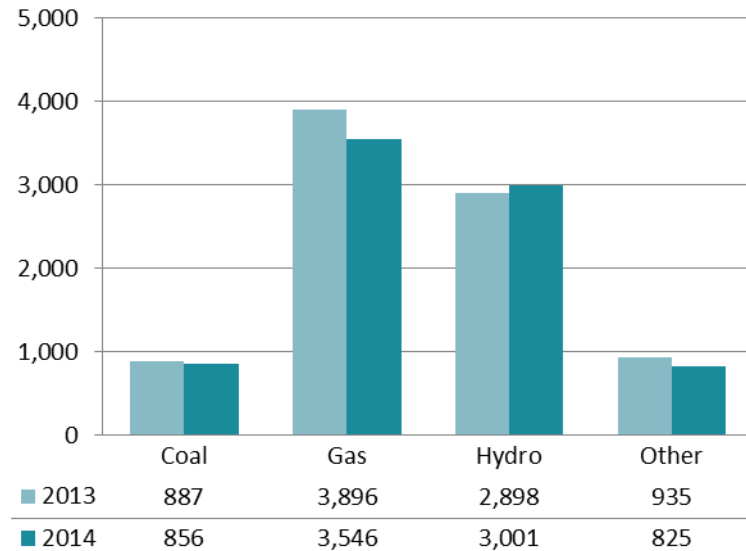
Incorrect settings of protection system equipment accounted for 52 percent of misoperations in 2014, up from 49 and 43 percent in 2013 and 2012 respectively. Entities should develop programs to periodically review relays associated with BES elements.

EVENTS & OUTAGES

GENERATION OUTAGES

Data on the availability of conventional generating units 20 MW and greater is available through NERC's Generating Availability Data System (GADS).⁵ There are 1,646 units for which data was available for both 2013 and 2014, including 86 coal units, 568 gas units, and 836 hydro units, representing 98 percent of all units reported to GADS in 2014.

Unplanned Outages of Generating Units
Reported in Both 2013 and 2014



Median Unplanned Outages Per Unit Per Year, 2013-2014

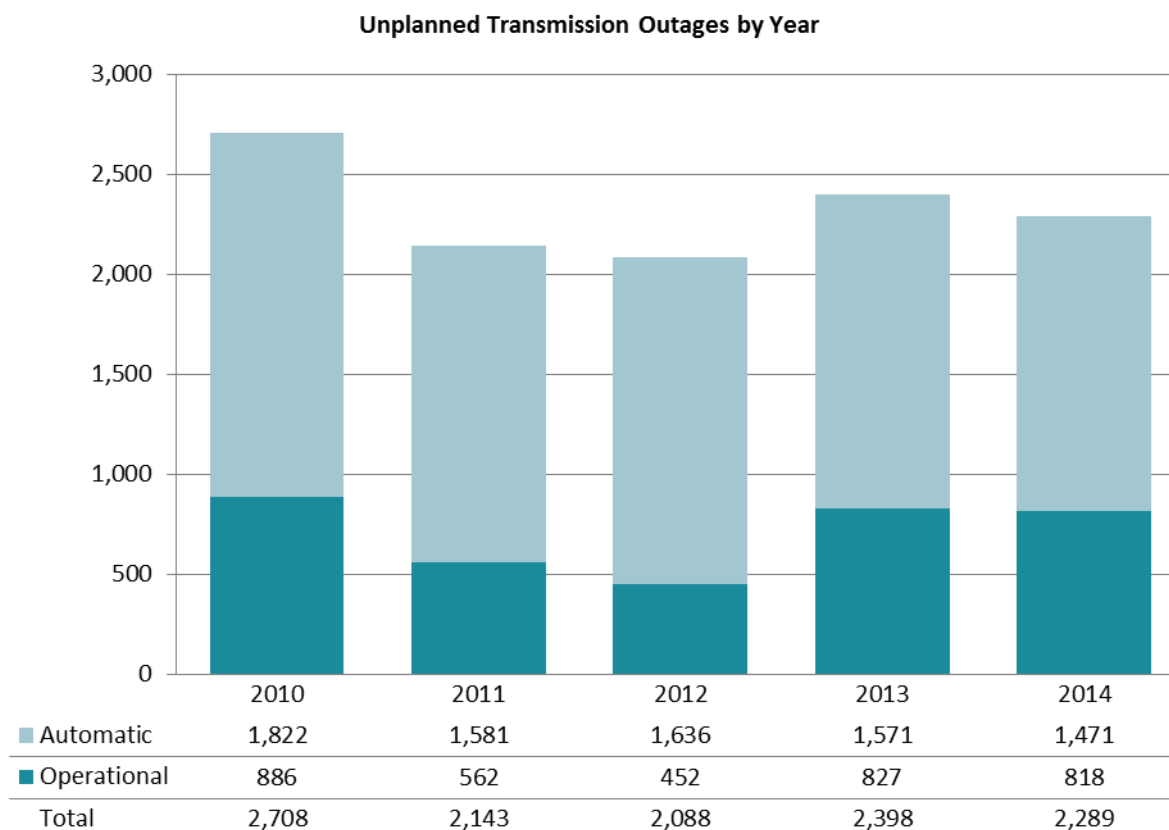
	2013	2014
Coal	9	9
Gas	5	5
Hydro	3	3

Observation

From 2013 to 2014, for those gas units reported in both years, the number of unplanned outages decreased by almost 10 percent.

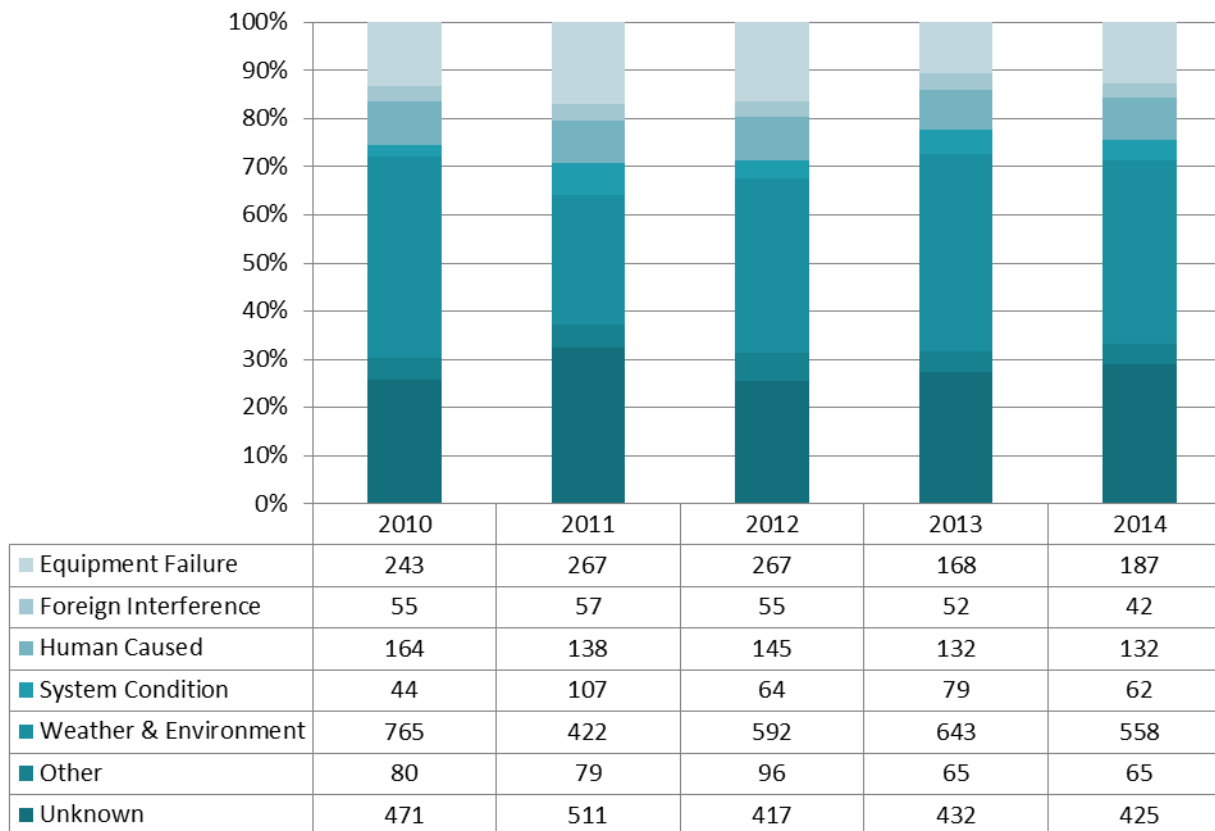
TRANSMISSION OUTAGES

In 2014 there were 2,289 unplanned transmission outages reported to NERC's Transmission Availability Data System (TADS)⁶ for the Western Interconnection. The outages break down into 1,471 *automatic* (automatic operation of a switching device) and 818 *operational* (manual operation of a switching device) outages.



EVENTS & OUTAGES

Distribution of Automatic Transmission Outages by Cause, 2010-2014

**Observation**

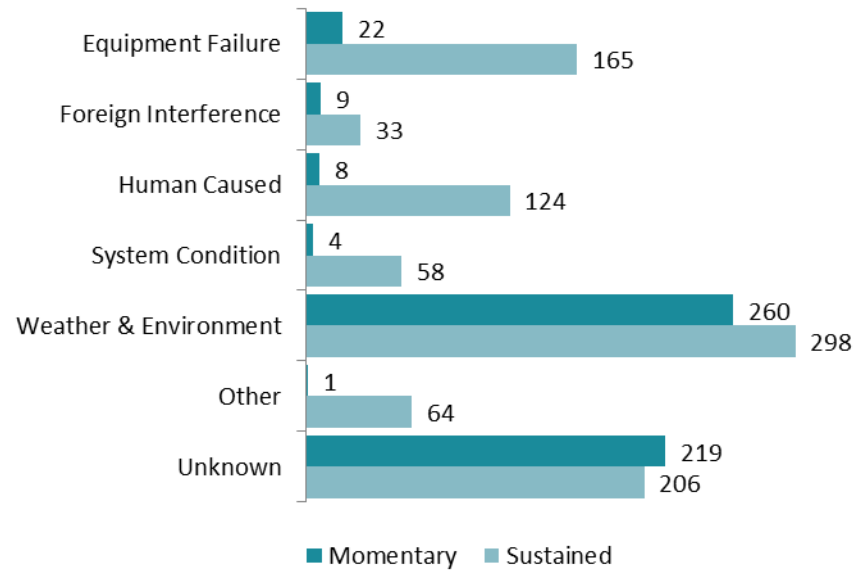
Unknown outages continue to make up the second largest portion of automatic outages, including more than 40 percent of momentary outages. Entities should pursue reasonable means of identifying the cause of unknown outages, especially sustained outages. Identifying and correcting the unknown outages may help entities detect and address systemic outages that could have a larger impact on system reliability.

Number of Unknown Transmission Outages by Year

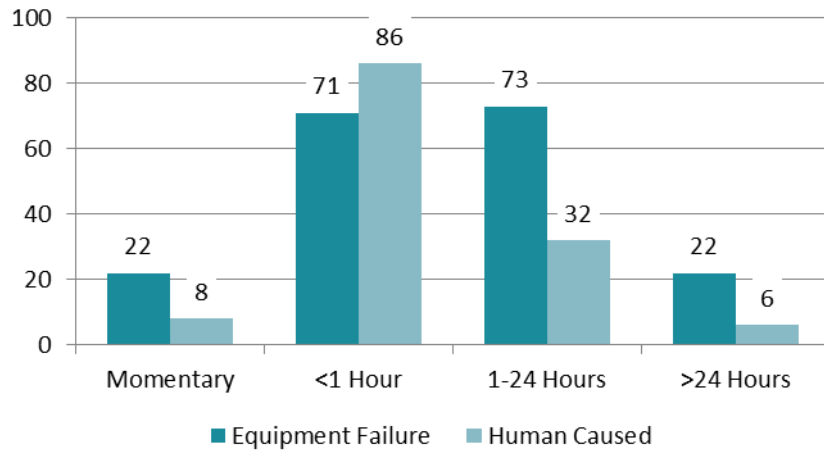
2014	425
2013	436
2012	417
2011	511
2010	471

Momentary transmission outages are those that last less than one minute. Sustained transmission outages last one minute or longer. In 2014, there were 523 momentary and 948 sustained outages.

Distribution of 2014 Automatic Transmission Outages by Cause



2014 Equipment Failure and Human-Caused Transmission Outages by Duration



Observation
 In 2014, 88 percent of equipment failure caused outages and 94 percent of human-caused outages were sustained outages.

¹The 2015 State of the Interconnection describes information about events in 2014 from three sources:

- » NERC Reliability Standard EOP-004 requires entities to develop an operating plan that includes reporting events to their Regional Entity according to criteria established in the standard.
- » The Department of Energy requires entities to file Form OE-417 when an event meets certain thresholds (e.g., uncontrolled loss of at least 300 MW for more than 15 minutes). The requirements of EOP-004 can be satisfied by submitting Form OE-417 when an event meets the criteria for both.
- » Through NERC's Event Analysis Process, entities voluntarily collaborate with NERC and their Regional Entity to review and learn from events in a non-punitive setting.

²Event Categories:

- » **Communication Failures:** Loss of monitoring and control capability that affects an entity's ability to make operating decisions
- » **Loss of Load:** Sustained loss of firm load above specified thresholds
- » **Loss of Generation or Transmission:** Loss of generation meeting a specified threshold or loss of transmission elements due to a common disturbance
- » **Vandalism and Security Threats:** Vandalism of or other damage to BES equipment and other security threats, including theft that degrades normal operations or suspicious activity near electric facilities
- » **Other:** Including fuel supply shortages and public appeals to reduce demand

³2014 was the first year that WECC requested data on the total number of operations. WECC received this data from most of the Balancing Authorities (BA). In future years, WECC hopes to obtain data on the total number of operations from all WECC BAs.

⁴Misoperations Categories:

- » **Communication Failures:** Malfunction of communication systems associated with a protection scheme
- » **Incorrect Settings:** Engineering errors by the system owner
- » **Relay Failures:** Failed equipment, or improper operation of a relay
- » **Other:** Problems in the AC inputs and DC controls of a protection system

⁵Prior to 2012, GADS reporting was voluntary. In 2012, reporting for conventional generation units 50 MW or greater became mandatory. In 2013, the threshold was reduced to 20 MW. This change affected the number of units reported. To ensure an appropriate comparison, this report only uses information from 2013 and 2014.

⁶NERC's Transmission Availability Data System (TADS) contains information about outages of BES transmission elements meeting certain criteria. TADS distinguishes between *automatic* and *operational* outages. Automatic outages are caused by the automatic operation of a switching device, while operational outages result in the manual operation of a switching device. Both can be considered unplanned outages.

LOAD

- » Energy Consumption
- » Consumption by Sector
- » Load Shape
- » Peak Demand

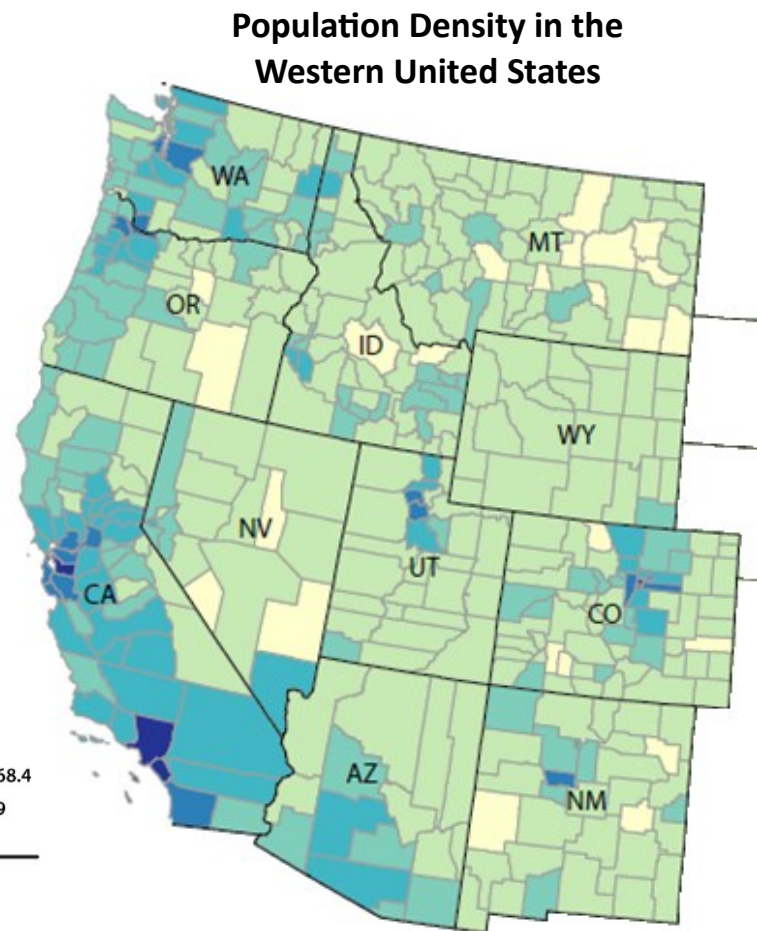
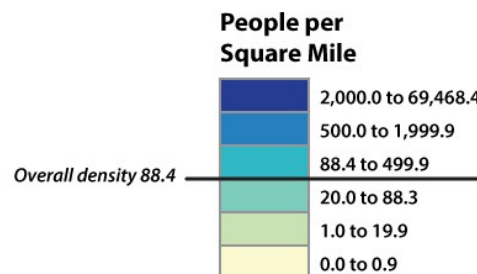
LOAD

LOAD

The Western Interconnection has a diverse load composition. In the last four years, annual energy consumption across the Interconnection has increased an average of 0.98 percent (8,400 GWh) each year, while seasonal peak demand has decreased 0.04 percent (100 MW) in the summer and increased 2.33 percent (3,000 MW) in the winter each year.

OBSERVATIONS

- » A number of large daily peaks occur during the shoulder periods of the year (October–November and April–May) when entities tend to schedule maintenance. The potential for large load increases should be factored into maintenance scheduling decisions.
- » While the summer peak remains relatively stable, the winter coincident peak has increased each of the last four years.



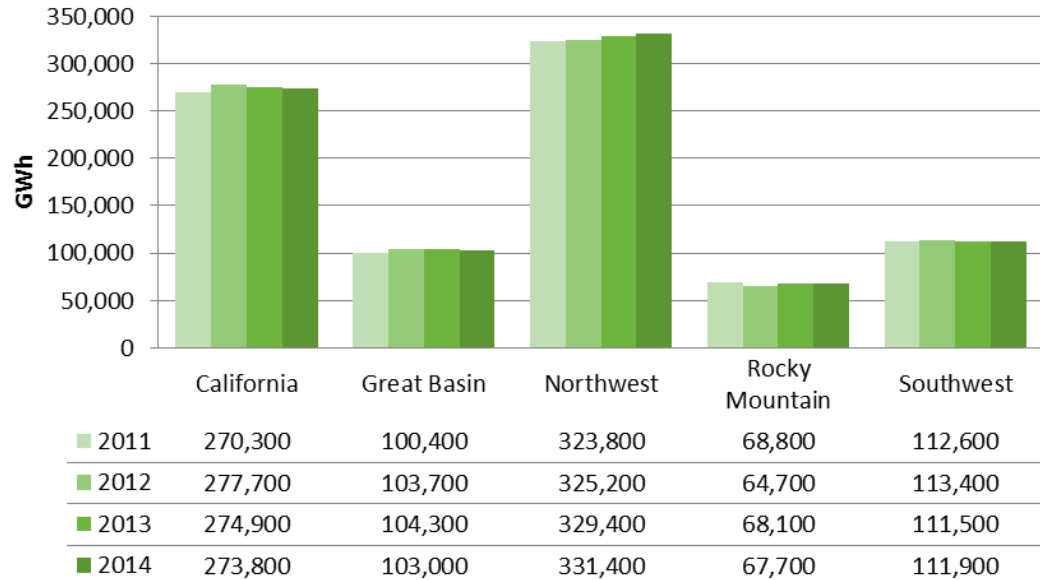
Source: 2010 U.S. Census

ENERGY CONSUMPTION¹

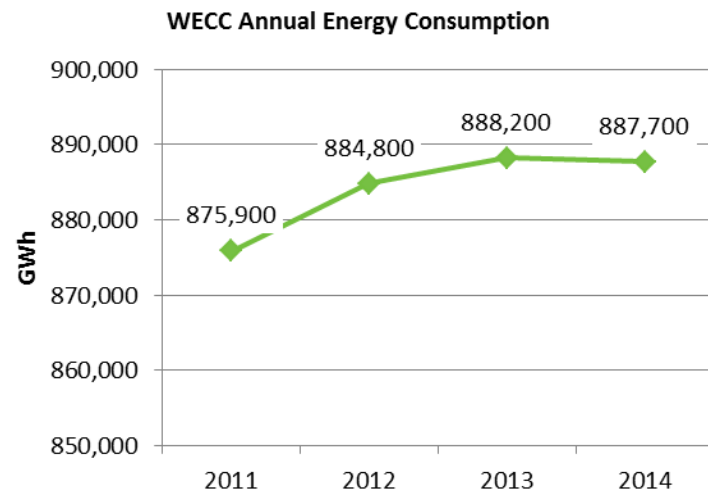
WECC is the largest of the eight subregions in terms of energy consumption.

Total energy consumption has grown slowly in the Western Interconnection. Several factors impact demand for electricity, such as, weather, demand-side management, distributed generation, energy efficiency programs, and economic conditions.

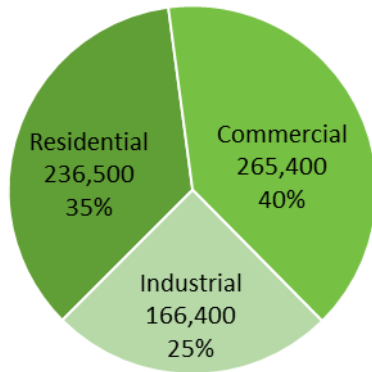
Annual Energy Consumption by Subregion



Regional Entity	2013 Energy Consumption (GWh) ²
FRCC	220,943
SPP RE	258,590
TRE	324,860
MRO	573,774
NPCC	643,414
RFC	781,247
SERC	824,640
WECC	888,200



LOAD

CONSUMPTION BY SECTOR³2014 Western US Consumption
of Electricity by Sector (GWh)Retail Customers by State and Sector, 2013⁴

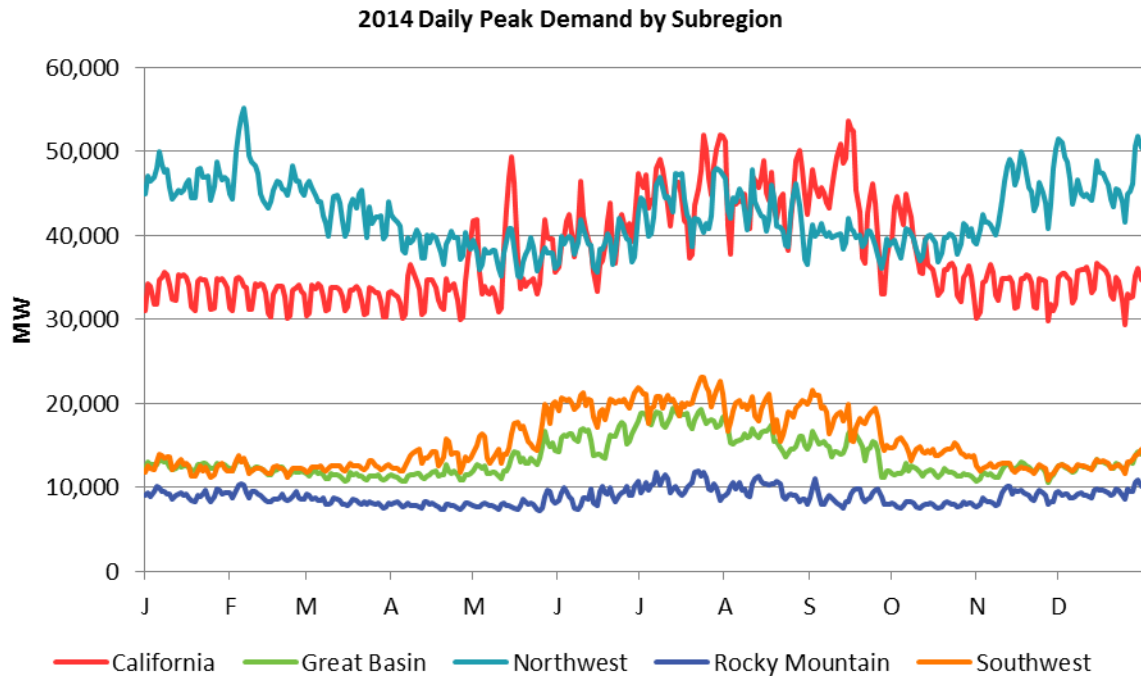
State	Residential	Commercial	Industrial	All Sectors
Arizona	2,630,595	308,857	7,624	2,947,076
California	13,359,503	1,794,018	71,556	15,225,090
Colorado	2,169,365	358,800	16,172	2,544,338
Idaho	680,930	103,400	26,846	811,176
Montana	477,266	101,216	8,692	587,174
Nevada	1,094,770	158,355	3,783	1,256,909
New Mexico	865,195	138,801	8,676	1,012,672
Oregon	1,650,803	235,191	23,392	1,909,390
Utah	981,194	116,263	9,629	1,107,087
Washington	2,880,008	360,855	27,808	3,268,677
Wyoming	263,614	58,015	10,134	331,763
Total	27,053,243	3,733,771	214,312	31,001,352

Retail Sales of Electricity by Sector (Western U.S.)



LOAD SHAPE

Spanning more than 1,850 latitudinal miles, the Western Interconnection covers a wide range of climatic zones. This results in seasonal changes in demand that are reflected in the daily peak demand for each subregion. Generally, the large peaks are strongly correlated with hot or cold weather events.



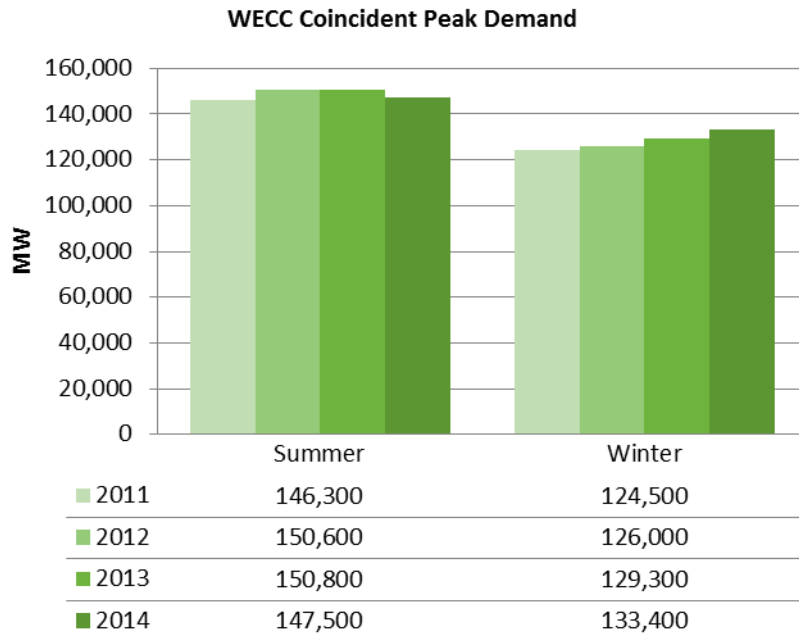
Observation

A number of large daily peaks occur during the shoulder periods of the year (October–November and March–May) when entities tend to schedule maintenance. The potential for large load increases should be factored into maintenance scheduling decisions.

LOAD

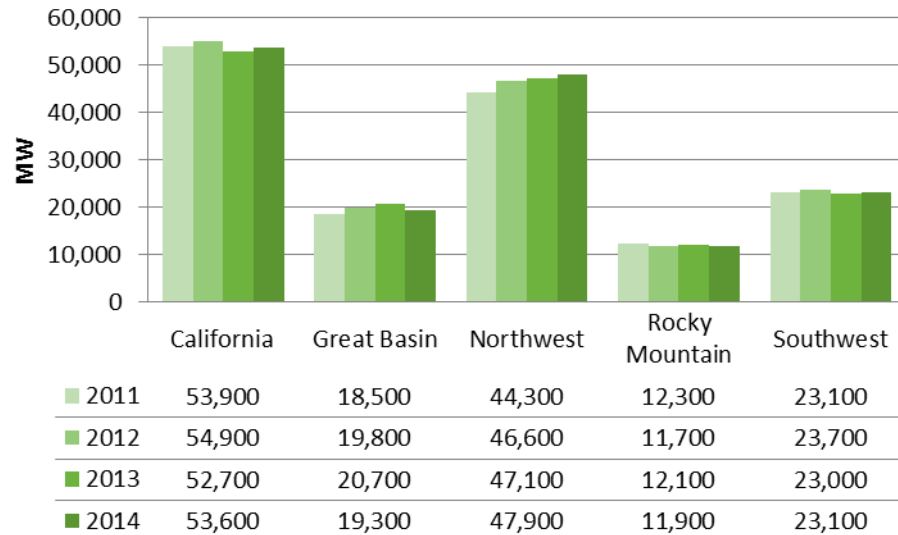
PEAK DEMAND⁵

The Western Interconnection is summer peaking. These peaks are highly sensitive to weather conditions across the Region, varying each year in response to the severity of a given season.

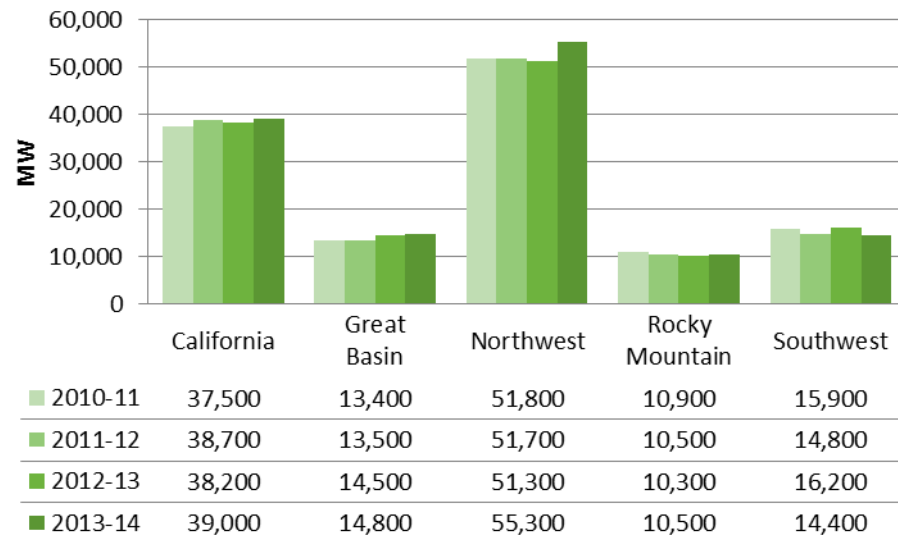
**Observation**

While the summer peak remains relatively stable, the winter coincident peak has increased each of the last four years. An analysis of how factors such as demand-side management, energy efficiency, and weather affect demand will help evaluate the drivers of changes in peak demand.

Non-Coincident Summer Peaks by Subregion



Non-Coincident Winter Peaks by Subregion



¹Balancing Authorities provide WECC with loads and resources data on an annual basis. The loads and resources data is extensive and supplies information on the Western Interconnection's historical and projected energy demand, load served, and resource portfolio.

²Source for other Regions: 2014 NERC ES&D.

³Electric Power Monthly, February 2015, U.S. Energy Information Administration.

⁴U.S. Energy Information Administration.

⁵Here, a coincident peak refers to a local maximum in demand across the Interconnection as a whole, while a non-coincident peak refers to a local maximum in demand within a given subregion alone, without regard to demand in the rest of the Interconnection.

GENERATION

- » Resource Portfolio
- » Capacity
- » Natural Gas Consumption
- » Actual Generation

GENERATION

GENERATION

The Western Interconnection is comprised of a diverse mix of generation resources varying by geographic area. This section contains information about generation in the West, in terms of both the resource portfolio (what is installed) and net generation (how specific resources are used).

2014 Generation in Brief

Nameplate Capacity: 284,300 MW

Net Generation

from Fossil Fuels: 450,600 GWh

from Hydro: 216,600 GWh

from Wind and Solar: 63,600 GWh

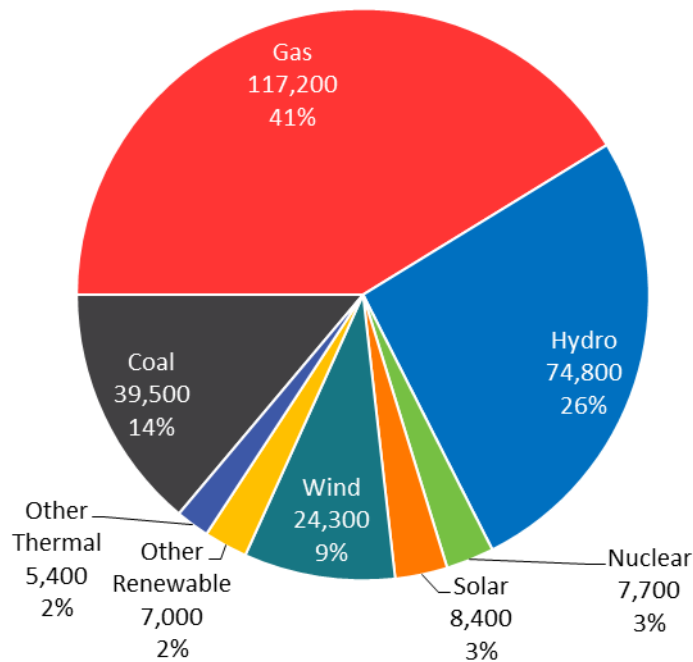
OBSERVATIONS

- » The largest generation addition in 2014 was the installation of more than 3,400 MW of new utility-scale solar generation. This does not include behind-the-meter solar, of which there are at least 3,200 MW installed in California and Arizona. Identifying the amount of rooftop solar generation online is critical to evaluating the impact of solar resources on system reliability.
- » Approximately 30 percent of installed wind capacity and 80 percent of installed solar capacity in the United States is located in the Western Interconnection. Entities should ensure they have adequate generation flexibility to cover ramps and fluctuations due to intermittent resources.
- » Natural gas consumption in the electricity sector is affected by weather. A good understanding of the effect that weather has on natural gas supply and consumption is important to the evaluation of resource adequacy issues in the West.
- » The base-load nature of coal and nuclear fueled generation resources tends to keep the output from these resources relatively steady throughout the day and throughout the year. However, generation from natural gas and hydro units can vary widely during the day to respond to changes in consumer demand and output from variable generation resources, with relative proportion of these two resources varying by hydro conditions.

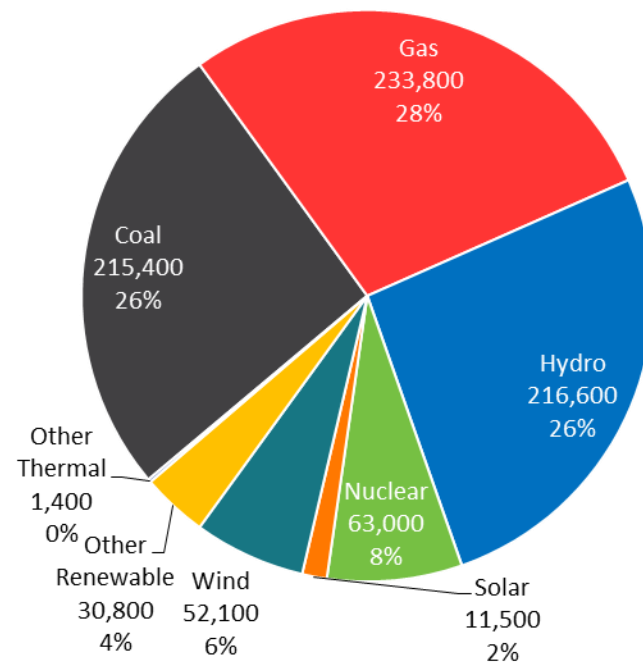
RESOURCE PORTFOLIO

In 2014, Balancing Authorities (BA) reported a nameplate capacity of 275,400 MW for all types of generators.¹ Coal, gas, and hydro comprise over 80 percent of installed capacity and net generation. Depending on the resource type, there can be a significant difference between nameplate capacity and the capacity actually available at any given time. The amount of electricity generated by a unit can be limited by operational decisions, environmental and system conditions, political and economic considerations, the efficiency of the technology, and the availability and quality of fuel.

2014 BA-Reported Nameplate Capacity (MW)



2014 BA-Reported Net Generation (GWh)

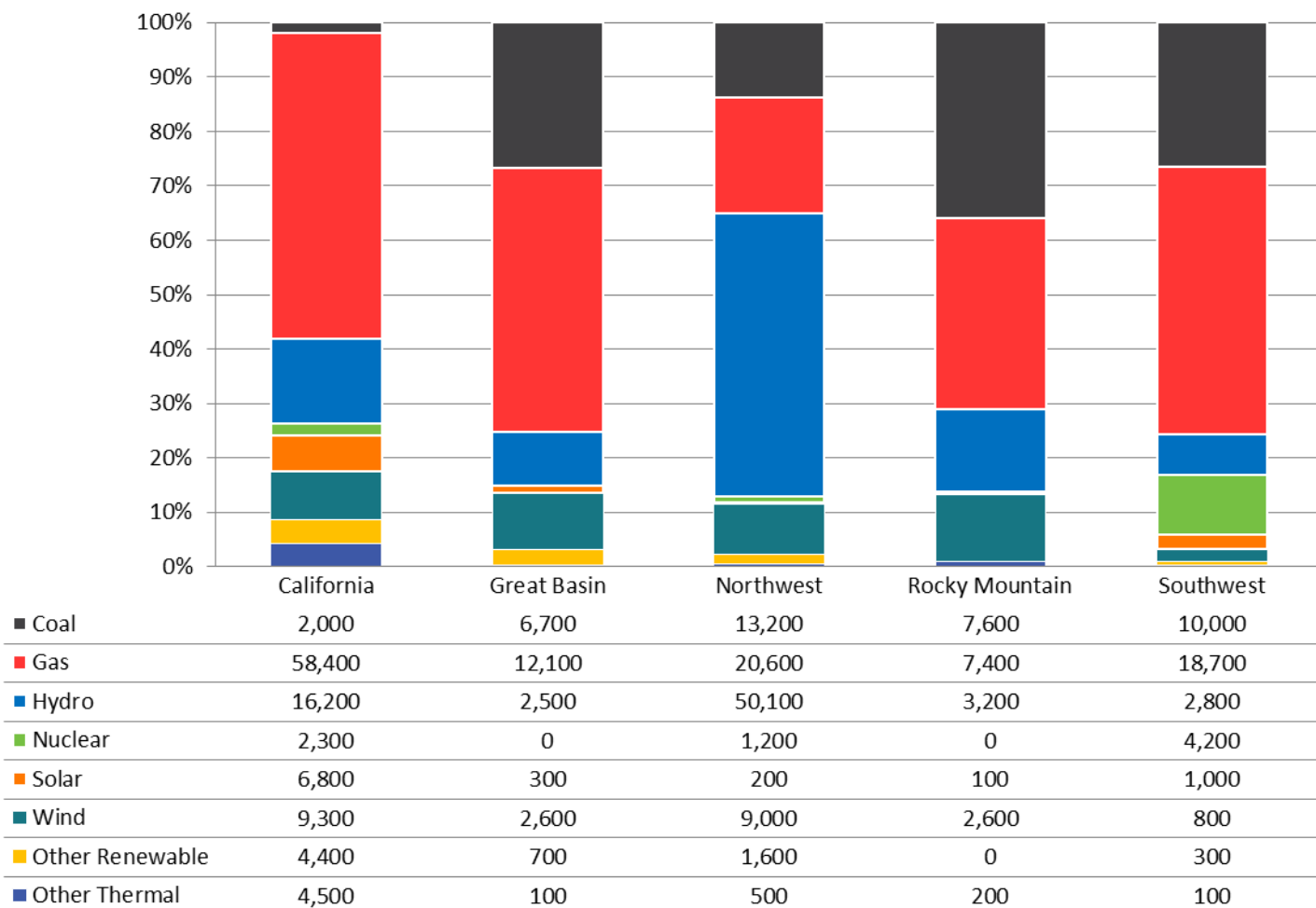


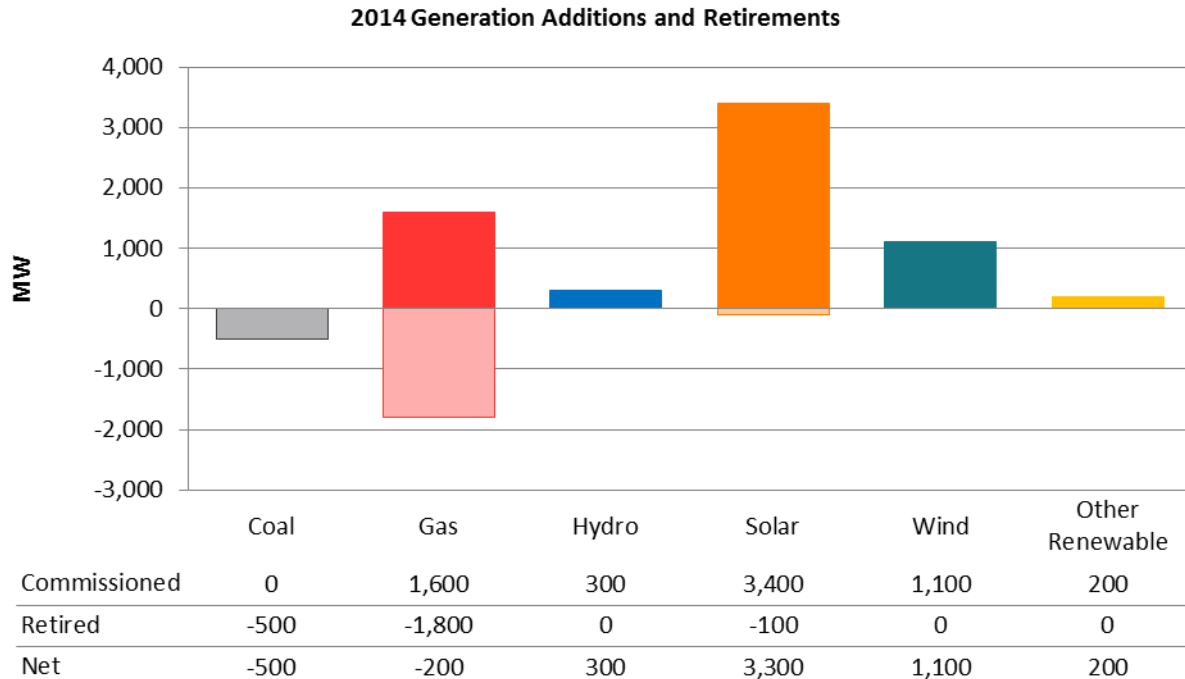
GENERATION

CAPACITY

The resource portfolio varies according to geography and fuel availability, e.g., hydro in the Northwest, solar in the Southwest. Note the California Subregion includes 1,800 MW of coal generation located in Utah.

2014 BA-Reported Nameplate Capacity by Subregion





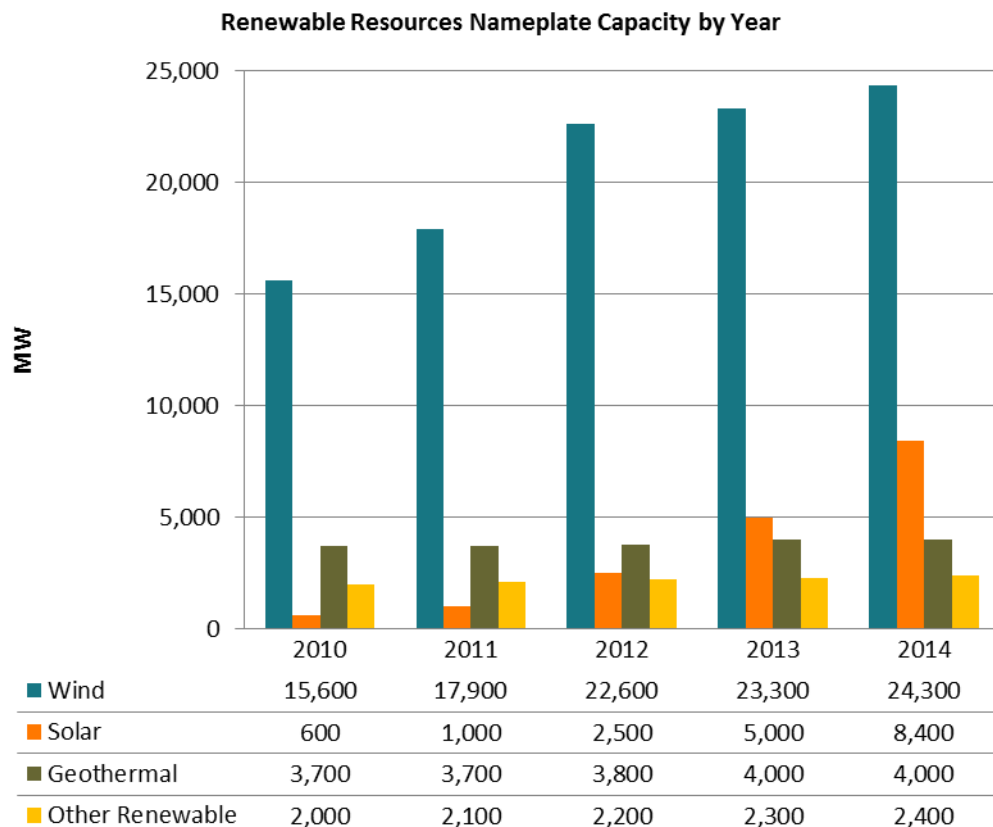
The addition of 1,600 MW of gas units was offset by the retirement of 1,800 MW of gas, including over 1,050 MW of natural gas-fired generation associated with California's once-through-cooling requirements. These changes to the resource portfolio are consistent with trends observed in the Western Interconnection over the last five years and are expected to continue as the generation resource mix changes. Since 2010, nearly 10,000 MW of wind and nearly 8,000 MW of solar generation has been added.

Observation

The largest generation addition in 2014 was the installation of more than 3,400 MW of new utility-scale solar generation. This does not include behind-the-meter solar, of which there are at least 3,200 MW installed in California and Arizona.² Identifying the amount of rooftop solar generation online is critical to evaluating the impact of solar resources on system reliability.

GENERATION

Over the last decade, wind generation capacity has increased steadily in the Western Interconnection. A similar trend in solar capacity has occurred over the last five years. In 2014, utility scale solar capacity in the Western Interconnection was 14 times that in 2010.

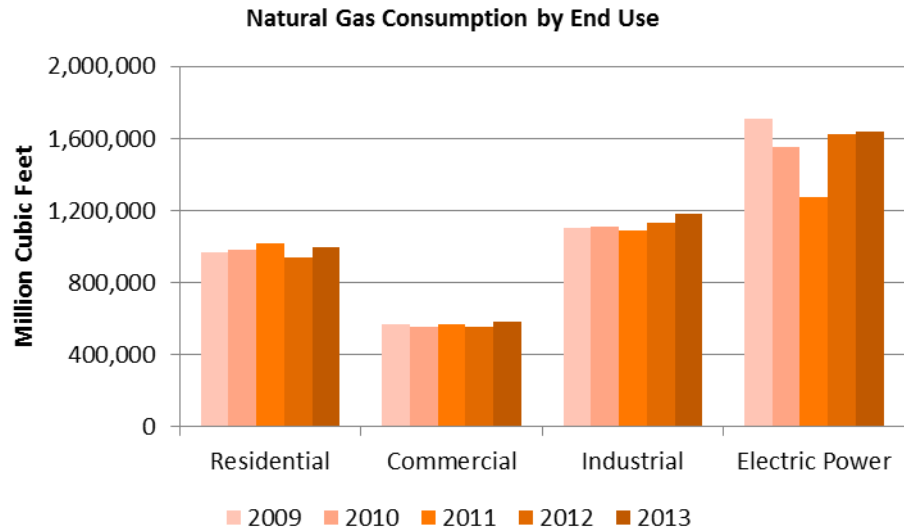


Observation

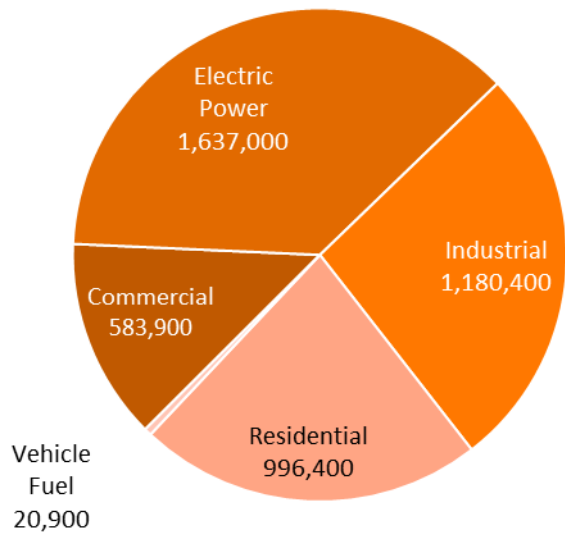
Approximately 30 percent of installed wind capacity and 80 percent of installed solar capacity in the United States is located in the Western Interconnection. Entities should ensure they have adequate generation flexibility to cover ramps and fluctuations due to intermittent resources.

NATURAL GAS CONSUMPTION³

The electric power sector continues to be the largest consumer of natural gas in the Western US, a trend that is likely to continue as reliance on natural gas grows.



2013 Consumption of Natural Gas, Western US (Million Cubic Feet)



Observation

Natural gas consumption in the electricity sector is affected by weather, sometimes in a different way than other sectors. For example, in the winter and spring of 2010-2011, the Northwest experienced unusually high precipitation. During this time, there was a small increase in residential consumption of natural gas; however, increased levels of hydro generation resulted in a substantial decrease in consumption of natural gas in the electric power sector. A good understanding of the effect that weather has on natural gas supply and consumption is important to the evaluation of resource adequacy issues in the West.

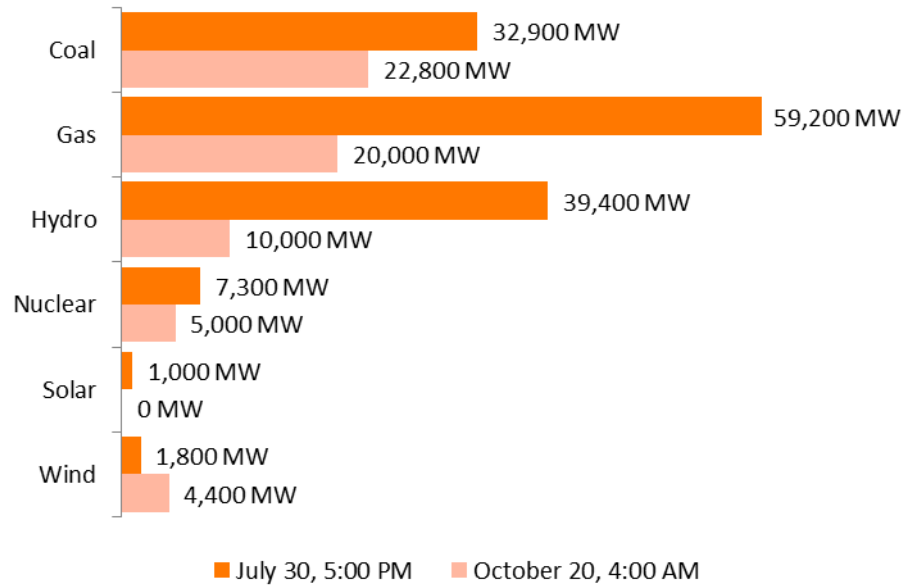
GENERATION

ACTUAL GENERATION

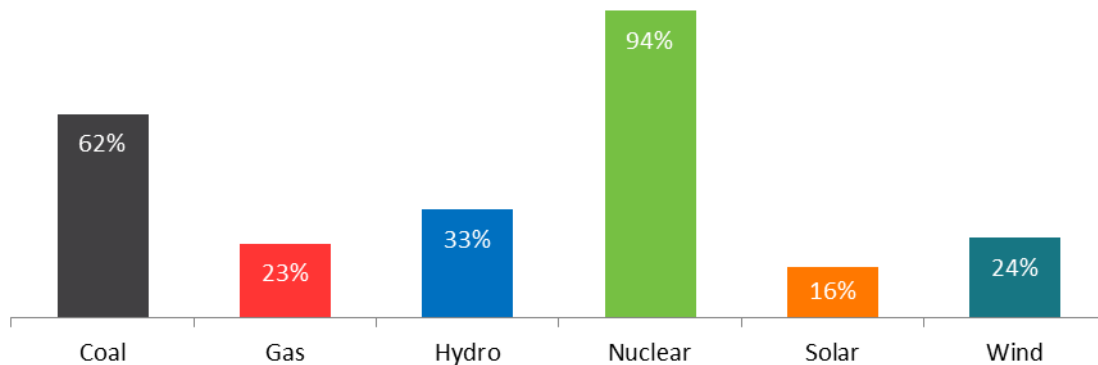
Despite the substantial growth in wind and solar generation installed capacity, the vast majority of generation on the system still comes from coal, gas and hydro. This is the case at both system maximum and minimum generation.

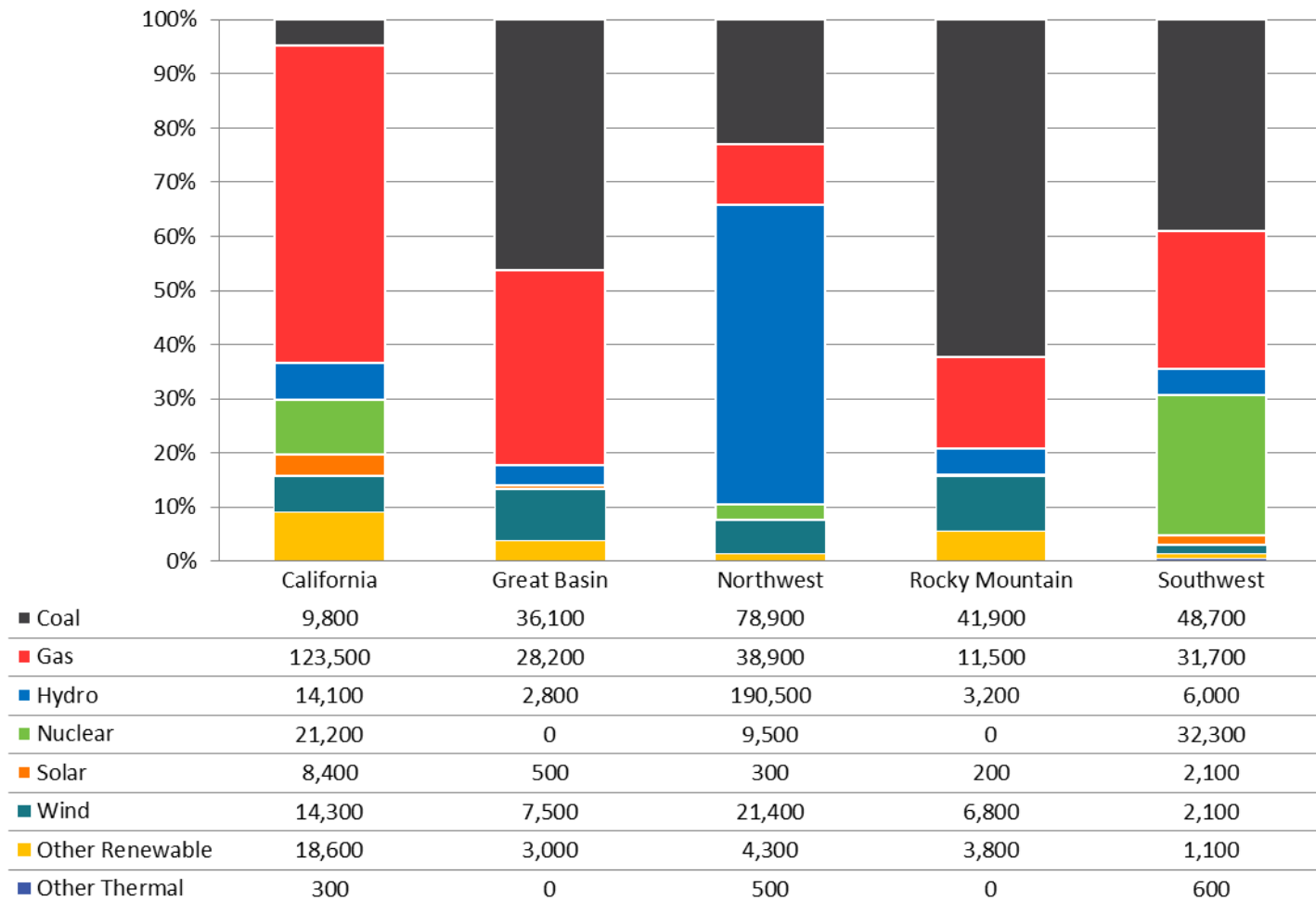
Capacity factors vary greatly depending on the type of generator. Coal and nuclear units have a high capacity factor, while generation from wind and solar units is limited to times when wind and sun are available. Capacity factors for gas and hydro vary, since they are used for reserves due to their ability to quickly respond to system need.

Actual Generation of Reported Units at System Maximum and Minimum⁴



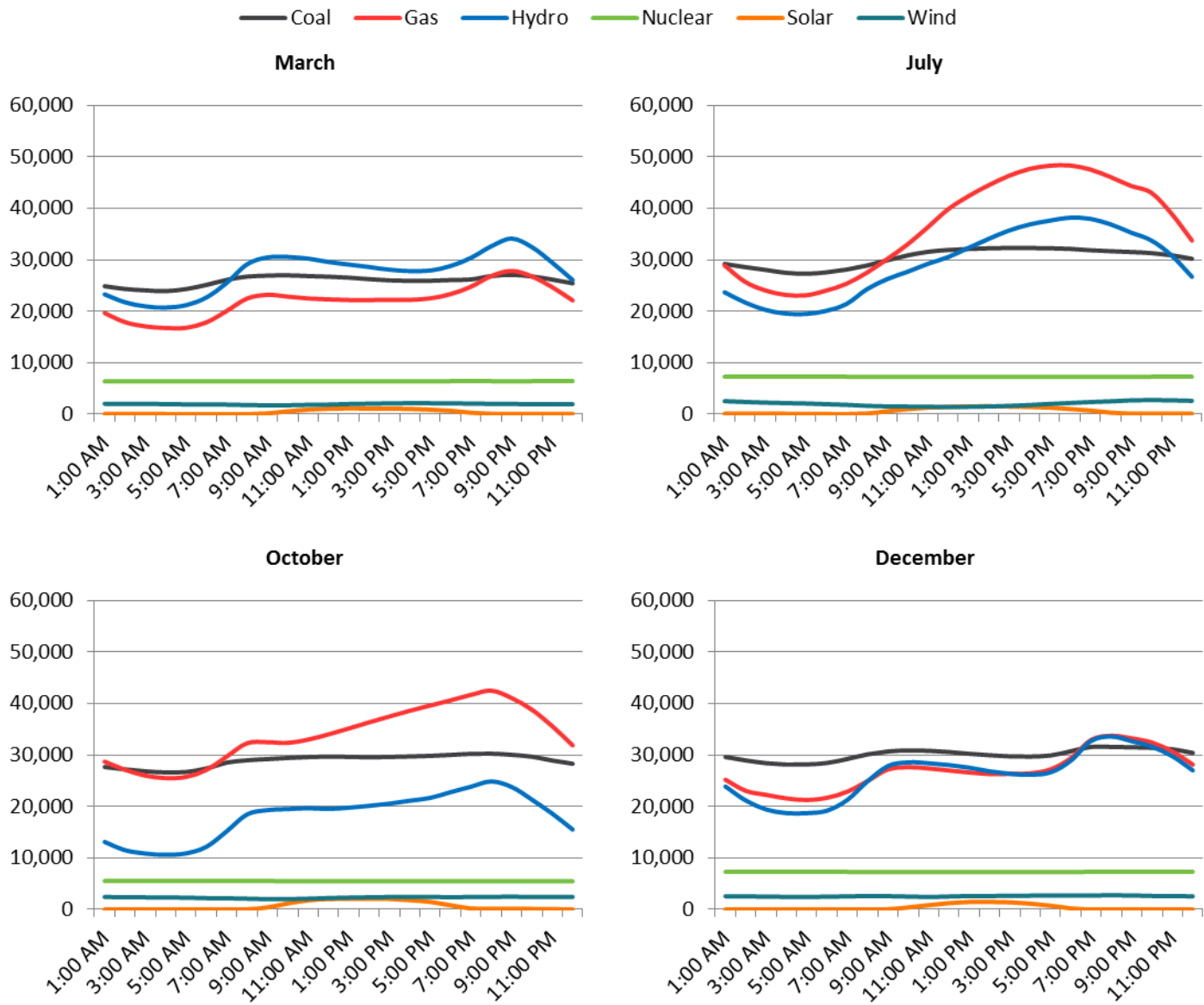
2014 Estimated Capacity Factors by Fuel Type⁵



2014 BA-Reported Net Generation by Subregion (GWh)⁶

GENERATION

AVERAGE HOURLY GENERATION BY MONTH



2014 Net Generation by State/Province (GWh)⁷

<i>State/Province</i>	<i>Coal</i>	<i>Gas</i>	<i>Hydro</i>	<i>Nuclear</i>	<i>Solar</i>	<i>Wind</i>	<i>Total</i>
<i>Arizona</i>	42,700	27,200	6,200	32,300	3,100	500	112,200
<i>California</i>	500	104,400	16,400	17,000	9,800	13,800	179,900
<i>Colorado</i>	32,500	12,200	1,700	0	300	7,300	53,900
<i>Idaho</i>	0	2,500	9,200	0	0	2,800	14,700
<i>Montana</i>	15,800	500	11,200	0	0	2,000	30,200
<i>Nevada</i>	6,500	22,700	2,400	0	1,000	300	36,000
<i>New Mexico</i>	20,400	8,600	100	0	500	2,300	32,000
<i>Oregon</i>	3,200	12,600	34,900	0	0	7,600	59,000
<i>Utah</i>	32,800	7,800	600	0	0	700	42,600
<i>Washington</i>	6,700	10,900	78,700	9,500	0	7,300	113,900
<i>Wyoming</i>	42,900	0	800	0	0	4,400	48,200
<i>Alberta</i>	42,600	12,400	1,900	0	0	3,500	60,900
<i>British Columbia</i>	0	1,000	55,700	0	0	1,100	59,800
<i>Baja California (WECC)</i>	0	6,000	0	0	0	0	9,800

Observation

The base-load nature of coal and nuclear fueled generation resources tends to keep the output from these resources relatively steady throughout the day and throughout the year. However, generation from gas and hydro units can vary widely during the day to respond to changes in consumer demand and output from variable generation resources, with relative proportion of these two resources varying by hydro conditions.

¹ Data on generation is obtained from BAs through WECC's Loads and Resources data request process.

² Source: U.S. Energy Information Administration.

³ Source: U.S. Energy Information Administration.

⁴ Only a subset of hourly generation information was available from Peak Reliability.

⁵ Capacity factors were estimating by dividing BA-reported net generation in MWh by BA-reported net summer capacity times the number of hours in the year.

⁶ Source: Loads and Resources data request.

⁷ U.S. generation comes from preliminary data from the U.S. Energy Information Administration through the February 2015 issue of Electric Power Monthly. Data for AESO, BCHA, and CFE come from those entities directly through WECC's annual Loads and Resources data request.

TRANSMISSION

- » Transmission Inventory
- » Path Flow
- » Net Interchange
- » SOL Exceedances

TRANSMISSION

TRANSMISSION

The Western Interconnection is characterized by long transmission lines connecting remote generation to load centers. Over 127,700 circuit miles of transmission lines cross the Western Interconnection. This section contains information about the structure and use of this complex transmission system, including the flow on WECC paths and the incidence of system operating limit (SOL) exceedances.

2014 in Brief

Transmission Miles (2012): 127,700

WECC Paths: 67

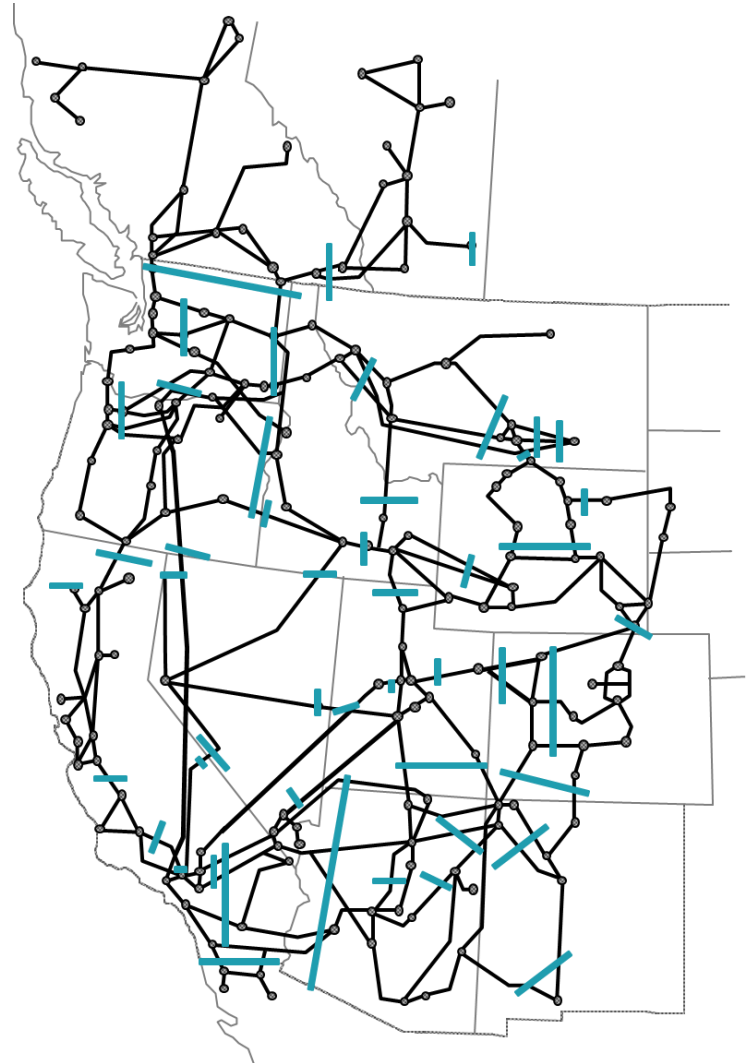
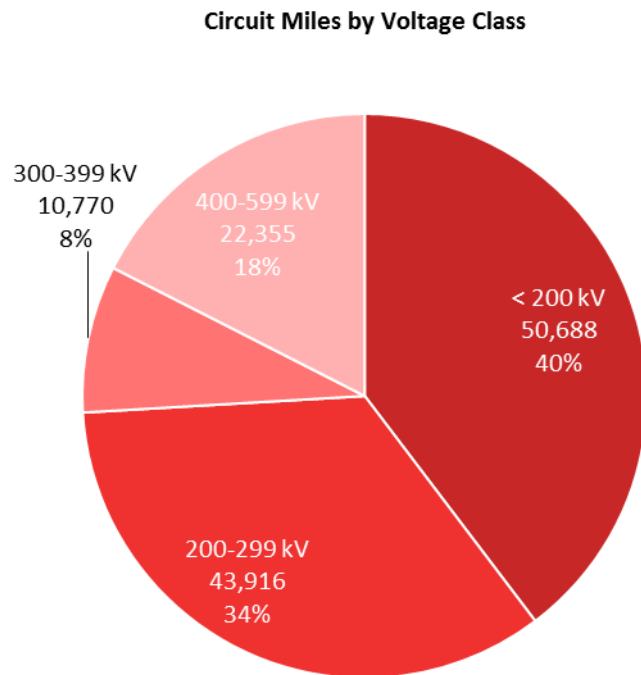
SOL Exceedances: 13,714

OBSERVATIONS

- » The majority of major WECC paths are regularly operated under 75 percent of their rating.
- » Since 2011, 87 percent of SOL exceedances have lasted for less than one minute, while 0.02 percent have lasted for more than 30 minutes.
- » 84 percent of the SOL exceedances in 2014 occurred in the Northwest Subregion. This subregion has shown significant increases in the number of SOL exceedances over the past three years. Operational practices should be established to maintain path flows within system operating limits. Additional work on identifying the operational issues around the increase in SOL exceedances should be considered.

TRANSMISSION INVENTORY¹

Key transmission lines are grouped into 67 paths for planning and operational purposes.



TRANSMISSION

PATH FLOW

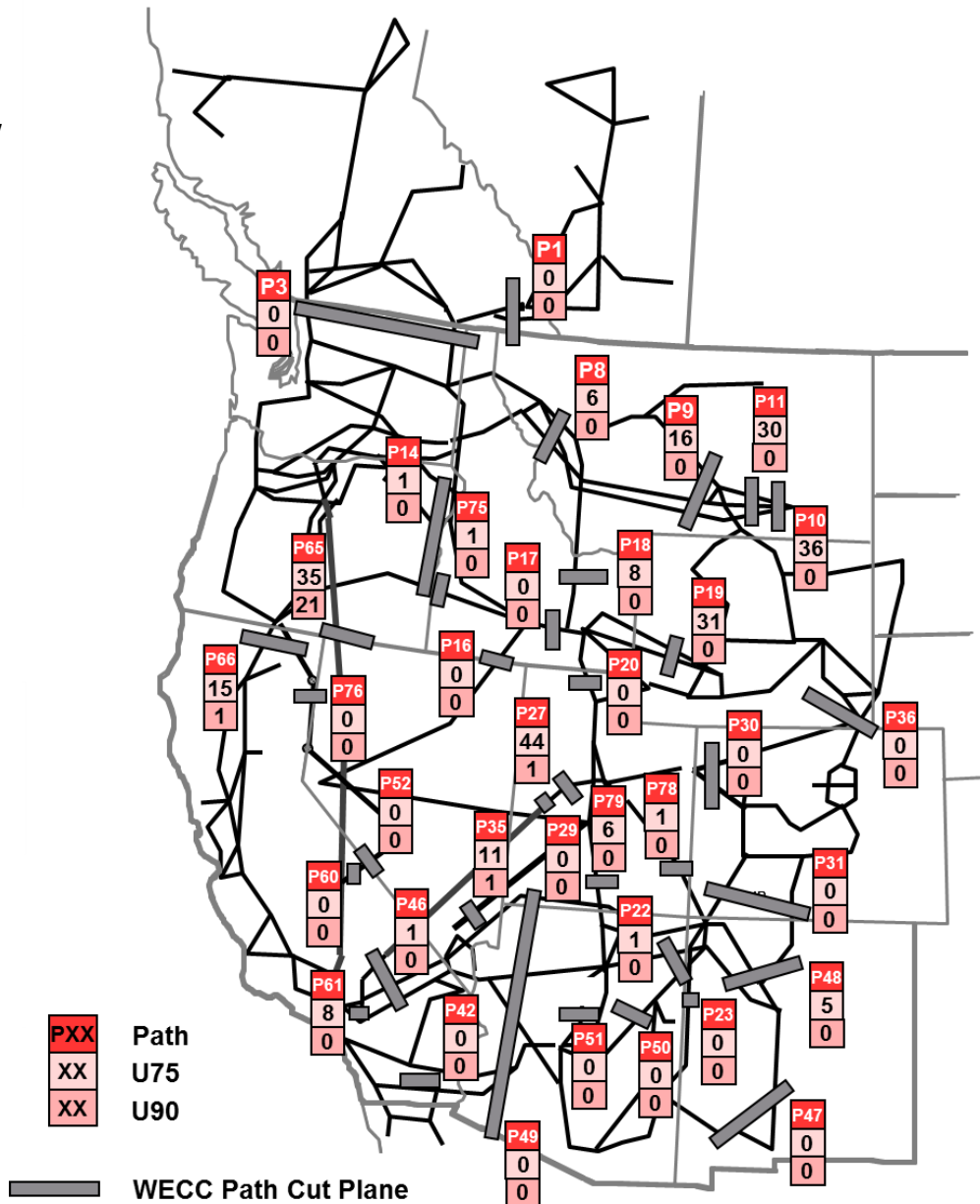
One measure of congestion on WECC paths is the utilization metric, which measures the percent of time the flow on the path is above a specific threshold.

- » The path's U75 value indicates the percent of time that flow on the path exceeded 75 percent of the path's rating.
- » The path's U90 value indicates the percent of time that flow on the path exceeded 90 percent of the path's rating.

Observation

The majority of major WECC paths are regularly operated below 75 percent of their rating.

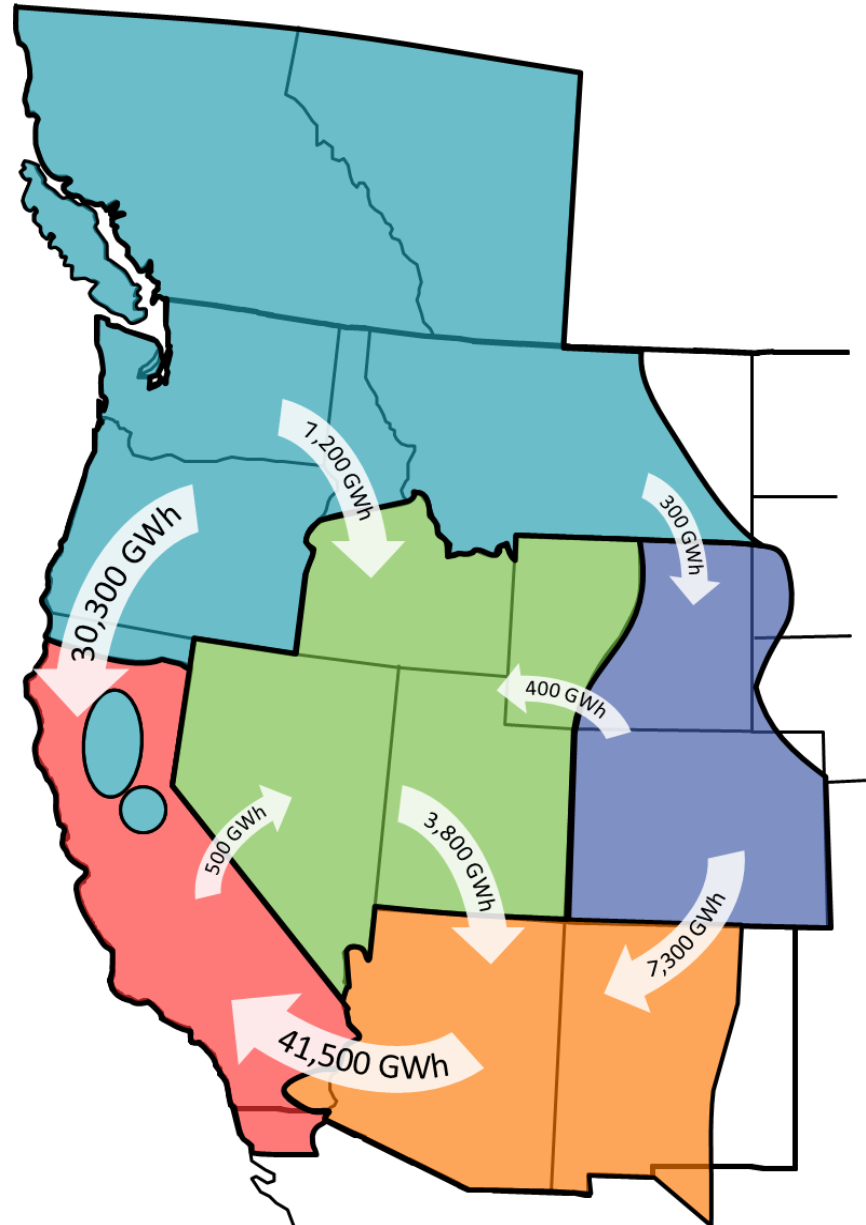
2014 WECC Path Utilization Metric Values



NET INTERCHANGE²

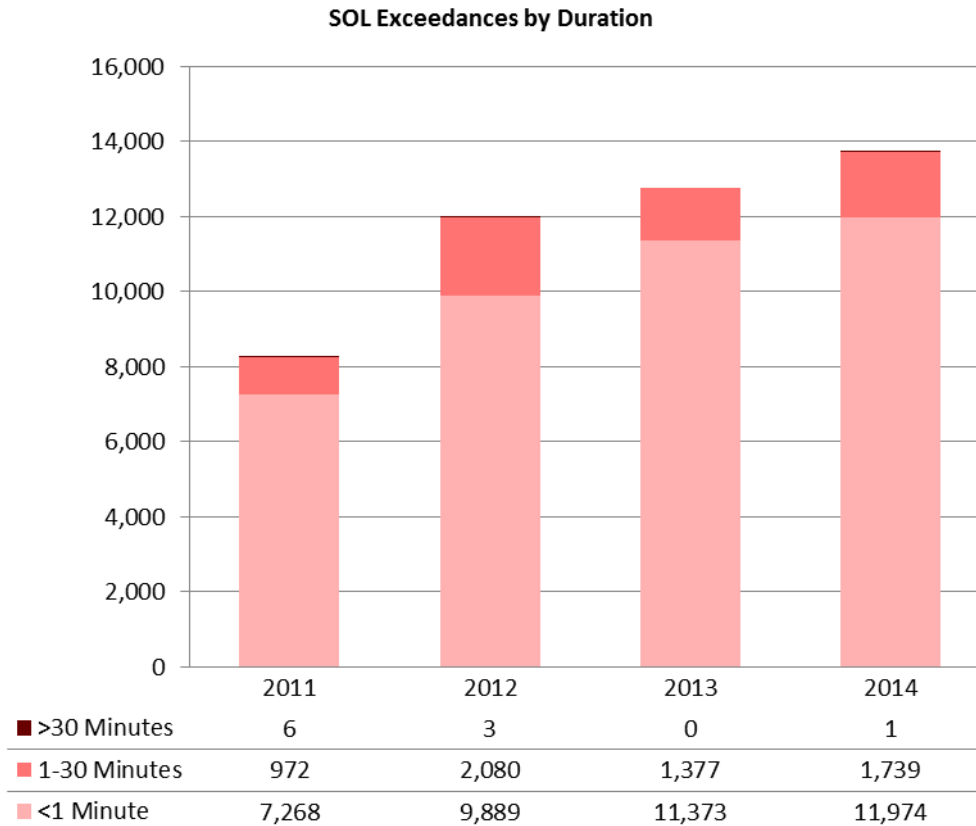
The California Subregion had net imports of 71,300 GWh during 2014, while the Northwest and Southwest Subregions had net exports of 37,800 and 30,400 GWh, respectively.

2014 Net Interchange between Subregions



TRANSMISSION

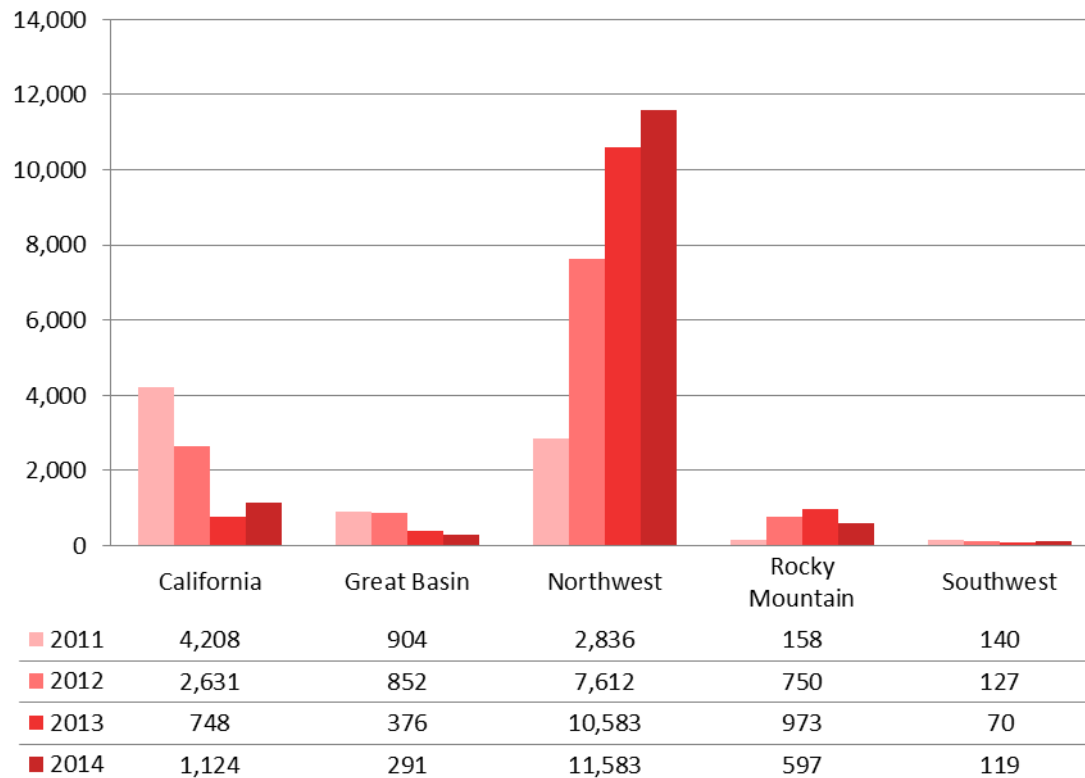
SYSTEM OPERATING LIMIT EXCEEDANCES³



Observation

Since 2011, 87 percent of SOL exceedances have lasted for less than one minute, while 0.02 percent have lasted for more than 30 minutes.

SOL Exceedances by Subregion



Observation

84 percent of the SOL exceedances in 2014 occurred in the Northwest Subregion. This subregion has shown significant increases in the number of SOL exceedances over the past four years. Operational practices should be established to maintain path flows within system operating limits. Additional work on identifying the operational issues around the increase in SOL exceedances should be considered.

¹Transmission mileage by voltage class was collected from each Balancing Authority by WECC through its Loads and Resources data request in early 2013.

²Source: WECC Interchange Tool.

³ A system operating limit (SOL) is defined as the most limiting of prescribed operating criteria to ensure operation of a particular system configuration will not compromise reliability. Standard TOP-007-WECC states that the SOL of any WECC path is not to be exceeded for more than 30 minutes.

COMPLIANCE

» Registration

» Violations

COMPLIANCE

COMPLIANCE

Through the Compliance Monitoring and Enforcement Program, NERC and the Regional Entities assure the reliability of the Bulk Electric System (BES), in part, by holding entities accountable for compliance with reliability standards.

The Western Interconnection accounts for roughly one quarter of the Registered Entities in the United States.¹ As the Compliance Enforcement Authority for the Western Interconnection, WECC is responsible for registration of owners and operators of the BES in the Western Interconnection and for ensuring that the entities remain in compliance with these standards. This section describes registration of entities and violations of Reliability Standards. Except where explicitly indicated, this section describes only entities registered with NERC.

OBSERVATIONS

- » There was a significant decrease in the number of Distribution Providers and Load-Serving Entities in 2014 coincident with a coordinated re-evaluation of those registrations during the year.
- » The majority of violations apply to only a small number of standards. Excluding dismissals, six CIP standards and PRC-005 account for nearly 50 percent of all violations since the Compliance program began.

2014 in Brief

Registered Entities (U.S.): 420

International Entities: 44

Violations Discovered: 392

REGISTRATION

NERC registers entities for Compliance purposes according to Reliability Functions. Approximately 25 percent of Registered Entities in the United States are under WECC's jurisdiction. As of December 31, 2014, there were 420 U.S. entities registered with NERC through WECC. There were also 44 international entities for which WECC provides certain Compliance services, but are not under the jurisdiction of NERC.

Observation

There was a significant decrease in the number of Distribution Providers and Load-Serving Entities in 2014 coincident with a coordinated re-evaluation of those registrations during the year.

**Entities Registered with NERC
as of December 31, 2014**

	Western Interconnection		Contiguous United States	
	2013	2014	2013	2014
Balancing Authority	35	34	125	106
Distribution Provider	167	109	540	469
Generator Operator	226	224	856	844
Generator Owner	231	230	901	891
Interchange Authority	1	1	48	38
Load-Serving Entity	143	103	513	462
Planning Authority	29	30	81	74
Purchasing-Selling Entity	145	145	684	440
Reliability Coordinator	1	1	22	15
Reserve Sharing Group	3	3	18	14
Resource Planner	55	54	179	175
Transmission Operator	56	50	187	178
Transmission Owner	86	79	345	328
Transmission Planner	44	45	186	181
Transmission Service Provider	34	34	94	82
Registered Entities	477	420	1,926	1,600

COMPLIANCE

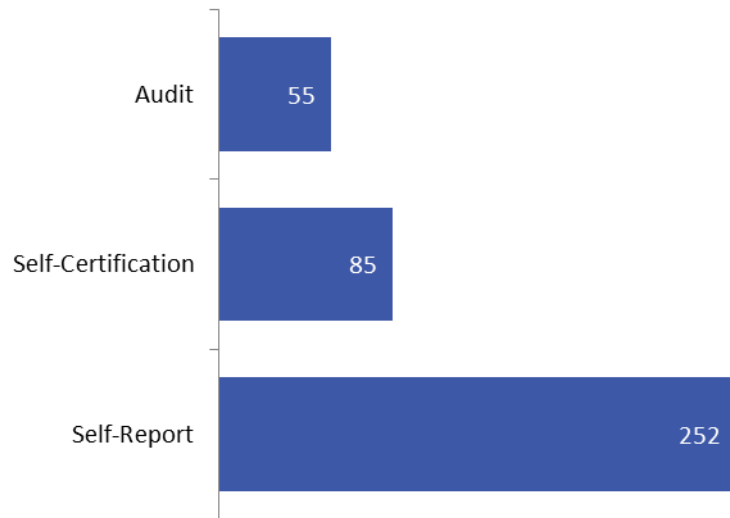
VIOLATIONS

All violations from 2014 were discovered through audits conducted by WECC, self-reported by the entity, or reported when an entity self-certified its compliance.²

In 2014, there were 125 audits conducted by WECC, 55 covering Critical Infrastructure Protection (CIP) standards and 70 covering Operations & Planning (O&P) standards. Through these audits, 55 potential violations were identified, an average of 0.4 violations per audit.

The number of potential violations includes those that were eventually dismissed. Since 2007, of 5,250 violations that had reached a final disposition, 2,700 (50 percent) were ultimately dismissed. Two-thirds of all potential violations discovered in 2014 were self-reported to WECC by the entity. Self-reported violations are more likely to be dismissed than those discovered through audits.

Potential Violations by Discovery Method, 2014



Observation

The majority of violations apply to only a small number of standards. Excluding dismissals, six CIP standards and PRC-005 account for nearly 50 percent of all violations since the Compliance program began.³

15 Most Violated Standards

2014		2007-2014	
<i>Standard</i>	<i>Potential Violations</i>	<i>Standard</i>	<i>Potential Violations</i>
CIP-007	96	CIP-007	674
PRC-005	49	PRC-005	502
CIP-006	40	CIP-006	407
CIP-004	32	CIP-004	368
CIP-005	32	CIP-005	331
CIP-003	16	CIP-001	263
CIP-002	15	CIP-003	214
CIP-001	7	VAR-002	171
CIP-009	7	TOP-002	164
FAC-008	7	CIP-002	163
FAC-010	7	EOP-005	138
VAR-001	7	FAC-008	114
VAR-002	7	CIP-009	113
COM-002	5	PER-002	106
FAC-009	5	FAC-009	103
CIP Standards	245	CIP Standards	2,504
O&P Standards	147	O&P Standards	3,322
All Standards	392	All Standards	5,826

¹ There can be a difference between an entity's registration with NERC and the functions it performs from a non-Compliance perspective. The data in this section considers entities only as they are registered with NERC.

² There are eight compliance monitoring methods through which potential violations of Reliability Standards are discovered by or reported to WECC. Violations can also be identified through periodic data submittals, spot checks, investigations, complaints, and exception reports.

³ As new versions of existing standards are developed, they may be renamed. For example, in 2014, FAC-009-1 became FAC-008-3. This table does not account for these differences.



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