



Western Interstate Energy Board Current Activities

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Western Regional Partnership Energy Committee
Webinar
October 20, 2017



Legal Basis & Purpose

Legal Basis

Western Interstate Nuclear Compact (PL 910461)

- Enacted by 12 Western states and ratified by Congress in 1970.
- Written broadly to encompass all energy topics.

Purpose

To provide the instruments and framework for cooperative state efforts to “enhance the economy of the West and contribute to the well-being of the region’s people.”



Board Members*

UT	Dr. Laura Nelson, Governor's Office of Energy Development
NV	Angela Dykema, Governor's Office of Energy
AZ	Brian Goretzki, Arizona Radiation Regulatory Agency
CA	Janea Scott, California Energy Commission
ID	John Chatburn, Governor's Office of Energy Resources
MT	Jeff Blend, Department of Environmental Quality
OR	Janine Benner, Oregon Department of Energy
WA	Tony Usibelli, Washington Department of Commerce
AB	Christine Lazaruk, Alberta Energy
BC	Les MacLaren, Ministry of Energy and Mines
SK	Mike Balfour, Ministry of the Economy

* Appointed by Governors and Premiers.



WIEB Portfolio

Western Interconnection Regional Advisory Body

- Governors created pursuant to Section 215(j) of the Federal Power Act.
- Advises FERC, NERC and WECC on the reliability of the Western electric power system.

Committee on Regional Electric Power Cooperation

- Joint Committee of WIEB and Western Conference of Public Service Commissioners.
- Focused on improving the economic efficiency of the Western electric power system.



More Portfolio Items

Western Energy Imbalance Market – Body of State Regulators

- One public utility commissioner from each state with a utility participating in the Western EIM.
- Advises the EIM Governing Body on EIM issues.

High-Level Radioactive Waste Committee

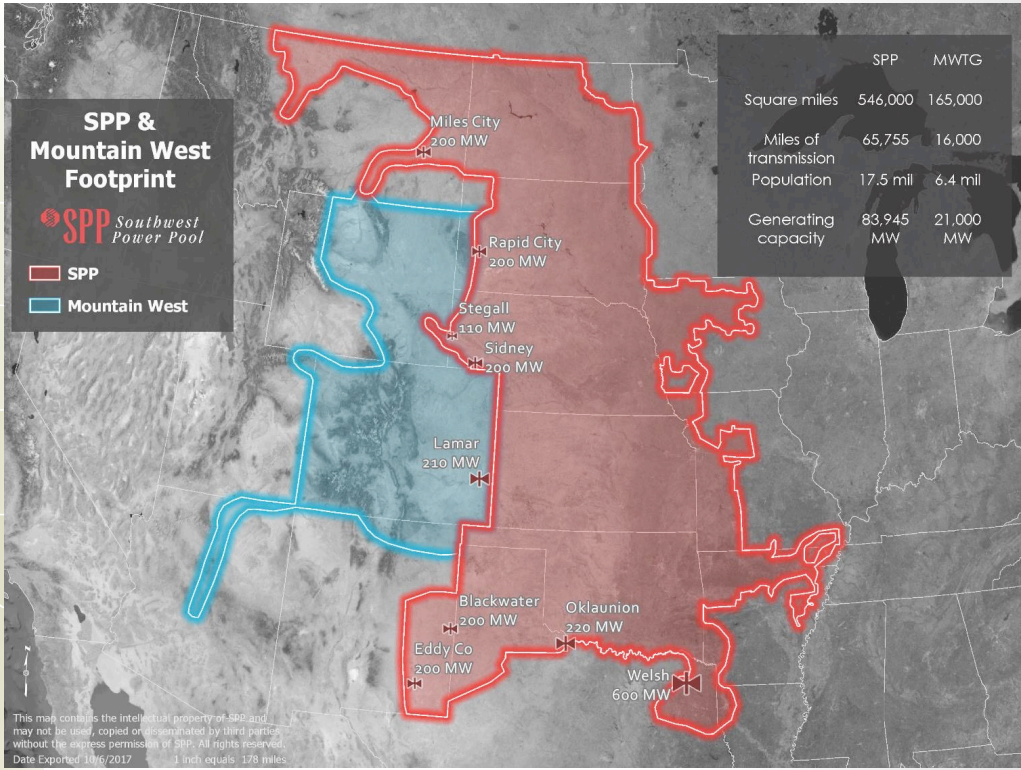
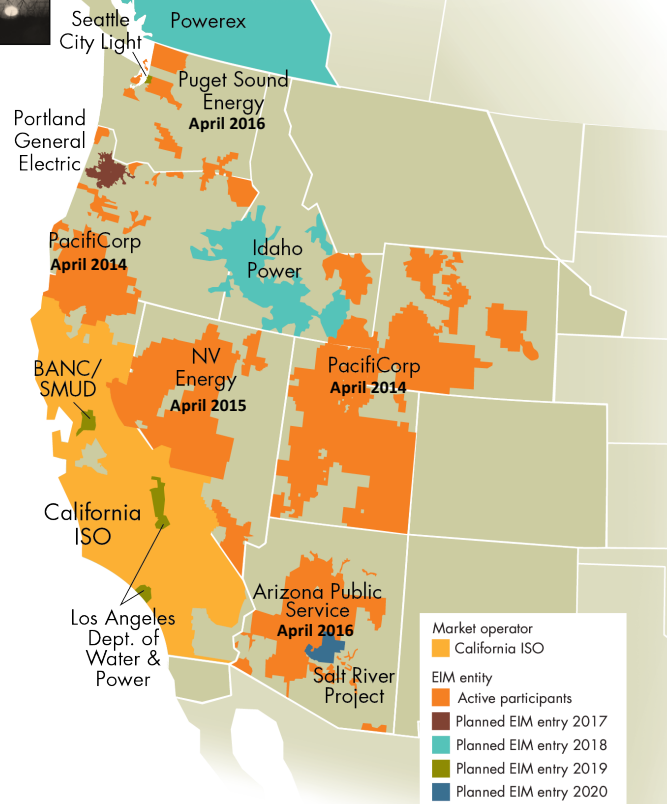
- Committee of WIEB.
- Cooperative Agreement with U.S. DOE-NE.
- Focused on transportation of spent nuclear fuel and high-level radioactive waste.



Current Activities

- **Regionalization of Electricity Markets**
 - WIEB Western Electricity Market Forum
 - Joint CREPC-WIRAB Meetings
- **Baseload Generation & Essential Reliability Services**
 - WIRAB Comments on DOE Staff Report on Reliability and Resilience Pricing
 - WIRAB Advice to FERC on Reliability and Resilience Pricing NOPR
 - WIRAB Advice to FERC Primary Frequency Response NOPR
- **Deployment of Solar PV in the West**
 - WIEB SunShot Award from US DOE

Electricity Market Expansion





Benefits of Regionalization

- Western EIM benefits totaled \$96.9 million in 2016.
- Progression to a day-ahead market makes perfect sense.
- EIM benefits derived from security constrained economic “dispatch” of generating units.
- Day-ahead benefits can be derived from security constrained economic “commitment” of generating units.
- Improved system security and situational awareness.



Governance Concerns

- All states want to retain authority to:
 - Implement state energy policies
 - Determine prudence of generation investment
 - Determine prudence of transmission investment
 - Permit siting of new transmission lines
- All states want impartial market design and cost allocation
- If states all want the same things, then why the concerns?
- States think other states are seeking advantages. Game theory's classic prisoner's dilemma.



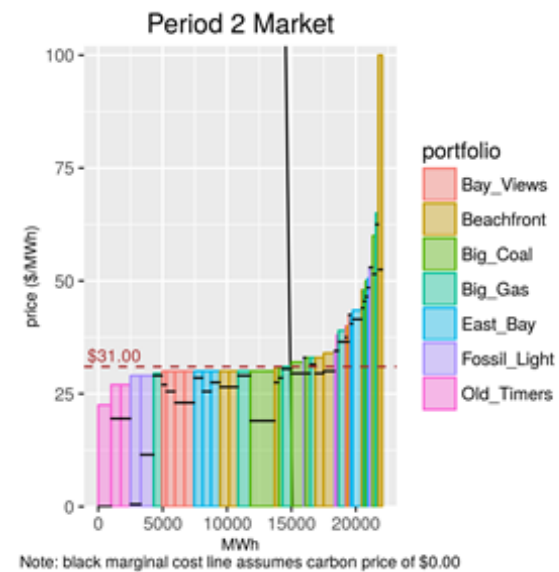
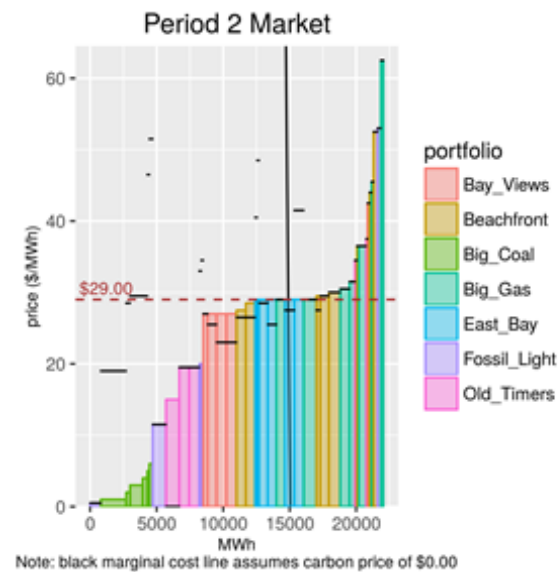
Incremental Approach

- One-time once-and-for-all thinking drives the classic dilemma.
- Better to think in terms of a long-term partnership (infinitely repeated prisoner's dilemma).
- Think in terms of incremental steps:
 - Real-time markets to...
 - Day-ahead markets to...
 - Resource adequacy and investment to...



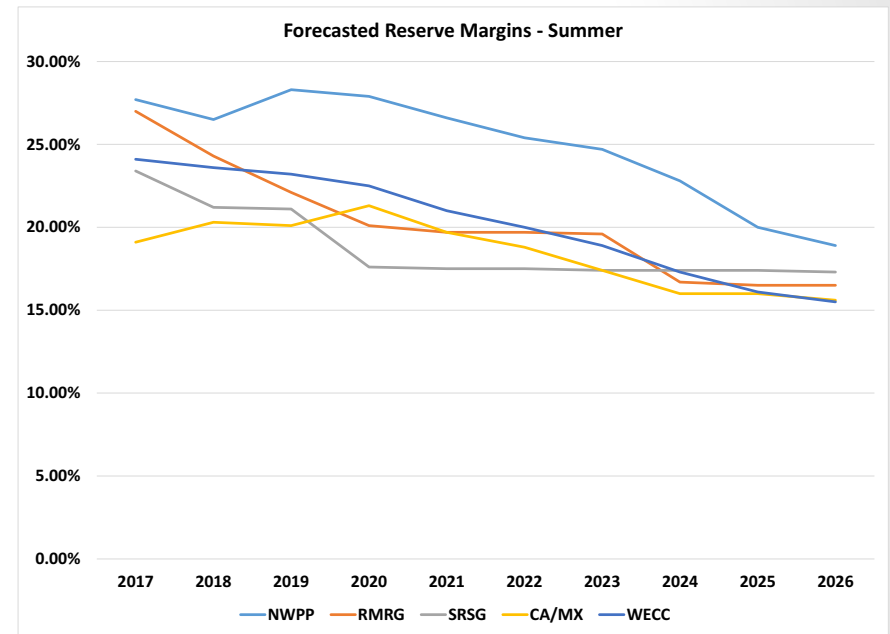
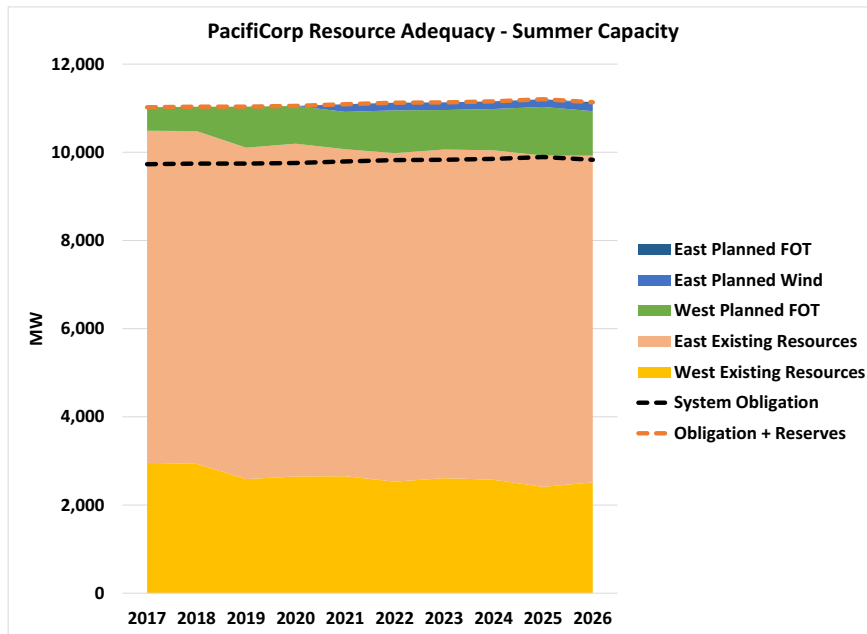
WIEB Western Electricity Market Forum

- Game-based market simulation training for regulators and policy makers
- Collaborative effort with Stanford University





CREPC Resource Adequacy Discussions





DOE Markets and Reliability Report

Secretary Perry's "April 14 Memo" asked:

- Whether the erosion of baseload power is compromising a reliable and resilient grid?
- Whether the diversity of generation resources has diminished and whether this is a problem for grid reliability and resilience?
- Whether the loss of baseload power is making the grid less affordable?
- Whether electricity markets are adequately compensating attributes that strengthen grid reliability and resilience?



DOE Report: Baseload Trends

- About 70% of the coal plants that retired between 2010 and 2016 had a capacity factor of less than 50% in the year prior to retirement.
- About half of the future planned coal plant retirements operated below a 50% capacity factor in 2016.
- The average capacity factor for all NGCC plants has grown from about 40% in 2008 to roughly 56% in 2016, surpassing that of coal.
- At the end of 2016, the system had more dispatchable capacity capable of operating at high utilization rates than it did in 2002.



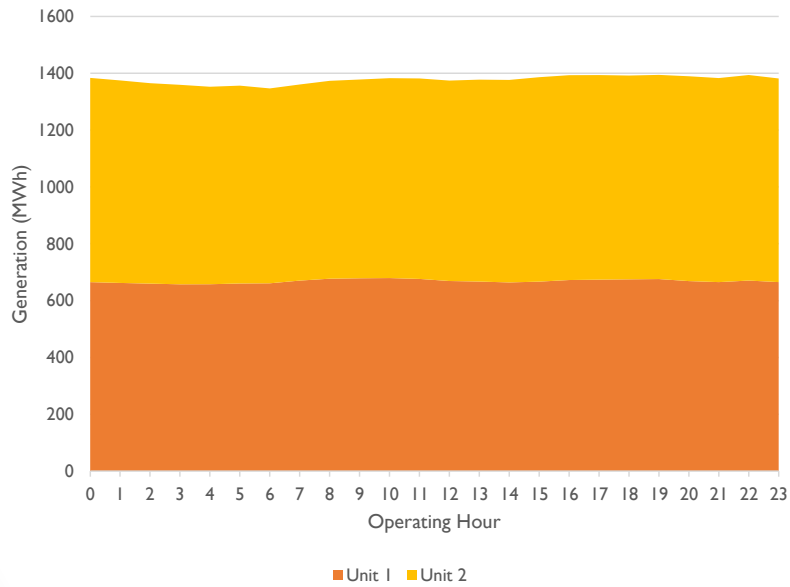
WIEB- Stanford Summer Internship

- Benjamin Lim and Max Vilgalys
- Focused on changes in the daily generation pattern of coal-fired generating units in the Western Interconnection over the 2001-2016 time period.
- EPA's Continuous Emissions Monitoring System (CEMS) Database
 - All thermal electric generating units in the West
 - 96 Coal Units, 544 NG Units
 - Hourly data for Heat Input, Generation, Emissions, etc.
 - $96 \text{ coal units} \times 365 \text{ days} \times 24 \text{ hours} \times 16 \text{ years} = \sim 13,455,360 \text{ data points}$
 - $96 \text{ coal units} \times 365 \text{ days} \times 16 \text{ years} = \sim 560,640 \text{ unit-days of operation}$

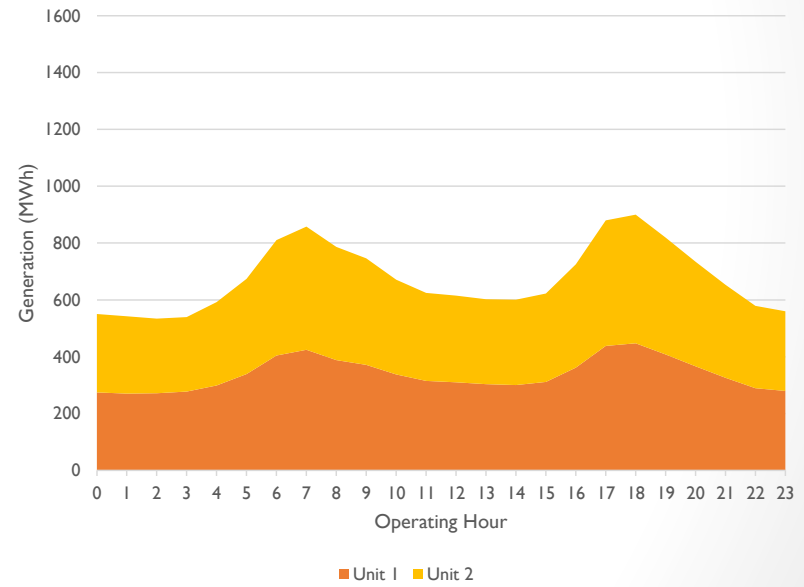


Average Hourly Generation

Average Hourly Generation at Centralia Coal Plant - November 2001



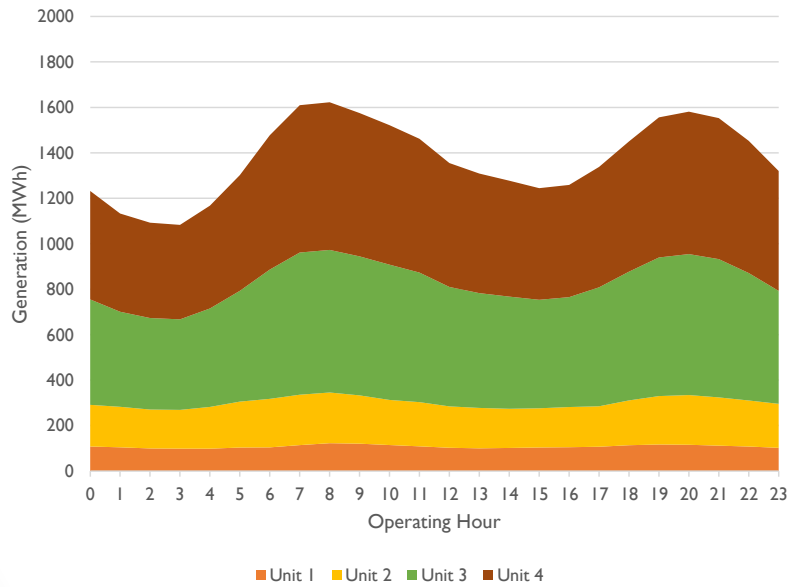
Average Hourly Generation at Centralia Coal Plant - November 2016



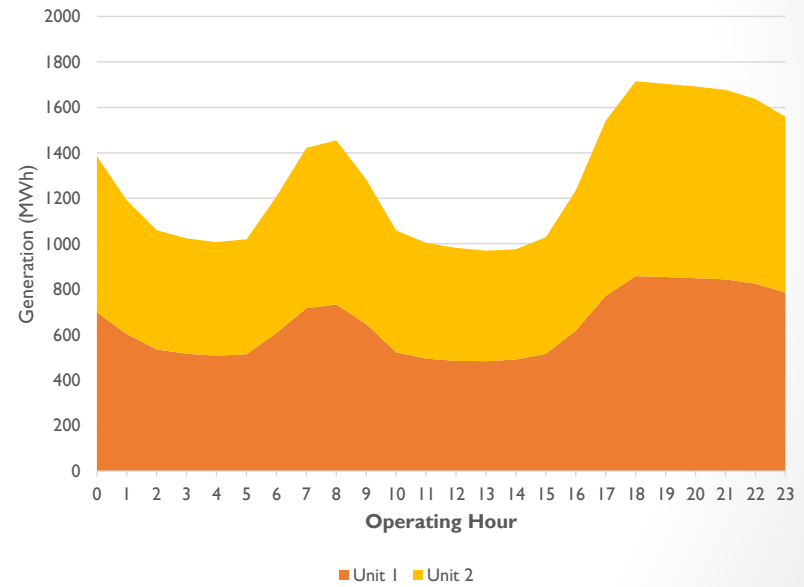


Other Units

Average Hourly Generation at Colstrip Coal Plant -
March 2016

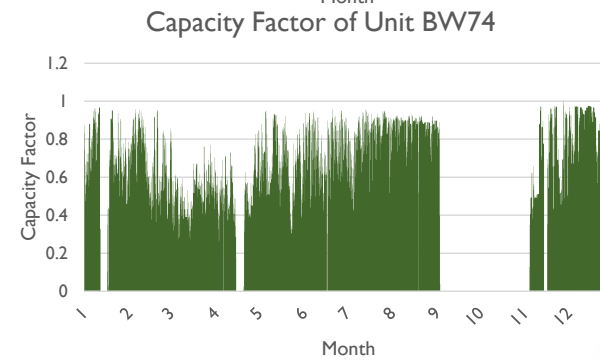
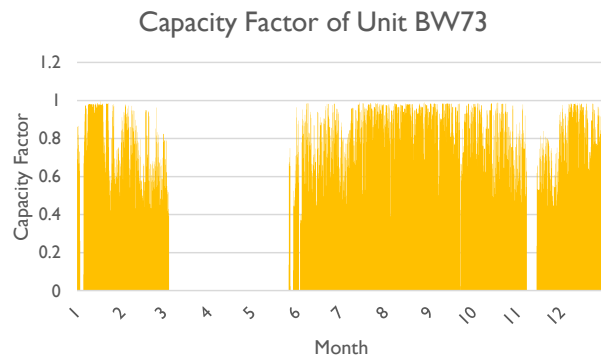
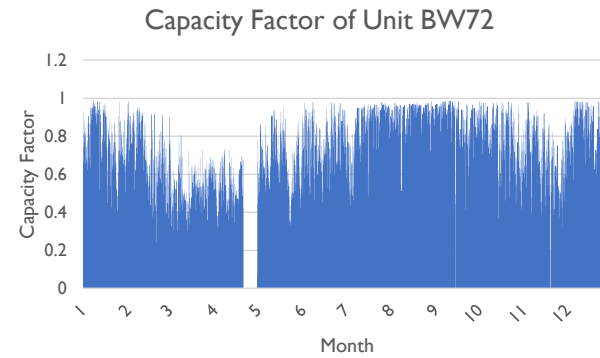
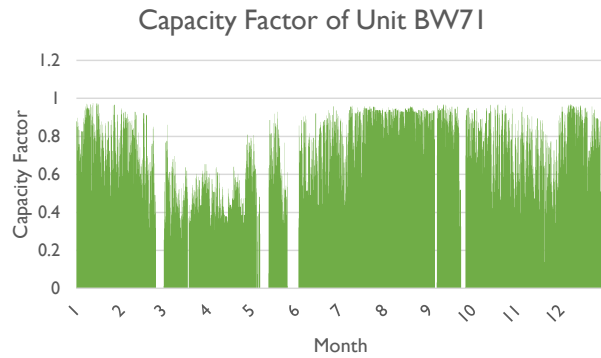


Average Hourly Generation at Intermountain Coal Plant -
December 2016



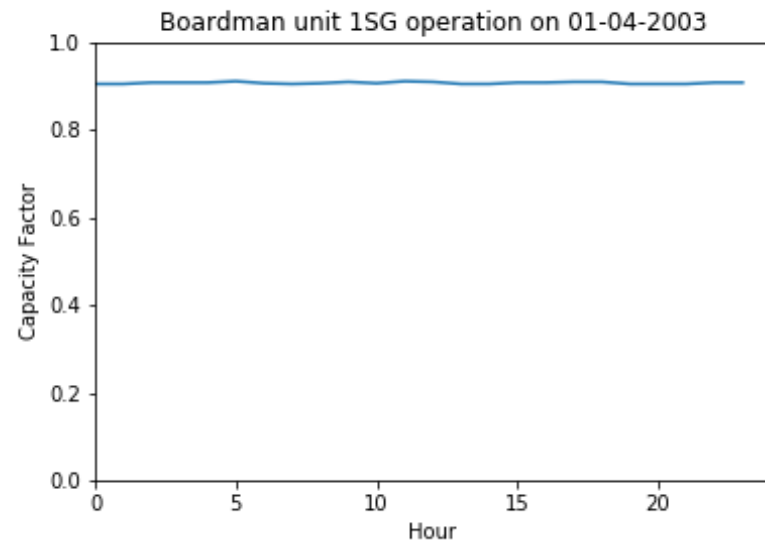
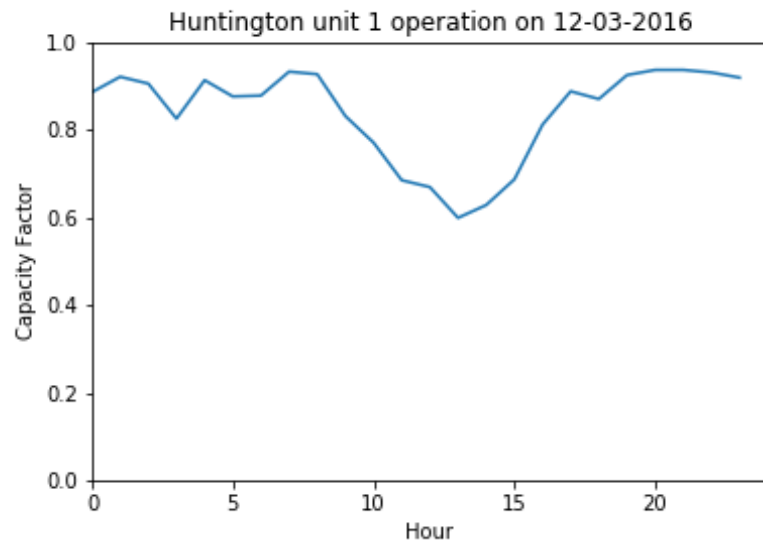


Hourly Capacity Factors - 2016





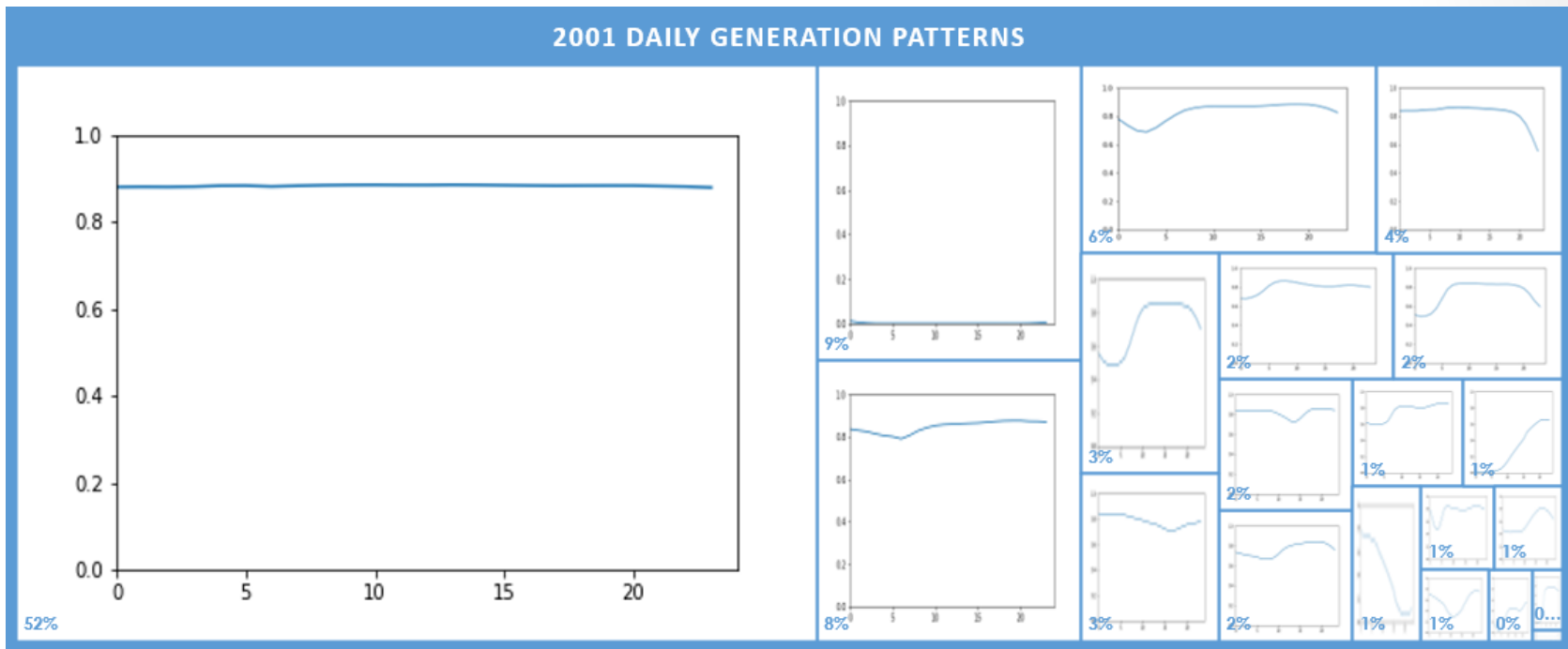
Unit Operating Days





Generation Patterns - 2001

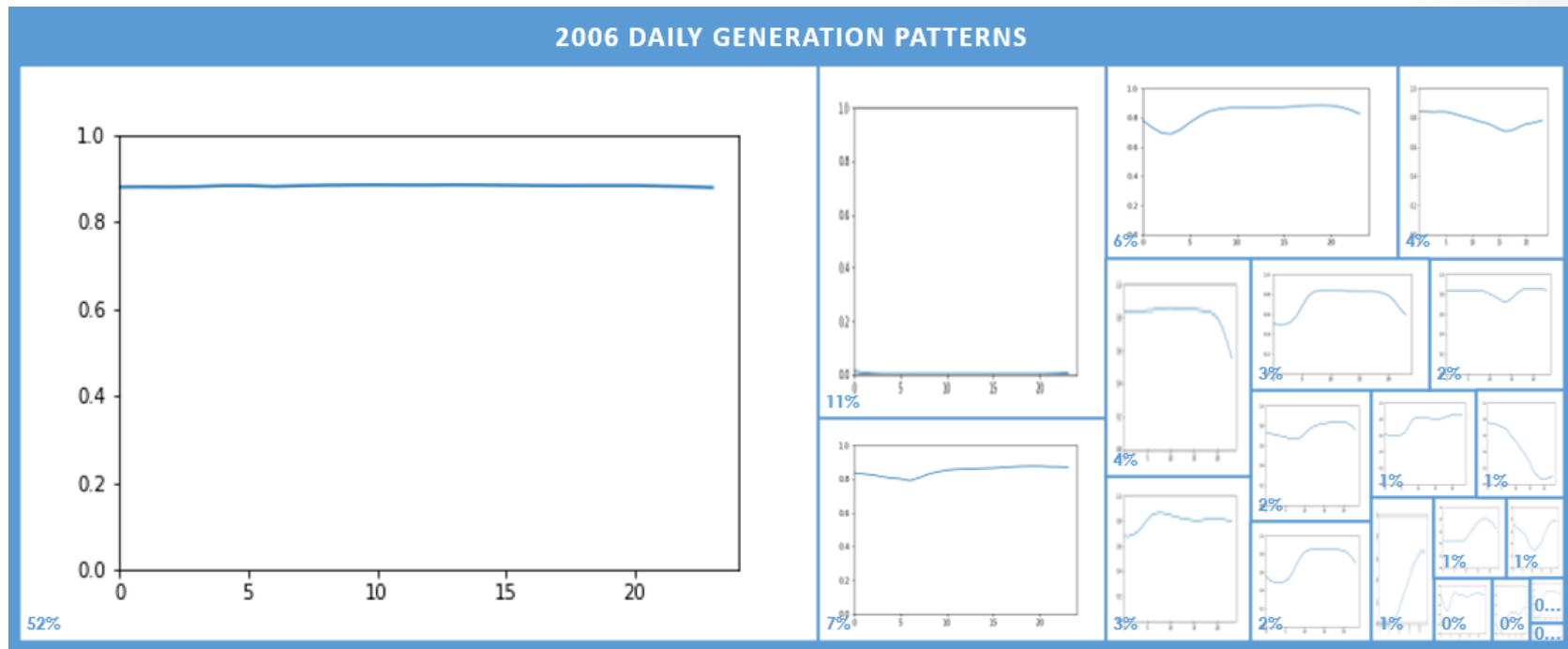
52% of the Unit-Days were baseload generation





Generation Patterns - 2006

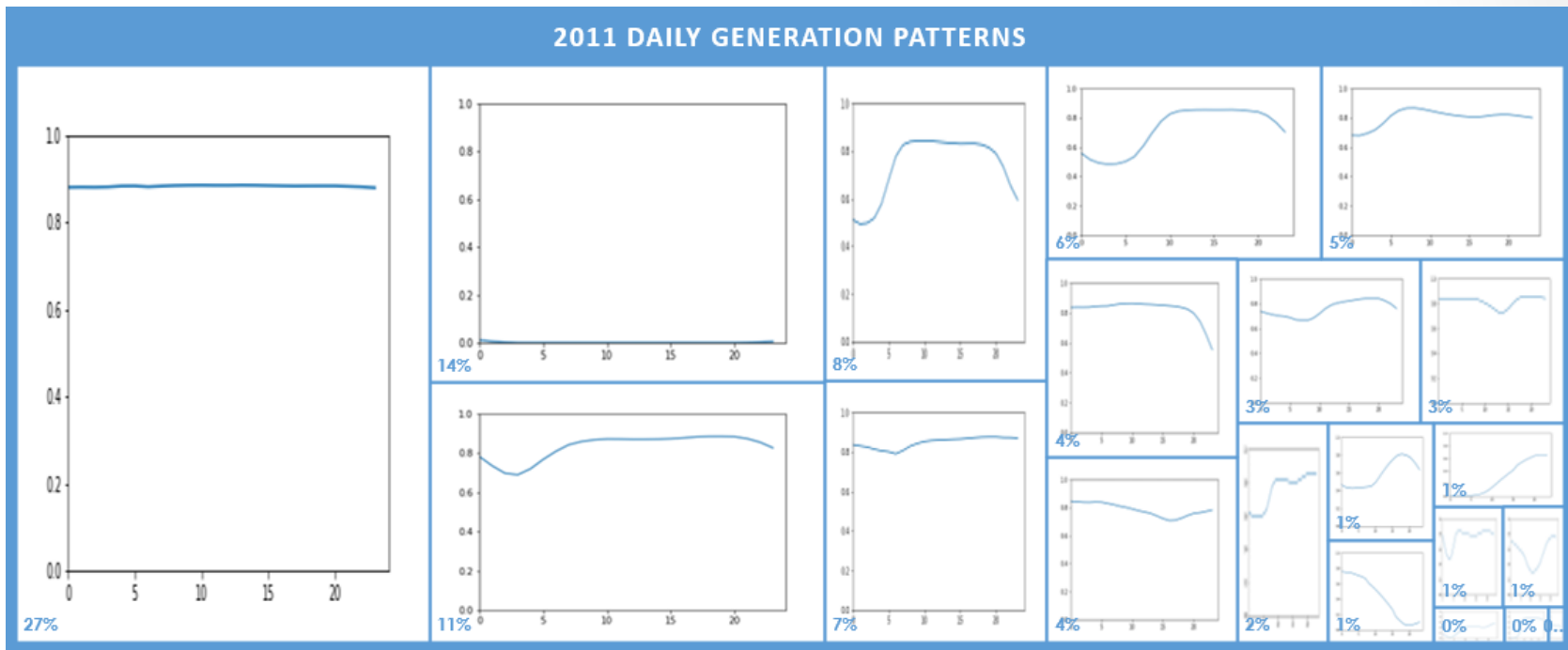
52% of the Unit-Days were baseload generation





Generation Patterns - 2011

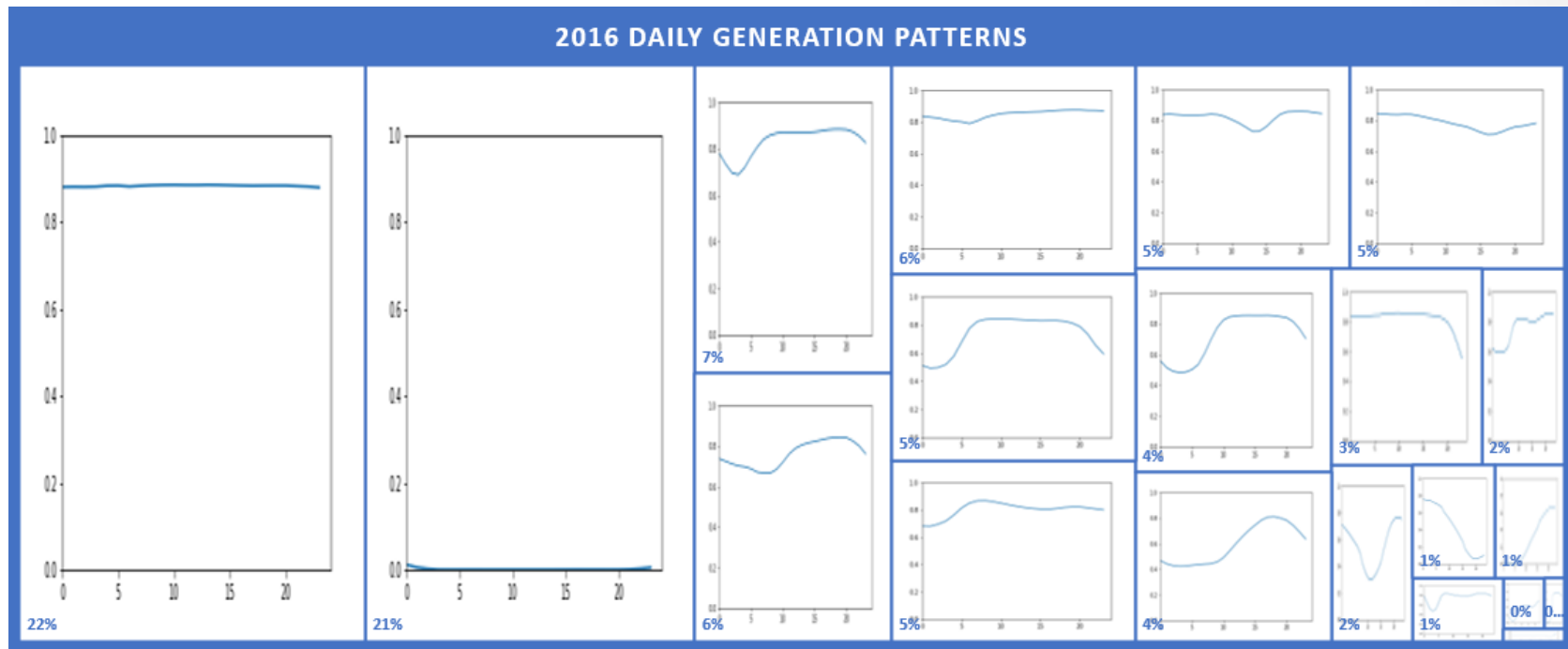
27% of the Unit-Days were baseload generation





Generation Patterns - 2016

22% of the Unit-Days were baseload generation





Key Findings

- Coal fleet baseload operation decreased from 52% of coal unit operating days in 2001 to 22% in 2016 in the Western U.S.
- Coal fleet offline operation increased from 9% of coal unit operating days in 2001 to 21% in 2016 in the Western U.S.
- In 2001, 53 units operated in baseload mode in more than 50% of the operating days; only 11 exceeded this threshold in 2016.
- Since 2011, the majority of coal units have spent less than 30% of the operating days in baseload operation.



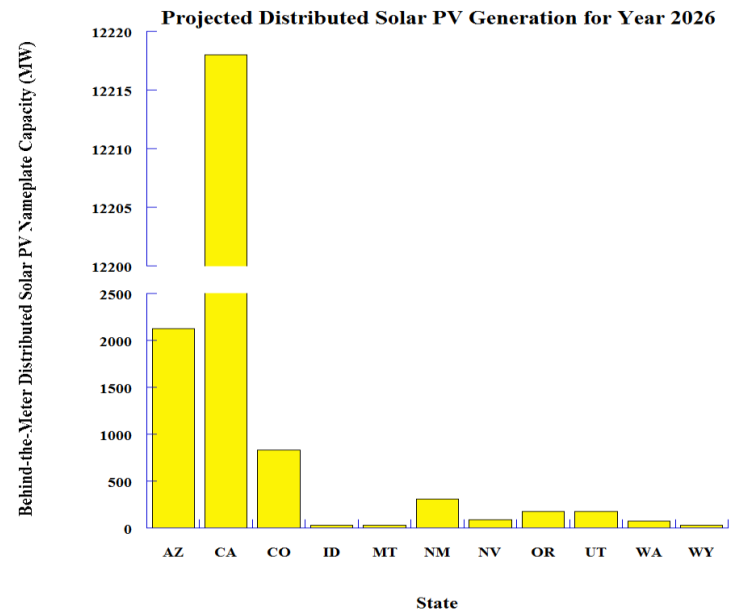
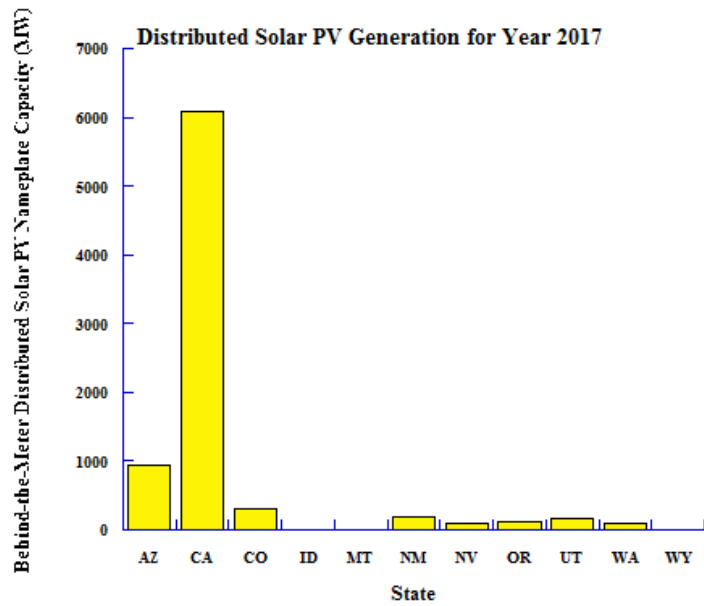
WIRAB Comments on DOE Staff Report

WIRAB confirmed two important findings in the U.S. DOE Staff Report:

1. Many coal-fired generating units that were used for baseload generation in the past are no longer operating in that role at this time.
2. Bulk Power System reliability is adequate today, but there has not yet been much analysis of how much primary frequency response will be needed as the composition of the grid changes, nor how best to complement primary frequency response from traditional sources.



WIEB SunShot Award





Barriers to Deployment

- The goal is to mitigate or even remove barriers to distributed solar PV deployment in the Western U.S.
- Three types of barriers:
 - lengthy timelines
 - utility rate designs
 - reliability
- Partners: NREL and LBNL
- Technical Advisory Committee Meeting: Oct. 26-27, 2017 in Folsom, CA



Opportunities for Engagement

WIRAB Monthly Teleconferences: 1st Thursday Every Month at 11 a.m. Mtn.

Spring 2018 Joint CREPC-WIRAB Meeting: April 18-20, 2018 in Vancouver BC

WIEB Announcements: <http://westernenergyboard.org/>

Webinars: <http://westernenergyboard.org/category/webinars/>



Thank You

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