

Western Interconnection Regional Advisory Body

2018 Business Plan and Budget

July 5, 2017

**Approved by:
Appointed Members of the
Western Interconnection Regional Advisory Body**

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Introduction

The Western Interconnection Regional Advisory Body (WIRAB) proposed budget for 2018 is \$1,067,785. This amount is \$161,295 (13%) lower than the amount in WIRAB's approved budget for 2017. Total proposed FTEs for 2018 remain constant at 5.5. WIRAB's total funding requirement is \$711,676. WIRAB's proposed funding assessment is \$711,026, a reduction of \$190,426 (21%) from the 2017 funding assessment. WIRAB's proposed funding assessment is allocated \$599,105 (84%) to the U.S. portion, \$101,526 (14%) to the Canadian portion, and \$10,396 (2%) to the Mexican portion of the Western Interconnection. The following table summarizes the WIRAB proposed budget for 2018.

WIRAB - Total Resources (in whole dollars)	2018 Budget	U.S.	Canada	Mexico
Statutory FTEs	5.50			
Non-statutory FTEs				
Total FTEs	5.50			
Statutory Expenses	\$ 1,067,785			
Non-Statutory Expenses				
Total Expenses	\$ 1,067,785			
Statutory Inc(Dec) in Fixed Assets				
Non-Statutory Inc(Dec) in Fixed Assets				
Total Inc(Dec) in Fixed Assets	\$ -			
Statutory Working Capital Requirement	\$ (356,109)			
Non-Statutory Working Capital Requirement	0			
Total Working Capital Requirement	\$ (356,109)			
Total Statutory Funding Requirement	\$ 711,676			
Total Non-Statutory Funding Requirement	\$ -			
Total Funding Requirement	\$ 711,676			
Statutory Funding Assessments	\$ 711,026	\$ 599,105	\$ 101,526	\$ 10,396
Non-Statutory Fees				
NEL	869,883,481	732,956,732	124,208,633	12,718,116
NEL%	100.00%	84.26%	14.28%	1.46%

Table 1. WIRAB Budget for 2018

Organizational Overview

In April 2006, ten Western Governors petitioned the Federal Energy Regulatory Commission (FERC or Commission) to create the Western Interconnection Regional Advisory Body (WIRAB) under Section 215(j) of the Federal Power Act. The Governors indicated their interest in inviting all U.S. states, Canadian provinces, and Mexican jurisdictions with territory in the Western Interconnection to join WIRAB.

In July 2006, FERC issued an order granting the Governors' petition to establish WIRAB.¹ In FERC's order, the Commission determined that WIRAB should receive funding for its Section 215(j) activities and directed WIRAB to annually develop a budget and related information for submission through the Electric Reliability Organization (ERO) budget approval process. The Commission instructed WIRAB to develop a budget in a form similar to that specified for regional entities as set forth in Order 672.² The Commission also required WIRAB to identify the portion of its funding to be received from Canada and Mexico.

The Governors created WIRAB as a standing advisory committee to the Western Interstate Nuclear Board (WINB), which was formed pursuant to the Western Interstate Nuclear Compact, P.L. 91-461. WIRAB has the same status under the compact as the Western Interstate Energy Board (WIEB). WIRAB operates under the bylaws of WINB as revised on April 4, 2006. Below is a chart that illustrates these organizational relationships.

¹ Order on Petition to Establish a Regional Advisory Body for the Western Interconnection, 116 FERC ¶ 61,061, Docket No. RR06-2-000, July 20, 2006.

² Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Reliability Standards, Order 672, Docket RM05-30-000, Feb. 3, 2006, P. 228. "Each Regional Entity must submit its complete business plan, entire budget and organizational chart to the ERO for it to submit to the Commission. The complete business plan and the entire budget will provide the Commission with necessary information about any non-statutory activities, the source of their funding, and whether the pursuit of such activities presents a conflict of interest for the Regional Entity. For a Cross-Border Regional Entity, this information will also inform the Commission as to what portion of the budget is expended upon activities within the United States."

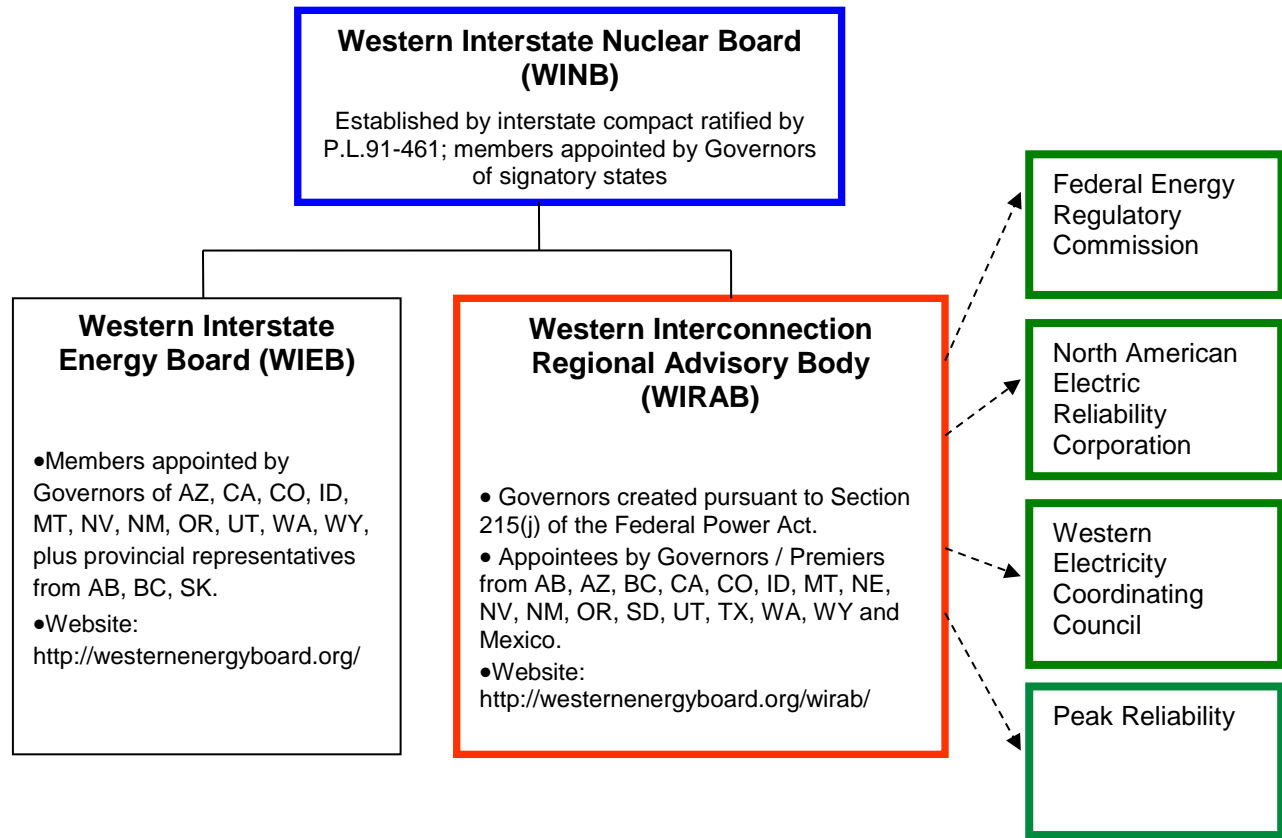


Figure 1. Organizational Relationships.

Membership and Governance

All of the states with territory in the Western Interconnection (AZ, CA, CO, ID, MT, NE, NV, NM, OR, SD, TX, UT, WA, WY), the Canadian provinces of Alberta and British Columbia, and Mexico are eligible to appoint members to WIRAB. Members of WIRAB are appointees of the Governors and Premiers or their alternates. Below is the list of current members:

WIRAB - Current Membership List		
Alberta	Christine Lazaruk	Executive Director, Strategy and Integration, Alberta Energy
British Columbia	Les MacLaren	Assistant Deputy Minister, Electricity & Alternative Energy Division, Ministry of Energy & Mines
California	Janea Scott	Commissioner, California Energy Commission
Colorado	Chris Worley	Director of Policy & Research, Colorado Energy Office
Idaho	Kristine Raper	Commissioner, Idaho Public Utilities Commission
Mexico	Marcos Valenzuela	Comision Federal de Electricidad
Montana	Jeff Blend	Economist, Montana Department of Environmental Quality
Nebraska	Tim Texel	Executive Director, Nebraska Power Review Board
Nevada	Angie Dykema	Director, Nevada Governor's Office of Energy
South Dakota	Greg Rislov	Commission Advisor, South Dakota Public Utilities Commission
Utah	David Clark	Commissioner, Utah Public Service Commission
Washington	Tony Usibelli	Assistant Director, State Energy Office, Washington Department of Commerce
Wyoming	Bill Russell	Commissioner, Wyoming Public Service Commission

Figure 2. WIRAB Membership List.

WIRAB holds two in-person meetings each year, typically in April and October. These meetings are open to the public. WIRAB also holds monthly conference calls to discuss emerging issues and hosts periodic webinars with presentations from subject matter experts on key reliability topics.

Statutory Functional Scope

FERC established WIRAB as a Regional Advisory Body under section 215(j) of the Federal Power Act. The language in Section 215(j) specifically provides for WIRAB's authority to advise NERC, FERC and WECC on whether reliability standards, budgets and fees, governance, compliance, assessments, strategic direction and other activities conducted pursuant to Section 215 are just, reasonable, not unduly discriminatory or preferential, and in the public interest.

FERC has additionally authorized WIRAB to advise Peak Reliability on these topics: “[D]eference to WIRAB is appropriate here because Peak Reliability funding implicates the following topics listed in FPA section 215(j) on which a Regional Advisory Body may give advice: ‘governance of an existing or proposed regional entity ... [and] whether fees proposed to be assessed within the region are just, reasonable, not unduly discriminatory or preferential, and in the public interest.’” FERC Order on Rehearing, Docket No. EL13-52 et al., P. 46 (Dec. 6, 2013).

WIRAB's advice to FERC, NERC, WECC, and Peak Reliability can be grouped into four categories that are appropriately funded under Section 215 of the FPA:

1. Governance and Strategic Planning;
2. Emerging Trends and System Risks;
3. Periodic Reliability Assessments; and
4. Reliability Standards and Proactive Enforcement.

WIRAB's activities in each of these categories are described in Section A – Statutory Activities.

2018 Strategic Priorities and Goals

The resource mix of the Western power system is rapidly changing. Utility-scale wind and solar generation is being built in many parts of the West. California and the Desert Southwest are experiencing rapid growth in the installation of rooftop solar photovoltaic generation. Environmental regulations—including those to reduce regional haze and mercury emissions—and efforts to transition to a lower carbon economy have resulted in announced retirements of coal-fired generating units. These changes to the generation resource mix will present new reliability challenges and opportunities for the Western Interconnection as more non-synchronous generation is added to the system and additional synchronous spinning mass generation is retired.

The structure of Western power markets is also undergoing significant change. Utility executives, state policymakers, and other interested stakeholders continue to engage in discussions about transforming the California ISO into a regional multi-state ISO. The California Independent System Operator (ISO) Energy Imbalance Market (EIM) continues to gain new participants. Also, in early 2017, the Mountain West Transmission Group (MWTG)—composed of 8 electricity service providers in the eastern part of the Western Interconnection—announced that they have engaged in discussions with the Southwest Power Pool (SPP) regarding membership in the Regional Transmission Organization (RTO). These market reforms could result in significant changes to system operations (e.g., transmission scheduling, congestion management, reliability coordinator regions) and create new reliability challenges and opportunities for the Western Interconnection.

The modernization of the electric grid has also resulted in an increasing focus on physical and cyber security. These threats will continue to impact the availability of data and the transparency of periodic reliability assessments. At the same time, there is a greater need for research and development of new technologies and operational tools that can be used to improve system reliability throughout the West.

In response to these on-going changes in the Western Interconnection, WIRAB has identified four strategic initiatives that it will pursue in 2018:

Initiative 1: Advise WECC on the implications of high levels of deployment of solar PV on the reliable operation of the bulk electric system.

Generation from distributed energy resources (DERs), specifically solar photovoltaic (PV) generation, is projected to total more than 16,000 MW in nameplate capacity by year 2026 in the Western U.S. While there are many expected benefits of this trend of increasing distributed solar PV generation, several potentially deleterious impacts are also associated with distributed solar PV capacity.

One such deleterious impact is the potential for distributed solar PV generation resources to simultaneously “trip off” or disconnect from the grid. This event could be triggered by and exacerbate the effects of an original system contingency, such as loss of a significant generator. Inverters that interconnect distributed solar PV systems with the grid typically have narrow tolerance ranges for frequency and/or voltage deviations. Thus, if a system contingency raises or lowers grid frequency and/or voltage to a value outside of inverter tolerance ranges, distributed solar PV generation will disconnect from the grid. Such disconnection would further disturb grid variables such as frequency and voltage. Smart (advanced) inverters, however, permit the setting of wider tolerance ranges and, consequently, so-called ride-through in the event of a system contingency.

Another deleterious impact of increasing distributed solar PV generation capacity is that this capacity, if behind customer meters, is not visible to distribution system operators. This impact has been recognized in California, where the Smart Inverter Working Group (SIWG) has provided recommendations to the California Public Utilities Commission (CPUC) concerning deployment and utilization of smart (advanced) inverters. SIWG’s recommendations will improve DER visibility to operators of distribution systems. However, no other Western U.S. states have requirements for DER-operator communications.

In 2017, WIRAB’s sister organization, WIEB, initiated a three-year project to remove barriers to deployment of distributed solar PV generation in the Western Interconnection. WIRAB is taking the lead on the assessment and evaluation of potential reliability barriers. This initiative will continue through the 2018 and 2019 budget cycles. The goals of this initiative are to:

- Conduct a research program that examines potential reliability barriers using modeling. Modeling will be conducted by the National Renewable Energy

Laboratory (NREL). NREL will develop a plan for modeling the potential reliability problems of increasing distributed solar PV generation. This plan will consider input from a technical advisory committee composed of state representatives and other stakeholders. This committee will also review and offer feedback on a report that NREL will prepare on findings from its modeling and interpretation of these findings.

- Form strategic advisory committees, composed of state representatives and other stakeholders, to develop mitigation measures/policy recommendations for those potential reliability problems found to be of relatively high likelihood by NREL. These advisory committees will also develop outreach plans and appropriate materials to assist with outreach to Western Interconnection states.
- Disseminate research findings and policy recommendations on high-likelihood reliability concerns associated with distributed solar PV generation to regulators and policymakers in Western Interconnection states.

Initiative 2: Advise WECC on interdependencies between the natural gas and electric industries in the West and the implications for the reliable operation of the bulk electric system.

The natural gas and electricity industries in the West, and across the Nation, have become inextricably interdependent. Recent issues surrounding the Aliso Canyon natural gas storage field in southern California highlighted increasing operational strains that high penetrations of variable energy resources (VER) and the increasing need for system flexibility are placing on the natural gas system. As the Western Interconnection continues to add large amounts of asynchronous VER and as traditional coal and nuclear generation resources retire, the natural gas system will play an increasingly key role in ensuring BES reliability.

As the Regional Entity responsible for assuring the reliability of the Bulk Electric System (BES) across the Western Interconnection, WECC is increasingly concerned about the adequacy, security, and risks associated with natural gas infrastructure and its ability to reliably meet evolving BES needs. WECC intends to structure and launch an assessment of the natural gas infrastructure and its interdependency with the electric

system in the West. WECC's intention is to identify key potential electric power supply reliability and operational risks of which policy makers and utility planners should be aware. WECC's assessment will build upon previous and related work commissioned by the Western Interstate Energy Board (WIEB) and conducted by Energy + Environmental Economics (E3) in 2014, NERC's assessment of single points of disruption currently underway, and other recent studies.

WIRAB will work with and advise WECC on its efforts to assess the interdependencies between the natural gas and electric industries in the West and the implications for the reliable operation of the BES.

The goals of this initiative are to:

- Evaluate potential future reliability risks associated with interdependencies between the natural gas delivery system and the BES.
- Identify potential mitigation measures to minimize risks to the BES.

The actions that WIRAB staff will take to achieve these goals include:

- Providing advice to WECC on the scope of work for the study.
- Providing advice to WECC on the performance of work including data collection, methodology, assumptions and presentation of results.
- Providing advice to WECC on the interpretation of study results.
- Providing advice to WECC on communication of the results and assisting in communication of the results to stakeholders with key roles in ensuring electricity reliability, such as policy makers and utility planners.

Initiative 3: Encourage WECC to systematically assess the availability of Essential Reliability Services under a wide-range of future resource scenarios.

Building on an initiative in WIRAB's 2017 BP&B, WIRAB will continue its objective to improve WECC's ability to assess the availability of essential reliability services under wide-range of future resource scenarios. Over the past year, WIRAB staff participated on WECC's Joint PCC-TEPPC Review Task Force (JPTRTF), which produced two important recommendations that were approved by the WECC Board in December of 2016. The first recommendation was to consolidate WECC's Planning

Coordination Committee (PCC) and the Transmission Expansion Planning Policy Committee (TEPPC) into the Reliability Assessment Committee (RAC) to better integrate power flow modeling and production cost modeling. The second recommendation was to develop an “Anchor Data Set”; a common, unified data set of the Western Interconnection—collaboratively developed and used by WECC, regional planning groups, and utility planners—for use in power flow and production cost modeling. These proposals, if properly implemented, will improve WECC’s ability to perform reliability assessments of essential reliability services under a wide-range of future scenarios.

WIRAB staff will monitor and participate in RAC and RAC subcommittee activities and will advocate for the creation of an ADS process that produces accurate and high-quality data on current and future generation, loads, and transmission in the Western Interconnection. The creation of the new RAC and the development of a common and unified data base provides an important foundation for future reliability assessments about challenges facing the Western Interconnection.

A systematic assessment of essential reliability services includes the evaluation of whether the power system has sufficient ramping capability, frequency response, and voltage stability under a variety of conditions as we add more non-synchronous, variable generation to the grid. It also includes evaluation of mitigation measures when reliability concerns are identified, including measures that would need to be taken by Registered Entities such as the installation of synchronous condensers to improve system response to frequency disturbances.³

The goals of this initiative are for:

- WECC to complete integrated reliability assessments (i.e., ramping, frequency response, and voltage stability) of a future with: 1) high utility-scale development of non-synchronous wind and solar generation; 2) significant retirements of coal-fired generation in the Western Interconnection; and 3) high-penetration of distributed energy resources, including rooftop solar photovoltaics.

³ See GE Energy Consulting, Final Report: Potential Mitigation of Dynamic Reliability Challenges with High Levels of Variable Energy Resources (discussing the types of analysis and data needed to identify and quantify potential reliability problems), <http://westernenergyboard.org/download/ge-roadmap-to-improve-reliability-analysis-in-transmission-planning-in-the-changing-resource-mix-april-2015/>

- WECC would complete the modeling and analysis, and then publicly disseminate written reports describing the methodology and results of the reliability assessments.

The actions that WIRAB staff will take to achieve these goals include:

- Participating directly in the RAC Studies Subcommittee Governing Body and monitoring other RAC activities that provide the foundation for development of the integrated data set and analytical tools needed to conduct comprehensive reliability assessments of the Western Interconnection and the availability of essential reliability services under a wide-range of future scenarios.
- Advise WECC on the tools and data to be developed for the reliability assessments.
- Advise and assist WECC in reporting on the reliability assessments to be completed by the RAC.

Initiative 4: Encourage the Member Advisory Committees (MAC) at WECC and Peak Reliability to increase their focus on emerging reliability issues and to improve the processes used by the MACs to advise the Boards of Directors of WECC and Peak Reliability.

It is the purpose of the WECC and Peak Reliability Member Advisory Committees (MACs) to advise the WECC and Peak Reliability Boards of Directors on those matters the Boards request the MACs to consider and/or any matters the MACs deem appropriate. MAC Class Member Representatives play a critical role in engaging WECC and Peak members and providing independent advice to the WECC and Peak Reliability Boards on important reliability issues and organizational matters such as governance, business plans and budgets, and strategic planning. Timely and robust engagement by MAC Representatives in Board discussions and decision-making is critical to ensuring the success of these organizations and their efforts to ensure the reliability of the BES. The WECC and Peak Reliability MACs often determine and frame the matters that will be considered by the WECC and Peak Reliability Boards and, in doing so, directly affect WIRAB's ability to provide important advice to these Boards.

WIRAB will encourage the WECC and Peak Reliability MACs to increase their focus on emerging reliability issues. WIRAB will also encourage the MACs to improve committee processes to better support efforts to efficiently and effectively advise the Boards in a manner that reflects the broad perspectives of the Member Classes and other interested stakeholders.

The goals of this initiative are for:

- The WECC and Peak Reliability MACs to increase their focus on emerging reliability issues and to regularly provide the WECC and Peak Reliability Boards with advice and recommendations on these matters.
- The WECC and Peak Reliability MACs to adopt formal processes that support the MAC, MAC work groups, and Class Member Representative in their efforts to inform and gather stakeholder feedback and to efficiently and effectively advise the WECC and Peak Reliability Boards.

The actions that WIRAB staff will take to achieve these goals will include:

- Encouraging the WECC and Peak Reliability MACs to invite industry experts to discuss emerging reliability issues (e.g., expansion of the Southwest Power Pool (SPP)) at MAC meetings, and to advise the Boards on the challenges that emerging reliability issues may present for the Western Interconnection.
- Inviting the WECC and Peak Reliability MACs to participate in WIRAB webinars and workshops on emerging reliability issues.
- Encouraging and working with the WECC and Peak Reliability MACs to develop/improve MAC processes for seeking stakeholder engagement (e.g. processes that identify key benchmarks and establish clear timelines in order facilitate robust, timely, and informed stakeholder engagement).
- Encouraging and working with the WECC and Peak Reliability MACs to develop or improve MAC processes for establishing and guiding the efforts of MAC work groups (i.e., processes that require the MACs to issue detailed written directives to better guide and support MAC work group efforts).

These four initiatives represent WIRAB's priorities for 2018. WIRAB's on-going activities are described in Section A – Statutory Activities. WIRAB's spring and fall public meetings will continue to be a forum for policymakers and regulators to discuss

important reliability issues and to exchange views on existing and emerging reliability risks.

2018 Budget and Assessment Impacts

The WIRAB proposed budget for 2018 is \$1,067,785. This amount is \$161,295 (13%) lower than the amount in WIRAB's approved budget for 2017. Total proposed FTEs for 2018 remain constant at 5.5. WIRAB's total funding requirement is \$711,676. WIRAB's proposed funding assessment is \$711,026; a reduction of \$190,426 (21%) from the 2017 funding assessment.

Personnel and Indirect Expenses

Personnel expenses drop from \$465,653 in the 2017 Budget to \$408,111 (12%) in the 2018 Budget due to turn-over in personnel. WIRAB uses a single rate method for indirect expenses. The indirect expenses include office expenses, medical and retirement expenses as well as holiday, vacation and sick leave for WIRAB staff. The indirect rate is a percent of direct staff time spent on WIRAB. It is estimated that the indirect rate will remain constant at 96% of direct labor costs. Table 2 shows personnel and indirect expenses per FTE for the approved 2017 Budget and the proposed 2018 Budget.

WIRAB - Personnel and Indirect Expense Analysis 2017-2018						
STATUTORY						
	Budget 2017	Projection 2017	Budget 2018	Variance 2018 Budget v 2017 Budget	Variance %	
Salary Expense	\$ 465,653	\$ 445,000	\$ 408,111	\$ (57,542)	-12.4%	
FTEs	5.50	5.20	5.50	-	0.0%	
Cost per FTE	\$ 84,664	\$ 85,577	\$ 74,202	\$ (10,462)	-12.4%	
Indirect Rate	96%	96%	96%			
Indirect Expense	\$ 447,027	\$ 427,200	\$ 391,664	\$ (55,363)	-12.4%	
FTEs	5.50	5.20	5.50	-	0.0%	
Cost per FTE	\$ 81,278	\$ 82,154	\$ 71,212	\$ (10,066)	-12.4%	

Table 2. Personnel and Indirect Expense Analysis, 2017-2018.

Meeting Expense

Meeting costs increase by \$9,800 to \$70,700. WIRAB will hold two major in-person meetings per year that include participation by state/provincial agencies with electric power responsibilities in the Western Interconnection. Wherever feasible, WIRAB meetings will be coordinated with other meetings of the Western states and provinces.

Travel Expense

Travel costs decrease by \$4,210 to \$95,290. WIRAB member travel to biannual meetings and reliability conferences accounts for \$28,280. WIRAB staff travel to attend meetings of WIRAB, WECC and Peak Reliability accounts for \$67,010. Hotel and travel costs are based on experience from the last year.

Consultants and Contracts

The budget includes \$100,000 in contract funding for technical expertise on issues related to improved grid operating practices, reliability standards and compliance. This expertise will help WIRAB prepare technically-sound advice under Section 215(j).

Budget Comparison

Table 3 shows the 2017 Budget and 2017 Projection compared to the 2018 Budget.

WIRAB - Statement of Activities and Change in Working Capital 2017 Budget & Projection, and 2018 Budget							
STATUTORY							
	2017 Budget	2017 Projection	Variance 2017 Projection v 2017 Budget		2018 Budget	Variance 2018 Budget v 2017 Budget	
			Over(Under)	% Change		Over(Under)	% Change
Funding							
WIRAB Funding							
Assessments	\$ 901,452	\$ 901,452	\$ -	0.0%	\$ 711,026	\$ (190,426)	-21.1%
Penalty Sanctions	-	-	-	-	-	-	-
Total WIRAB Funding	\$ 901,452	\$ 901,452	\$ -	0.0%	\$ 711,026	\$ (190,426)	-21.1%
Membership Dues	-	-	-	-	-	-	-
Testing Fees	-	-	-	-	-	-	-
Services & Software	-	-	-	-	-	-	-
Workshops	-	-	-	-	-	-	-
Interest	650	650	\$ -	0.0%	650	\$ -	0.0%
Miscellaneous	-	-	-	-	-	-	-
Total Funding (A)	\$ 902,102	\$ 902,102	\$ -	0.0%	\$ 711,676	\$ (190,426)	-21.1%
Expenses							
Personnel Expenses							
Salaries	465,653	445,000	(20,653)	-4.4%	408,111	\$ (57,542)	-12.4%
Payroll Taxes	-	-	-	-	-	-	-
Benefits	-	-	-	-	-	-	-
Retirement Costs	-	-	-	-	-	-	-
Total Personnel Expenses	\$ 465,653	\$ 445,000	\$ (20,653)	-4.4%	\$ 408,111	\$ (57,542)	-12.4%
Meeting Expenses							
WIRAB Meetings	\$ 60,900	\$ 63,000	\$ 2,100	3.4%	\$ 70,700	\$ 9,800	16.1%
State Travel	99,500	30,500	\$ (69,000)	-69.3%	28,280	\$ (71,220)	-71.6%
Staff Travel	-	67,000	-	-	67,010	\$ 67,010	100.0%
Conference Calls	6,000	4,000	\$ (2,000)	-33.3%	2,020	\$ (3,980)	-66.3%
Total Meeting Expenses	\$ 166,400	\$ 164,500	\$ (68,900)	-41.4%	\$ 168,010	\$ 1,610	1.0%
Operating Expenses							
Consultants & Contracts	\$ 150,000	\$ 100,000	\$ (50,000)	-33.3%	\$ 100,000	\$ (50,000)	-33.3%
Office Rent	-	-	-	-	-	-	-
Office Costs	-	-	-	-	-	-	-
Professional Services	-	-	-	-	-	-	-
Miscellaneous	-	-	-	-	-	-	-
Depreciation	-	-	-	-	-	-	-
Total Operating Expenses	\$ 150,000	\$ 100,000	\$ (50,000)	-33.3%	\$ 100,000	\$ (50,000)	-33.3%
Total Direct Expenses	\$ 782,053	\$ 709,500	\$ (139,553)	-17.8%	\$ 676,121	\$ (105,932)	-13.5%
Indirect Expenses	\$ 447,027	\$ 427,200	\$ (19,827)	-4.4%	\$ 391,664	\$ (55,363)	-12.4%
Other Non-Operating Expenses	\$ -	\$ -	\$ -	-	\$ -	\$ -	-
TOTAL BUDGET (B)	\$ 1,229,080	\$ 1,136,700	\$ (159,380)	-13.0%	\$ 1,067,785	\$ (161,295)	-13.1%
CHANGE IN WORKING CAPITAL (=A-B)¹	\$ (326,978)	\$ (234,598)	\$ 159,380	-	\$ (356,109)	\$ (29,131)	-
FTEs	5.50	5.50	-	0.0%	5.50	-	0.0%

¹ Fixed Asset included in Indirect Expenses.

Table 3. Budget Comparison, 2017 to 2018.

Statutory Assessments

WIRAB's proposed funding assessment of \$711,026 is allocated \$599,105 (84%) to the U.S. portion, \$101,526 (14%) to the Canadian portion, and \$10,396 (2%) to the Mexican portion of the Western Interconnection.

Key Assumptions

The WIRAB 2018 Budget and Business Plan is based on the following assumptions:

- There will be no significant expansion of FERC, NERC, WECC, or Peak Reliability responsibilities as a result of legislation or administrative actions.
- WIRAB will continue to provide advice to Peak Reliability.
- WIRAB will hold two in-person meetings in 2018.
- WIRAB will organize and sponsor webinars and workshops on key reliability issues for WIRAB members, state and provincial representatives, industry representatives, and other interested stakeholders.
- WIRAB will attend all WECC and Peak Reliability Boards of Directors and Member Advisory Committee (MAC) meetings.
- WIRAB will attend selected NERC meetings and workshops on relevant topics.
- WIRAB will annually visit with FERC in its offices.
- WIRAB will monitor all FERC business meetings.
- WIRAB will attend FERC technical conferences on reliability issues.

Section A – Statutory Activities

2018 Business Plan and Budget

Section A – Statutory Activities

WIRAB's advice to FERC, NERC, WECC, and Peak Reliability can be grouped into four categories that are appropriately funded under Section 215 of the FPA:

1. **Governance and Strategic Planning:** Section 215(j) of the FPA authorizes WIRAB to provide advice to FERC on the governance, strategic direction, budget and fees of WECC. FERC has previously authorized WIRAB to provide advice on the governance, strategic direction, budget and fees of Peak Reliability.
2. **Emerging Trends and System Risks:** WIRAB must maintain awareness of system conditions and emerging trends and system risks in order to provide effective and technically sound advice regarding the strategic direction of FERC and Peak Reliability. WIRAB also uses knowledge of emerging trends and risks to provide advice to WECC on reliability readiness activities and proactive compliance efforts. These activities are appropriately funded under Section 215(j) of the FPA.
3. **Periodic Reliability Assessments:** Section 215(g) of the FPA requires NERC to conduct periodic assessments of the reliability and adequacy of the bulk-power system. WECC assists NERC in performing this statutory activity. WIRAB works closely with WECC to improve reliability assessment in the Western Interconnection.
4. **Reliability Standards and Proactive Enforcement:** Section 215(j) of the FPA authorizes WIRAB to provide advice to FERC on whether reliability standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest. WIRAB works closely with WECC and Peak Reliability to identify emerging problems or conditions that should be considered in the course of drafting and voting on amendments to existing standards or new standards. WIRAB also works closely with WECC to develop reliability readiness activities and to promote proactive compliance efforts.

WIRAB's activities in each of these categories are described in the following subsections.

Governance and Strategic Planning

Section 215(j) of the FPA authorizes WIRAB to advise FERC on the governance, strategic direction, budget, and fees of WECC and Peak Reliability. The WIRAB staff engages with the WECC and Peak Reliability Boards of Directors, standing committees, staff, Member Advisory Committees (MACs), and MAC work groups to monitor and evaluate the effectiveness and efficiency of governance and operations at each organization and to ensure that all “activities conducted pursuant to Section 215 are just, reasonable, not unduly discriminatory or preferential, and in the public interest.”

The WIRAB staff attends meetings of the WECC and Peak Reliability Boards of Directors, standing committees, Member Advisory Committees (MAC), and MAC work groups and monitors developments related to each organization’s organizational governance, strategic direction, and budget. The WIRAB staff also conducts monthly webinars to provide WIRAB Members, WECC and Peak Reliability’s Class 5 Representatives, and other interested stakeholders with regular updates on current and upcoming activities at WECC and Peak Reliability and to review and develop WIRAB’s written advice and guidance to the Boards of Directors. WIRAB provides WECC and Peak Reliability with independent expert advice on operational practices and performance, annual business plans and budgets, strategic plans, committee charters, proposed bylaw amendments, fees, and other matters. WIRAB and the WIRAB staff will continue to engage with WECC and Peak Reliability and to provide advice and recommendations to each organization as necessary.

Emerging Trends and System Risks

WIRAB staff engage in the following on-going activities in order to provide independent expert advice on the emerging reliability trends and system risks:

Event Analysis and Situational Awareness:

Understanding important operational issues occurring today, as well as in the past, is key to ensuring reliability in the Western Interconnection. Event analysis and situational awareness topics need to be discussed in open and transparent forums that include both utility operators who see these types of issues on a day-to-day basis and thought leaders from diverse backgrounds. It is important to promote best practices and

lessons learned to ensure system operators have access to the tools and knowledge available to maintain a reliable grid in real-time.

WIRAB and the WIRAB staff provide leadership by attending and participating in WECC's Operating Committee meetings, WECC's Market Implementation Committee meetings and Peak Reliability's RC User Group meetings, as well as other forums outside of WECC and Peak Reliability. WIRAB staff also provides periodic outreach webinars and panel sessions at in-person meetings to identify and discuss emerging trends and risks associated with event analysis and situational awareness with Western policy makers and other stakeholders.

Distributed Solar PV Generation Resources:

Distributed energy resources, particularly solar photovoltaic (PV) generation, are projected to total more than 16,000 MW in nameplate capacity by year 2026 in the Western U.S. While California is projected to contribute the majority of this capacity, several other Western states are also predicted to contribute to Western-wide distributed solar PV capacity. Significant benefits of this trend include distributed solar PV generation's increased capacity, partial coincidence with peak power demand, and potential for the provision of grid support services. Several potentially deleterious impacts are also associated with distributed solar PV capacity, such as the simultaneous "tripping off" of distributed solar PV generation systems with narrow tolerance ranges for frequency and/or voltage deviations, which may be triggered by and exacerbate deviations created by an original system contingency, such as the loss of a significant generator. Advanced inverters that permit wider tolerance range settings could provide frequency and/or voltage ride-through in the event of a system contingency.

In addition to the trend of increasing distributed solar PV generation, there is a trend for retirement of synchronous generators such as coal-fired power plants in Western states. Non-synchronous generation technologies, specifically solar PV generation, have historically been regarded as unable to provide grid support services commonly associated with synchronous generation resources, such as frequency support and voltage control. New power electronic technologies, however, enable non-synchronous generation to provide grid support.

WIEB and WIRAB lead efforts to study potential reliability problems associated with increasing distributed solar PV generation in the Western Interconnection. WIEB and WIRAB support the technical advisory committees in their efforts to advise the research partners and to provide feedback on study findings and interpretations. WIEB and WIRAB representatives and staff also work to disseminate research findings and policy recommendations on potential reliability concerns associated with distributed solar PV generation to regulators and policymakers in Western Interconnection states.

Expanding Market Operations:

Expanding market operations is a growing trend in the Western Interconnection. Western states have engaged in discussions on the potential creation of a regional ISO that would involve a multi-state grid using the California ISO's technology to coordinate and optimize electric systems across the states. The Energy Imbalance Market (EIM), which began operation in 2014, has been continuously expanding to include new participants. Additionally, electricity service providers in the eastern part of the Western Interconnection formed the Mountain West Transmission Group (MWTG) to evaluate various options ranging from establishing a common transmission tariff to Regional Transmission Organization (RTO) membership. These market reforms could result in significant changes to system operations (e.g., transmission scheduling, congestion management) and create new reliability challenges and opportunities for the Western Interconnection.

The WIRAB staff monitors market reform efforts in the West and provides a forum for discussions about related issues such as the potential for a regional ISO, expansion of the EIM, and opportunities and challenges for the MWTG. The WIRAB staff also monitors and participates in other forums that are exploring these issues, such as PUC and RTO meetings and workshops. Additionally, the WIRAB staff attends and participates in relevant WECC committee meetings and activities, such as those of the Market Interface Committee (MIC). WIRAB will continue to provide advice to WECC and Peak Reliability and to make recommendations as appropriate on reliability challenges and opportunities associated with expanding market operations.

Essential Reliability Services:

With the rapidly changing resource mix, the Bulk Electric System (BES) is becoming more reliant on more variable, asynchronous generating resources. It is

important that the electric utility industry look over the horizon at emerging issues and make sure that policies and practices set today do not adversely impact reliability, now and in the future. Because of the changing resource mix, some reliability services that are inherently provided by traditional generation resources may not be available to the same extent in the future. However, with emerging technologies, accompanying policies and practices set today can ensure grid reliability, even if the future grid operates differently than it does today.

WIRAB staff provides leadership and advice by attending, participating in and monitoring WECC's Reliability Assessment Committee, Operating Committee and Market Implementation Committee meetings, Peak Reliability's RC User Group meetings, NERC's Essential Reliability Service Work Group meetings, FERC's Reliability Technical Conferences and other forums within the industry. WIRAB provides written advice to WECC, Peak and the Federal Energy Regulatory Commission on policies regarding the provision of essential reliability services. WIRAB staff also provides periodic outreach webinars and develops panel sessions for WIRAB's in-person meetings to discuss emerging trends and to inform Western policy makers and other interested stakeholders of the emerging risks associated with the changing resource mix and the provision of essential reliability services.

Periodic Reliability Assessments

WIRAB staff engage in the following on-going activities in order to provide guidance and independent expert advice on WECC's periodic reliability assessments:

Variable Energy Resources:

High priority reliability topics for the Western Interconnection include the increasing penetration of variable renewable resources, increasing retirements of baseload coal generation that would reduce inertia on the grid, and the growth of distributed energy resources that interface with the Bulk Electric System. WIRAB strives for high quality resource assessments that address the reliability implications of the changing resource mix in the Western Interconnection over the 10- to 20-year timeframe. Production cost modeling can identify economic dispatch of a potential new resource mix for every hour over a future year and identify critical hours of system

stress. Power flow analysis examines these critical stress hours for traditional reliability parameters. The integrated use of production cost modeling and power flow analysis will be an essential tool for future reliability assessments of the Western Interconnection.

WIRAB monitors, advises, and participates in WECC's Reliability Assessment Committee (RAC) to promote improved reliability assessments of the Western Interconnection. WIRAB will encourage and support the RAC in its efforts to integrate WECC's data and modeling capability to perform roundtrip reliability assessments that combine power flow analysis and production cost modeling. WIRAB will also monitor, engage and communicate findings on the leading research about the integration of variable energy resources into the Western Interconnection. Further, WIRAB staff monitors and engages with the National Renewable Energy Laboratory (NREL), the Utility Variable Integration Group, the California ISO, and other researchers investigating the flexibility and reliability of the power system to integrate higher levels of renewable energy. WIRAB also provides outreach to Western states and provinces on the policy implications from new research.

Gas-Electric Interdependencies:

The North American power sector's reliance on natural gas for electric generation has grown significantly. Low natural gas prices, environmental regulations, and improving technologies have all contributed to rapid and sustained investment in new gas-fired power plants across the U.S. The natural gas and electricity industries evolved independently but are now inextricably interdependent. In the West, issues surrounding the Aliso Canyon natural gas storage field in southern California highlighted these interdependencies. In response to growing concerns about electric reliability, both FERC and NERC directed focused inquiries into issues related to gas-electric coordination, including NERC's assessment of single points of disruption.

In 2014, WIRAB's sister organization, WIEB, commissioned a Western-Interconnection-wide assessment of gas-electric interdependencies. Phase 1 of the study assessed natural gas infrastructure. Phase 2 of the study assessed short term operational flexibility. WIRAB and the WIRAB staff continue to work with WIRAB's partners in the Western Interconnection to assess the adequacy, security, and risks

associated with natural gas infrastructure and its ability to reliably meet evolving BES needs. These assessments continue to build upon previous and related work, including the WIEB-commissioned study. WIRAB continue to work closely with WECC and other research partners to develop the scope of work, guide the work of contractors in performing assessments, and communicate results to stakeholders with key roles in ensuring reliability of the BES, such as policy makers and utility planners.

Reliability Standards and Proactive Enforcement

WIRAB staff engage in the following on-going activities in order to provide independent expert advice on the development and proactive enforcement of reliability standards:

Reliability Standards:

NERC reliability standards were created to provide minimum requirements for planning and operating the electric grid. The compliance and enforcement of these reliability standards ensures there is oversight and accountability of bulk power system owners and operators and that system-wide reliability is maintained. It is important that reliability standards are strict enough to guarantee that system reliability is maintained, but flexible enough to respond to the changing industry. It is important to develop and review reliability standards to ensure they effectively preserve reliability while not being overly burdensome on the entities required to comply.

WIRAB staff provides independent expert advice on the development and proactive enforcement of reliability standards by contracting with subject matter experts with direct knowledge of the efficacy of reliability standards and the burden of compliance on regulated entities. WIRAB staff attends, participates and/or monitors WECC's Operating Committee meetings, WECC's Standards Committee meetings, NERC's standard development process and other industry forums. When necessary, WIRAB provides written advice to WECC, NERC and FERC on the implementation of specific standards within the Western Interconnection. WIRAB staff also provide periodic outreach webinars and panel sessions at in-person meetings to lead discussions on emerging trends and risks associated with enforceable reliability standards and to inform Western policy makers and other stakeholders on these issues.

Physical Security and Cybersecurity:

Physical security and cybersecurity of the electric grid are of great concern. Until recent years, physical and cyber security incidents were confined to other sectors. Recently, however, physical incidents (including two incidents at a California substation) and cyber incidents (including a late 2015 incident in the Ukraine that left one-quarter of a million customers without power) have impacted the power sector.

WIRAB has monitored incidents that have compromised the physical security and cybersecurity of the grid for several years. In 2014 and 2015, WIRAB conducted webinars on both physical security and cybersecurity of the grid. In addition, WIRAB has monitored NERC's Critical Infrastructure Protection (CIP) standards. As appropriate, WIRAB will provide updates on CIP standards during its Monthly Teleconference with WIRAB members.

Section B – WIRAB Supplemental Financial Information

2018 Business Plan and Budget

Section B – Supplemental Financial Information

Working Capital Reserve

WIRAB projects it will have a working capital reserve of \$956,109 on December 31, 2017, as compared to a desired working capital reserve at December 31, 2018, of \$600,000. The surplus working capital reserve results in a \$356,109 reduction in WIRAB's funding requirement for 2018. WIRAB is changing its reserve policy to stabilize statutory assessments over the next several budget cycles. WIRAB has traditionally maintained a working capital reserve of \$100,000. Higher working capital reserves in 2018 and 2019 are intended to stabilize assessments during the transition from the current high level of reserves. Starting in 2020, WIRAB will strive to maintain a reserve equal to 20% of budgeted expenses. Table B.1 shows WIRAB's analysis of working capital reserve.

WIRAB - Working Capital Reserve Analysis 2017-2018	
STATUTORY	
Beginning Working Capital Reserve (Deficit), December 31, 2016	1,190,707
Plus: 2017 Funding (from LSEs or designees)	901,452
Plus: 2017 Other funding sources	650
Minus: 2017 Projected expenses & capital expenditures	(1,136,700)
Projected Working Capital Reserve (Deficit), December 31, 2017	956,109
Desired Working Capital Reserve, December 31, 2018¹	600,000
Minus: Projected Working Capital Reserve, December 31, 2017	(956,109)
Increase(decrease) in funding requirement to achieve Working Capital Reserve	(356,109)
2018 Expenses and Capital Expenditures	1,067,785
Less: Penalty Sanctions ²	0
Less: Other Funding Sources	(650)
Adjustment: To achieve desired Working Capital Reserve	(356,109)
2018 NERC Assessment	711,026

¹ Desired working capital reserve is 56 percent of budgeted expenses.

² Penalty sanctions are not applicable to WIRAB.

Table B-1. Working Capital Reserve Analysis 2017 – 2018.

Budget Projections for 2019-2020

WIRAB - Statement of Activities and Change in Working Capital 2018 Budget & 2019 and 2020 Projections							
STATUTORY							
	2018	2019	Variance 2019 Projection v 2018 Budget		2020	Variance 2020 v 2019 Projections	
	Budget	Projection	Over(Under)	% Change	Projection	Over(Under)	% Change
Funding							
WIRAB Funding							
Assessments	\$ 711,026	\$ 880,195	\$ 169,169	23.8%	\$ 1,024,103	\$ 143,908	16.3%
Penalty Sanctions	-	-	-	-	-	-	-
Total WIRAB Funding	\$ 711,026	\$ 880,195	\$ 169,169	23.8%	\$ 1,024,103	\$ 143,908	16.3%
Membership Dues	-	-	-	-	-	-	-
Testing Fees	-	-	-	-	-	-	-
Services & Software	-	-	-	-	-	-	-
Workshops	-	-	-	-	-	-	-
Interest	650	750	\$ 100	15.4%	800	\$ 50	6.7%
Miscellaneous	-	-	-	-	-	-	-
Total Funding (A)	\$ 711,676	\$ 880,945	\$ 169,269	23.8%	\$ 1,024,903	\$ 143,958	16.3%
Expenses							
Personnel Expenses							
Salaries	408,111	420,354	12,243	3.0%	432,965	\$ 12,611	3.0%
Payroll Taxes	-	-	-	-	-	-	-
Benefits	-	-	-	-	-	-	-
Retirement Costs	-	-	-	-	-	-	-
Total Personnel Expenses	\$ 408,111	\$ 420,354	\$ 12,243	3.0%	\$ 432,965	\$ 12,611	3.0%
Meeting Expenses							
WIRAB Meetings	\$ 70,700	\$ 72,821	\$ 2,121	3.0%	\$ 75,006	\$ 2,185	3.0%
State Travel	\$ 28,280	\$ 29,128	\$ 848	3.0%	\$ 30,002	\$ 874	3.0%
Staff Travel	\$ 67,010	\$ 69,020	\$ 2,010	3.0%	\$ 71,091	\$ 2,071	3.0%
Conference Calls	\$ 2,020	\$ 2,081	\$ 61	3.0%	\$ 2,143	\$ 62	3.0%
Total Meeting Expenses	\$ 168,010	\$ 173,050	\$ 5,040	3.0%	\$ 178,242	\$ 5,192	3.0%
Operating Expenses							
Consultants & Contracts	\$ 100,000	\$ 100,000	\$ -	0.0%	\$ 100,000	\$ -	0.0%
Office Rent	-	-	-	-	-	-	-
Office Costs	-	-	-	-	-	-	-
Professional Services	-	-	-	-	-	-	-
Miscellaneous	-	-	-	-	-	-	-
Depreciation	-	-	-	-	-	-	-
Total Operating Expenses	\$ 100,000	\$ 100,000	\$ -	0.0%	\$ 100,000	\$ -	0.0%
Total Direct Expenses	\$ 676,121	\$ 693,405	\$ 17,284	2.6%	\$ 711,207	\$ 17,802	2.6%
Indirect Expenses	\$ 391,664	\$ 403,540	\$ 11,876	3.0%	\$ 415,646	\$ 12,106	3.0%
Other Non-Operating Expenses	\$ -	\$ -	\$ -	-	\$ -	\$ -	-
TOTAL BUDGET (B)	\$ 1,067,785	\$ 1,096,945	\$ 29,160	2.7%	\$ 1,126,853	\$ 29,908	2.7%
CHANGE IN WORKING CAPITAL (=A-B)¹	\$ (356,109)	\$ (216,000)	\$ 140,109	-	\$ (101,950)	\$ 114,050	-
FTEs	5.50	5.50	-	0.0%	5.50	-	0.0%

¹ Fixed Asset included in Indirect Expenses.

Table B-2. Budget 2018 Compared with 2019-2020 Projections.

WIRAB projects a 2.7% increase to its annual budget in 2019 and a 2.7% increase in 2020. These increases reflect expected cost-of-living adjustments to personnel expenses for employees working in Denver, Colorado.

Section C – Non-Statutory Activities

2018 Business Plan and Budget

Section C – Non-Statutory Activities

WIRAB does not engage in non-statutory activities.

Section D – Additional Consolidated Financial Statements

2018 Business Plan and Budget

Section D – Additional Consolidated Financial Statements

Statement of Financial Position

Table D-1 provides WIRAB's Statement of Financial Position as of the following dates:

- As of December 31, 2016, per audit
- As of December 31, 2017, projected
- As of December 31, 2018, as budgeted

WIRAB - Statement of Financial Position				
STATUTORY				
	As of June 30, 2016 (Audit)	As of December 31, 2017 (Projected)	As of December 31, 2018 (Budgeted)	
Assets				
Cash and Investments	\$ 1,779,012	\$ 956,109	\$ 600,000	
Total Assets	\$ 1,779,012	\$ 956,109	\$ 600,000	

Table D-1. Statement of Financial Position, Three-Year Comparison

Appendix A Organization Chart

The WIRAB Organization Chart is shown below.

