This report covers activities of the Committee on Regional Electric Power Cooperation, the State-Provincial Steering Committee, and the Western Interconnection Regional Advisory Body.

I. COMMITTEE ON REGIONAL ELECTRIC POWER COOPERATION (CREPC)

CREPC is a joint committee of the Western Interstate Energy Board (WIEB) and the Western Conference of Public Service Commissioners. In 1984, CREPC organized to provide a forum for discussion and information sharing among the Governor/Premier offices, energy agencies and the regulatory commissions from the states and provinces in the Western Interconnection. The Northwest Power and Conservation Council is also a member of the Committee.

Activities since June 2014

CREPC meets twice a year to share and exchange information and views on energy policy matters relevant to the Western Interconnection. Over the past year, CREPC held two joint meetings in conjunction with the State-Provincial Steering Committee (SPSC) and the Western Interconnection Regional Advisory Body (WIRAB).

These meetings include participation by representatives of the U.S. Department of Energy (DOE), the Federal Energy Regulatory Commission (FERC), the U.S. Environmental Protection Agency (EPA), the Western Electricity Coordinating Council (WECC), and the Western power industry.

Fall Meetings 2014

CREPC, SPSC, and WIRAB jointly met in San Diego, California on October 20-22, 2014. The meetings began with a System Flexibility Forum. The forum was organized around the following key questions:

- **What is system flexibility and why do we need it?**
  - Lisa Schwartz of Lawrence Berkeley National Laboratory opened the forum with an overview of system flexibility.

- **What’s the demand for system flexibility under alternative futures?**
Clyde Loutan described the California ISO’s efforts to estimate California’s need for system flexibility.

Keegan Moyer of WECC described a joint effort of WECC, SPSC, and Energy and Environmental Economics to assess system flexibility in the Western Interconnection.

Where are we today in terms of system flexibility? How much more room is there to increase system flexibility? What action should companies and states/provinces be focused on?

- Michael Milligan of NREL presented the concept of a flexibility supply curve.
- Doug Larson of WIEB discussed recent actions taken in Western states/provinces to improve system flexibility and actions that can be taken in the future.
- Kevin Porter of Exeter Associates present the results of study of utility efforts to address system flexibility in the long-term planning time horizon.

What should be done to cost-effectively meet the need for greater system flexibility? What is needed to evaluate flexibility options (data, analytic tools, policy options to consider, new standards, impacts of incentives and penalties)?

- An expert panel comprised of Arne Olson, Energy and Environmental Economics, Justin Thompson, Arizona Public Service, Clyde Loutan, California ISO, Jim Caldwell, CEERT, and Michael Milligan, NREL discuss these questions and responded to questions from state and provincial regulators and policy makers.

The System Flexibility Forum ended on the morning of October 22nd with presentations on the reliability challenges associated with adding more variable energy resources to the Western grid and with a panel discussion of the challenges associated with adding more distributed energy resources to utility distribution systems. All of the presentations and background materials for the System Flexibility Forum are archived in the meeting agenda.

The joint CREPC, SPSC, and WIRAB meeting began with summaries of recent developments at FERC and the EPA. The remainder of joint meeting was organized around the following topics:

- Methane Leakage
  - Tom Curry of MJ Bradley & Associates presented findings of a SPSC funded study that compared methodologies of estimating methane leakage from the natural gas supply system.
  - Richard McAllister of WIEB discussed the implications of the MJ Bradley & Associated for electric utility system planning in the West.
• **EPA Section 111(d) Rulemaking**
  o Joseph Goffman, Associate Assistant Administrator for Climate and Senior Counsel at the EPA provided opening introductory remarks.
  o State policy makers provided observations and analysis of key issues related to the proposed rule. Presenters included:
    o Travis Kavulla, Montana PSC
    o Bill Drumheller, Washington Dept. of Ecology
    o Ed Stoneburg, Arizona Corporation Commission
    o Steve Burr, Arizona DEQ
    o Glade Sowards, Utah Air Quality
    o Jasmine Mehta, Nevada Bureau of Air Quality Planning
    o John Chatburn, Idaho Office of Energy Resources
    o Brian Turner, California PUC / Craig Segall, CARB
  o Western stakeholder provided observations and analysis of key issues related to the proposed rule. Presenters included:
    o Frank Prager, Xcel
    o Mary Wiencke, PacifiCorp
    o John Nielson, Western Resource Advocates
    o Nancy Hirsh, Northwest Energy Coalition
    o Laura Beane, Iberdrola
  o Keegan Moyer of WECC presented preliminary results of modelling the reliability impact of EPA’s proposed rule.

• **Natural Gas and Electric System Interdependencies**
  o Arne Olson and Nick Schlag of Energy and Environmental Economics presented results of an SPSC funded study examined the capability of the natural gas pipeline system to meet the variable gas demand associated with using natural gas generators to integrate high penetrations of wind and solar resources.

• **New Utility Business Models**
  o Carl Linvill of the Regulatory Assistance Project provided an introduction to performance incentive mechanisms and how they might be used to improve regulation.
  o Tim Woolf and Melissa Whited of Synapse Energy Economics presented an outline for a guidebook for regulators on performance incentive mechanisms and received feedback and guidance from state regulators.
  o Lisa Schwartz discussed on-going and future work at LBNL to examine new utility business and regulatory models.
• Wind and Solar Integration Costs
  o Scott Olson of Black & Veatch and Kevin Porter of Exeter Associates presented results of a survey of wind integration cost studies prepared by 26 Western electric utilities.

The joint CREPC, SPSC, and WIRAB meeting ended with business session to address:

• The future of CREPC and SPSC following expiration of the ARRA grant in April 2015; and
• A reallocation of ARRA funds to high priority projects.

Details of these discussions and presentations are linked to the meeting agenda. A detailed summary of the formal actions taken by the SPSC can be found in this meeting summary.

Spring Meetings 2015
CREPC, SPSC, and WIRAB jointly met in San Diego, California on April 6-8, 2015. The theme of the meetings was “Preparing for a Changing Resource Mix”. All of the presentations and background materials for the meetings are archived in the meeting agenda.

The presentations and discussions on the first day of the meetings set the stage for later presentations. Topics covered on the first day included:

• Changing electricity trading patterns
  o Arne Olson of Energy and Environmental Economics presented findings from an SPSC funded review of production cost model simulations that projected a changing resource mix in the West to identify potential changes in electricity trading patterns. An important finding is that instead of California utilities purchasing power from Northwest and Southwest utilities, California utilities increasingly may to other regions during times of peak solar production.
  o Steve Beuning of Xcel Energy and Clyde Loutan of the CAISO responded to the presentation and commented on the possibility of changing trading patterns.

• Renewable energy and energy efficiency trading under EPA Section 111(d)
  o Hossein Haeri and Kate Swayne-Wilson of the Cadmus Group presented results of an SPSC funded study of the feasibility of trading renewable energy and energy efficiency credits under the EPA’s proposed regulation of carbon emissions under Section 111(d) of the Clean Air Act.
A panel of state representative and regulatory experts commented on the findings of the Cadmus report and provided guidance and direction for future work. The response panel included:

- John Shenot, Regulatory Assistance Project
- Dr. Laura Nelson, UT Office of Energy and Development
- Brian Turner, CA PUC
- Steve Burr, AZ Air Quality Division
- Jeff Blend, MT Energy and Pollution Prevention Bureau
- John Nielsen, Western Resource Advocates

**Activities of the Center for the New Energy Economy**

- Jeff Lyng informed CREPC of the activities of the Center for New Energy Economy related to helping Western states better understand the implications of EPA’s proposed Clean Power Plan.

**Reliability Analysis for a Changing Western Grid**

- Branden Sudduth of the WECC provided an update on its evaluation WIRAB’s 2014 study requests that focused on the reliability implications of a changing resource mix in the West.
- Debbie Lew of GE Energy presented the finding of an SPSC funded report that provides Western states and provinces with a roadmap for carefully and credibly identifying different types of potential reliability problems and for identifying and analyzing potential mitigation measures or solutions.

The discussion of the reliability implications of a changing resource mix carried over to the morning of the second day the meetings. Topics covered included:

**Activities of the FERC Order 1000 Regional Planning Groups**

- Ken Collison of ICF presented the finding of an SPSC funded report that describes the history and current activities of the four regional planning groups.
- Travis Kavulla of the Montana PSC and Grace Anderson of the California Energy Commission moderated a panel discussion of how the RPG and WECC transmission planning can provide a seamless and consistent analysis of the need for wires and grid reliability across the interconnection and in local areas. Panelists included:
  - Dave Angell, Northern Tier Transmission Group
  - Neil Millar, California ISO
  - Dave Angell, Northern Tier Transmission Group
  - Patrick Damiano, Columbia Grid
Ron Belval, WestConnect
Jim Robb, WECC
Dave Smith, TransWest Express

**WECC Study Requests**
- Tom Carr of WIEB and Keegan Moyer of Energy Strategies presented the results of SPSC funded work to develop a set of preliminary scenarios of different resource mixes that states may consider as possible strategies for compliance with the Clean Power Plan.
- SPSC’s Western State’s 111(d) Modeling Work Group discussed which of the “mock” scenarios to send to WECC to further develop its analytic capabilities to prepare to quickly respond to requests after the EPA issues its final rule.

Other changes and new developments that were discussed include:

**New Method for Determining Path Transfer Capability**
- Tim Mason of GridSME and Ali Daneshpooy of Quanta Technologies presented the results of an SPSC funded project to develop an alternative method to establish path transfer capacities that can improve the utilization of the grid and system reliability.
- An expert panel comprised of Vic Howell of Peak Reliability, Chifong Thomas of Smart Wire Grid, Tim Van Blaricom of GridSME, and Jim Robb, CEO of WECC discussed the implications of the new method and next steps for testing and evaluation the approach.

**Energy Imbalance Market Updates**
- Travis Kavulla of the Montana PSC and Chair of the PUC EIM Group moderated a panel discussion of the performance of CAISO-PacifiCorp EIM and progress in Colorado and the Pacific Northwest to establish similar imbalance mechanisms. Panelists included:
  - Don Fuller, CAISO
  - Stefan Bird, PacifiCorp
  - Shawn Elicegui, Nevada Energy
  - Steve Beuning, Xcel
  - Robert Cromwell, Seattle City Light
  - Dan Williams, Portland General Electric
o Rebecca Wagner of the Nevada PUC and Chair of the EIM Transitional Committee moderated a panel discussion on the range of conceptual models for the long-term governance of the EIM. Panelists included:
  o Karen Edson, CAISO
  o Carl Zichella, NRDC
  o Travis Kavulla, Montana PUC
  o Steve Beuning, Xcel

- **Distribution System Planning**
  o Ken Nichols of EQL Energy and Frances Cleveland of Xanthus Consulting presented the work of an SPSC funded project that examined the drivers of changes in utility distribution system planning.
  o Tom Bialek of San Diego Gas and Electric, Paul Caldara of the Colorado PUC, David Erikson of the California PUC, and Matt Rowell of the Arizona Corporation Commission discussed the findings of the report and how they might apply to the changes occurring in their states.

CREPC also engaged in a discussion of future priorities:

- Doug Larson of WIEB set the stage for the discussion by reviewing the achievement of the recent ARRA grant.
- John Chatburn of the Idaho Office of Energy Resources and Alaine Ginocchio of WIEB presented an overview of a new state energy planning grant awarded to the Idaho OER and WIEB by the U.S. DOE.
- Maury Galbraith of WIEB presented WIEB’s work to identify and priorities the key electric system challenges facing the West.
- Larry Mansueti of the U.S. DOE presented preliminary findings from Quadrennial Energy Review and discuss potential areas of collaboration between DOE and Western states/provinces.
- Steve Rodgers of FERC discussed current activities at FERC.
- Deborah Jordan, Director of EPA’s Region 9 discussed the proposed Clean Power Plan and opportunities for future collaboration.

Finally, Maury Galbraith of WIEB led a discussion of the future consolidation of CREPC and SPSC. Details of these discussions and presentations are linked to the meeting agenda. The formal actions taken by CREPC can be found in this meeting summary.
II. STATE-PROVINCIAL STEERING COMMITTEE

Under the authority of the American Recovery and Reinvestment Act (ARRA), in 2009, DOE launched a new federal initiative to promote the formation of interconnection-wide transmission planning processes in the Western Interconnection, the Eastern Interconnection and the Electric Reliability Council of Texas (ERCOT). On June 15, 2009, DOE issued a Funding Opportunity Announcement (FOA), providing funding to entities to carry out interconnection-wide transmission planning and analysis activities under Topic A, and to states to provide input into these activities under Topic B.

The State-Provincial Steering Committee (SPSC) was formed as a result of this DOE funding and is comprised of one representative of the Governor and one representative of the public utility commission or public service commission in each state in the Western Interconnection, plus provincial representatives from Alberta and British Columbia. The SPSC has three responsibilities:

1. Provide input into WECC’s transmission expansion planning;
2. Promote actions to make more efficient use of the existing transmission grid; and
3. Promote actions to lower the cost of integrating variable (wind and solar) generation into a reliable power system.

Over the past year, the SPSC has met twice, each time in conjunction with CREPC. The meeting summaries are included above in the CREPC section of this report. The DOE ARRA grant for the SPSC ended April 30, 2015.

Study Requests to WECC

The SPSC and WIRAB have submitted study requests to WECC every January over the past six years (2010-2015). In 2015, SPSC/WIRAB submitted three 10-year study requests and one 20 year study request. Short summaries of the 10-year study requests are provided below:

- **High Renewables Mitigation and Flexibility Case** – This request proposes to specify a very high penetration of variable generation that initially causes operational or reliability problems and then implement mitigation or flexibility measures to address such problems. The purpose of this study is to identify and better understand potential solutions that could improve the flexibility of the power system.

- **Coal Retirement Case** – This request expands on a previous SPSC/WIRAB Coal Retirement Case that sought to examine the potential reliability impacts of substantially greater coal plant retirements than included in the 2024 Common Case. The new request proposes to evaluate additional hours during the year; to examine additional reliability factors such as N-1 contingencies, line overloads, voltage issues, and stability issues; and
to analyze specific mitigation measures that could be taken to resolve any reliability problems such as replacing retired generators with synchronous condensers and using a coordinated re-dispatch program to keep some plants operational.

- **High Distributed Generation Case** – This request expands on SPSC/WIRAB’s 2014 High DG Case and other related work underway at WECC. The purpose of this request is to examine whether the current IEEE 1547 standard that requires small distributed inverter-based photovoltaic generation to trip during over/under voltage or over/under frequency conditions could hamper the western grid’s ability to recover from a major disturbance. The request also asked WECC to study inverter settings that could allow this generation to ride-through disturbances and other solutions that could mitigate any reliability problems.

Here is short summary of the 20-year study request:

- **Low Carbon Future Options** – This request seeks to explore alternative pathways to a lower carbon energy future by linking modeling tools from WECC and Energy and Environmental Economics (E3). The purpose of the study is to inform policy makers of options to potentially attain lower economy-wide carbon targets. This request asks WECC to use its Long Term Planning Tool to attain carbon reduction targets of 53% in 2034 and 80% in 2050 relative to the 2005 level.

**Final SPSC Reports**

The following SPSC funded reports were published between July 2014 and June 2015:

- **Potential Mitigation of Dynamic Reliability Challenges with High Levels of Variable Energy Resources.**

This report provides a roadmap for Western states and provinces, the Western Electricity Coordinating Council (WECC), Regional Planning Groups and others to follow to carefully and credibly analyze the reliability challenges associated with high levels of variable energy resources and the retirement of coal plants in the Western Interconnection. The report discusses the types of analysis and data needed to identify and quantify potential reliability problems, as well as the identification and analysis of mitigation options that can provide promising solutions.
• **Methane Emissions in the Natural Gas Life Cycle**

  This report concerns the issue of methane leakage during the life cycle of natural gas-fired power generation. Methane leakage is an important issue because methane is a greenhouse gas (GHG) of much greater global warming potential than carbon dioxide. Although natural gas-fired generation results in GHG emissions (almost exclusively carbon dioxide) of approximately one-half those associated with coal-fired generation, methane leakage at life cycle stages upstream of power generation (i.e., extraction, transmission) could result in GHG emissions over the fuel life cycle such that coal- and gas-fired generation are more similar in their total GHG emission profiles.

• **EPA Clean Power Plan: Western State Resource Scenarios**

  This report documents the assumptions in four planning scenarios developed in consultation with an SPSC modeling work group. These scenarios illustrate future state-level resource mixes that could result from strategies that state may employ to comply with the Clean Power Plan. Two scenarios will be submitted to WECC for a practice run of modeling and analysis prior to the EPA’s release of a final rule.

• **New Methodology for Determining the Transfer Capability of the Western Grid**
  April 2015 – GridSME – [Report](#)
  April 2015 – Quanta Technology – [Report](#)

  These reports develop a new methodology for dynamically calculating transmission path transfer capabilities that better reflect actual system operating conditions. The new methodology would allow for more active management of path flows by automating the path rating process and using data from the recently deployed synchrophasor network. More accurate path ratings would improve the utilization of transmission facilities while maintaining or improving the reliability of the Western Interconnection.
• **The “Base Case”: Summary of Current Resource Plans in the West and Their Effect on Regional Electricity Trading Patterns**


This report begins an exploration of potential new electricity trading patterns in the Western Interconnection over the next ten years as a result of the changing generation mix. Higher penetrations of solar generation will have a noticeable effect on daily trading patterns and transmission flows across the West. While regional flows do exhibit more variability, the transmission system does not generally experience substantially higher levels of congestion under the conditions examined.

• **Emerging Changes in Electric Distribution Systems in Western States and Provinces**


This report investigates the forces changing electric utility distribution system planning and operation in the West. Historically, utilities designed and operated distribution systems to reliably serve load, not to manage distributed generation. Today, utilities regulators, and customers are working in an environment with numerous technology choices and business models that affect distribution systems. With these increased choices and providers comes increased opportunity for customer benefits, but also more complex decision making related to utility distribution planning and operation. This report examines both the positive and negative impacts of the new technologies that are changing utility distribution systems in the West.

• **Exploring and Evaluating Modular Approaches to Multi-State Compliance with EPA’s Clean Power Plan in the West**


This report explores a modular approach to multi-state compliance with the EPA’s Clean Power Plan. Under this approach individual states would develop their own state compliance plans and meet their own state targets, but would develop portions of their plans – called compliance “modules” – in voluntary collaboration with other states. The report describes the reporting system capabilities and functionalities needed to enable the tracking and trading of renewable energy and energy efficiency under a modular compliance approach. The existing WREGIS system provides a technologically robust and flexible platform that could be expanded or modified to accommodate the necessary activities.
• Western Planning Regions and Transmission Planning Coordination

April 2015 – ICF Resources – Report

This report provides an overview of the state of the Western Interconnection as it relates to regional transmission planning. The first four chapters provide individual summaries of the efforts in the four western Planning Regions covered by the California Independent System Operator (CAISO), the Northern Tier Transmission Group (NTTG), ColumbiaGrid and WestConnect. The report also provides an overview of the interconnection-wide planning efforts of the Western Electricity Coordinating Council (WECC). This foundational information is valuable to anyone involved in the ongoing policy discussion of the interregional coordination efforts of the western Planning Regions, specifically as it relates to the requirements set forth in FERC Order 1000.

• A Review of Variable Energy Resource Integration Charges

January 2015 – Black & Veatch – Report

This report updates and expands upon the information in the National Renewable Energy Laboratory (NREL) report titled “A Review of Variable Generation Integration Charges” published in March 2013. As was found in the NREL Report, there are significant differences in western utility VER integration cost studies, including, but not limited to, study methodology, assumptions, reserve definitions, and the data that is collected and utilized. These findings indicate that studies in support of VER integration costs are at an early stage and are more art than science.

• Greater Flexibility in the Power Sector in the West: Results of Industry Interviews


A primary purpose of the project was to discern the capabilities of resource planning models to model flexible generation, as well as determine how utilities and state regulators are assessing the need for flexibility. Interviews were conducted with utility representatives, resource modelers, and utility commission representatives. There was also near universal consensus that the resource planning or load flow models do not adequately address flexibility needs. However, all acknowledge the trade-off between having a more complex model that could address numerous factors such as variability and the time it takes for the model to run and demonstrate results. Utilities are either conducting side analyses or commissioning VG integration studies, or both, in order to assess the need for more flexibility.
• **Utility Performance Incentive Mechanisms: A Handbook for Regulators**
  
  
  This report describes how regulators can guide utility performance through the use of performance incentive mechanisms. Regulators have used these mechanisms for many years to address traditional performance areas such as reliability, safety, and energy efficiency. In recent years, these mechanisms have also received increased attention due to regulatory concerns over resilience, utilities’ ability to respond to technological change, and the expanding opportunities for distributed energy resources.

• **Natural Gas Infrastructure Adequacy in the Western Interconnection: An Electric System Perspective (Phase 2 Report)**
  
  
  With the recent expansion of renewable generation under state renewables portfolio standard (RPS) programs, the scope of electric reliability planning in the Western Interconnection is beginning to address not only whether the capacity of a generation fleet is sufficient to meet its peak demands but whether that same fleet has sufficient operational flexibility to meet the ramping needs and reserve requirements associated with a growing fleet of renewable resources. New gas-fired generation resources in the West are trending towards technologies with faster ramping rates and shorter start times, despite higher up-front costs. The timely delivery of natural gas to these plants is a prerequisite to their ability to provide the flexibility desired by electric system operators. This study uses a case study approach to explore the following questions: Under what operating conditions are pipelines most likely to encounter challenges related to variability of demand? Will the intraday variability of electric sector demand for natural gas exceed the physical capability of pipeline systems to accommodate fluctuations in demand within the operating day? Could additional uncertainty in the electric sector result in adverse impacts on gas system operations due to an increase in imbalances?
III. WESTERN INTERCONNECTION REGIONAL ADVISORY BODY (WIRAB)

The Western Interconnection Regional Advisory Body (WIRAB) is the product of seven years of lobbying by Western governors (following the major Western blackouts in 1996) to achieve the following goals: (1) delegation of authority to a Western Interconnection grid reliability organization; (2) deference by the North American Electric Reliability Corporation (NERC) and the Federal Energy Regulatory Commission (FERC) to decisions made by interconnection-wide organizations; and (3) a significant role for states in reliability decisions. The governors’ lobbying resulted in Congress’ enactment of Section 215 of the Federal Power Act and the official formation of WIRAB, which was approved by FERC on July 20, 2006. WIRAB has statutory authority under Section 215(j) of the Federal Power Act to advise FERC, the ERO (i.e., NERC), and the Regional Entity (i.e., WECC) on the following:

1. **Governance** of an existing or proposed Regional Entity within the region;
2. Whether a **standard** proposed to apply within the region is just, reasonable, not unduly discriminatory or preferential, and in the public interest;
3. Whether **fees** proposed to be assessed in the region are just, reasonable, not unduly discriminatory or preferential, and in the public interest; and
4. “…any other responsibilities requested by the Commission.”

In addition, in a December 6 Order on Rehearing, FERC authorized WIRAB to advise Peak Reliability (now overseeing the Reliability Coordinator and Interchange Authority functions following WECC’s bifurcation in February 2014) on governance, standards, fees, and “any other responsibilities requested by the Commission.”

All of the states with territory in the Western Interconnection, the provinces of Alberta and British Columbia, and Mexico participate in WIRAB and members are appointed by the Governor or Premier.

In addition to its two in-person meetings with CREPC and the SPSC described above, WIRAB has provided written comments and advice to WECC, Peak Reliability, and FERC. WIRAB has also hosted webinars for state and provincial policy makers on key reliability matters.

**Reliability Webinars**

Audio recordings of WIRAB’s past webinars are posted on this [webpage](#). Over the past year, WIRAB hosted the following webinars:

- **Utility Operations – VER Reliability and Integration Series Webinar #1**

  November 13, 2014 – Debbie Lew – [Presentation](#)
This discussion focused on how system operators balance supply and demand when they have high penetrations of wind and solar on their system. We discussed the unit commitment process and options for intra-day unit commitment and coordinated unit commitment. We discussed the economic dispatch process and options for coordinated economic dispatch. We will also discussed forecasting for load, wind and solar, and how forecasts can be used in operations.

- **Ramping Issues and Solutions – VER Reliability and Integration Series Webinar #2**
  November 19, 2014 – Debbie Lew – Presentation

  High penetrations of wind and solar can increase ramping needs. High penetrations of solar can lead to a net load “duck curve” which accentuates the need for ramping to meet the evening peak. Very high wind speeds can lead to wind cutout events that can create a need for ramping capability. We discussed options for ramping capability including market solutions, use of existing generation, and load solutions.

- **Frequency Response – VER Reliability and Integration Series Webinar #3**
  December 2, 2014 – Debbie Lew – Presentation

  We discussed the operational reliability of the power system with high penetrations of wind and solar. Can we keep the lights on when a large generator goes out? Wind and solar technologies are inverter-based and do not necessarily provide the same frequency response services that conventional synchronous generators can provide. We discussed the inertial response and primary frequency response that synchronous generators can provide and how wind and solar can be enabled to provide grid-friendly services.

- **Transient Stability – VER Reliability and Integration Series Webinar #4**
  December 11, 2014 – Debbie Lew – Presentation

  We discussed stability of the power system with high penetrations of wind and solar. Wind and solar provide some advantages and some disadvantages to keeping the system stable when a large disturbance occurs. A bigger issue for the west in terms of stability is
not the addition of wind and solar but having conventional plants in key locations offline or retired.

- **Distributed Generation – VER Reliability and Integration Series Webinar #5**
  
  December 18, 2014 – Debbie Lew – [Presentation](#)

  Distributed energy resources such as rooftop solar, can provide benefits to the system but can also pose bulk power system issues due to their interconnection requirements. We discussed lessons learned from Germany in their rapid rooftop solar growth. We also discussed the IEEE 1547 inverter standard, the ongoing process to revise this standard, and efforts in California to develop their own smart inverter requirements.

- **Utility Cybersecurity**
  
  January 22, 2015 – Michael Ball and Toley Clague – [Presentation](#)

  Michael Ball, Director of Corporate Security & Business Continuity at PacifiCorp, and Toley Clague, Director of Compliance at PacifiCorp, discussed cybersecurity threats, as well as CIP v.5 and its implementation, including: the threat (nation states, targeted attacks) and intent; malware and its delivery; managing the threat; NERC CIP v.5; knowing your resources; and future challenges.

- **Current Grid Transfer Capability Planning – Path Transfer Series Webinar #1**
  
  March 5, 2015 – Tim Mason – [Presentation](#)

  This webinar was coordinated with GridSME, a consultant to the SPSC and WIRAB. The purpose was to review the current process for determining transmission transfer capabilities and to identify the drivers to develop a more dynamic methodology that can make better use of existing wires.

- **Grid Management Technologies – Path Transfer Series Webinar #2**
  
  March 12, 2015 – Tim Mason – [Presentation](#)
During the last several years more than $100 million has been invested in the West in the deployment of synchrophasor technology. Additional investments have been made in smart grid control devices. During this webinar, GridSME explained how data from synchrophasors and grid control devices such as D-FACTs can improve grid operations. The webinar identified opportunities to capitalize on investments in these technologies through new grid monitoring and control applications.

- **Flexible Adaptable Scalable Transfer Capability – Path Transfer Series Webinar #3**
  March 19, 2015 – Ali Daneshpooy and Rahul Anilkumar – [Presentation](#)

  This two-hour webinar explained a proposed new path transfer methodology that could increase transfer capacities on the existing transmission system while maintaining reliability. Such a methodology could save tens of millions of dollars by lowering system-wide production costs and help integrate the variable generation that is coming on-line. The methodology was presented by Quanta Technologies, the SPSC’s consultant. The first hour explained how the methodology meets future grid needs and goals. The second hour was dedicated to a discussion of the technical detail of the methodology.

**WIRAB Written Comments to WECC**

- WECC 2016 Budget – May 15, 2015
- WECC Draft 1600 Data Request – February 17, 2015
- WECC Reliability Challenges White Paper – October 2, 2014

**WIRAB Written Comments to Peak Reliability**

- Peak 2016 Budget – May 15, 2015
- Peak Draft Data Sharing Policy -- February 19, 2015
- Peak Redline of Alternative Funding Agreement – February 17, 2015
- Alternative Funding Agreement for Peak Reliability – January 14, 2015

**WIRAB Written Comments to FERC**

- Staff Observations on Reliability Implications of EPA’s Proposed Clean Power Plan – March 2, 2015
• Advice to FERC on WECC and Peak 2015 Budgets – September 17, 2014