
Western Interconnection Regional Advisory Body

2019 Business Plan and Budget

April 25, 2018

**Under Consideration 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 2019 is \$1,162,700. This amount is \$94,915 (8.9%) higher than the amount in WIRAB's approved budget for 2018. Total proposed FTEs for 2019 are 5.0. WIRAB's total funding requirement is \$750,600. WIRAB's proposed funding assessment is \$750,000, an increase of \$38,974 (5.5%) from the 2018 funding assessment. WIRAB's proposed funding assessment is allocated \$631,944 (84%) to the U.S. portion, \$107,091 (14%) to the Canadian portion, and \$10,965 (2%) to the Mexican portion of the Western Interconnection. The following table summarizes the WIRAB proposed budget for 2019.

WIRAB - Total Resources (in whole dollars)	2019 Budget	U.S.	Canada	Mexico
Statutory FTEs	5.00			
Non-statutory FTEs				
Total FTEs	5.00			
Statutory Expenses	\$ 1,162,700			
Non-Statutory Expenses				
Total Expenses	\$ 1,162,700			
Statutory Inc(Dec) in Fixed Assets				
Non-Statutory Inc(Dec) in Fixed Assets				
Total Inc(Dec) in Fixed Assets	\$ -			
Statutory Working Capital Requirement	\$ (412,100)			
Non-Statutory Working Capital Requirement	0			
Total Working Capital Requirement	\$ (412,100)			
Total Statutory Funding Requirement	\$ 750,600			
Total Non-Statutory Funding Requirement	\$ -			
Total Funding Requirement	\$ 750,600			
Statutory Funding Assessments	\$ 750,000	\$ 631,944	\$ 107,091	\$ 10,965
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 2019

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 an 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."

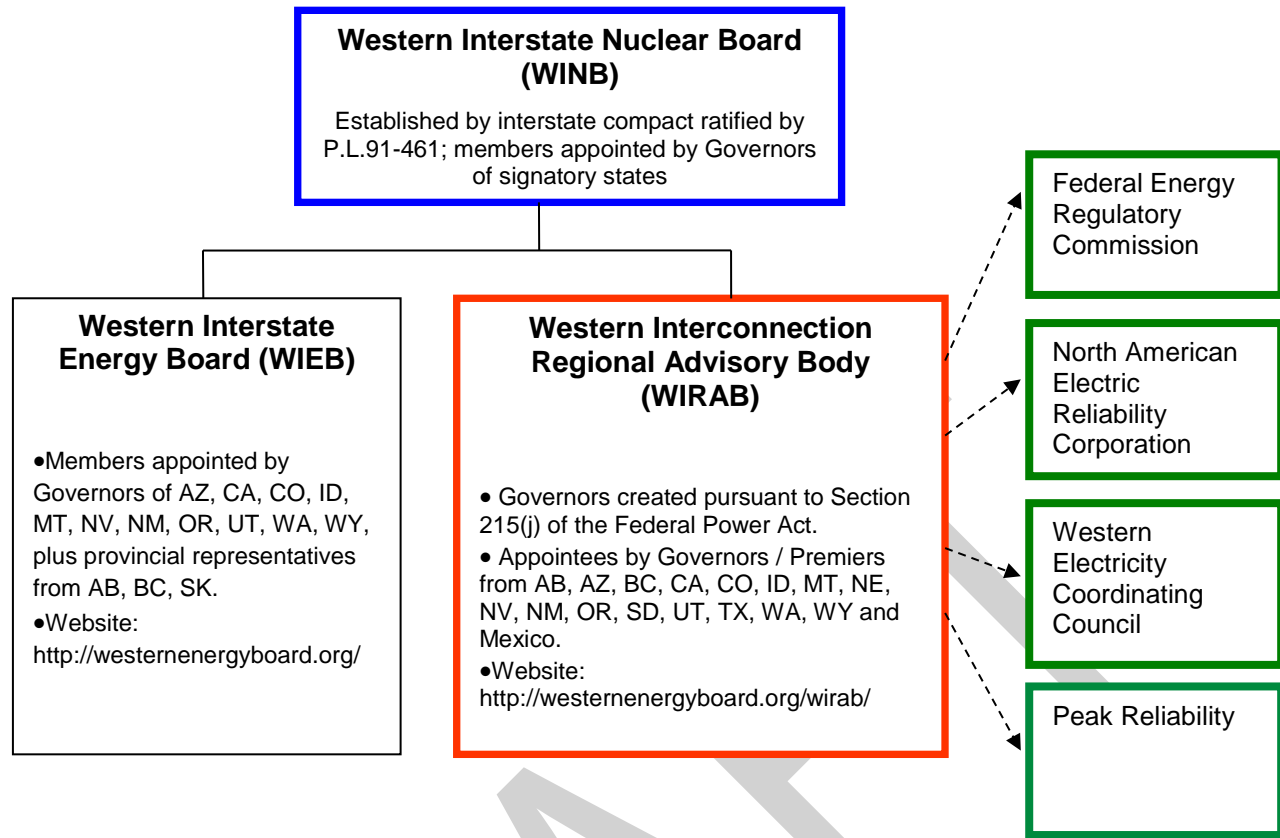


Figure 1. Organizational Relationships

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 designated alternates. Below is the list of current members:

WIRAB - Current Membership List		
Alberta	Christine Lazaruk	Executive Director, Strategy and Integration, Alberta Energy
Arizona	Brian Goretzki	Chief, Bureau of Radiation Control, Arizona Department of Health Services
British Columbia	Les MacLaren	Assistant Deputy Minister, Ministry of Energy, Mines and Petroleum Resources
California	Janea Scott	Commissioner, California Energy Commission
Colorado	Frances Koncilja	Commissioner, Colorado Public Utilities Commission
Idaho	Kristine Raper	Commissioner, Idaho Public Utilities Commission
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
Oregon	Lisa Hardie	Commissioner, Oregon Public Utilities Commission
Utah	David Clark	Commissioner, Utah Public Service Commission
Washington	Tony Usibelli	Special Assistant for Energy & Climate Policy, Washington State Energy Office
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.

Additionally, FERC authorized WIRAB to advise Peak Reliability, the Reliability Coordinator (RC) for the Western Interconnection, 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 the RC 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.

2019 Strategic Priorities and Goals

The resource mix of the Western power system is rapidly changing. Environmental regulations (including those to reduce regional haze and mercury emissions), efforts to transition to a lower carbon economy, and shifting market forces have resulted in announced retirements of coal-fired and nuclear generating units. Utility-scale wind and solar generation is being built in many parts of the West, and California and the Desert Southwest are experiencing rapid growth in the installation of distributed solar photovoltaic generation. State energy storage procurement mandates are also incentivizing a broader implementation of energy storage technologies that may support higher penetrations of asynchronous, variable energy resources (VER). These changes to the generation resource mix will present new reliability challenges and opportunities for the Western Interconnection as more asynchronous generation is added to the system and additional synchronous spinning mass generation is retired.

Grid modernization efforts also present new reliability challenges and opportunities for the West. Increased reliance on distributed energy resources (DER) and electric vehicles (EV) is creating a need for better coordination between Bulk Electric System (BES) operators and distribution system operators and a greater need for implementation, research, and development of new technologies and operational tools that can be used to improve system reliability throughout the West. Grid modernization also necessitates an increasing focus on cyber security, grid resilience, and physical hardening of electric grid infrastructure. Physical and cyber threats to the grid will continue to impact the availability of data and the transparency of periodic reliability assessments, creating a need for better data sharing protocols to improve information sharing, coordination, and overall situational awareness.

The structure of Western power markets is also undergoing significant change, creating new reliability challenges and opportunities for the Western Interconnection. The California Independent System Operator (ISO) Western Energy Imbalance Market (EIM) continues to gain new participants and the California ISO is considering offering day ahead market services to EIM participants. The Southwest Power Pool (SPP) and Peak Reliability-PJM Connex are offering market services to BAs and TOPs within the Western Interconnection. Finally, Alberta is expanding its energy-only market to an energy and capacity market. These market reforms could result in significant changes

to system operations (e.g., transmission scheduling, congestion management, and reliability coordination).

The fragmentation of Reliability Coordinator (RC) responsibilities across the Western Interconnection also raises questions about ongoing reliable operations of the BES. The California ISO and SPP have both announced their intent to offer RC services to Balancing Authorities (BAs) and Transmission Operators (TOPs) throughout the Western Interconnection. Starting in September 2019, Peak Reliability will no longer be the sole RC for the U.S. portion of the Western Interconnection; raising concerns about shared responsibilities for coordinated RC operations across RC boundaries and seams.

In response to these on-going changes in the Western Interconnection, WIRAB has identified five strategic initiatives that it will pursue in 2019:

Initiative 1: Advise WECC on the implications of high levels of distributed solar photovoltaic (PV) deployment on the reliable operation of the Bulk Electric System.

In 2019, WIRAB will continue to advise WECC on the implications of high levels of distributed solar PV deployment. By 2026, solar PV generation in the Western U.S. is projected to total more than 16,000 MW in nameplate capacity. While there are many expected benefits of increasing distributed solar PV generation, several potential reliability concerns are also associated with this trend.

One such concern stems from the potential for many distributed solar PV systems to simultaneously “trip off” or disconnect from the grid. This event could be triggered by the effects of an original system contingency, such as loss of a significant generator. Inverters that interconnect distributed solar PV systems with the grid are typically configured to have narrow tolerance ranges for frequency and voltage deviations. If a system contingency alters grid frequency or voltage to a value outside of inverter tolerance ranges, distributed solar PV generation will disconnect from the grid. This simultaneous tripping of distributed solar systems can exacerbate the original system contingency and potential result in load-shedding or system outages. Wider inverter tolerance ranges could mitigate the risk by allowing these generators to ride-through some abnormal conditions and could, in some circumstances, provide additional benefits to BES reliability.

Another concern regarding increasing distributed solar PV generation is that this generation is often not visible to system operators. This lack of visibility 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 advanced inverters. Advanced inverters can improve the visibility of distributed generation to system operators because they enable two-way communication between the generator and the utility.

In 2017, WIRAB's sister organization, WIEB, initiated a three-year project to mitigate or remove barriers to deployment of distributed solar PV generation in the Western Interconnection. WIEB is working with the National Renewable Energy Laboratory (NREL) to address potential reliability barriers. WIRAB will share the key findings and insights of this research with WECC and its stakeholders.

The goals of this initiative are to:

- Inform WECC and its stakeholders of key findings and insights from research on potential reliability concerns with increasing deployment of distributed solar PV.
- Inform the WECC Reliability Assessment Committee of modeling techniques used by NREL to conduct its assessment of reliability concerns associated with distributed solar PV systems.
- Inform WECC and its RAC of reliability concerns that warrant further study and assessment.

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

- Participating directly in RAC subcommittee meetings to share key findings and insights and new modelling techniques.
- Including key findings and insights in WIRAB's reports to the WECC Board of Directors.

Initiative 2: Encourage WECC to systematically perform reliability assessments evaluating the availability of Essential Reliability Services under a wide range of future resource scenarios.

WIRAB continues to build upon a multi-year initiative to improve WECC's ability to assess the availability of essential reliability services under a wide range of future resource scenarios. WECC's Reliability Assessment Committee (RAC) continues to work to better integrate its power flow modeling and production cost modeling. WECC continues to work with stakeholders to develop an "Anchor Data Set," envisioned to be a common, unified data set for power flow and production cost modeling across the Western Interconnection. These steps, if properly implemented, would improve WECC's ability to perform reliability assessments of essential reliability services under a wide-range of future scenarios.

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 the resource mix in the Western Interconnection continues to change. It also includes evaluation of mitigation measures when reliability concerns are identified.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.
- 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

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/>

reliability assessments of the Western Interconnection and the availability of essential reliability services under a wide-range of future scenarios.

- Advising WECC on the tools and data to be developed for reliability assessments.
- Advising and assisting WECC in reporting on reliability assessments to be completed by the RAC.
- Participating in the WECC process to identify reliability risk priorities and advising WECC on priorities in the Western Interconnection.

Initiative 3: Encourage all Reliability Coordinators (RCs) in the Western Interconnection to coordinate outages, study seams issues, and share information to maintain or improve the overall reliability of the Bulk Electric System.

In January 2018, the California ISO (CAISO) announced its intent to withdraw from Peak Reliability's Funding Agreement and to offer RC services to Balancing Authorities (BAs) and Transmission Operators (TOPs) within its own footprint and throughout the Western Interconnection starting in September 2019. The Southwest Power Pool (SPP) also expressed its intent to offer RC services to the Mountain West Transmission Group (MWTG) (along with market services) and to other BAs and TOPs within the Western Interconnection. Nearly all of Peak Reliability's Funding Parties have now submitted revocable notices to withdraw from Peak Reliability's Funding Agreement for RC Services by September 1, 2019 or at the end of 2019. The prospect of having multiple reliability coordinators in the Western Interconnection raises concerns about interconnection-wide coordination and shared responsibilities for operations across RC boundaries and seams.

In 2019, WIRAB will encourage Western Interconnection RCs to maintain or improve reliability by coordinating outages, studying seams issues and sharing information.

The goals of this initiative are to:

- Maintain high-quality RC Services at Peak Reliability as other entities pursue RC certification.
- Maintain or improve reliability in a new, multiple RC environment by encouraging RC providers to analyze, coordinate, collaborate on seams issues.
- Maintain high-quality and cost-effective RC Services across the West.

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

- Participating as an observer in the Western Electricity Coordinating Council (WECC)/NERC Certification Process for all RC Certifications in the Western Interconnection.
- Work with the RCs and WECC to establish a Western Interconnection seams coordination groups to ensure information is being shared between RCs, BAs, and TOPs.
- Work with the RCs and WECC to determine if WECC specific standards, criteria or guidance is necessary to maintain situational awareness at an interconnection-wide level.
- Work with NERC to ensure that any new or updated RC reliability standards appropriately account for the unique operating characteristics of the Western Interconnection.
- Advise RC providers on the RC governance structure to ensure that the RC remains independent within their organization.
- Advise all RCs on RC service rate structures, terms, and fees.

Initiative 4: Encourage WECC to share key findings and insights from its Event Analysis and Situational Awareness Program in public briefings with Western policymakers and regulators in an effort to increase awareness of the causes of system events and the actions that can be taken to prevent recurrences of the events.

Over the past year, WIRAB has hosted multiple webinars with policymakers and industry experts to discuss recent power system events, such as “Blue Cut Fire Event” in Southern California. During the Blue Cut Fire Event, solar PV inverter settings caused multiple solar PV plants to trip offline simultaneously in response to a brief, momentary decline in system frequency, resulting in a loss of nearly 1,200 MWs of PV power generation. The resulting imbalance between generation and load caused a significant decline in system frequency. The California ISO was able to quickly restore its load/resource balance without shedding load. WIRAB used this event and others as a tutorial to share information on the role of the Reliability Coordinator and Balancing Authorities in responding to deviations in system frequency. Peak and the California ISO discussed how they work together to maintain reliability during these types of events. Sharing lessons learned from these types of events with policymakers and regulators is an important way to raise awareness of key issues and to improve state energy policy. As the regional entity, it is appropriate that WECC share lesson learned from its Event Analysis and Situational Awareness Program in public briefings with Western policymakers and regulators to increase awareness of recent events and to inform future public policy.

The goals of this initiative are for:

- WECC to conduct periodic public briefings with Western policymakers and regulators in order to share lessons learned from the Event Analysis and Situational Awareness Program.
- WECC and WIRAB to increase awareness of the causes of system events and actions that can be taken to prevent recurrences of events with Western policymakers and regulators.

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

- Work with WECC to identify potential power system events for discussion and frame information at a level that policymakers and stakeholders can understand.
- Work with WECC to disseminate information and lessons learned to an audience of Western policymakers and stakeholders.

2019 Budget and Assessment Impacts

The WIRAB proposed budget for 2019 is \$1,162,700. This amount is \$94,915 (8.9%) higher than the amount in WIRAB's approved budget for 2018. Total proposed FTEs for 2019 are 5.0. WIRAB's total funding requirement is \$750,600. WIRAB's proposed funding assessment is \$750,000 an increase of \$38,974 (5.5%) from the 2018 funding assessment.

Personnel and Indirect Expenses

Personnel expenses increase from \$408,111 in the 2018 Budget to \$436,500 (7.0%) in the 2019 Budget due to personnel changes and cost-of-living and merit-based salary increases. 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. The indirect rate increases from 96% of direct labor costs in the 2018 Budget to 101% in the 2019 Budget. The increase is due to increased expenses for office rent, medical insurance, employee retirement, and other office costs. Table 2 shows personnel and indirect expenses per FTE for the approved 2018 Budget and the proposed 2019 Budget.

WIRAB - Personnel and Indirect Expense Analysis 2018-2019						
STATUTORY						
	Budget 2018	Projection 2018	Budget 2019	Variance 2019 Budget v 2018 Budget	Variance %	
Salary Expense	\$ 408,111	\$ 408,200	\$ 436,500	\$ 28,389	7.0%	
FTEs	5.50	5.50	5.00	(0.50)	-9.1%	
Cost per FTE	\$ 74,202	\$ 74,218	\$ 87,300	\$ 13,098	17.7%	
Indirect Rate	96.0%	96.0%	101.3%			
Indirect Expense	\$ 391,664	\$ 391,700	\$ 442,200	\$ 50,536	12.9%	
FTEs	5.50	5.50	5.00	(0.50)	-9.1%	
Cost per FTE	\$ 71,212	\$ 71,218	\$ 88,440	\$ 17,228	24.2%	

Table 2. Personnel and Indirect Expense Analysis, 2018-2019.

Meeting Expense

Meeting costs increase by \$10,100 to \$80,800. 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. Webinars on topics of concern will continue to be utilized between meetings. WIRAB also conducts monthly conference calls to update members on current activities and to develop positions on reliability issues in the Western Interconnection. Conference call costs increase by \$1,180 to \$3,200.

Travel Expense

Travel costs increase by \$4,720 to \$100,000. WIRAB member travel to biannual meetings and reliability conferences accounts for \$28,200. WIRAB staff travel to attend meetings of WIRAB, WECC and Peak Reliability accounts for \$71,800. 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 2018 Budget and 2018 Projection compared to the 2019 Budget.

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WIRAB - Statement of Activities and Change in Working Capital 2018 Budget & Projection, and 2019 Budget							
STATUTORY							
	2018 Budget	2018 Projection	Variance 2018 Projection v 2018 Budget		2019 Budget	Variance 2019 Budget v 2018 Budget	
			Over(Under)	% Change		Over(Under)	% Change
Funding							
WIRAB Funding							
Assessments	\$ 711,026	\$ 711,026	\$ -	0.0%	\$ 750,000	\$ 38,974	5.5%
Penalty Sanctions	-	-	-	-	-	-	-
Total WIRAB Funding	\$ 711,026	\$ 711,026	\$ -	0.0%	\$ 750,000	\$ 38,974	5.5%
Membership Dues	-	-	-	-	-	-	-
Testing Fees	-	-	-	-	-	-	-
Services & Software	-	-	-	-	-	-	-
Workshops	-	-	-	-	-	-	-
Interest	650	650	\$ -	0.0%	600	\$ (50)	-7.7%
Miscellaneous	-	-	-	-	-	-	-
Total Funding (A)	\$ 711,676	\$ 711,676	\$ -	0.0%	\$ 750,600	\$ 38,924	5.5%
Expenses							
Personnel Expenses							
Salaries	408,111	408,200	89	0.0%	436,500	\$ 28,389	7.0%
Payroll Taxes	-	-	-	-	-	-	-
Benefits	-	-	-	-	-	-	-
Retirement Costs	-	-	-	-	-	-	-
Total Personnel Expenses	\$ 408,111	\$ 408,200	\$ 89	0.0%	\$ 436,500	\$ 28,389	7.0%
Meeting Expenses							
WIRAB Meetings	\$ 70,700	\$ 70,700	\$ -	0.0%	\$ 80,800	\$ 10,100	14.3%
State Travel	28,280	28,300	\$ 20	0.1%	28,200	\$ (80)	-0.3%
Staff Travel	67,000	67,000	-	-	71,800	\$ 4,800	100.0%
Conference Calls	2,020	1,900	\$ (120)	-5.9%	3,200	\$ 1,180	58.4%
Total Meeting Expenses	\$ 168,010	\$ 167,900	\$ (100)	-0.1%	\$ 184,000	\$ 16,000	9.5%
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	\$ 676,100	\$ (21)	0.0%	\$ 720,500	\$ 44,379	6.6%
Indirect Expenses	\$ 391,664	\$ 391,700	\$ 36	0.0%	\$ 442,200	\$ 50,536	12.9%
Other Non-Operating Expenses	\$ -	\$ -	\$ -	-	\$ -	\$ -	-
TOTAL BUDGET (B)	\$1,067,785	\$1,067,800	\$ 15	0.0%	\$ 1,162,700	\$ 94,915	8.9%
CHANGE IN WORKING CAPITAL (=A-B)¹	\$ (356,109)	\$ (356,124)	\$ (15)	-	\$ (412,100)	\$ (55,991)	-
FTEs	5.50	5.50	-	0.0%	5.00	(0.50)	-9.1%

¹ Fixed Asset included in Indirect Expenses.

Table 3. Budget Comparison, 2018 to 2019.

Statutory Assessments

WIRAB's proposed funding assessment of \$750,000 is allocated \$631,944 (84%) to the U.S. portion, \$107,091 (14%) to the Canadian portion, and \$10,965 (2%) to the Mexican portion of the Western Interconnection.

Key Assumptions

The WIRAB 2019 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 2019.
- 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 Board 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

2019 Business Plan and Budget

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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 will engage in the following on-going activities in order to provide independent expert advice on 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 members 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. The 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:

By 2026, solar photovoltaic (PV) generation in the Western U.S. is projected to total more than 16,000 MW in nameplate capacity. 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, potential for the provision of grid support services, and reductions in greenhouse gas and conventional air pollutant emissions. Several potentially deleterious impacts are also associated with distributed solar PV capacity, including the potential for simultaneous disconnection 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 permit wider tolerance range settings, could provide frequency and/or voltage ride-through in the event of a system contingency, and have other capabilities that could provide additional benefits.

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 the 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 more rapidly than synchronous generators.

WIEB and WIRAB are leading 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 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, the California ISO is developing plans to extend day ahead market services to EIM participants. Other market opportunities are also being explored in the West. Peak Reliability and PJM Connex are exploring the possibility of engaging in a joint venture to provide Reliability Coordination (RC) services and energy markets in the West and the Mountain West Transmission Group (MWTG), formed by electricity service providers in the eastern part of the Western Interconnection, is evaluating various options, including membership in an existing regional transmission organization (RTO), the Southwest Power Pool (SPP). 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 to new participants, extending the California ISO's day ahead market services to EIM participants, and opportunities and challenges for the MWTG. The WIRAB staff 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 BES is becoming increasingly reliant on more variable, asynchronous generating resources. It is important that the electric utility industry examine emerging issues and ensure that policies and practices set today do not adversely impact reliability, now and in the future. With 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, policies and practices accounting for these emerging technologies can ensure grid reliability, even if the future grid operates differently.

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 FERC 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 a 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 then 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 leading research about the integration of variable energy resources into the Western Interconnection, such as the work of NERC's Inverter-Based Resource Performance Joint Task Force. 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 associated with 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. In 2017-2018, WIRAB staff participated in WECC's Gas and Electric Interface Study, which analyzed potential vulnerabilities between the gas sector and the electric sector in the Western Interconnection. WIRAB members 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.

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 BES 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, 2015, and 2017, WIRAB conducted webinars on the physical security and/or 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

2019 Business Plan and Budget

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Section B – Supplemental Financial Information

Working Capital Reserve

WIRAB projects it will have a working capital reserve of \$1,012,100 on December 31, 2018, as compared to a desired working capital reserve at December 31, 2019, of \$600,000. The surplus working capital reserve results in a \$412,100 reduction in WIRAB's funding requirement for 2019. 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 2019 and 2020 are intended to stabilize assessments during the transition from the current high level of reserves. Starting in 2021, 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 2018-2019	
STATUTORY	
Beginning Working Capital Reserve (Deficit), December 31, 2017	1,368,238
Plus: 2018 Funding (from LSEs or designees)	711,026
Plus: 2018 Other funding sources	650
Minus: 2018 Projected expenses & capital expenditures	(1,067,800)
Projected Working Capital Reserve (Deficit), December 31, 2018	1,012,100
Desired Working Capital Reserve, December 31, 2019¹	600,000
Minus: Projected Working Capital Reserve, December 31, 2018	(1,012,100)
Increase(decrease) in funding requirement to achieve Working Capital Reserve	(412,100)
2019 Expenses and Capital Expenditures	1,162,700
Less: Penalty Sanctions ²	0
Less: Other Funding Sources	(600)
Adjustment: To achieve desired Working Capital Reserve	(412,100)
2019 NERC Assessment	750,000

¹ Desired working capital reserve is 52 percent of budgeted expenses.

² Penalty sanctions are not applicable to WIRAB.

Table B-1. Working Capital Reserve Analysis 2018 – 2019.

Budget Projections for 2019-2021

WIRAB - Statement of Activities and Change in Working Capital 2019 Budget & 2020 and 2021 Projections							
STATUTORY							
	2019 Budget	2020 Projection	Variance 2020 Projection v 2019 Budget Over(Under)	% Change	2021 Projection	Variance 2021 v 2020 Projections Over(Under)	% Change
Funding							
WIRAB Funding							
Assessments	\$ 750,000	\$ 1,012,100	\$ 262,100	34.9%	\$ 1,115,700	\$ 103,600	10.2%
Penalty Sanctions	-	-	-	-	-	-	-
Total WIRAB Funding	\$ 750,000	\$ 1,012,100	\$ 262,100	34.9%	\$ 1,115,700	\$ 103,600	10.2%
Membership Dues	-	-	-	-	-	-	-
Testing Fees	-	-	-	-	-	-	-
Services & Software	-	-	-	-	-	-	-
Workshops	-	-	-	-	-	-	-
Interest	600	600	\$ -	0.0%	600	\$ -	0.0%
Miscellaneous	-	-	-	-	-	-	-
Total Funding (A)	\$ 750,600	\$ 1,012,700	\$ 262,100	34.9%	\$ 1,116,300	\$ 103,600	10.2%
Expenses							
Personnel Expenses							
Salaries	436,500	449,600	13,100	3.0%	463,100	\$ 13,500	3.0%
Payroll Taxes	-	-	-	-	-	-	-
Benefits	-	-	-	-	-	-	-
Retirement Costs	-	-	-	-	-	-	-
Total Personnel Expenses	\$ 436,500	\$ 449,600	\$ 13,100	3.0%	\$ 463,100	\$ 13,500	3.0%
Meeting Expenses							
WIRAB Meetings	\$ 80,800	\$ 83,200	\$ 2,400	3.0%	\$ 85,700	\$ 2,500	3.0%
State Travel	\$ 28,200	\$ 29,000	\$ 800	2.8%	\$ 29,900	\$ 900	3.1%
Staff Travel	\$ 71,800	\$ 74,000	\$ 2,200	3.1%	\$ 76,200	\$ 2,200	3.0%
Conference Calls	\$ 3,200	\$ 3,300	\$ 100	3.1%	\$ 3,400	\$ 100	3.0%
Total Meeting Expenses	\$ 184,000	\$ 189,500	\$ 5,500	3.0%	\$ 195,200	\$ 5,700	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	\$ 720,500	\$ 739,100	\$ 18,600	2.6%	\$ 758,300	\$ 19,200	2.6%
Indirect Expenses	\$ 442,200	\$ 455,500	\$ 13,300	3.0%	\$ 469,200	\$ 13,700	3.0%
Other Non-Operating Expenses	\$ -	\$ -	\$ -	-	\$ -	\$ -	-
TOTAL BUDGET (B)	\$ 1,162,700	\$ 1,194,600	\$ 31,900	2.7%	\$ 1,227,500	\$ 32,900	2.8%
CHANGE IN WORKING CAPITAL (=A-B)¹	\$ (412,100)	\$ (181,900)	\$ 230,200	-	\$ (111,200)	\$ 70,700	-
FTEs	5.00	5.00	-	0.0%	5.00	-	0.0%

¹ Fixed Asset included in Indirect Expenses.

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

WIRAB projects a 2.7% increase to its annual budget in 2020 and a 2.8% increase in 2021. These increases reflect expected cost-of-living adjustments to personnel expenses for employees working in Denver, Colorado and increased costs for meetings and travel.

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Section C – Non-Statutory Activities

2019 Business Plan and Budget

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Section C – Non-Statutory Activities

WIRAB does not engage in non-statutory activities.

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Section D – Additional Consolidated Financial Statements

2019 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, 2018, projected
- As of December 31, 2019, as budgeted

WIRAB - Statement of Financial Position				
STATUTORY				
	As of June 30, 2017 (Audit)	As of December 31, 2018 (Projected)	As of December 31, 2019 (Budgeted)	
Assets				
Cash and Investments	\$ 1,805,619	\$ 1,012,100	\$ 600,000	
Total Assets	\$ 1,805,619	\$ 1,012,100	\$ 600,000	

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

Appendix A Organization Chart

The WIRAB Organization Chart is shown below.

