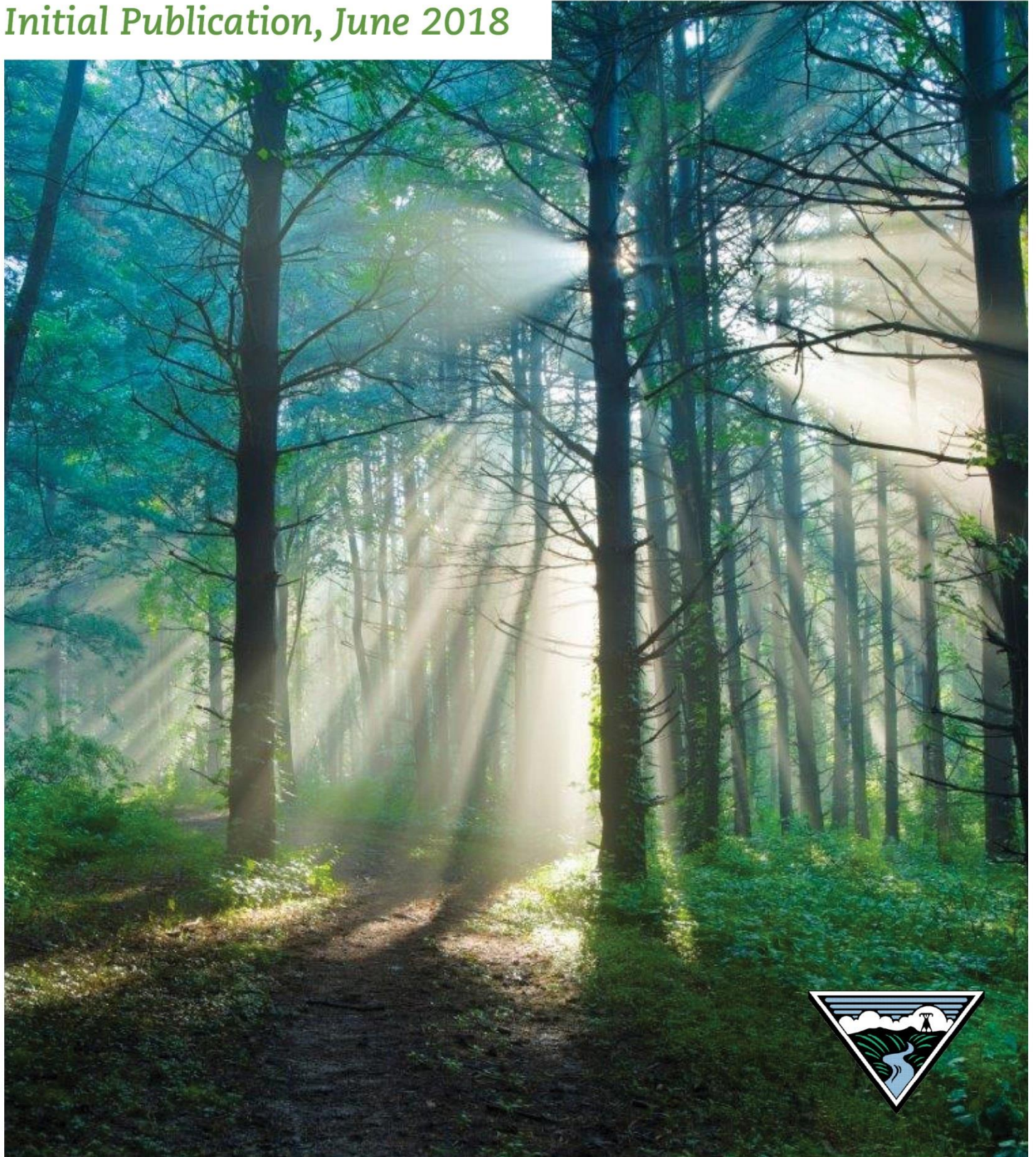


# IPR Detailed Document

*Initial Publication, June 2018*



# IPR DETAILED DOCUMENT

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# 1. IPR OVERVIEW

## 1.1 Spending level development

The first goal of the BPA 2018-2023 Strategic Plan is to strengthen financial health with a major focus on improving cost-management discipline. The plan outlines an objective to hold the sum of program costs, by business line, at or below the rate of inflation. In order to take steps to achieve this objective, BPA changed its approach to the IPR.

In the 2018 IPR process, senior-level executives established spending caps early in the process with the expectation that the caps were firm and should not to be exceeded, and where possible the expense spending levels should come in even lower than the caps. Program spending decisions and priorities were to be guided by the goals of the strategic plan.

Similar to the 2016 IPR, BPA’s costs were consolidated into four distinct spending level pools: Power, Transmission, Corporate and Chief Administrative Office. These pools were led by the senior vice presidents of Power and Transmission Services, chief operating officer, deputy administrator and chief administrative officer. Separating into these distinct pools was meant to encourage discussions of trade-offs and the prioritization of funding requests.

| Spending pool program summary   |  |  |  |
|---|--|--|--|
| Transmission  | Power  | Corporate  | CAO  |
| <ul style="list-style-type: none"> <li>• Engineering</li> <li>• Internal Support</li> <li>• Maintenance</li> <li>• Marketing</li> <li>• System Operations</li> <li>• Transmission Acquisition and Ancillary Services</li> </ul> | <ul style="list-style-type: none"> <li>• Bureau of Reclamation</li> <li>• Columbia Generating Station</li> <li>• Corps of Engineers</li> <li>• Energy Efficiency</li> <li>• Internal Support</li> <li>• Non-Generation Operations</li> <li>• Renewables</li> </ul> | <ul style="list-style-type: none"> <li>• Business Transformation Office</li> <li>• Communications</li> <li>• Compliance, Audit and Risk</li> <li>• Customer Support Services</li> <li>• Corporate Strategy</li> <li>• Finance</li> <li>• Environment, Fish and Wildlife</li> <li>• General Counsel</li> <li>• Intergovernmental Affairs</li> </ul> | <ul style="list-style-type: none"> <li>• Safety</li> <li>• Facilities</li> <li>• Fleet</li> <li>• Human Resources Service Center</li> <li>• Information Technology</li> <li>• Security and Continuity of Operations</li> <li>• Supply Chain</li> <li>• Workplace Services</li> </ul> |

In the 2018 IPR, the pool managers led the effort from the beginning, with the objective of keeping the spending levels flat in nominal terms, or without inflation, to BP-18 levels for both expense and capital for the FY 2020-2021 rate period. Pool managers and executives then had prioritization and trade-off discussions about which programs should receive the same funding, less funding or more funding based on BPA’s strategic goals and the given financial constraints.

The pool manager discussions also revealed some areas where additional efforts would be needed to evaluate whether spending levels could be reduced below the firm caps set by the pool. Examples of items that received additional scrutiny include the Technology Innovation portfolio, library,

aircraft services, lease terminations and a variety of services used across the business, such as corporate memberships, subscriptions and positions that qualify for relocation expenses.

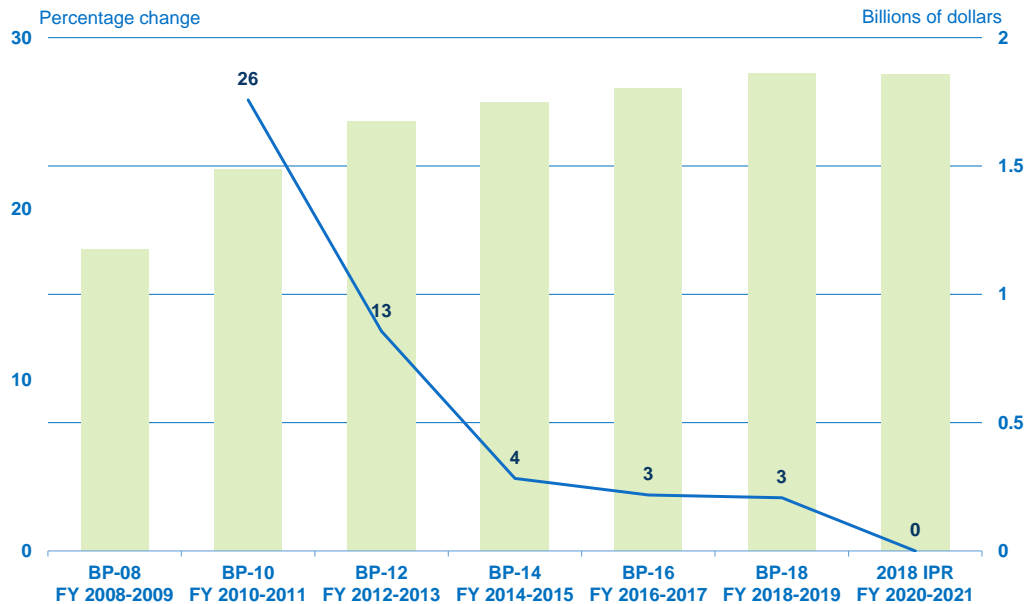
Each of the items were reviewed to determine if the work could be performed more efficiently, if it is critical for doing business, if it is possible to scale back the program and still provide key services, and if it is critical to achieving our mission and vision. The final decision was whether or not spending on that particular item would help BPA advance its strategic objectives. If the answer was no, then spending was either reduced or eliminated. These decisions brought spending levels below the target to keep them flat compared to BP-18.

All of these discussions and choices have allowed BPA to bend the cost curve this IPR and resulted in the spending levels by pool shown below.

|                    | Proposed IPR     |                  |
|--------------------|------------------|------------------|
|                    | 2020             | 2021             |
| Transmission       | 314,451          | 314,451          |
| Power              | 885,936          | 940,850          |
| CAO                | 211,964          | 211,964          |
| Corporate          | 428,742          | 431,862          |
| <b>Grand Total</b> | <b>1,841,094</b> | <b>1,899,127</b> |

### Bending the cost curve

Average annual program costs in billions of dollars and percentage of cost change by rate period



BPA is actively looking for additional spending level reductions. Pool managers and executives will continue to analyze potential cost efficiencies that will be incorporated into the final IPR decisions in August.

## **1.2 General allocation of Corporate and CAO costs**

Corporate and CAO organization costs must be included in the power and transmission revenue requirements. Some costs are directly charged to Power and Transmission Services operation and maintenance programs, and some are allocated to each business line through cost pools. The allocation process is accomplished through General and Administrative and Business Support pools.

There are 15 G&A cost pools: Executive/Planning/Governance; Corporate Application Asset; Security Services; Legal Services; Human Resource Services; Finance; Safety; IT Administration and Management; IT Infrastructure Assets; Cross Agency Application Assets; Workplace Services; Communications and Intergovernmental Affairs; Workplace Direct Projects for Power/Transmission; and Agency Services Awards.

In addition, there are nine Business Support pools: Risk Management; Dedicated IT Projects for Power/Transmission; Supply Chain Management Administration; Supply Chain Agency Purchasing; BTO Portfolio Management; Technology Innovation; Metering and Billing Services; and Forecasting and Contract Management.

The pools are collections of costs from the centralized Corporate and CAO organizations. Each organization may charge into one or more cost pool. The description of products and services provided by these organizations can be found in the individual organizations' summaries.

### **1.2.1 Corporate and CAO general allocation methodology**

Before each IPR process, BPA conducts a review of the cost allocation pools and the cost drivers used to assign Corporate and CAO costs to Power and Transmission for recovery through revenue requirement. Each pool is examined to determine the appropriate drivers of cost. The drivers are used to determine the allocation rates. The costs associated with these pools are assigned to the Agency Services G&A program or the benefiting O&M program for each business unit. As part of this review, managers verify that the makeup of the cost pools and the drivers are up-to-date and accurately reflect cost causation.

When determining the allocation rates, these principles apply:

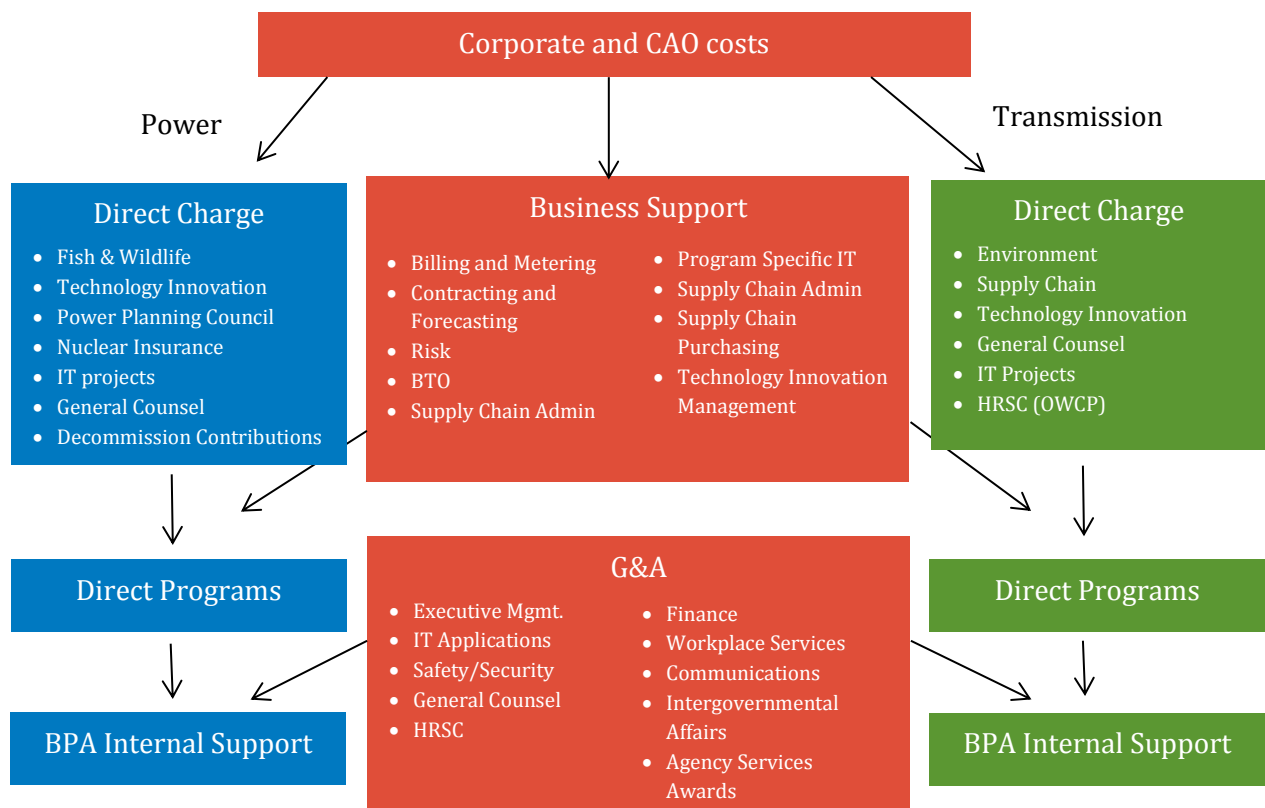
- Methodologies are equitable and fair.
- Methodologies are defensible in a rate setting environment.
- Methodologies are defensible with internal and external auditors.
- Methodologies can be implemented and are cost-effective.
- Methodologies are direct and simple: improving understanding and transparency.
- Methodologies are used to develop rates that will be implemented and unchanged on an annual basis.

G&A and Business Support costs can be allocated either evenly to Power and Transmission Services or based on specific cost drivers, such as number of employees or the amount of time spent supporting either business line.

- Even allocations - traditional G&A costs: cost pools that serve the general purpose of BPA support functions and are split 50-50 to Power and Transmission.
  - No consistent, measurable method of assigning support costs directly to the benefactor.
  - Functions are general in nature and are not directly affected by changes in traditional cost drivers (i.e., federal employee and supplemental labor levels, budget levels, etc.).
  - Collection of costs or measurement of driver is cost prohibitive – it is uneconomical to attempt more precise allocations.
  - Lack of causal relationship to benefactors prevents a clear distinction for assigning those costs.
- Directed allocation pools: cost pools that can be distributed with more precision, based on specific cost drivers and are not split 50-50 to Power and Transmission.
  - Activities are managed and budgeted centrally, but methods exist to assign costs to benefactors.
  - Functions can be linked to cost drivers and can change based on those drivers.
  - Direction of effort studies or other means can be used to allocate in a cost-effective manner.

Upon completion of the cost pool review, potential changes to allocations are presented to the accounting officer and the chief financial officer for review and approval. The approved allocations are then implemented in the IPR and used for the upcoming year’s budgets and allocation of actual costs.

The accounting review for the 2018 IPR resulted in minor changes to a number of pools. A summary of the cost pool changes can be found on the next page and in the internal support section.



**FY 2019 & IPR 2020-2021 G&A Allocations**

|    | COST POOL  | 2019/IPR Rates |       | 2018 Rates |       | Costs included in the pool  | Drivers  |
|----|--|----------------|-------|------------|-------|---|--|
|    |  | POWER          | TRANS | POWER      | TRANS |   |  |
| 1  | G&A EXEC/PLANNING/GOVERNANCE                     | 50%            | 50%   | 50%        | 50%   | Regulatory affairs, executive, CAO management, strategic planning and internal audit  | Standard rate with no consistent, measurable method of assigning support costs. Functions are general in nature. This rate does not get adjusted year-to-year.   |
| 2  | G&A CORPORATE APPLICATION ASSET                  | 35%            | 65%   | 35%        | 65%   | IT maintenance of BES/Financials, HRMIS and a number of other IT business systems applications such as SharePoint, customer contracting and DOE hiring. Expense projects from the beginning OR projects post-capitalization in O&M phase. | Applications in this cost pool follow the profile of benefiting Power and Transmission at a rate of 35%-65%. This rate does not get adjusted year-to-year but was reconfirmed in FY2018.                           |
| 3  | G&A SECURITY SERVICES                            | 12%            | 88%   | 12%        | 88%   | Physical, personnel and information security, continuity of operations  | Rate established by a direction of effort study (time spent by security staff for Power and Transmission).   |
| 4  | G&A LEGAL SERVICES                               | 50%            | 50%   | 50%        | 50%   | General counsel (excludes direct charges to Power and Transmission)   | Standard rate that does not get adjusted year-to-year.   |
| 5  | G&A HUMAN RESOURCE SERVICES                      | 22%            | 78%   | 23%        | 77%   | HR policy, talent acquisition, employee development, labor relations, staffing and classification, EEO  | BFTE count by business unit.   |
| 6  | G&A FINANCE                                      | 46%            | 54%   | 45%        | 55%   | Accounting, budgeting, forecasting, accounts payable, payroll, financial reporting, treasury, rates support, capital management, financial liaisons   | Most costs in this pool are 50-50%. Exceptions are budget, payroll and AP. Rate impact for these costs are based on budget support for Power and Transmission, BFTE for payroll, and number of vouchers for AP.    |
| 7  | G&A SAFETY                                       | 5%             | 95%   | 6%         | 94%   | Field safety, construction safety, medical surveillance, corporate safety   | Direction of effort study looking at business line program support provided by the Safety Tier 4 Depts.  |
| 8  | RISK MANAGEMENT                                  | 62%            | 38%   | 62%        | 38%   | Enterprise risk, transaction risk and credit risk management.   | Direction of effort study looking at risk support for Power and Transmission Services by Risk Dept/Ids.  |
| 9  | G&A IT ADMINISTRATION & MANAGEMENT               | 29%            | 71%   | 29%        | 71%   | IT leadership & planning, admin, quality control, project management, IT training   | Rate based on weighted average for the other IT cost pools.  |
| 10 | DEDICATED IT PROJECTS (for Power)                | 100%           | 0%    | 100%       | 0%    | Dedicated projects for Power & Trans such as Columbia Vista, Hydro Ops, CAD support, and OATI application   | Dedicated applications for Power and Transmission Services. Rate does not get adjusted year-to-year.   |
| 11 | DEDICATED IT PROJECTS (for Transmission)         | 0%             | 100%  | 0%         | 100%  | Dedicated projects for Power & Trans such as Columbia Vista, Hydro Ops, CAD support, and OATI application   | Dedicated applications for Power and Transmission Services. Rate does not get adjusted year-to-year.   |
| 12 | G&A IT INFRASTRUCTURE ASSETS                     | 21%            | 79%   | 22%        | 78%   | Data center storage, Linux, Wintel, security, Desk top/end user computing, LAN, WAN, help desk, and phone services  | Allocated headcount split = B/CFTE (badged employees) list broken into P/T/F&W/Corpt. Portion of F&W headcount allocated to P/T/Corpt. Portion of NW and NS allocated to T. Corpt allocated to P/T based on 35/65. |
| 13 | G&A CROSS AGENCY APPLICATION                     | 50%            | 50%   | 50%        | 50%   | Customer billing system, enterprise performance management (EPM), reporting services, data integration  | Standard agency rate that does not get adjusted year-to-year. Projects in this cost pool benefit Power and Transmission Services equally.  |
| 14 | G&A WORKPLACE SERVICES                           | 42%            | 58%   | 46%        | 54%   | HQ and field leases, utilities, janitorial, maintenance, space management including moves and furniture, office equipment & supplies, mail/courier, media services, motor pool, transit and parking                                       | FY2017, use a combination of B/CFTE by location for other services, as applicable to the nature of the cost in this cost pool.   |
| 15 | SUPPLY CHAIN MANAGEMENT & ADMINISTRATION         | 8%             | 92%   | 11%        | 89%   | Management and administrative costs for agency purchasing & Transmission contracting and logistics  | Overall rate based on program level support by Supply Chain management.  |
| 16 | G&A PUBLIC AFFAIRS                               | 50%            | 50%   | 50%        | 50%   | Internal and external communications, national relations, regional relations, tribal relations  | Standard agency rate that does not get adjusted year-to-year.  |
| 17 | SUPPLY CHAIN AGENCY PURCHASING                   | 64%            | 36%   | 64%        | 36%   | Purchasing services for environment, Energy Efficiency, Power, IT and Corporate   | Weighted average of actual costs charged to environment, EE, Power, IT and Corporate work orders within the Agency Purchasing cost pool.   |
| 18 | BTO PORTFOLIO MANAGEMENT                         | 50%            | 50%   | 50%        | 50%   | BTO administration and project management costs   | Standard agency rate applied until definitive drivers are identified.  |
| 19 | TECHNOLOGY INNOVATION                            | 50%            | 50%   | 50%        | 50%   | Technology innovation administration and project management costs   | Standard agency rate that does not get adjusted year-to-year.  |
| 20 | G&A WORKPLACE DIRECT PROJECTS (for Transmission) | 0%             | 100%  | 0%         | 100%  | Dedicated Transmission and Power workplace costs such as Van Mall and the 4400 building lease (most of the costs are for Transmission)  | Dedicated workplace services for Power and Transmission.   |
| 21 | G&A WORKPLACE DIRECT PROJECTS (for Power)        | 100%           | 0%    | 100%       | 0%    | Dedicated Transmission and Power workplace costs such as Van Mall and the 4400 building lease (most of the costs are for Transmission)  | Dedicated workplace services for Power and Transmission.   |
| 22 | METERING & BILLING SERVICES                      | 41%            | 59%   | 48%        | 52%   | Power and Transmission Services customer billing and metering services  | Direction of effort study with information provided by the responsible Dept managers.  |
| 23 | FORECASTING & CONTRACT MANAGEMENT                | 56%            | 44%   | 47%        | 53%   | Contract management and support, load forecasting and analysis  | Direction of effort study with information provided by the responsible Dept managers.  |
| 24 | AGENCY SERVICES AWARDS                           | 40%            | 60%   | 40%        | 60%   | Corporate awards  | Based on overall Corporate G&A personnel costs for Power and Transmission  |



## 1.3 Capital spending level development

In 2016, BPA introduced the Asset Management Key Strategic Initiative designed to bring a renewed focus to asset management. Central to the renewed focus is the intent to more closely align BPA's asset management processes with ISO 55000 Asset Management as outlined in the Institute of Asset Management principles and practices. The key building blocks necessary to achieve that alignment are strategic asset management plans and asset plans.

BPA developed the strategic asset management plans and the asset plans in 2017 and 2018. The strategic asset management plans represent a refinement and evolution of the asset management strategies that BPA had been producing for a number of years. They provide a medium to long-term strategic approach that aligns with the goals in the strategic plan. More detailed and near-term asset plans are developed off of these strategic asset management plans.

The second goal of BPA's strategic plan is to modernize assets and system operations. This goal describes the objective of administering an industry-leading asset management program. It also describes how the strategic asset management plans will inform capital investment decisions by:

- Understanding our assets' criticality, health and risks.
- Establishing risk-based asset performance objectives (such as lost generation and reliability).
- Using leading analytical methods to prioritize maintenance activities and capital investments for safe, reliable asset performance.

The strategic asset management plans also include risk assessments. The risk assessments play a key role in enabling limited capital to be prioritized in order to ensure the most critical reliability concerns are addressed first.

Managing an industry-leading asset management program must be accomplished within the context of BPA's focus on strengthening financial health. Effective management of asset lifecycle costs is a key contributor to the agency's financial health in this capital intensive industry.

### 1.3.1 Asset Overview

Operating in a capital intensive industry involves managing the lifecycle costs of a wide array of assets and, in BPA's case, managing those assets across a widespread geographic area. Physical assets — such as hydroelectric dams, transmission lines, substations, information systems and investment in fish and wildlife mitigation – enable BPA and its partners to deliver on its mission and vision. Below are brief descriptions of the assets funded and managed by BPA.

**Federal hydro assets** are comprised of 31 hydroelectric plants with over 200 generating units. Installed generating capacity is over 22,000 MW; over the last five years an annual average of 74 million megawatt-hours of electricity has been generated. Twenty-one of the plants are owned and operated by the Corps and 10 by Reclamation.

**Transmission assets** include over 15,000 circuit miles of high-voltage transmission lines, 260 substations, nearly 400 dedicated communications sites, and over 195,000 acres of transmission

line corridor rights-of-way. Transmission assets also include hardware and software applications for grid operations. These assets are owned or leased by BPA.

**Facilities assets** include system control centers, substation control houses, communications buildings, administrative offices, maintenance shops, warehouses and other non-electric plants. BPA owns over 1,000 buildings at over 400 sites in five states.

**IT assets** include desktops, laptops and other office automation hardware and software; servers, operating systems, and other data center hardware and software; data, voice and video network systems; and applications for a range of business purposes. These assets are owned by or licensed to BPA.

**Fish and Wildlife assets** include habitat protection for tributary passage, fish hatcheries, conservation land acquisitions and culvert replacements. The assets also include fish and wildlife improvements at federal dams and fish hatcheries. The assets are owned and operated by federal and state agencies, conservation organizations, tribes and private property owners.

The **Columbia Generating Station**, a nuclear generation plant, is owned and operated by Energy Northwest, and BPA pays all costs incurred by the plant. Columbia is not covered by a BPA asset strategy at this time but Energy Northwest produces the Columbia Long Range Plan. BPA provides input to this plan.

### 1.3.2 Strategic Challenges

BPA's strategic and financial plans provide the objectives and the parameters within which the asset management program exists. The asset management program must balance objectives and constraints to maximize the long-term operational and economic value of power and transmission system assets. This is accomplished by maintaining and investing in the system so that:

- Assets operate efficiently and effectively and provide the capacity and capabilities needed to meet reliability, availability, environmental, health and safety, security and other standards.
- Total economic costs are minimized over the long-term. Total economic costs include both the full life-cycle costs of the assets and the costs that customers and others may bear should the assets fail to perform (customer outages).

All this must be accomplished while navigating a number of strategic challenges described below.

#### **Managing the risks of aging infrastructure**

The transmission system with its high-voltage power lines and substations includes many assets that are significantly older than those of BPA's industry peers. Much of the critical infrastructure needs to be replaced or upgraded so that equipment continues to provide the reliable service and the capacity and capabilities that will be needed.

The average age of the facilities portfolio is 38 years. These facilities are in need of elevated levels of repair and maintenance or, in many instances, replacement. The identified backlog of maintenance and repairs leads to an overall poor portfolio facility condition index. As assets continue to age, the

poor facility portfolio facility condition index represents an increased risk to grid reliability and personnel safety. Furthermore, facility degradation is a risk to the loss of expected operational and economic benefits due to premature system failure and increased maintenance expenses. Aging infrastructure also increases the risk of damage during extreme natural events.

The average age of the federal hydroelectric generating units is over 50 years with 27 percent of federal hydropower equipment at or exceeding its design life and almost 30 percent of the equipment assessed to be in marginal or poor condition. But age alone is not an indicator of when an asset should be refurbished or replaced. The physical condition, performance and corrective maintenance history of equipment and facilities are often the bigger drivers for planning and prioritizing replacements.

### *Managing technological change*

The strategic plan describes the necessity of ensuring BPA's assets are compatible with emerging markets and advanced technologies. For some classes of equipment, such as telecommunications and control systems equipment, technological obsolescence remains a major risk in meeting operational demands, maintaining long-term system reliability and managing costs. Technological advances are instrumental to the success of many industry-wide initiatives, including: integrating variable energy resources, enhancing the reliability and efficiency of system operations, deploying demand response programs and enabling energy storage devices for potential use in non-wires applications.

Understanding of climate science, seismic behavior and risks to the bulk electric system continue to evolve, particularly in the Northwest for extreme weather events and a Cascadia subduction zone earthquake. BPA must invest to strengthen, replace or enhance transmission and supporting facilities infrastructure in order to provide resilience and safety when extreme events occur.

### *Manage increasing demands on the power and transmission system*

In recent years, there has been significant demand on the power and transmission system from new loads, such as data centers, as well as extensive development of renewable resources and changing fish operations. Such demand has tested the flexibility of the power and transmission systems and led to substantial investment in both to maintain reliability. In the future, BPA plans to continue to make prudent investments for reliability. Additionally, BPA will continue to find creative ways to get the most out of existing hydro flexibility, rely less on new transmission infrastructure solutions, and rely more on solutions that allow the region to maximize its existing infrastructure.

### *Meet evolving compliance requirements*

The Energy Policy Act of 2005 subjects BPA and all utilities to a wide range of North American Electric Reliability Corporation reliability standards enforced by the Western Electricity Coordinating Council. The challenge that BPA and similar entities face is the amount and rate of change in reliability standards since their inception. A large share of BPA's investment in transmission is now being driven by reliability and other regulatory requirements.

Growth in security and continuity of operations requirements to protect critical infrastructure has been rapid. BPA's information technology systems must conform to evolving federal and industry-mandated laws and regulations.

### *Implement Endangered Species Act and other environmental compliance requirements*

The federal hydropower systems must operate in compliance with multiple legal mandates, including the Northwest Power Act, the Endangered Species Act, Tribal Treaty, Clean Water Act, National Historic Preservation Act, and the National Environmental Policy Act. These ever-evolving environmental mandates are a significant component of BPA's business costs. Perhaps most notable is ongoing litigation under the Endangered Species Act over the Federal Columbia River Power System Biological Opinion, the federal plan for operating 14 mainstem Columbia and Snake river hydroelectric dams while protecting Endangered Species Act listed salmon and steelhead.

### 1.3.3 Proposed Capital Spending

The capital levels in the table below are consistent with the strategic plan's goals and the asset plans. The spending levels will allow BPA to continue to operate a reliable system while addressing many of the concerns outlined in the strategic challenges. Additional information on specific capital spending for 2020 and 2021 are described in the program sections of this document. The new approach to capital planning has resulted in capital levels (excluding PFIA) that are lower than those in the BP-18 Rate Case as seen below.

| Asset Category                        | Actuals        |                | Rate Case      |                | Proposed IPR   |                |
|---------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                                       | 2016           | 2017           | 2018           | 2019           | 2020           | 2021           |
| (\$Thousands)                         |                |                |                |                |                |                |
| <b>Asset Category Direct Spending</b> |                |                |                |                |                |                |
| Transmission Direct                   | 378,778        | 270,670        | 317,044        | 310,544        | 310,193        | 317,655        |
| Federal Hydro                         | 178,498        | 196,359        | 236,000        | 258,000        | 238,000        | 256,000        |
| Columbia Generating Station           | 127,000        | 138,400        | 111,284        | 99,439         | 75,729         | 93,206         |
| Facilities                            | 10,145         | 17,986         | 17,900         | 35,000         | 29,646         | 23,254         |
| Security                              | 10,917         | 6,597          | 6,000          | 8,000          | 7,000          | 7,000          |
| Fleet                                 | 6,026          | 5,456          | 6,700          | 7,200          | 6,700          | 7,200          |
| IT                                    | 22,155         | 10,745         | 25,000         | 25,000         | 20,910         | 20,906         |
| Fish & Wildlife                       | 16,030         | 5,402          | 50,532         | 44,000         | 47,266         | 47,266         |
| Environment                           | 7,049          | 6,297          | 5,529          | 5,585          | 5,557          | 5,557          |
| <b>Direct Total</b>                   | <b>756,598</b> | <b>657,912</b> | <b>775,989</b> | <b>792,768</b> | <b>741,001</b> | <b>778,044</b> |
| PFIA                                  | 2,427          | 5,197          | 16,000         | 15,500         | 65,457         | 50,061         |
| Transmission Indirects                | 54,109         | 50,489         | 56,249         | 57,093         | 54,747         | 55,569         |
| Corporate Indirects                   | 52,194         | 54,007         | 57,323         | 59,006         | 47,395         | 47,577         |
| AFUDC                                 | 38,509         | 32,884         | 33,112         | 33,126         | 31,552         | 30,248         |
| <b>Grand Total</b>                    | <b>903,837</b> | <b>800,489</b> | <b>938,673</b> | <b>957,493</b> | <b>940,152</b> | <b>961,499</b> |

| (\$Thousands)                         | Proposed IPR   |                |                  |                  |                  |                  |                  |                  |
|---------------------------------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                                       | 2022           | 2023           | 2024             | 2025             | 2026             | 2027             | 2028             | 2029             |
| <b>Asset Category Direct Spending</b> |                |                |                  |                  |                  |                  |                  |                  |
| Transmission Direct                   | 314,386        | 321,278        | 328,282          | 335,394          | 342,483          | 349,808          | 357,042          | 364,360          |
| Federal Hydro                         | 281,000        | 300,000        | 306,000          | 313,000          | 319,000          | 326,000          | 333,000          | 340,000          |
| Columbia Generating Station           | 76,310         | 80,727         | 93,959           | 108,073          | 96,328           | 98,118           | 114,220          | 143,689          |
| Facilities                            | 17,224         | 41,678         | 51,667           | 4,344            | 27,400           | 27,900           | 28,500           | 29,000           |
| Security                              | 7,000          | 7,000          | 5,400            | 5,500            | 5,600            | 5,700            | 5,800            | 5,900            |
| Fleet                                 | 8,200          | 8,200          | 8,500            | 9,000            | 9,200            | 9,800            | 9,800            | 10,000           |
| IT                                    | 19,905         | 19,904         | 18,903           | 17,902           | 16,901           | 15,900           | 14,899           | 14,898           |
| Fish & Wildlife                       | 43,000         | 43,000         | 40,000           | 40,000           | 40,000           | 40,000           | 39,923           | 15,000           |
| Environment                           | 5,580          | 5,590          | 5,600            | 5,610            | 5,620            | 5,630            | 5,640            | 5,650            |
| <b>Direct Total</b>                   | <b>772,605</b> | <b>827,377</b> | <b>858,311</b>   | <b>838,823</b>   | <b>862,532</b>   | <b>878,856</b>   | <b>908,824</b>   | <b>928,497</b>   |
| PFIA                                  | 45,134         | 29,914         | 30,041           | 30,000           | 30,000           | 30,000           | 30,000           | 30,000           |
| Transmission Indirects                | 56,402         | 57,248         | 58,107           | 58,979           | 59,863           | 60,761           | 61,673           | 62,598           |
| Corporate Indirects                   | 48,379         | 49,199         | 50,032           | 50,875           | 51,719           | 52,564           | 53,404           | 54,248           |
| AFUDC                                 | 30,920         | 31,609         | 32,311           | 33,022           | 33,732           | 34,440           | 35,139           | 35,842           |
| <b>Grand Total</b>                    | <b>953,440</b> | <b>995,347</b> | <b>1,028,802</b> | <b>1,011,699</b> | <b>1,037,846</b> | <b>1,056,621</b> | <b>1,089,040</b> | <b>1,111,185</b> |

### Substitutions for emerging critical projects

Two emerging projects are included in the IPR capital spending plan: an overhaul of critical components at the Grand Coulee switchyard and capital needs of the grid modernization roadmap. Trade-off discussions were held at various levels in order to make choices among competing priorities and include these projects within the capital spending levels for FY 2020 and 2021 at the levels established in the BP-18 Rate Case.

### 1.4 What's not here

The power and transmission rate cases will establish the rates for BPA's products and services. The expense and capital spending levels determined in the IPR process are just one component of costs and factors used in setting rates. The image below outlines other assumptions that will be considered in the rate-setting process.



## 2. GRID MODERNIZATION KSI

### Program cost details

| (\$Thousands)                   | Rate Case     |               | Proposed IPR  |               |
|---------------------------------|---------------|---------------|---------------|---------------|
|                                 | 2018          | 2019          | 2020          | 2021          |
| Power                           | 3,330         | 4,995         | 4,125         | 4,125         |
| Transmission                    | 6,670         | 10,005        | 8,375         | 8,375         |
| <b>Grid Modernization Total</b> | <b>10,000</b> | <b>15,000</b> | <b>12,500</b> | <b>12,500</b> |

### Description

BPA’s strategic plan identified modernizing federal power and transmission system operations and supporting technology as a strategic objective. The strategic plan describes the actions needed over the next several years to become more competitive and responsive to customer needs and to leverage and enable industry change through modernized assets and system operations. The importance of this objective is emphasized by the creation of the Grid Modernization Key Strategic Initiative, which will be BPA’s only KSI beginning in FY 2019.

BPA has developed a grid modernization roadmap for the federal power and transmission system that will enhance system operations in three major ways: automation, real-time data analysis and operational visibility. Automating processes will minimize the potential for human error, improve operational effectiveness and support quicker responses to certain system conditions. By incorporating more real-time data and analysis into power and transmission operations, BPA will be able to more accurately determine system limitations, obligations and the inventory available to meet them. BPA will also be better equipped to monitor operating conditions that impact obligations and system capability. Increasing the visibility of system conditions, including market flows, forecasts, stability concerns, and post-contingent concerns, will help preserve reliability, optimize reserve levels and operate the transmission system closer to its physical limits.

Continued investments in grid modernization are necessary to bring systems, staff and processes up-to-date. Upcoming grid modernization projects, such as those related to network modeling, outage management and inventory management, will better position BPA to make more informed choices about reliability coordination, day-ahead market enhancements, its tariff strategy, and potential market participation in the future. While BPA’s decisions on these efforts are distinct, programmatic investments will support a more reliable, flexible and efficient system, help to reduce future costs and create new market opportunities for BPA and other regional resource owners. The changes driven by this program will better position BPA to improve our capability for reliable operations, to capitalize on rapidly evolving wholesale electricity markets, to leverage opportunities to monetize the valuable clean hydropower capacity, to better utilize the flexibility of the federal transmission system and to return value to the region from the federal power system and transmission grid.

## Impacts of proposed spending level

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The Grid Modernization KSI holds proposed spending levels flat for expense and capital. BPA is proposing to manage the incremental Grid Modernization KSI expenses within the \$25 million rate period funding level, or an average of \$12.5 million per year from FY 2018 through FY 2021. The allocation between Power and Transmission remains unchanged from the previous IPR of one-third and two-thirds respectively. This cost allocation is consistent with the current rate period and BPA believes this allocation remains appropriate given the resources required for the grid modernization projects from each business line.

BPA has sequenced the grid modernization project portfolio to satisfy multiple objectives while holding expense levels flat: (1) to modernize BPA's commercial and operational systems; (2) to support the option to choose the Reliability Coordinator that provides the best value to BPA and the region; (3) to leverage day-ahead market enhancements expected to be implemented by the California Independent System Operator in October 2019; and (4) to position BPA to determine whether to join the energy imbalance market operated by CAISO.

The portfolio provides benefits and solutions for long-standing issues in BPA's existing business and are needed regardless of BPA's decision to join the Western EIM or not. More effective and efficient processes will provide operational improvements in the long run. For example, BPA currently does not have forecast granularity and frequency needed to provide accurate and timely updates to federal generation requests. This can result in Bonneville using or storing more water, or purchasing or selling more energy than planned to balance net load and generation. By investing in better meters and improving business processes, BPA can more accurately plan river operations to serve load while optimizing river and grid operations. In another example, the network modeling project will integrate load, generation and transmission configurations and naming conventions across the transmission functions. This would provide a modeling platform to support the needs of Transmission planning and operations organizations, reliability coordinator requirements, and market operator requirements needed if BPA pursues EIM participation.

Several components identified in the grid modernization roadmap typically fall under capital funding. Two of the biggest items are mission-critical IT infrastructure and metering projects in Transmission. Smaller items include software to support outage management, market participation and inventory management. Initial scoping identified what would fall under the capital funding category. This totaled approximately \$48 million for BPA over the life of the Grid Modernization KSI. No incremental capital funding is proposed for grid modernization in the 2018 IPR. Instead, the Transmission and Power capital portfolios have been re-prioritized to absorb the financial impacts of these projects - resulting in no increase in the level of capital funding needed. Transmission expects to absorb approximately \$10 million a year and Power plans to absorb approximately \$3 million a year in FY 2020 and 2021, for a total of \$26 million over the two years.

## **Work expected in FY 2018 and 2019**

Numerous projects are underway to support the Grid Modernization KSI. Two projects have been completed to date, including replacement of the system used to manage generator outages and capacities and a new system to place and settle energy trades.

There are also mission-critical IT efforts underway and anticipated to be complete by the end of FY 2020. This work is increasing IT capabilities by establishing a more robust and modern IT architecture with improved integration and security. This will streamline and improve the IT service delivery model. This effort is a bedrock component of the Grid Modernization KSI, in that it will enable implementation of future projects more efficiently, with less risk and greater reliability.

Other projects underway address two key areas: operational improvements and commercial enhancements. The first area includes projects that modernize key operational functions in Transmission and Power, such as improving management of the Corps, Reclamation and nonfederal generation outages as well as transmission line outages; improving generation and load metering capabilities; modernizing Automatic Generation Control; enhancing dispatch visibility and situational awareness; and streamlining BPA's network modeling capabilities. There is also a project underway in Transmission that considers a potential change to reliability coordinator services and the associated impacts. The second key area of projects underway implements commercial enhancements, which include upgrading Power's energy trade risk management system, developing a new structured training program for Power Services functions, aligning Transmission tariff with pro forma standards and improving the operational coordination with the Corps and Reclamation. These projects are primarily FY 2018 and 2019 efforts with important elements extending into the 2020-2021 rate period.

## **Work expected in FY 2020 and 2021**

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Components planned for FY 2020 and 2021 include a broad collection of efforts in Transmission and Power that further modernize operational and commercial systems and processes that increase dispatcher capabilities and visibility, in addition to improve planning and operations in both business lines. This includes projects focused on automating transmission planning and reliability assessment power flow cases, a data analytics program as well as projects improving delivery of transmission services related to the tariff standardization effort. Potential work includes improved load and renewable forecasting, transmission settlements, pricing and bidding, and new work that would be triggered by specific market designs and associated participation decisions. These efforts are expected to span the period of FY 2019-2021 with the bulk of the work in FY 2020-2021.

The FY 2020-21 components of the program plan include projects specifically focused on market participation should BPA choose to participate in new market opportunities, like the EIM. These future projects represent less than half of the total Grid Modernization KSI program costs and include aspects of the transmission tariff, rates and business process changes, development of a robust EIM training program, development of bid and base schedule submission capabilities, new processes for transmission and generation outage submission to the market operator, technology to support EIM real-time operations changes, integration of market awards into AGC, and the development of market



settlement systems and processes. Should BPA choose not to participate in an energy imbalance-type market, these future EIM-specific projects will no longer be pursued; remaining grid modernization efforts would be reprioritized and executed within the proposed program cost levels.

The Grid Modernization KSI makes major steps toward a commercially efficient and operationally effective future for Bonneville and its customers. The included projects will deliver these commercial and operational enhancements for transmission and power through automating manual processes, better incorporating real-time data and increasing visibility of loads, resources and flows. As the only KSI, BPA is committed to both rigorous management and focused, results oriented execution of this program. With the breadth and pace of change occurring in the industry, grid modernization is key for BPA to meet its public responsibilities, leverage the value of the federal power system and transmission grid and provide enduring economic value to the region.

### 3. POWER SERVICES

#### OVERVIEW

Power Services proposes an expense reduction of \$6 million a year compared to BP-18 spending levels.

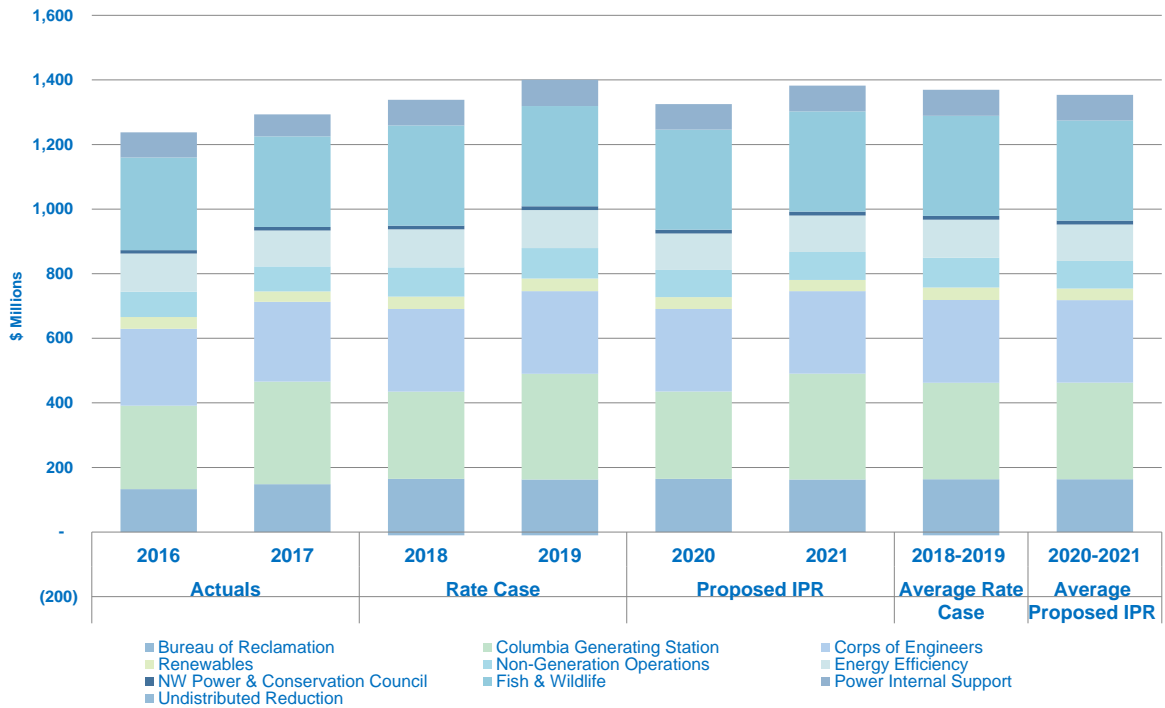
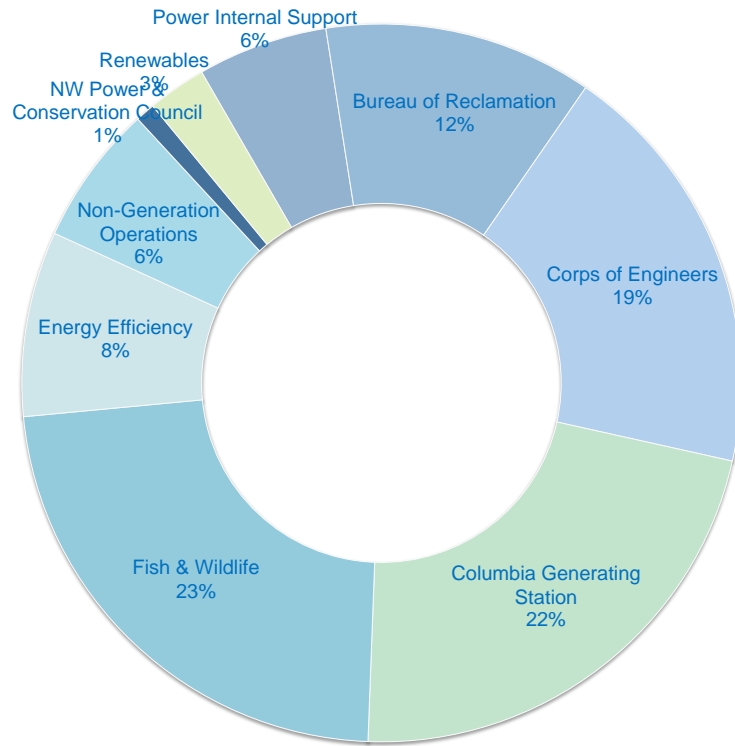
- BPA's partners are proposing to absorb the rate of inflation for operations and maintenance programs to keep spending levels flat.
- Internal operations continues to lower costs through savings on labor and service contracts.

Power proposes to maintain its ramp to a \$300 million annual capital program to increase power production and reliability.

Power Services is responsible for marketing federal power and in particular firm power sold under the long-term Regional Dialogue power sales contracts. Power's costs include the cost of federal and nonfederal power, fish and wildlife mitigation and energy efficiency. For FYs 2020 and 2021, Power is proposing an average decrease of \$6 million in total IPR program costs compared to BP-18 Rate Case. Some of the main areas of IPR costs for Power Services are:

- **Bureau of Reclamation and Corps of Engineers O&M:** Both the Corps and Reclamation are demonstrating their commitment to embrace disciplined cost management while continuing to provide safe, reliable operations by recalibrating programs to operate at BP-18 Rate Case spending levels, which requires absorbing roughly \$25 million in inflation annually.
- **Columbia Generating Station O&M:** O&M expenses for Columbia Generating Station are also proposed to stay flat in nominal terms. Operating within these constraints is made possible by cost-optimization efforts that began in FY 2016.
- **Non-Generation Operations:** This program reflects internal support costs for all aspects of Power's business activities and processes. Proposed spending levels are \$7 million less than the BP-18 Rate Case reflecting a continued trend in funding reductions for this program since FY 2016 while absorbing inflationary pressure. Operating at the proposed level requires reprioritization of workload while constraining funding in all categories, including staffing, service contracts and supplemental labor.

## Power Services Expense Summary



\*Use of undistributed reductions was discontinued in FY20/FY21 proposed IPR. For comparability, total program levels shown on this chart should be netted down by undistributed reduction amounts.

## Power Services Summary

| (\$Thousands)                                | Actuals          |                  | Rate Case        |                  | Proposed IPR     |                  |
|--|------------------|------------------|------------------|------------------|------------------|------------------|
|  | 2016             | 2017             | 2018             | 2019             | 2020             | 2021             |
| <b>Costs Described in IPR</b>                |                  |                  |                  |                  |                  |                  |
| Columbia Generating Station                  | 258,587          | 317,646          | 270,146          | 327,354          | 270,571          | 327,762          |
| Bureau of Reclamation                        | 132,756          | 148,390          | 164,609          | 162,623          | 164,609          | 162,623          |
| Corps of Engineers                           | 237,966          | 247,048          | 256,057          | 256,057          | 255,557          | 255,557          |
| Renewables                                   | 36,284           | 32,280           | 38,332           | 39,060           | 36,523           | 34,869           |
| Energy Efficiency                            | 118,106          | 111,246          | 117,677          | 117,597          | 112,940          | 113,054          |
| Non-Generation Operations                    | 78,663           | 77,176           | 90,411           | 94,319           | 84,348           | 86,367           |
| Fish & Wildlife, Lower Snake River Comp Plan | 286,788          | 280,596          | 310,197          | 310,187          | 309,817          | 310,245          |
| NW Planning & Conservation Council           | 10,720           | 10,766           | 11,624           | 11,914           | 11,789           | 12,004           |
| Power Internal Support                       | 77,974           | 68,109           | 79,353           | 81,417           | 78,836           | 79,916           |
| Undistributed Reduction                      | 0                | 0                | -10,000          | -10,000          | 0                | 0                |
| <b>Costs Described in IPR Total</b>          | <b>1,237,844</b> | <b>1,293,256</b> | <b>1,328,406</b> | <b>1,390,528</b> | <b>1,324,990</b> | <b>1,382,397</b> |
| <b>Capital</b>                               |                  |                  |                  |                  |                  |                  |
| Bureau of Reclamation                        | 34,660           | 35,958           | 82,368           | 139,180          | 114,929          | 138,037          |
| Corps of Engineers                           | 143,838          | 160,376          | 153,632          | 118,820          | 123,071          | 117,963          |
| Columbia Generating Station                  | 127,000          | 138,400          | 111,284          | 99,439           | 75,729           | 93,206           |
| Fish and Wildlife                            | 16,030           | 5,402            | 50,532           | 44,000           | 47,266           | 47,266           |
| IT Asset Category                            | 4,904            | 4,337            | 5,000            | 5,000            | 3,900            | 3,900            |
| AFUDC  | 8,646            | 10,686           | 8,046            | 7,982            | 7,167            | 7,590            |
| <b>Capital Total</b>                         | <b>335,078</b>   | <b>355,159</b>   | <b>410,862</b>   | <b>414,421</b>   | <b>372,062</b>   | <b>407,962</b>   |
| <b>Other Costs</b>                           |                  |                  |                  |                  |                  |                  |
| Reimbursable Energy Efficiency Development   | 4,812            | 5,586            | 8,000            | 8,000            | 8,000            | 8,000            |
| Legacy                                       | 566              | 581              | 590              | 590              | 590              | 590              |
| Long-Term Contract Generating Projects       | 20,455           | 11,225           | 12,595           | 13,687           | 12,709           | 13,250           |
| Non-Operating Generation                     | 1,239            | 743              | 1,500            | 1,534            | 1,631            | 1,531            |
| Operating Generation Settlement              | 17,496           | 16,667           | 22,612           | 22,997           | 22,997           | 22,997           |
| Power Services Transmission Acquisition      | 174,913          | 206,164          | 215,045          | 211,640          | 220,246          | 213,651          |
| Residential Exchange & IOU Settlements       | 218,717          | 219,265          | 241,313          | 241,378          | 257,122          | 255,399          |
| <b>Other Costs Total</b>                     | <b>438,198</b>   | <b>460,230</b>   | <b>501,656</b>   | <b>499,827</b>   | <b>523,295</b>   | <b>515,418</b>   |
| <b>Grand Total</b>                           | <b>2,011,120</b> | <b>2,108,644</b> | <b>2,240,924</b> | <b>2,304,775</b> | <b>2,220,347</b> | <b>2,305,777</b> |

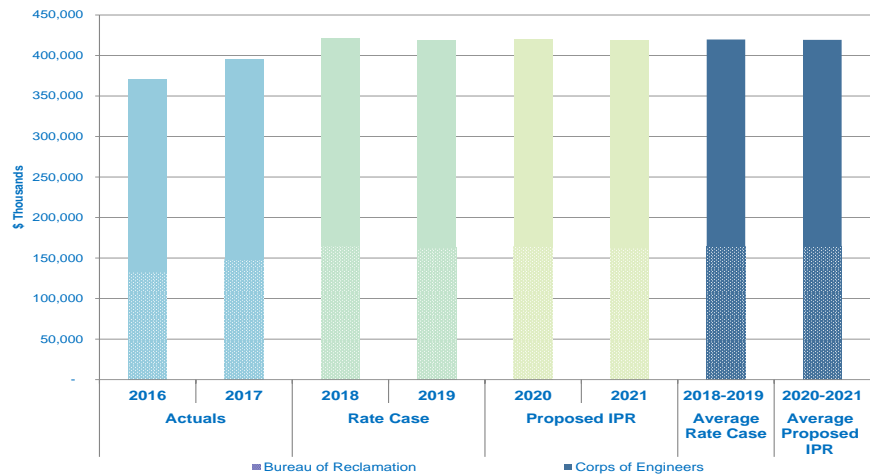
\*For information on the Fish and Wildlife, Lower Snake Comp Plan, and NWPPC, please see the detailed write-up on Pages, 67 and 86.

## Power Services Capital Outyears Summary

| (\$Thousands)               | Capital Outyears |                |                |                |                |                |                |                |
|-----------------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                             | 2022             | 2023           | 2024           | 2025           | 2026           | 2027           | 2028           | 2029           |
| Bureau of Reclamation       | 155,491          | 167,537        | 158,862        | 167,749        | 157,850        | 196,616        | 236,419        | 263,212        |
| Corps of Engineers          | 125,509          | 132,463        | 147,138        | 145,251        | 161,150        | 129,384        | 96,581         | 76,788         |
| Columbia Generating Station | 76,310           | 80,727         | 93,959         | 108,073        | 96,328         | 98,118         | 114,220        | 143,689        |
| Fish and Wildlife           | 43,000           | 43,000         | 40,000         | 40,000         | 40,000         | 40,000         | 39,923         | 15,000         |
| IT Asset Category           | 3,600            | 3,600          | 3,300          | 3,300          | 3,000          | 2,700          | 2,700          | 2,700          |
| AFUDC                       | 7,851            | 7,854          | 7,709          | 7,479          | 7,202          | 7,202          | 7,202          | 7,202          |
| <b>Capital Total</b>        | <b>411,761</b>   | <b>435,181</b> | <b>450,968</b> | <b>471,852</b> | <b>465,530</b> | <b>474,020</b> | <b>497,045</b> | <b>508,591</b> |

### 3.1 Bureau of Reclamation and Corps of Engineers

31 percent of Power Services' IPR program costs



#### Program cost details

#### Expense

| (\$Thousands)         | Actuals        |                | Rate Case      |                | Proposed IPR   |                |
|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                       | 2016           | 2017           | 2018           | 2019           | 2020           | 2021           |
| Bureau of Reclamation | 132,756        | 148,390        | 164,609        | 162,623        | 164,609        | 162,623        |
| Corps of Engineers    | 237,966        | 247,048        | 256,057        | 256,057        | 255,557        | 255,557        |
| <b>Grand Total</b>    | <b>370,722</b> | <b>395,438</b> | <b>420,666</b> | <b>418,680</b> | <b>420,166</b> | <b>418,180</b> |

#### Capital

| (\$Thousands)         | Proposed IPR   |                | Capital Outyears |                |                |                |                |                |                |                |
|-----------------------|----------------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                       | 2020           | 2021           | 2022             | 2023           | 2024           | 2025           | 2026           | 2027           | 2028           | 2029           |
| Bureau of Reclamation | 114,929        | 138,037        | 155,491          | 167,537        | 158,862        | 167,749        | 157,850        | 196,616        | 236,419        | 263,212        |
| Corps of Engineers    | 123,071        | 117,963        | 125,509          | 132,463        | 147,138        | 145,251        | 161,150        | 129,384        | 96,581         | 76,788         |
| <b>Capital Total</b>  | <b>238,000</b> | <b>256,000</b> | <b>281,000</b>   | <b>300,000</b> | <b>306,000</b> | <b>313,000</b> | <b>319,000</b> | <b>326,000</b> | <b>333,000</b> | <b>340,000</b> |

#### Federal Columbia River Power System background

The purpose of BPA's federal hydropower program purpose is to oversee both capital investment strategies and operation and maintenance of the Federal Columbia River Power System. BPA works with the U.S. Army Corps of Engineers and Bureau of Reclamation to maximize federal resources to sustain infrastructure assets in the Pacific Northwest, allowing BPA to fulfill its mandate to provide reliable, affordable and clean electricity worth nearly \$2 billion annually to people, businesses and industries throughout the region.

In keeping with the 2018-2023 Strategic Plan to strengthen its financial health and manage the lifecycle costs of its assets, the federal hydropower program managers are planning spending for the next several years with a critical eye toward more disciplined cost management while maintaining safe, reliable operations.

### 3.1.1 Fed hydro O&M expense program

#### Description

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The fed hydro O&M program makes up 31 percent of Power's total IPR costs and provides enormous value as one of the lowest cost hydropower generation fleets in North America. The O&M program funds all Corps and Reclamation routine hydropower operations and maintenance activities, non-routine maintenance projects, and mitigation-related activities to benefit fish and wildlife and protect cultural resources at FCRPS facilities. Other Corps and Reclamation programs funded with routine O&M dollars include dam safety, personnel safety, engineering, contracting, physical and cyber security, water management and reliability compliance.

O&M funding levels will be held at BP-18 Rate Case levels which requires absorbing an estimated \$25 million, on average, of inflation. Efforts to hold costs flat come at a time when the hydropower industry is facing rising cost pressures from aging infrastructure, increasing regulations, and wage increases for skilled craftsman. Operating within these funding constraints will not be easy – resources will be prioritized to support mission critical efforts while also implementing strategic reductions in other program areas.

#### Impacts of proposed spending level

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Achieving the proposed spending levels while absorbing significant inflationary pressure requires rebalancing and reprioritizing projects. During the 2016 IPR and the subsequent IPR2, the Corps and Reclamation agreed to spending levels for FY 2019 that were well below the identified need. To achieve this reduced target, non-routine maintenance projects were deferred into future rate periods and labor costs were reduced by increasing vacancy rates. Holding FY 2020-2021 funding levels flat, in light of actions already taken in the 2016 IPR, magnifies potential program impacts.

Sixty-five percent of O&M funding is expended on labor costs, for which increases are mandated through either congressional action or through state and federal wage board action. The remaining portions of the program, consisting of materials and contracts, are subject to many of the same economic forces, although to a different degree. Therefore, by holding spending levels flat for fiscal years 2019, 2020, and 2021, the agencies are absorbing reductions of about 2 to 3 percent in each of those years. The net result is the need to find reductions of about \$20 million in FY 2020 and \$30 million in FY 2021.

In order to manage within the proposed O&M levels and achieve significant reductions in spending, both the Corps and Reclamation are taking steps to reduce overall labor costs at all facilities, including delayed hiring actions, reduced training and travel costs, and consolidating some functions.

Non-routine maintenance projects are also being regularly reprioritized, with only the most critical projects moving forward and many others being deferred into future rate periods. Non-routine maintenance projects include a wide variety of work including repairs of failed equipment, large-

scale rehabilitation, acquisition of spare equipment, etc. Any cessation of this work will delay these equipment renewal efforts and have a long-term degradation effect on the plant. Numerous projects have been deferred in previous rate periods, causing the growing backlog of needs to grow even faster. The Corps has already stopped or postponed some non-routine work due to funding shortfalls, including two transformer rehabilitations, one turbine oil replacement project, a spillway gate repair project, and a thrust bearing oil cooler project.

Funding for non-routine maintenance is already fully allocated for FYs 2019-2021; any emerging work or failed components will require reprioritization and deferral of existing projects after a risk-based evaluation of impacts. In order to meet funding targets, Reclamation has reduced the amount of funds set aside for unforeseen circumstances that may arise during the Grand Coulee third power plant overhaul project, the largest portion of its non-routine maintenance program. Resource constraints will limit Reclamation's ability to respond to forced outages and other unforeseen breakdown maintenance occurring after hours.

Many other smaller actions will be taken in FY 2020 and FY 2021 to operate within the proposed spending levels. Programs that have been identified for potential funding reductions include cultural resources activities, the Grand Coulee world class hydro effort, the Corps trap and transport, and the Corps medical surveillance. BPA will monitor the impacts from the spending reductions and make adjustments if needed over the coming rate period, as well as share updates with customers, constituents and stakeholders.

### Work expected in 2020 and 2021

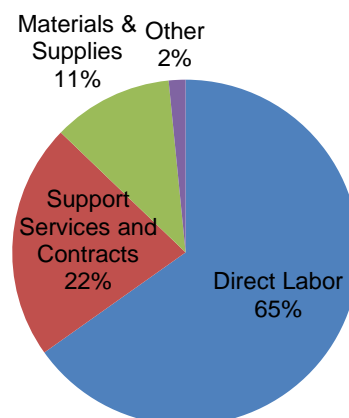
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Work in the O&M program will be focused on better increasing cost discipline, finding efficiencies through O&M best practice programs and creating alignment with long-term capital investment plans. The federal hydro partners are committed to these efforts to enable a sustainable business model that, while minimizing risk, provides affordable and reliable power for years to come.

About 85 percent of funding in FY 2020 and 2021 will support routine operations and maintenance efforts including labor, materials and contracted support services. The remaining funding will provide for non-routine maintenance projects, many of which are in place to repair failed equipment or prevent expected failures. Major non-routine projects include:

- Grand Coulee third power plant mechanical overhaul.
- Baldwin-Lima-Hamilton family of turbines at John Day and the Lower Snake plants which have had recurring blade linkage failures.
- Ongoing spillway gate rehabilitations at Chief Joseph, The Dalles, McNary, Bonneville, and throughout the Willamette Valley.
- Oil replacement at McNary.

### FCRPS Routine Expenses



- Little Goose unit five upper guide bearing bracket repair.
- Columbia River System Operations Environmental Impact Statement.

Developing more robust plant-specific strategies for operations and maintenance is a critical step to improving the long-term sustainability of our hydro assets. Current O&M plans at each facility have served the region well for many years, but there is now a need to expand and refine those strategies with a more robust analytical basis. Expanding and refining O&M strategies will allow hydro assets to be integrated with our existing capital investment strategy to reflect the current and long-term power requirements of each generating unit.

Creating plant-specific strategies will involve the identification of “tiers,” or groups of power plants categorized by their criticality at different times of the year to power generation and other benefits, similar to the formal approach of asset classes used in our capital investment strategy. Establishing formal approaches to outage planning, maintenance intervals, resource needs and other areas based on these tiers will enable BPA to intelligently deploy resources to our highest priority functions.

This initiative will build upon ongoing efforts at the Corps and Reclamation to improve maintenance management and planning. In the short-term, these O&M strategies will help focus expense spending on the highest value assets, and identify assets where reduced spending and additional risk may be acceptable. In the long-term, optimizing these maintenance strategies and integrating them with our capital investment strategies will ensure the federal partners maximize the long-term value of our FCRPS power assets.

The agencies are also implementing a new Outage Tracking System in the coming year, which will enhance our ability to plan, execute and analyze outages taken at generating units. Additional tools are being developed to improve outage analysis allowing operational insight that could increase marketable generation, and ultimately net revenues, by optimizing outage plans.

As a part of this commitment to finding efficiencies in the O&M program, nearly every part of the program will be examined. Several areas of opportunity have already been identified and will be investigated further, including increased use of remote operations and automation (which many Reclamation facilities already utilize), increased workforce mobility and centralized warehousing and engineering. However, as the agencies get further into this process, BPA expects additional opportunities to arise and be implemented.

### 3.1.2 Fed hydro capital

#### Description

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Maintaining the aging federal power infrastructure is essential to delivering value to BPA’s customers and their communities. As presented at the 2016 IPR, the federal hydropower program capital investment strategy is to ramp up from \$200 million per year to \$300 million per year and then maintain pace with inflation. In order to align appropriately with the Corps’ and Reclamation’s ability to execute work plans, and to hold capital investments in the 2020-2021 rate period at the



same levels relative to the 2018-2019 approved spending levels, the planned ramp up to the \$300 million recommended program level has been extended two years with total capital investment reaching \$300 million per year in 2023.

The investment strategy uses a lifecycle cost minimization approach to identify the optimal time for asset replacement or refurbishment. Condition and associated probabilities of failure are forecast for more than 5,500 assets. Investments in the proposed plan are expected to reduce lost generation and direct cost risks, as well as safety and environmental risks while improving unit efficiency. The proposed plan has an incremental net present value of \$500 million relative to a plan that continues to invest at \$200 million per year.

### Impacts of proposed spending level

In each year for a 50-year study period, the present value cost of deferring investment is weighed against the present value cost of replacement or refurbishment for each of the 5,500 assets. Assets at or past their calculated optimal replacement dates are prioritized based on their deferral cost in the event that the optimal replacement need exceeds capital funding constraints. Assets posing high and increasing risk are prioritized over assets with flatter risk profiles.

The proposed investment level is expected to lower the risk of lost generation as the level of investment ramps up to \$300 million per year by 2023.

#### Capital investment by fiscal year (nominal \$ millions)

| 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 238  | 256  | 281  | 300  | 306  | 313  | 319  | 326  | 333  | 340  | 347  | 354  | 362  |

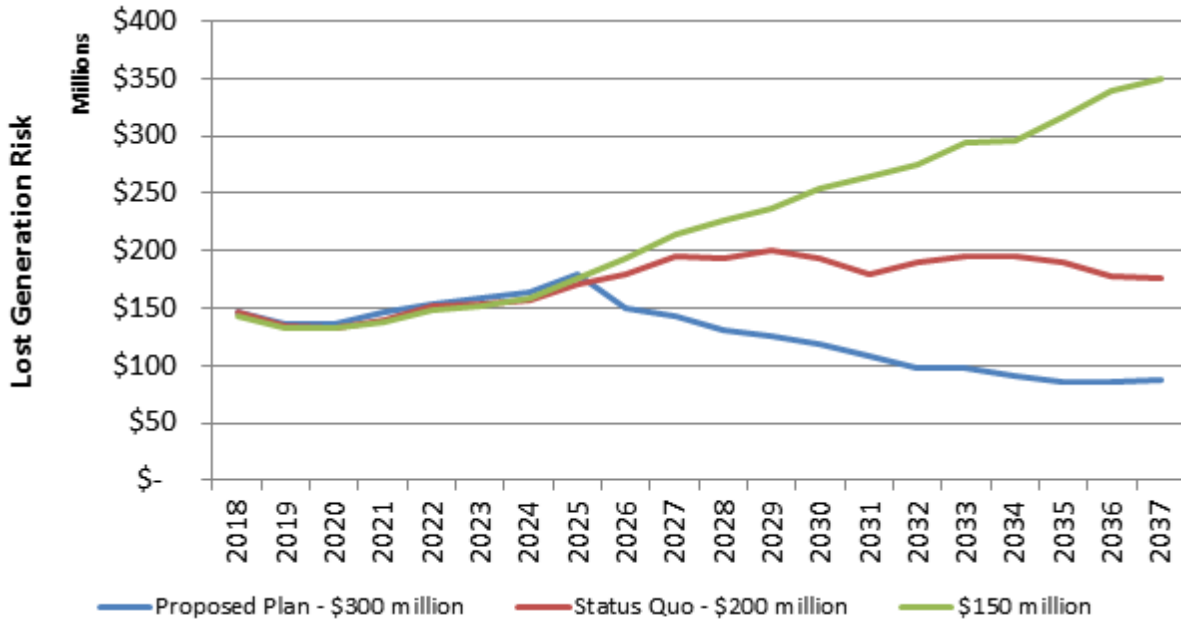
Eighty-five percent of the long-term capital investment program and 87 percent of the long-term O&M program are forecast for mainstem Columbia and headwater/Lower Snake facilities. Together, these assets represent 95 percent of the FCRPS average annual generation and are forecast to have a levelized cost of generation less than \$12 per megawatt-hour given the proposed spending levels.

#### Capital and O&M forecast by asset class relative to annual generation

| Asset class           | Percent of average annual generation | Percent of capital forecast | Percent of O&M forecast | Levelized cost of generation (\$/MWh) |
|-----------------------|--------------------------------------|-----------------------------|-------------------------|---------------------------------------|
| Mainstem Columbia     | 77                                   | 68                          | 65                      | \$9.03                                |
| Headwater/Lower Snake | 18                                   | 17                          | 22                      | \$11.41                               |
| Area support          | 4                                    | 12                          | 10                      | \$30.83                               |
| Local support         | 1                                    | 3                           | 3                       | \$44.28                               |

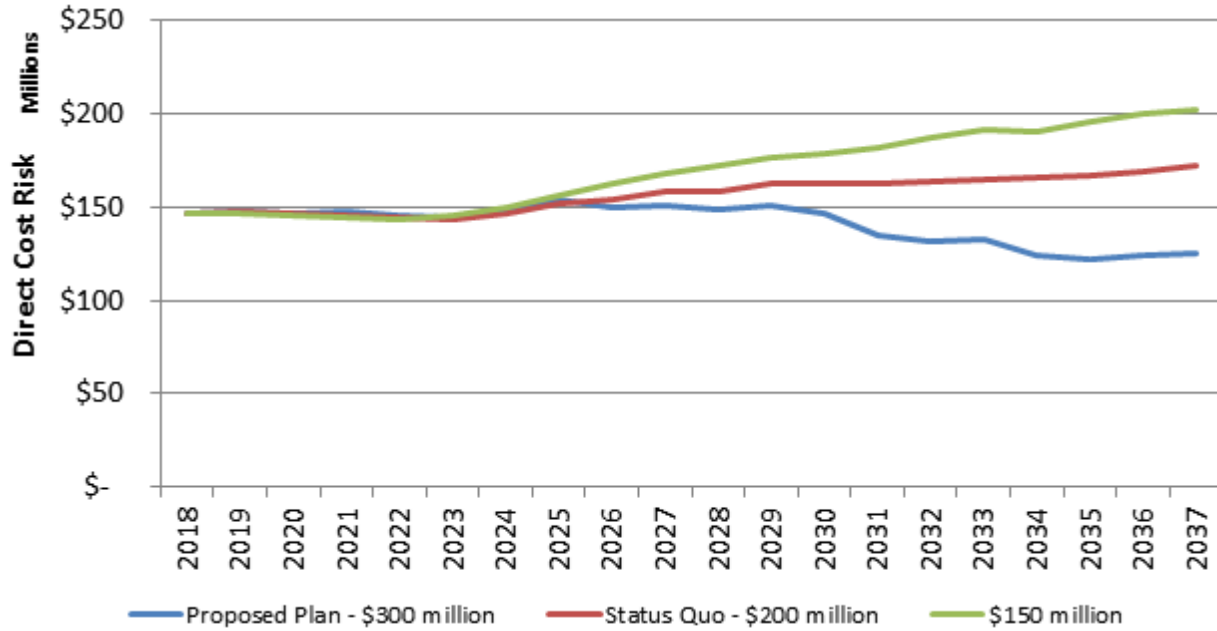
The three agencies continue to evaluate the capital investments in the FCRPS investment portfolio, especially for those with higher forecast costs of generation. Additional savings and efficiencies in the capital program may be found as the projects mature, the optimal number of units to replace is evaluated and the replace versus refurbish decisions are made.

Risk mitigation benefits of the proposed plan begin in the late 2020s as the first projects associated with incremental investment are completed. By the 2030s, lost generation risk mitigation benefits average \$92 million per year compared to status quo levels.



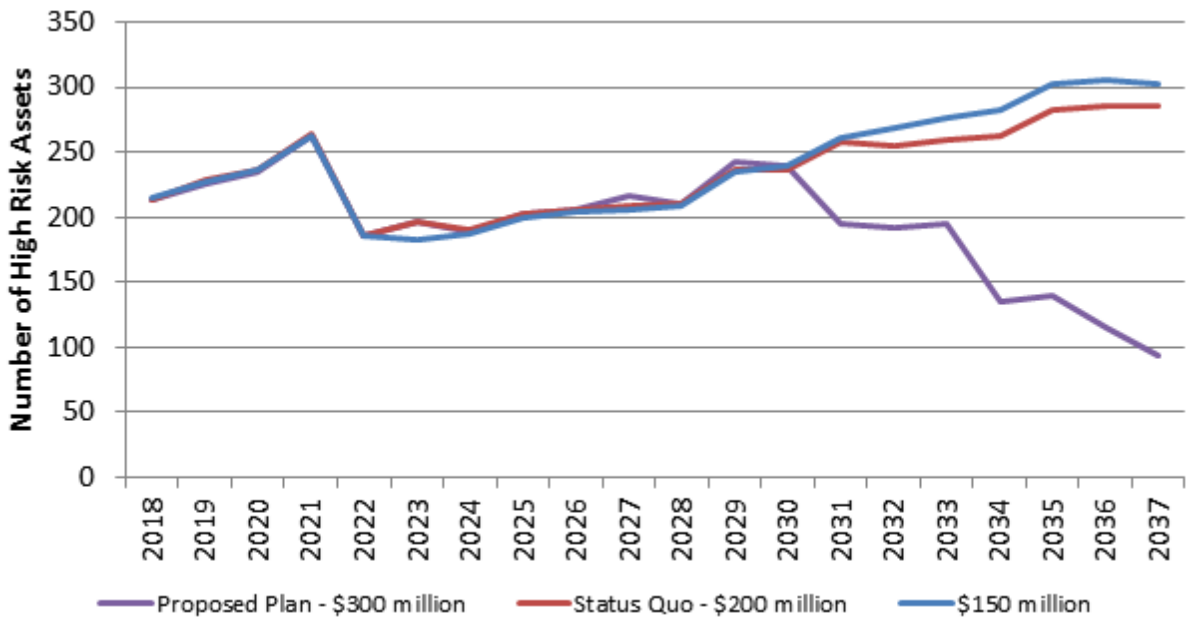
Direct cost risk, the risk associated with the incremental cost of replacing assets following failure compared to planned replacement, is also expected to decrease in nominal terms under the proposed spending level. Direct costs from failure can manifest themselves as non-routine expense repairs or through increased maintenance requirements in the base program. It is expected that the increased capital investment program will reduce the upward pressure on the non-routine O&M maintenance program but that the benefits will not be seen until the late 2020s.

**Figure 1 - Direct Cost Risk**



In addition to the financial benefits of the proposed investment level, safety and environmental risks are also reduced. The proposed level of investment is able to address these risks sooner so that they do not accumulate.

**High safety and environmental risks**



## **Work expected in 2020 and 2021**

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The majority of BPA's capital investment over the next 20 years is focused on the mainstem Columbia with 40 percent of total capital investment targeted at Grand Coulee and McNary dams. Together, Grand Coulee and McNary represent over half of the current lost generation risk in the FCRPS.

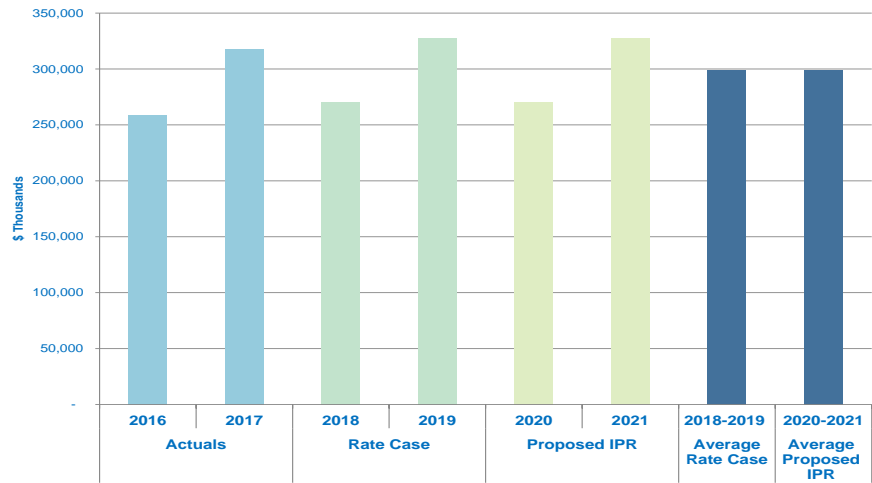
Turbines and generators in Grand Coulee third powerhouse units 19-21 are aged and in poor condition and have experienced extended forced outages in recent years. These units currently account for 9 percent of the total lost generation risk of the system and replacement and repair alternatives are currently under evaluation. Other capital investment work at Grand Coulee includes left and right powerhouse bridge crane replacement in preparation for generator rewinds. This work is expected to be completed in 2020.

At McNary Dam, exciters and governor replacements are scheduled for completion in 2022. Exciters and governors at this facility currently represent 3 percent of the total lost generation risk of the system. Design work for turbine runner replacements on all 14 units is expected to be complete in 2021 with the first unit undergoing replacement in 2023. Turbine runners and components currently represent 6 percent of the lost generation risk in the FCRPS. All work is scheduled for completion by 2032.

Other significant capital investments include the ongoing replacement of turbine runners and generator windings on Ice Harbor units one through three, crane replacements at Hungry Horse in anticipation of unit modernization in the mid-2020s and the beginning of generator winding replacements at Chief Joseph. Study and design work will also be underway for unit modernizations at John Day that are currently expected to begin in the late 2020s.

### 3.2 Columbia Generating Station

22 percent of Power Services' IPR program costs



#### Program cost details

##### Expense and capital

| (\$Thousands)                      | Actuals        |                | Rate Case      |                | Proposed IPR   |                |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                                    | 2016           | 2017           | 2018           | 2019           | 2020           | 2021           |
| <b>Columbia Generating Station</b> |                |                |                |                |                |                |
| Expense                            | 258,587        | 317,646        | 270,146        | 327,354        | 270,571        | 327,762        |
| Capital                            | 127,000        | 138,400        | 111,284        | 99,439         | 75,729         | 93,206         |
| <b>Grand Total</b>                 | <b>385,587</b> | <b>456,046</b> | <b>381,430</b> | <b>426,793</b> | <b>346,300</b> | <b>420,968</b> |

##### Capital outyears

| (\$Thousands)               | Capital Outyears |               |               |                |               |               |                |                |
|-----------------------------|------------------|---------------|---------------|----------------|---------------|---------------|----------------|----------------|
|                             | 2022             | 2023          | 2024          | 2025           | 2026          | 2027          | 2028           | 2029           |
| Columbia Generating Station | 76,310           | 80,727        | 93,959        | 108,073        | 96,328        | 98,118        | 114,220        | 143,689        |
| <b>Capital Total</b>        | <b>76,310</b>    | <b>80,727</b> | <b>93,959</b> | <b>108,073</b> | <b>96,328</b> | <b>98,118</b> | <b>114,220</b> | <b>143,689</b> |

#### Description

The Columbia Generating Station is a 1,174 net megawatt boiling water nuclear reactor located on the Department of Energy Hanford site in Richland, Washington. Columbia began operating in 1984 and is licensed through 2043. It is owned and operated by Energy Northwest, a joint action agency created by the Washington legislature. Energy Northwest’s mission is to provide its public power members and regional customers with safe, reliable, cost-effective, responsible power generation and energy solutions that align with BPA’s commitment to provide competitive power products and services to the Northwest.

Columbia’s operating costs are included in Power Services’ rates and cover the operations and maintenance of the nuclear plant. BPA acquires 100 percent of Columbia’s generation and funds 100 percent of its costs plus directly funds the Decommissioning Trust Fund and Nuclear Electric Insurance Limited (NEIL) insurance premiums.

Energy Northwest continues to work toward achieving technical and cost performance measures with the goal of providing competitively priced power and achieving industry top quartile performance. Columbia has implemented its cost-effective operation project and other industry supported initiatives to reduce its production cost of power by increasing the efficiency of overall operations.

Energy Northwest has seen improvement in these areas. In December 2017, Columbia broke a monthly generation record by generating 867 million kilowatt-hours. Columbia also set annual generation records in 2012, 2013, 2014 and 2016. Columbia is on a two-year refueling and maintenance outage cycle. Its last refueling and maintenance outage in the spring of 2017 was scheduled for 40 days and was completed 2.5 days ahead of schedule. These efforts support BPA's strategic goals to strengthen financial health and provide competitive power products and services, as established in the 2018-2023 Strategic Plan.

### **Work expected in 2020 and 2021**

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Proposed spending levels for FY 2020-2021 will support continued operation and maintenance of Columbia and are consistent with the spending forecast provided by Energy Northwest. In FY 2021, Columbia will have a refueling and maintenance outage, so costs for that year are higher.

Proposed O&M costs are based on Energy Northwest's Columbia Long Range Plan. The LRP is established through a rigorous internal process that looks at challenges and constraints that need to be overcome to meet the agency's mission and support continued operation. O&M and capital projects are reviewed and ranked prior to inclusion in the LRP. Highest priority projects are included in the proposed spending levels, whereas lower priority projects may be deferred to future years or dropped from the list.

Columbia identifies funds and completes projects each year. Examples of noteworthy expense projects for Energy Northwest in FYs 2020-2023 are the in-service inspection and non-destructive examination project<sup>1</sup>, inspection, repair and refurbishment of valves in the plant, vessel services during the outage, and main turbine inspections. Noteworthy capital projects include Fukushima impacts due to the natural disaster that occurred in Japan in 2011, ongoing commitments from the 2012 Plant License Renewal, low pressure turbine upgrade project, reactor water cleanup piping, reactor recirculating pump and motor replacement, and independent spent fuel storage installation cask expansion.

As described below, Energy Northwest also continues to implement strategies to decrease costs and increase generation. Columbia is now operating under a 60-year license with the Nuclear Regulatory Commission. On May 23, 2012, the NRC signed the documents approving the extension of Columbia's operating license to 2043. This extension of operating life has allowed BPA to reduce annual contributions to the Columbia Generating Station Decommissioning Trust Fund as the contributions will be made over a longer period of time.

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<sup>1</sup> The non-destructive examination project is required by the Nuclear Regulatory Commission.

In May 2012, DOE, Tennessee Valley Authority, the U.S. Enrichment Corporation and Energy Northwest signed agreements to pursue a depleted uranium program to provide nuclear fuel for Columbia, a program similar to the one conducted in 2005. The program involves DOE providing depleted uranium hexafluoride that can be cost-effectively enriched to provide enough enriched uranium for Columbia operations through at least 2028. This agreement generated savings of approximately \$20 million per year for the FY 2014-2017 period and is projected to continue resulting in savings through 2028. Columbia's significant uranium inventory and the long-term enrichment contracts in place continue to minimize the impact of volatility in the nuclear fuel market prices.

During Columbia's previous refueling outage in the spring of 2017, the NRC granted Energy Northwest permission to proceed with a measurement uncertainty recapture power uprate. This allowed Columbia to increase its licensed output from 3,486 megawatts thermal to 3,544 megawatts thermal. The reactor power uprate also resulted in additional electrical output of approximately 19 megawatts electric for the station.

### **Impacts of proposed spending level**

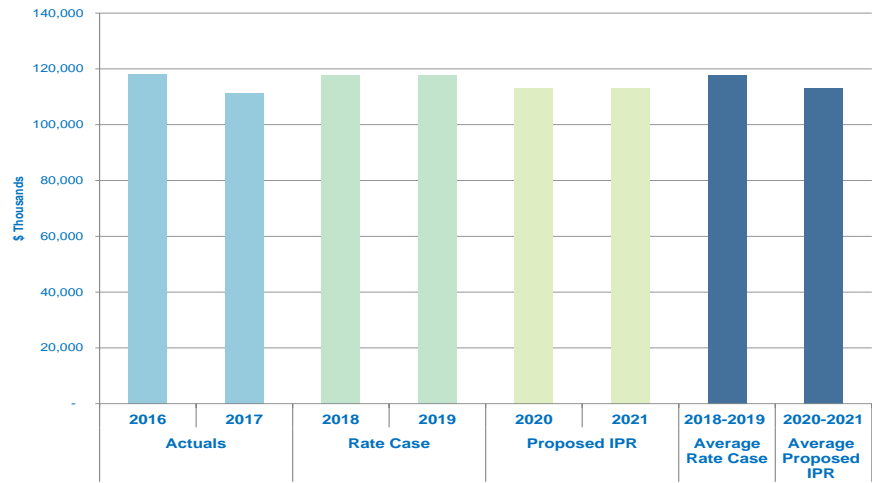
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The proposed spending levels for Columbia are achievable and are aligned with Energy Northwest's cost-effective operation initiatives (pending final approval by the Energy Northwest executive board). Columbia will absorb inflation and operate at levels equivalent to the BP-18 Rate Case primarily through staff reductions attained through attrition. Financial exposure will be reduced based on Columbia's LRP health and demonstrated predictable performance. Columbia demonstrates predictable performance by staying within its generation and cost targets each year.

There are potential factors that may influence Columbia's ability to operate within the proposed spending levels. These include any emergent equipment reliability issues, any additional days needed for the refueling and maintenance outage, a change in regulatory fees, any forced outages if the plant needs to be taken offline for repairs, unexpected changes by the state of Washington rates for retirement costs, any unexpected increases in employee benefits, and undefined and/or unknown regulatory mandates from the NRC. As part of its adaptive management process, Columbia will look for opportunities to move projects to future fiscal years and/or spread out the implementation of projects over more fiscal years.

### 3.3 Energy Efficiency

8 percent of Power Services' IPR program costs



#### Program cost details

| (\$Thousands)                | Actuals        |                | Rate Case      |                | Proposed IPR   |                |
|------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                              | 2016           | 2017           | 2018           | 2019           | 2020           | 2021           |
| Conservation Infrastructure  | 22,826         | 20,437         | 27,149         | 27,283         | 27,296         | 27,296         |
| Conservation Purchases       | 76,758         | 72,548         | 71,785         | 71,785         | 67,000         | 67,000         |
| Demand Response & Smart Grid | 947            | 729            | 856            | 854            | 855            | 855            |
| Low-income Energy Efficiency | 5,361          | 5,415          | 5,523          | 5,627          | 5,739          | 5,853          |
| Market Transformation        | 12,213         | 12,117         | 12,364         | 12,049         | 12,050         | 12,050         |
| <b>Grand Total</b>           | <b>118,106</b> | <b>111,246</b> | <b>117,677</b> | <b>117,597</b> | <b>112,940</b> | <b>113,054</b> |

#### Description

Through its Energy Efficiency program, BPA maximizes the value of the FCRPS by avoiding development and purchase of more costly resources and mitigating price volatility risk by reducing exposure to the market. BPA meets the conservation goals of the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act) by working with and through its electric utility customers to acquire energy efficiency. The EE program delivers cost-effective energy savings that help meet BPA's need for reliable load service. When acquiring resources to meet future loads, the Northwest Power Act requires BPA's administrator to first consider and acquire cost-effective energy efficiency consistent with the Northwest Power and Conservation Council's power plan.

The proposed spending level for the Energy Efficiency program includes funding for regional program delivery infrastructure (program implementation, oversight, market research, compliance, market support services, technology confirmation, regional planning and market transformation), payments for energy savings acquisition, grant funding to the Northwest Energy Efficiency Alliance for market transformation and regional infrastructure support, and low-income weatherization grants to states and tribes.



During BPA's Focus 2028 discussions on the Energy Efficiency program, BPA committed to reassess the basis for its energy efficiency goal. The 2018 Resource Program provided insight into the scale and type of energy efficiency that will most cost effectively meet BPA's projected needs. The proposed spending levels in the IPR tune BPA's acquisition funding to reflect a refinement of energy efficiency acquisitions aligned to BPA's needs as reflected in the Resource Program.

### **Impacts of proposed spending level**

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BPA is holding conservation infrastructure costs and major program spending flat relative to BP-18 Rate Case levels. Conservation acquisition funding is sized to reflect both accelerated achievements in FYs 2016 and 2017 relative to the 2016 Energy Efficiency Action Plan, as well as the mix and scale of energy efficiency acquisitions identified in the resource program. BPA estimates it will acquire between 74 and 101 average megawatts by 2021. BPA is presenting a range as there are several variables with varying degrees of uncertainty that could impact actual achieved conservation. They include program changes to what qualifies for momentum savings, the programs utilities may choose to offer and the cost of measures BPA chooses to implement. BPA will further describe proposed program changes in its rate period 2020-2021 energy efficiency goal proposal document.

Generally, as markets are transformed, energy efficiency becomes more difficult and expensive to achieve. The primary risk BPA faces at the proposed spending level is the risk that implementation conditions in 2020 and 2021 may vary from planning assumptions. Possible circumstances include: higher than expected costs of energy efficiency acquisition, a need to add or enhance program support services, risk that assumed volume or pace of market adoption may lag, and risk that energy efficiency measure development may not keep pace with goal expectations.

In 2020 and 2021, BPA's conservation infrastructure funding will include the cost of BPA's contribution to the Northwest Energy Efficiency Alliance's research to refresh our data on end-use load shapes. This investment is essential to the accuracy in planning energy efficiency and to understand the reliability and performance of energy efficiency resources.

Distributed energy resources, along with energy efficiency, will play an important role in BPA's grid modernization efforts. The proposed Distributed Energy Resources program funding levels only cover base resource costs (foundational infrastructure and supplemental labor). The cost of any DER development and implementation would be funded by Power and Transmission.

BPA's DER work is at an inflection point. In the past, BPA undertook extensive research and demonstrations to test DER effectiveness and performance. With a successful track record established, the efforts in this area will focus on applying those learnings in commercially viable applications. Aligned with BPA's integrated planning efforts, BPA will develop appropriate DER solutions in the current market landscape.

In FY 2020 and 2021, BPA will assess operational opportunities for DER solutions and, when cost effective, drive coordinated implementation and program management. This approach is consistent with the BPA 2018-2023 Strategic Plan, positively contributing to the goals for cost competitive power services and efficient and responsive transmission services.

## **Work expected in 2020 and 2021**

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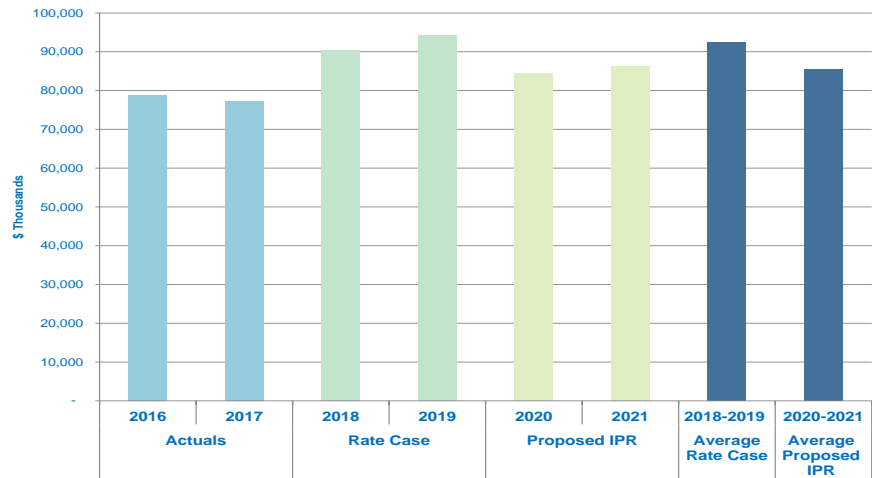
BPA will increase its focus on energy efficiency and demand response initiatives that deliver cost-effective solutions in support of BPA's integrated planning and evolving system needs, capabilities and constraints. BPA will work collaboratively with the Council, its customers and regional public interest organizations to ensure BPA meets its statutory obligations while guided by its power and transmission system needs and the imperatives of competitiveness and long-term commercial performance.

As BPA endeavors to use energy efficiency to more directly meet its power and transmission system needs, BPA will need to focus on programs, delivery channels or technologies that provide the most value to the FCRPS. Such changes will begin in the BP-20 rate period.

Regardless of scale, scope and composition, changing customer and market needs continuously drive BPA to develop new programs and evaluate and update the size and scale of existing programs. BPA develops new programs and integrates new technologies to obtain savings. To keep a consistent savings pipeline, BPA plans to maintain investments in new measures and programs as well as evaluate its existing portfolio. In addition to large-scale programs, BPA still need to develop new measures to keep the savings pipeline full when existing measures mature and saturate the region. Once measures are implemented, quality assurance is essential to prove their reliability and persistence. BPA will continue its project and program evaluation efforts to ensure acquisition of reliable resources.

### 3.4 Non-Generation Operations

6 percent of Power Services' IPR program costs



#### Program cost details

| (\$Thousands)                         | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                       | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Conservation Support                  | 8,224         | 8,075         | 9,094         | 9,409         | 8,399         | 8,699         |
| Executive & Administrative Services   | 4,123         | 3,501         | 4,120         | 4,205         | 4,009         | 4,097         |
| Generation Project Coordination       | 5,894         | 6,082         | 6,174         | 6,409         | 6,059         | 6,205         |
| Information Technology                | 5,904         | 5,822         | 6,976         | 7,294         | 6,714         | 6,775         |
| Operations Planning                   | 6,468         | 6,274         | 8,528         | 8,416         | 5,643         | 5,839         |
| Operations Scheduling                 | 8,889         | 8,718         | 10,054        | 10,404        | 8,806         | 9,148         |
| Power R&D                             | 6,033         | 5,116         | 4,705         | 4,600         | 3,662         | 3,666         |
| Sales and Support                     | 19,886        | 20,378        | 22,885        | 23,485        | 23,114        | 23,877        |
| Slice Implementation                  | 810           | 502           | 1,024         | 1,061         | 555           | 575           |
| Strategy, Finance and Risk Management | 12,432        | 12,707        | 16,852        | 19,037        | 17,386        | 17,486        |
| <b>Grand Total</b>                    | <b>78,663</b> | <b>77,176</b> | <b>90,411</b> | <b>94,319</b> | <b>84,348</b> | <b>86,367</b> |

#### Description

The Power Services Non-Generation Operations program includes the salaries and benefits for approximately 300 employees responsible for all aspects of the business activities and processes performed by Power Services as well as costs for support received from Corporate and CAO, such as Information Technology and grid modernization efforts described in pages 90 and 14 respectively. This program includes Power Services' costs for professional services, supplemental labor, travel, training and awards.

This program funds essential staffing and training required to fulfill BPA's commitment to provide competitive products and services along with modernizing assets and system operations outlined in the 2018-2023 Strategic Plan. Costs fall into three main categories that cover a full range of work performed in Power Services: asset management, commercial activities and operations.

Power is committed to managing its costs and ensuring sustained financial health and competitive market offerings for many years to come. As a result, the Non-Generation Operations program is

absorbing \$11 million in reductions compared to the BP-18 Rate Case consisting of \$7 million in programmatic reductions and \$4 million of inflation. This amount aligns FY 2020-2021 proposed spending levels with actual expenditures during FY 2015-17. The proposed spending level supports BPA's goal to reduce supplemental labor costs and federal employee levels.

### **Impacts of proposed spending level**

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Operating at reduced levels from the BP-18 Rate Case requires reprioritization of workload and constrained funding in all aspects of this program, including staffing levels, service contracts, and supplemental labor. Staffing levels are low and will remain near current levels through FY 2021 in support of cost-management efforts. Management is actively monitoring staffing needs and seeking out operational efficiencies to mitigate business risk, such as delays in important work, quality control and/or slower customer service. Power has also performed a thorough review of non-labor costs resulting in reductions to training, subscriptions, service contracts, sponsorships and memberships.

Along with holding staffing at current levels and reducing non-labor costs, managers throughout Power Services are evaluating projects and resource needs and identifying areas to reduce or stop work in favor of mission critical efforts. Efforts supporting grid modernization, in particular, require that some existing work be scaled back as work continues on the systems and processes necessary to enhance our ability to capture additional value. Power intends to meet the demands of the grid modernization efforts within proposed funding levels by improving processes, reprioritizing work, and ensuring that the right people are assigned to the highest priority work.

### **Work expected in 2020 and 2021**

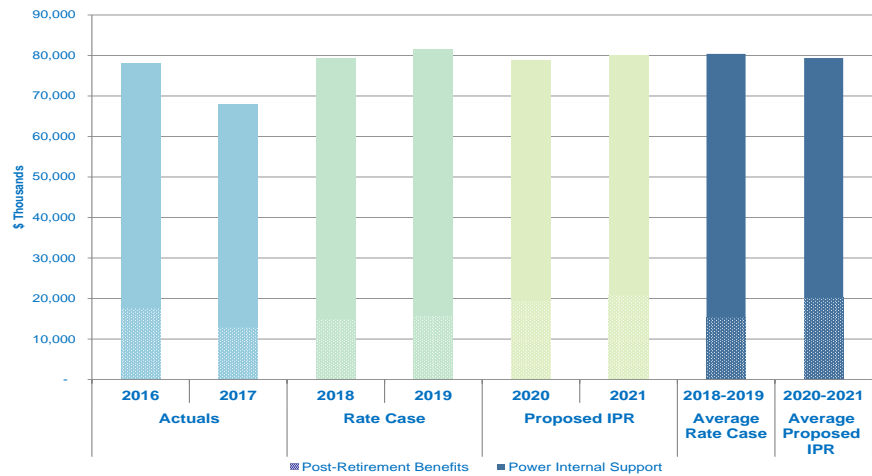
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As established in the strategic plan, Power will focus on initiatives and work that supports BPA's efforts to provide competitive products and services. Power will also focus on modernization of its assets and system operations.

Work will continue on the modernization of the Columbia River Treaty, the BiOp, the court-ordered environmental impact statement related to system operations, maintenance and configuration of 14 federal dams, long-term marketing of surplus capacity and other products producing new revenue from the California market, and the constant pursuit of efficiencies and operational excellence in programs and processes.

### 3.5 Power internal support

6 percent of Power Services' IPR program costs



#### Program cost details

| (\$Thousands)                       | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|-------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                     | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Additional Post-Retirement Benefits | 17,743        | 13,106        | 14,962        | 15,620        | 19,577        | 20,831        |
| Power Internal Support              | 60,230        | 55,003        | 64,391        | 65,796        | 59,259        | 59,085        |
| <b>Grand Total</b>                  | <b>77,974</b> | <b>68,109</b> | <b>79,353</b> | <b>81,417</b> | <b>78,836</b> | <b>79,916</b> |

#### Description

Internal support consists of two separate programs, additional post retirement benefits contributions and Power’s share of G&A. The internal support program is included in both the power and transmission revenue requirements. Since the program is the same for each business unit, the full narrative is captured here in the Power Services unit section and only a brief summary and corresponding table are included on page 51 for Transmission Services.

Both federal employers and their employees contribute a percentage of eligible employee compensation toward funding the employees’ post-retirement benefits. BPA and employee contribution rates under the Civil Service Retirement System are 7 percent each. Under the Federal Employees Retirement System, the contribution rates are 11.7 percent and 0.8 percent, respectively. Employees also usually participate in the Federal Employees Health Benefits Program and/or the Federal Employees’ Group Life Insurance Program. Beginning in 1998, the BPA administrator elected to include an additional post-retirement contribution as an operational expense as part of power and transmission rates to help offset underfunding for the before-mentioned programs. BPA does this by voluntarily remitting to the U.S. Treasury each year in the year-end payment. The contribution includes component amounts that represent both BPA retirees and the retirees related to the power producing operations of the Corps and Reclamation.

The Corporate and CAO G&A pools are used to spread shared corporate costs to Power and Transmission Services. For details, refer to section 2.2 on Page 6.

### **Impacts of proposed spending level**

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The Corporate and CAO G&A funding levels are determined by the level of service required to support the business lines. Proposed funding levels for Corporate and CAO have been reduced from the BP-18 funding levels.

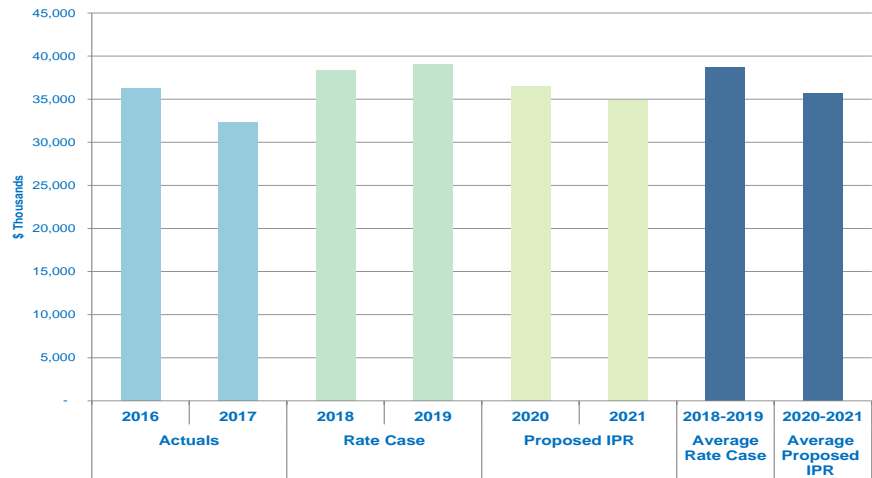
### **Work expected in 2020 and 2021**

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The work expected by each of the Corporate and CAO organization is outlined in each of the individual executive summaries.

### 3.6 Renewables

3 percent of Power Services' IPR program costs



#### Program cost details

| (\$Thousands)      | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                    | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Renewables         | 36,284        | 32,280        | 38,332        | 39,060        | 36,523        | 34,869        |
| <b>Grand Total</b> | <b>36,284</b> | <b>32,280</b> | <b>38,332</b> | <b>39,060</b> | <b>36,523</b> | <b>34,869</b> |

In FYs 2020-2021, the Renewables program will meet existing contract obligations while seeking opportunities to reduce costs and maintain existing program functions. Program funding supports BPA’s purchase of wind energy from six projects currently under contract with one contract expiring in 2021. Funds also support maintaining the solar and wind monitoring networks and management costs of Tier 1 Renewable Energy Certificates.

The Renewables program is expected to meet BPA’s strategic goal to strengthen financial health by growing at or below the rate of inflation through 2028. As the power purchase contracts expire over the next nine years, the cost of the program will steadily decrease.

The Renewables program proposed spending level is 99 percent long-term power purchase contracts costs and 1 percent program support costs. The power purchase contracts costs cover existing obligations at an annual average cost of \$35.4 million for the rate period. The program support costs are forecast at \$0.3 million per year.

The expenses for the wind project contracts are forecast using the updated contract costs and conservative wind energy output forecasts. There is a risk that the energy output will be greater than forecast. In the event of a windier than forecast year, BPA will seek out offsetting cost reductions in other programs.

## 4. TRANSMISSION SERVICES

### OVERVIEW

Transmission Services proposes to increase costs by \$3 million a year compared to BP-18 spending levels. While this is significantly below the rate of inflation, Transmission is looking for additional reductions to get to BP-18 levels by the end of this IPR.

- Expenses are prioritized to support safety, compliance and market transformation activities, as well as to modernize assets.
- Transmission took significant steps to offset increasing costs, such as inflation, critical positions and licensing costs.
- Capital spending is set to achieve safety and high reliability, availability and adequacy standards, and to maximize economic value to the region.

Transmission Services is responsible for planning, designing, marketing, operating and maintaining over 15,100 circuit miles of high-voltage transmission assets in the Pacific Northwest across eight states. The proposed Transmission Services spending for FY 2020–2021 supports the 2018-2023 Strategic Plan and builds on BPA’s legacy of transmission system reliability. A strategic goal for BPA is to strengthen financial health, which we will do by cost-effectively modernizing, managing, and maintaining our assets. Transmission builds on a foundation of safety, regulatory and statutory compliance to meet Transmission customer needs efficiently and responsively, in support of its other strategic goals.

The average age of Transmission’s assets is approaching 50 years and many are well past the end of their expected economic life. Transmission faces an increasingly dynamic, uncertain and quickly changing operating environment.

Transmission customers are diverse with complex needs, some of which may be at odds with each other under our current products and services portfolio. BPA is facing capital and expense pressures while the system is aging and becoming more constrained. These facts demand a responsive and modern approach to the way BPA position’s itself commercially and how it aligns to deliver and capture value. BPA is adopting a more flexible, scalable, economical and operationally efficient

#### Vision for managing transmission assets:

*Transmission Services will manage its assets to achieve safety, reliability, and availability and adequacy standards and maximize economic value for the region. It will use efficient and transparent practices that are effective in managing risks and delivering results.*



approach to managing its transmission system in order to remain a competitive transmission provider. This work will ensure we maintain financial strength while continuing to meet our multiple statutory responsibilities and delivering the public benefits that are so valuable to the region.

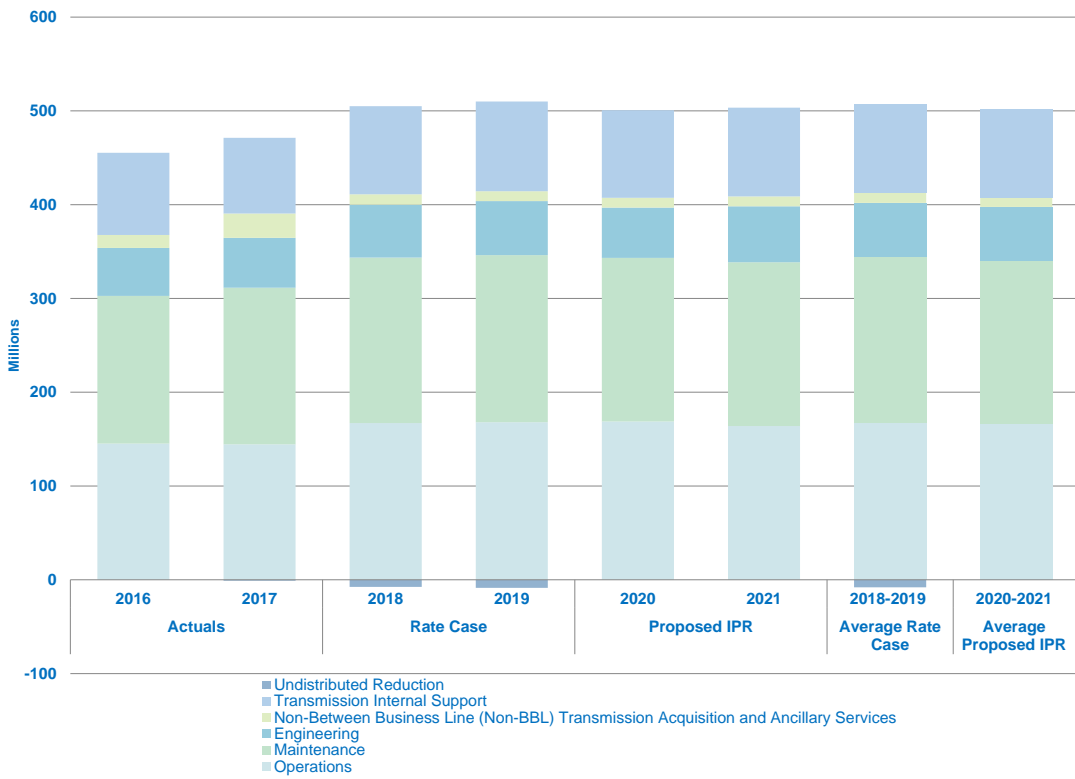
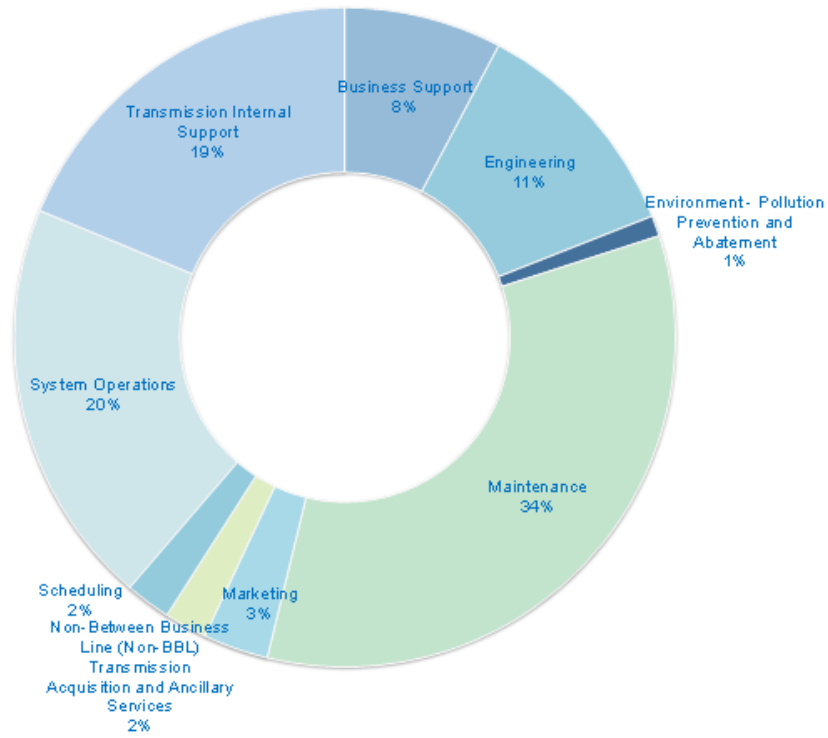
Transmission Services creates value by operating a high-performing grid, enabling economic growth in the region, and providing access to federal and non-federal resources and markets. As a dependable and responsive business partner for BPA's customers, Transmission meets compliance requirements, while ensuring the continuing safe, reliable and economic operation of the transmission grid consistent with sound business principles. Enabling economic growth and providing grid access means that Transmission provides flexible products and services to meet evolving demand forecasts, impacts to energy markets, generation choices and policies.

Transmission Services' three main goals from the agency strategy used to prioritize spending in the BP-20 rate period are: strengthen financial health; modernize assets and operations; and meet Transmission customer needs efficiently and responsively. Financial health was supported by balancing upward cost pressures against efficiencies. Upward pressures include price and wage inflation and additional workloads in adding responsiveness capability and modernization of systems. Balancing factors included carefully evaluating and prioritizing hires, projects, work and initiatives and consolidating support workload.

To date, careful stewardship of Transmission's expense levels has resulted in a small increase in proposed spending compared to BP-18 levels, which is still below the rate of inflation. Throughout the IPR process, Transmission will work toward flat program levels in order to support the strategic and financial plans. The proposed spending levels support safety, compliance, reliability, and market transformation activities. Each program contributes to improving business performance while managing down costs. In Operations, the primary focus will be to modernize the grid and its supporting technology. Grid modernization and preparing for evolving markets will be a significant undertaking impacting all of Operations. In Engineering, improvements to Transmission's asset management practices will continue. Transmission will start optimizing maintenance intervals as well as our spares inventory with the use of a decision support tool that allows us to perform a probabilistic risk assessment. Marketing will develop strategy, policies and implementation plans to enable customer participation in the CAISO energy imbalance market that involves the use of BPA's transmission system. Transmission Maintenance will accomplish its compliance-driven and contractually-obligated maintenance responsibilities efficiently and cost-effectively, ensuring the reliability of the grid through management of maintenance resources.

Finally, the Transmission capital funding proposal reflects the transition from an era of large system expansion to one dominated by smaller sustain projects. Capital execution for this rate period is approximately \$300 million direct spend per year. There is a growing volume of projects funded by customers in advance reflecting developer and utility demand on project resources, which can exacerbate resource constraints. Capital levels are held flat by delaying and deferring replacement of assets, alternative service delivery arrangements, and adopting a risk assessment and evaluation method that prioritizes available dollars to mitigate the highest system risks.

## Transmission Services Expense Summary



Note: Transmission Services discontinued the use of an undistributed reduction in this 2018 IPR. The proposed 2018 IPR levels are increasing compared to the BP-18 Rate Case levels if you net the undistributed reduction out.

## Transmission Services Summary

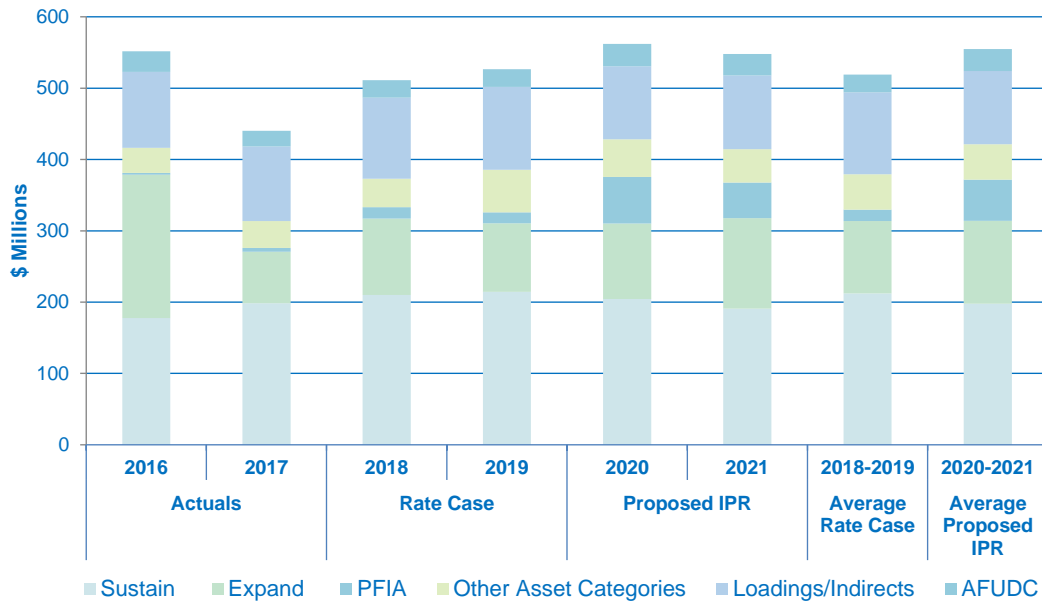
| (\$Thousands)   | Actuals          |                  | Rate Case        |                  | Proposed IPR     |                  |
|---|------------------|------------------|------------------|------------------|------------------|------------------|
|   | 2016             | 2017             | 2018             | 2019             | 2020             | 2021             |
| <b>Costs Described in IPR</b>                                 |                  |                  |                  |                  |                  |                  |
| Operations  | 145,216          | 144,518          | 167,050          | 168,007          | 168,852          | 163,878          |
| Maintenance   | 157,453          | 166,927          | 176,580          | 178,125          | 174,337          | 174,666          |
| Engineering   | 51,168           | 53,240           | 56,351           | 57,718           | 53,683           | 59,733           |
| Non-Between Business Line Acquisitions and Ancillary Services | 13,856           | 25,921           | 11,031           | 10,464           | 10,476           | 10,476           |
| Transmission Internal Support                                 | 87,584           | 80,644           | 93,940           | 95,607           | 93,326           | 94,705           |
| Undistributed Reduction/Other Income (Loss)                   | 0                | -1,045           | -7,548           | -8,539           | 0                | 0                |
| <b>Costs Described in IPR Total</b>                           | <b>455,278</b>   | <b>470,205</b>   | <b>497,403</b>   | <b>501,382</b>   | <b>500,673</b>   | <b>503,457</b>   |
| <b>Capital</b>  |                  |                  |                  |                  |                  |                  |
| Transmission Asset Category                                   | 378,778          | 270,670          | 317,044          | 310,544          | 310,193          | 317,655          |
| PFIA  | 2,427            | 5,197            | 16,000           | 15,500           | 65,457           | 50,061           |
| Other Asset Categories Within Transmission                    | 35,247           | 37,809           | 39,929           | 59,585           | 52,713           | 46,817           |
| Transmission Indirects  | 54,109           | 50,489           | 56,249           | 57,093           | 54,747           | 55,569           |
| Corporate Indirects   | 52,194           | 54,007           | 57,323           | 59,006           | 47,395           | 47,577           |
| AFUDC   | 29,026           | 21,916           | 24,733           | 24,819           | 31,552           | 30,248           |
| <b>Capital Total</b>  | <b>551,781</b>   | <b>440,088</b>   | <b>511,278</b>   | <b>526,547</b>   | <b>562,057</b>   | <b>547,927</b>   |
| <b>Other Costs</b>  |                  |                  |                  |                  |                  |                  |
| Between Business Line Acquisitions and Ancillary Services     | 115,354          | 114,993          | 108,430          | 101,519          | 124,926          | 124,614          |
| Reimbursables   | 8,649            | 15,646           | 9,929            | 9,936            | 9,916            | 9,923            |
| <b>Other Costs Total</b>                                      | <b>124,002</b>   | <b>130,639</b>   | <b>118,359</b>   | <b>111,455</b>   | <b>134,842</b>   | <b>134,537</b>   |
| <b>Grand Total</b>  | <b>1,131,061</b> | <b>1,040,932</b> | <b>1,127,040</b> | <b>1,139,384</b> | <b>1,197,572</b> | <b>1,185,921</b> |

\*The other Asset Categories included in Transmission are: Facilities, IT, Fleet Equipment, Security and Environment.

## Transmission Services Capital Outyears Summary

| (\$Thousands)                              | Capital Outyears |                |                |                |                |                |                |                |
|--|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|  | 2022             | 2023           | 2024           | 2025           | 2026           | 2027           | 2028           | 2029           |
| Transmission Asset Category                | 314,386          | 321,278        | 328,282        | 335,394        | 342,483        | 349,808        | 357,042        | 364,360        |
| PFIA                                       | 45,134           | 29,914         | 30,041         | 30,000         | 30,000         | 30,000         | 30,000         | 30,000         |
| Other Asset Categories Within Transmission | 40,309           | 64,772         | 73,170         | 26,456         | 49,421         | 50,330         | 51,039         | 51,848         |
| Transmission Indirects                     | 56,402           | 57,248         | 58,107         | 58,979         | 59,863         | 60,761         | 61,673         | 62,598         |
| Corporate Indirects                        | 48,379           | 49,199         | 50,032         | 50,875         | 51,719         | 52,564         | 53,404         | 54,248         |
| AFUDC                                      | 30,920           | 31,609         | 32,311         | 33,022         | 33,732         | 34,440         | 35,139         | 35,842         |
| <b>Capital Total</b>                       | <b>535,530</b>   | <b>554,021</b> | <b>571,943</b> | <b>534,725</b> | <b>567,218</b> | <b>577,904</b> | <b>588,296</b> | <b>598,896</b> |

## 4.1 Transmission Capital



### Program cost details

| (\$Thousands)                              | Proposed IPR   |                | Capital Outyears |                |                |                |                |                |                |                |
|--|----------------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|  | 2020           | 2021           | 2022             | 2023           | 2024           | 2025           | 2026           | 2027           | 2028           | 2029           |
| Transmission Asset Category                | 310,193        | 317,655        | 314,386          | 321,278        | 328,282        | 335,394        | 342,483        | 349,808        | 357,042        | 364,360        |
| PFIA                                       | 65,457         | 50,061         | 45,134           | 29,914         | 30,041         | 30,000         | 30,000         | 30,000         | 30,000         | 30,000         |
| Other Asset Categories Within Transmission | 52,713         | 46,817         | 40,309           | 64,772         | 73,170         | 26,456         | 49,421         | 50,330         | 51,039         | 51,848         |
| Transmission Indirects                     | 54,747         | 55,569         | 56,402           | 57,248         | 58,107         | 58,979         | 59,863         | 60,761         | 61,673         | 62,598         |
| Corporate Indirects                        | 47,395         | 47,577         | 48,379           | 49,199         | 50,032         | 50,875         | 51,719         | 52,564         | 53,404         | 54,248         |
| AFUDC                                      | 31,552         | 30,248         | 30,920           | 31,609         | 32,311         | 33,022         | 33,732         | 34,440         | 35,139         | 35,842         |
| <b>Capital Total</b>                       | <b>562,057</b> | <b>547,927</b> | <b>535,530</b>   | <b>554,021</b> | <b>571,943</b> | <b>534,725</b> | <b>567,218</b> | <b>577,904</b> | <b>588,296</b> | <b>598,896</b> |

### Description

With BPA's responsibility to serve the majority of the Northwest region's high-voltage needs, a robust asset management strategy and plan for deployment of capital is essential, and execution of the strategy is vitally important to efficiently deliver the benefits. The strategy covers primary asset programs including alternating current substations, direct current substations, control centers, power system control, system telecommunications, system protection and control, rights of way, wood pole lines and steel lines. The assets within these programs deliver electric power to three to four million people through four product categories:

- Transmission service to regional utilities.
- Generation and line and load interconnections.
- Interregional transfers of capacity and energy.
- Ancillary services, such as regulation and load following services.

The vision for managing transmission assets at BPA states, “Transmission Services will manage its assets to achieve high reliability, availability and adequacy standards and maximize economic value for the region. It will use efficient and transparent practices that are effective in managing risks and delivering results.” With this vision, long-term Transmission asset management goals have been developed that focus on:

- Integrating system expansion, replacements and maintenance to optimize the asset lifecycle.
- Prioritizing investments in terms of asset criticality and risk to meet reliability and other standards at lowest total economic cost.
- High data quality and situational awareness for asset attributes, utilizing the asset inventory (e.g. condition and performance data) to support decision-making.

Transmission’s strategic asset management plan and asset plan were developed in accordance with the Institute of Asset Management framework, a set of industry best practices centered around the international standards ISO 55000 (asset management) and ISO 31000 (risk). Transmission is also aligned with BPA’s strategy and committed to become more responsive to customer needs; leverage and enable industry change through modernized assets and system operations; and deliver on BPA’s public responsibilities through a commercially successful business.

Modernizing assets and system operations requires a rigorous approach to asset management that leads to the most efficient use of resources, recognizing that our assets do not all deliver the same value. Transmission will optimize the life-cycle cost of acquiring, operating, maintaining and disposing of assets to preserve their reliability and value. BPA will also prioritize the use of limited funding and human resources by understanding asset criticality, health and risks; establish risk-based planning and prioritization; and use leading analytical methods to prioritize investments in expansion, replacement and maintenance for safe, reliable asset performance. The utility industry is in the midst of great change, resulting in an increased need for flexible products and services to maintain a competitive position and effectively serve the Northwest. BPA must position itself to adapt as forecast demand, impacts to energy markets, generation choices, and national, regional and local policies evolve.

Transmission Services is developing action plans for managing the transmission system today through well-planned, cost-effective asset plans, while also positioning Transmission Services to meet the regional needs of tomorrow. Transmission Service’s current and projected annual spending level is approximately \$300 million direct, predominately capital with a minor amount of expense related to capital projects. BPA has adopted a scalable, flexible approach which will first seek to use efficiencies and non-wires alternatives to relieve congestion or increase capacity on constrained transmission paths where new line construction is unfeasible or cost prohibitive.

## **Challenges**

In FY 2017, Transmission Services completed an era of large system expansions and turned its focus to sustain (replacement) projects. Expand project volume is now greatly reduced and two-thirds of Transmission's capital funded projects in the next five years are sustain. By coincidence, the volume of developer and utility customer driven projects funded in advance (commonly referred to as PFIA projects) has also ramped up significantly. While PFIA projects are funded separately, these projects impact the same resources needed to accomplish Transmission's own projects.

Transmission is addressing the work prioritization and resource challenges in several ways. In dealing with prioritization and investment decisions, BPA is implementing capital portfolio management including formal early scoping, stage gate approval, asset lifecycle cost comparison and risk based planning and prioritization. Transmission is also establishing the health and criticality of each key asset, and utilizing the asset register to automate risk calculations in addition to testing decision support tools to better inform maintenance analytics and reliability engineering decisions. BPA is balancing the workload demands with labor limitations by carefully evaluating necessary skills and process steps. One action we are taking is augmenting existing staff with term-limited personnel to meet near-term production needs. BPA also worked with Supply Chain and Transmission to implement consulting engineer and engineer procure construct master contracts to enable faster releases of design and design-build work packages and prioritized staffing of particularly constrained internal workgroups in key process areas, such as test and energization, and construction management.

These are important steps in maturing Transmission Services' asset management capability to strengthen financial health, modernize assets and system operations, and meet transmission customer needs efficiently and responsively. While always important, prioritization and sequencing of work is critical in the current environment to maintain acceptable grid reliability. Data driven and risk informed decisions result in better investment choices that support reliability.

## **Impacts of proposed spending level**

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The impacts of holding Transmission's direct capital spending essentially flat and absorbing inflation through FY 2021 include:

- Deferring most O&M flexibility projects for several years. O&M flex projects increase system availability through alternative service delivery arrangements, and reduce the impact to customers of required maintenance on BPA assets.
- Deferring some BPA participation in cooperative replacements with other utilities, such as protective relaying and transfer trip.

- Reduction of planned asset replacements, resulting in increased backlog, based on economic life, within the various asset categories. BPA faces ‘asset walls’ of like equipment installed in large quantities during various construction eras reaching economic and obsolescence replacement points, along with failures of a small percentage of these equipment groupings. BPA is beginning to experience the ‘asset wall’ effects in the 500-kilovolt circuit breaker and motor operated disconnect switch populations. Planned asset replacement rates have not been achieved due to resources being diverted to perform customer and compliance driven work, and emergency replacements have increased as a result. BPA is monitoring the trend and comparing actual asset failure experience to its models.
- Reduction in condition based planned asset replacements due to increasing fault current levels on the power system, caused by system additions and expansion projects. These equipment replacements, based on ratings, take precedence over condition-based replacements, resulting in increased unplanned outages and emergency replacements.

Transmission Services’ original total economic cost model-informed asset strategy recommended a plan ramping up to a steady state replacement pace that is not realistic in BPA’s current environment. The required investment levels developed for the previous two rate cases cannot be sustained with the capital spending held flat. Transmission Services is updating the TEC models to reflect realistic planned asset replacements based on actual assets replaced in the previous five years at current replacement costs. A combination of TEC model recommended investment levels and risk-informed projections will guide Transmission Services in the distribution of available funding to the various asset replacement programs in FY 2020 and 2021.

By funding at lower base levels in the near term, BPA has an increased risk of having an increased amount of high-value critical replacements during the next 10-15 years that need to be replaced as they fail. As a result, the replacement backlog will continue to grow, increasing the risk of unplanned outages and causing corrective maintenance costs to rise and emergency replacements of equipment to increase. Current sustain funding and limited human resources and contracting capacity results in a tradeoff: lower capital spending now with increased likelihood of unplanned outages and emergency equipment replacements in the future.

## **Work expected in 2020 and 2021**

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### **Large capital projects**

Transmission currently has 13 projects larger than \$7 million in flight from FYs 2019-2025 to meet the known demands of present and new customers. One of those projects (Series Caps) will be completed in FY 2019, with four completed in FY 2020, and three more completed in FY 2021. These projects outlined below are a mix of expand (customer driven), and sustain projects (steel lines, subs direct current, system telecom, and wood lines).

| FY19 through FY25 Transmission KSI Capital Projects Greater Than \$7M in Work Order as of 3/30/18 |                |                          |                     |      |      |      |      |      |      |      |
|---|----------------|--------------------------|---------------------|------|------|------|------|------|------|------|
| API Title   | Work Order Nbr | Program                  | Project Total Spend | FY19 | FY20 | FY21 | FY22 | FY23 | FY24 | FY25 |
| INSTALL SERIES CAPACITOR - DESIGN/CONSTRUCTION  | 434481         | EXPAND - CUSTOMER-DRIVEN | \$16,500,000.00     |      |      |      |      |      |      |      |
| [TC] L0389 UEC MORROW FLAT PHASE II (DESIGN/CONSTRUCTION)   | 440283         | EXPAND - CUSTOMER-DRIVEN | \$16,000,000.00     |      |      |      |      |      |      |      |
| [CF] L0389 MORROW FLAT PHASE II (DES/CON)   | 450830         | EXPAND - CUSTOMER-DRIVEN | \$7,500,000.00      |      |      |      |      |      |      |      |
| 2.5" RECOND (11 MILES OF 67 MI FULL LINE PH 1) (STEEL)  | 421572         | STEEL LINES              | \$9,014,040.00      |      |      |      |      |      |      |      |
| BANDON-ALVEY FIBER REPLACEMENT  | 433936         | SYS TELECOM - SUSTAIN    | \$18,500,000.00     |      |      |      |      |      |      |      |
| [CF] N0396 MIDWAY-ASHE: DOER CPTL PORTION (AUO)   | 458403         | EXPAND - CUSTOMER-DRIVEN | \$8,968,868.00      |      |      |      |      |      |      |      |
| REBUILD LATTICE WITH ENGR STEEL POLE  | 409667         | STEEL LINES              | \$14,000,000.00     |      |      |      |      |      |      |      |
| HOLCOMB-NASELLE 115 KV LINE UPGRADE-1: (OXBOW-NASELLE) DESIGN/CONSTRUCT                           | 377837         | WOOD POLE LINES          | \$8,200,000.00      |      |      |      |      |      |      |      |
| REPLACE SVC   | 350983         | SUB DC                   | \$8,088,000.00      |      |      |      |      |      |      |      |
| HOT SPRINGS-GARRISON FIBER UPGRADE  | 347761         | SYS TELECOM - SUSTAIN    | \$13,000,000.00     |      |      |      |      |      |      |      |
| REBUILD 57.8 MILES (WOOD)   | 347405         | WOOD POLE LINES          | \$11,383,054.00     |      |      |      |      |      |      |      |
| REBUILD 57.8 MILES (WOOD)   | 347405         | WOOD POLE LINES          | \$8,315,764.00      |      |      |      |      |      |      |      |
| OLYMPIA-PORT ANGELES FIBER REPLACEMENT (WITH SHELTON-FAIRMOUNT LINE REBUILD)                      | 458465         | SYS TELECOM - SUSTAIN    | \$15,628,668.00     |      |      |      |      |      |      |      |

FY 2019 - 2025 Transmission capital projects greater than \$7 million not in work Order as of 3/18

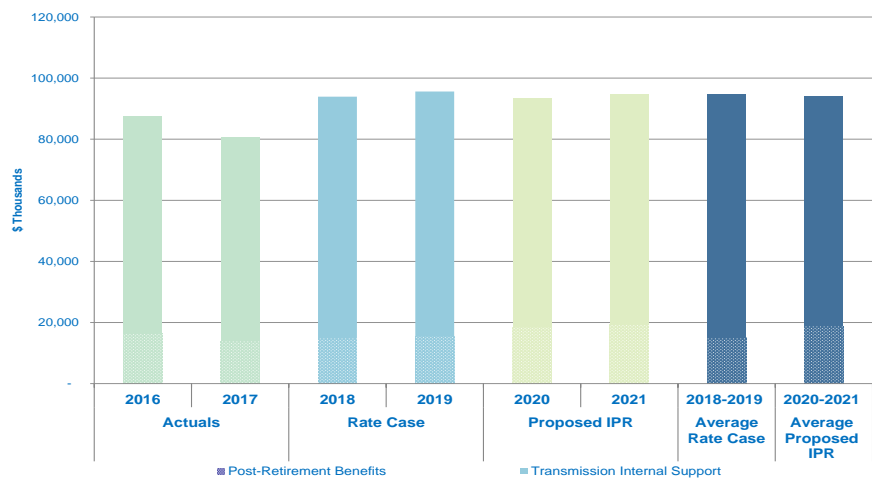
| API ID | API Title   | Program                  | Start Date | In Service Date | Project Total Spend | FY19 | FY20 | FY21 | FY22 | FY23 | FY24 | FY25 |
|--------|---|--------------------------|------------|-----------------|---------------------|------|------|------|------|------|------|------|
| 35012  | SCHULTZ-WAUTOMA 500KV SERIES CAPACITORS                   | EXPAND                   | 10/1/2018  | 6/1/2022        | \$35,000,000        |      |      |      |      |      |      |      |
| 35730  | GRID MODERNIZATION  | EXPAND                   | 10/1/2018  | 10/1/2022       | \$39,279,000        |      |      |      |      |      |      |      |
| 35777  | GRAND COULEE 230KV YARD MODERNIZATION                     | EXPAND                   | 10/1/2018  | 10/1/2029       | \$50,000,000        |      |      |      |      |      |      |      |
| 8849   | OMET PHASE 4 - MULTIPLE SITES                             | SYS TELECOM - EXPAND     | 12/1/2018  | 12/31/2019      | \$7,865,000         |      |      |      |      |      |      |      |
| 35181  | 2.5" RECOND (11 MILES OF 67 MI FULL LINE PH 2) (STEEL)    | STEEL LINES              | 2/1/2019   | 12/1/2020       | \$9,014,040         |      |      |      |      |      |      |      |
| 34992  | SOUTH TRI-CITIES REINFORCEMENT                            | EXPAND                   | 4/1/2019   | 3/31/2023       | \$25,000,000        |      |      |      |      |      |      |      |
| 30759  | NEW MIDWAY-ASHE 230KV DOUBLE CIRCUIT LINE CONSTRUCTION    | EXPAND - CUSTOMER-DRIVEN | 5/1/2019   | 10/31/2021      | \$38,768,439        |      |      |      |      |      |      |      |
| 31032  | LONGVIEW SUB 230/115 KV TRANSFORMER BANK ADDITION         | EXPAND                   | 7/1/2019   | 6/30/2023       | \$8,000,000         |      |      |      |      |      |      |      |
| 733    | REPLACE 500 KV CONCRETE SWITCH SUPPORT                    | SUB AC                   | 10/1/2019  | 9/1/2024        | \$11,491,000        |      |      |      |      |      |      |      |
| 35180  | 2.5" RECOND (11 MILES OF 67 MI FULL LINE PH 3) (STEEL)    | STEEL LINES              | 2/1/2020   | 12/1/2021       | \$9,014,040         |      |      |      |      |      |      |      |
| 283    | NEW 500 KV CROSS-CASCADE LINE                             | EXPAND                   | 10/1/2020  | 9/30/2024       | \$124,000,000       |      |      |      |      |      |      |      |
| 32467  | INSULATOR REPL (174 MI FULL LINE) (STEEL)                 | STEEL LINES              | 10/1/2020  | 9/1/2028        | \$13,000,000        |      |      |      |      |      |      |      |
| 35179  | 2.5" RECOND (11 MILES OF 67 MI FULL LINE PH 4) (STEEL)    | STEEL LINES              | 2/1/2021   | 12/1/2022       | \$9,014,040         |      |      |      |      |      |      |      |
| 201    | UPGRADE MURRAY-SEDRO-CUSTER 230KV LINE                    | EXPAND                   | 10/1/2021  | 9/30/2025       | \$17,391,000        |      |      |      |      |      |      |      |
| 35178  | 2.5" RECOND (11 MILES OF 67 MI FULL LINE PH 5) (STEEL)    | STEEL LINES              | 2/1/2022   | 12/1/2023       | \$9,014,040         |      |      |      |      |      |      |      |
| 34102  | NOXON-TAFT FIBER REPLACEMENT                              | SYS TELECOM - SUSTAIN    | 10/1/2022  | 9/1/2025        | \$8,700,000         |      |      |      |      |      |      |      |
| 35177  | 2.5" RECOND (11 MILES OF 67 MI FULL LINE PH 6) (STEEL)    | STEEL LINES              | 2/1/2023   | 12/1/2024       | \$9,014,040         |      |      |      |      |      |      |      |
| 33163  | ROSS-MALIN FIBER OPTIC CABLE REPLACEMENT                  | SYS TELECOM - SUSTAIN    | 10/1/2023  | 9/30/2029       | \$68,000,000        |      |      |      |      |      |      |      |
| 32624  | 2.5" EXP RECONDUCTOR (18.6 MI OSTD-6/4, 7/4-PERL) (STEEL) | STEEL LINES              | 10/1/2024  | 9/1/2028        | \$9,000,000         |      |      |      |      |      |      |      |
| 33164  | KEELER-TILLAMOOK FIBER OPTIC CABLE REPLACEMENT            | SYS TELECOM - SUSTAIN    | 10/1/2025  | 9/30/2028       | \$12,000,000        |      |      |      |      |      |      |      |

The second chart shows that the programmatic makeup of this work is similar to that already in flight but adds the expand control center work (for grid modernization) as well as a sustain substation alternate current 500-kV foundations replacement project.



## 4.2 Transmission internal support

19 percent of  
Transmission  
Services' IPR  
program costs



### Program cost details

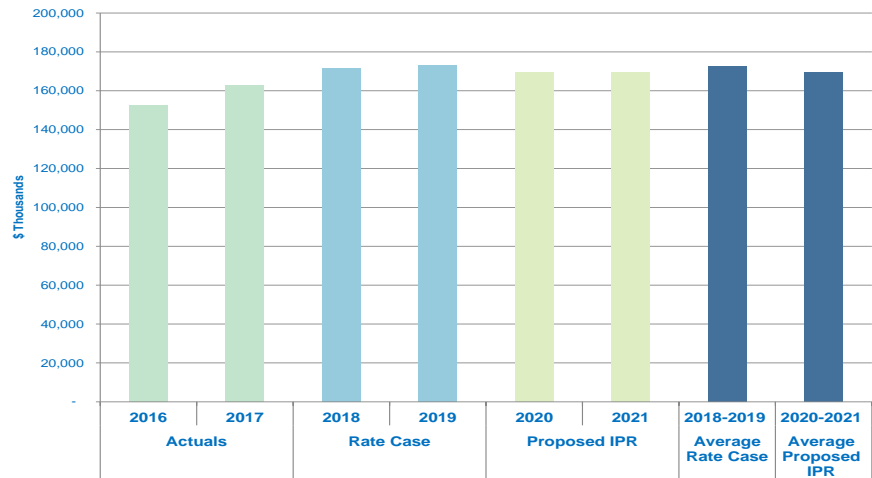
| (\$Thousands)                       | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|-------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                     | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Additional Post-Retirement Benefits | 16,440        | 13,920        | 14,946        | 15,532        | 18,438        | 19,293        |
| Transmission Internal Support       | 71,144        | 66,724        | 78,994        | 80,075        | 74,888        | 75,412        |
| <b>Grand Total</b>                  | <b>87,584</b> | <b>80,644</b> | <b>93,940</b> | <b>95,607</b> | <b>93,326</b> | <b>94,705</b> |

### Description

Internal support consists of two separate programs, additional post retirement benefits contributions and Corporate and CAO G&A. The internal support program is included in both the Power and Transmission revenue requirements. Since the program is the same for each business unit, the full narrative is captured in the Power Internal Support section on Page 37.

### 4.3 Maintenance

34 percent of Transmission Services' IPR program costs



#### Program cost details

| (\$Thousands)                      | Actuals        |                | Rate Case      |                | Proposed IPR   |                |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                                    | 2016           | 2017           | 2018           | 2019           | 2020           | 2021           |
| Non-Electric Maintenance           | 27,546         | 28,872         | 32,058         | 31,180         | 28,990         | 29,074         |
| Substation Maintenance             | 31,124         | 30,858         | 36,046         | 36,693         | 33,378         | 33,378         |
| Transmission Line Maintenance      | 25,564         | 27,574         | 29,817         | 30,228         | 29,358         | 29,358         |
| System Protection Controls         | 13,222         | 14,921         | 15,640         | 15,999         | 16,588         | 16,588         |
| Power System Maintenance           | 19,080         | 21,589         | 20,437         | 20,859         | 24,388         | 24,388         |
| Joint Cost Maintenance             | 230            | 190            | 148            | 149            | 1              | 1              |
| System Maintenance Management      | 8,555          | 8,348          | 7,779          | 8,010          | 7,811          | 7,811          |
| Row Maintenance                    | 7,785          | 10,401         | 9,944          | 9,986          | 7,065          | 7,065          |
| Heavy Mobile Equipment Maintenance | 327            | 427            | 18             | 18             | 559            | 680            |
| Technical Training                 | 2,719          | 2,796          | 2,471          | 2,526          | 2,682          | 2,682          |
| Vegetation Management              | 16,489         | 16,784         | 17,354         | 17,441         | 18,513         | 18,513         |
| <b>Grand Total</b>                 | <b>152,639</b> | <b>162,760</b> | <b>171,712</b> | <b>173,089</b> | <b>169,332</b> | <b>169,537</b> |

#### Description

The Transmission maintenance program directly supports the strategic goal of modernizing assets and system operations. The maintenance program is responsible for maintaining a large percentage of the Northwest's high-voltage transmission assets and providing safe, reliable, and cost-effective service to customers. The system is an interconnected network of more than 15,100 circuit miles of transmission lines connecting 260 substations, 732 communication sites, 3,100 miles of fiber optic cable, 43,500 steel towers, 73,500 wood poles, 195,600 acres of right-of-way corridors and 11,860 miles of access roads. Maintenance supports functions in the following sub-programs:

Substation maintenance provides service and repair of more than 32,000 pieces of BPA-owned high-voltage power system equipment, including power transformers, circuit breakers, switchgear, shunt and series capacitors and reactors, a high-voltage direct current converter facility, instrument transformers, station alternating current and direct current auxiliary power, and substation bus, insulators and structures.

Transmission line maintenance maintains and repairs BPA's network of overhead transmission lines and transmission line structures and fixtures including steel and aluminum lattice towers, wood poles and associated structures, insulators, insulator assemblies, overhead conductors and devices, fiber optic cable assemblies, obstruction warning devices, and roads and trails.

System protection and control maintenance provides critical support to the primary circuit elements of BPA's transmission system by maintaining overall reliability, gathering and storing operational data and ensuring public safety. The SPC program is responsible for 28,000 pieces of equipment in more than 950 locations, including BPA and customer-owned substations, power houses, maintenance buildings and control centers.

Power system control maintenance is responsible for the maintenance of crucial transmission system fiber/telecommunications assets, remedial action scheme, supervisory control and data acquisition, and telemetering equipment. Power system control responsibilities include more than 11,000 pieces of equipment at 732 sites.

System maintenance management supports maintenance and general upkeep of capital plant, property, and equipment, and provides operational support including plant repairs and minor replacements from point of generation to the entrance to the distribution system.

Non-electric facilities is responsible for maintaining buildings, sites and systems that support the functionality of BPA's transmission system. BPA's facilities asset management program is also a part of the non-electric facilities sub-program. See the complete facilities asset management strategy and the Workplace Services summary in the CAO section of this publication.

Heavy mobile equipment maintenance is BPA's Fleet Management group's responsibility. They are responsible for the acquisition, maintenance, and overall asset management of BPA's mobile equipment fleet, as well as the maintenance of over 150 emergency generators in unmanned sub-maintenance facilities.

Vegetation management and rights-of-way maintenance ensures that BPA can safely access, construct, operate and maintain its transmission facilities, and that BPA's rights-of-way are clear of trees, brush, and encroachments that could affect the safety, accessibility, and reliability of the transmission system. This sub-program ensures compliance with all applicable environmental and reliability standards, including the Endangered Species Act, the National Environmental Policy Act and NERC FAC-003.

Technical training provides training and continuing education for electricians, linemen, operator apprentices and craftsmen. In addition, it provides operator and engineer training, as well as professional training for Transmission Services annual employees in certain technical areas.

### **Impacts of proposed spending level**

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The Maintenance programs continue to prioritize safety and occupational health to empower employees and contractors to recognize and address safety issues. This focus reinforces and helps to advance the safety culture throughout BPA.

Transmission maintenance will maintain current spending levels with increases for salary inflation. Proposed spending will ensure compliance maintenance work completion but may result in a backlog of lower-priority work. Backlogging scheduled maintenance increases the likelihood of equipment failure causing significant system reliability issues and unplanned transmission system outages.

Personnel cost increases in the trades and crafts has increased costs in the sub-programs. To offset these increased costs, BPA is improving work planning and scheduling processes, combining work activities, and aligning resources.

### **Work expected in 2020 and 2021**

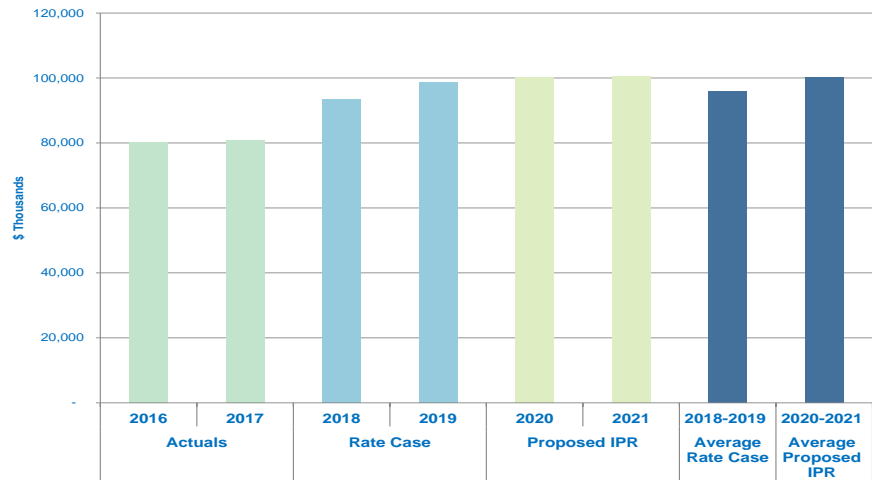
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BPA's transmission maintenance program will accomplish its compliance-driven and contractually-obligated maintenance responsibilities as efficiently and cost-effectively as possible, ensuring the reliability of BPA's transmission system through effective management of maintenance resources.

The maintenance program is embracing asset management life-cycle maintenance practices, optimizing maintenance intervals with improved data-driven decisions. Enacting these principles should realize efficiency and support BPA's strategic plan.

## 4.4 System Operations

20 percent of  
Transmission  
Services' IPR  
program costs



### Program cost details

| (\$Thousands)                | Actuals       |               | Rate Case     |               | Proposed IPR   |                |
|------------------------------|---------------|---------------|---------------|---------------|----------------|----------------|
|                              | 2016          | 2017          | 2018          | 2019          | 2020           | 2021           |
| Information Technology       | 9,436         | 9,903         | 8,523         | 8,668         | 10,890         | 10,972         |
| Power System Dispatching     | 13,913        | 13,722        | 16,082        | 16,376        | 16,237         | 16,237         |
| Control Center Support       | 23,066        | 23,567        | 26,398        | 26,919        | 26,962         | 26,962         |
| Technical Operations         | 7,648         | 7,864         | 14,397        | 17,937        | 15,453         | 15,453         |
| Strategic Integration        | 2,414         | 2,028         | 1,404         | 1,447         | 3,684          | 3,660          |
| Substation Operations        | 23,572        | 23,444        | 25,452        | 26,091        | 26,686         | 26,686         |
| Transmission System Operator | 102           | 165           | 1,100         | 1,100         | 403            | 403            |
| <b>Grand Total</b>           | <b>80,151</b> | <b>80,693</b> | <b>93,355</b> | <b>98,538</b> | <b>100,315</b> | <b>100,373</b> |

### Description

System Operations is comprised of six sub-programs: operations technology, power system dispatching, control center support, technical operations, scheduling, and substation operations. The department fully supports core components of the 2018–2023 Strategic Plan, including: objective 2b, modernize federal power and transmission system operations and supporting technology; and objective 4d, offer more standardized products and services, by better aligning BPA's Open Access Transmission Tariff with pro forma and industry best practices.

Operations technology implements and maintains grid operations' automation solutions to meet Transmission business needs (asset information and work management systems, for example) and provides overall transmission technology program-support services.

Power system dispatching operates two 24/7 regional control centers as a NERC-certified balancing authority, transmission operator, and transmission owner. It monitors the safe, reliable and compliant operation of the interconnected power system; provides dispatch and control services; directs real-time actions during all system conditions; provides outage coordination; develops and manages real-time system limits; and trains NERC-certificated dispatch staff.

Control center support provides full life-cycle support of control center assets used for the secure and reliable operation and control of the interconnected transmission system. Support activities include planning; engineering; design and build; project management; and operations and maintenance of control center assets, including software applications, systems and associated infrastructure. This sub-program provides necessary control-center implementation of and compliance with cyber and reliability regulatory standards.

Technical Operations develops and manages all near-term system operating limits and total transfer capabilities to support the safe, reliable and open access operation of the transmission system. Technical Operations also provides operating and mitigation plans for all system conditions to support real-time operation of the interconnected system. The sub-program provides technical support for planned outages; remedial action schemes; automatic generation control; balancing authority operations; renewable resource integration; and disturbance and event monitoring and reporting.

Transmission scheduling provides overall management of transmission scheduling, reservation transaction processing and analytical support for long-term and short-term transmission sales, consistent with BPA's OATT, business practices and procedures. The program is comprised of reservations, pre-scheduling, real-time scheduling, technical support, and scheduling after-the-fact.

Substation operations supports the continuity of operations through work standards; control of energized access, including physical; and cyber security requirements impacting system reliability and safety.

### **Impacts of proposed spending level**

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The proposed spending level is based on known regulations, requirements and technology, and existing resources that support BPA's strategic plan. While System Operations relies on the grid modernization spending levels to support the incremental changes identified in BPA's strategic plan, the proposed spending level is necessary to maintain the ability to support the strategic plan and deliver on the core mission.

System Operations, and its sub-programs, will continue to face challenges maintaining and acquiring adequate staffing due to competition of job opportunities in the region; evolving markets; and industry-wide, competitive recruiting incentives for specialized skillsets. BPA has limited ability to incentivize critical hires. This could be relieved by the new special salary rate for engineers that was recently approved by the Office of Personnel Management.

Ongoing changes with technology will pose risks associated with escalating costs and workload necessary to remain compliant with changing NERC standards and regulations; software licensing cost increases; and increased demands to support the development, operations and maintenance of systems and tools to accommodate emerging BPA and regional initiatives, including market initiatives with limited staffing.

Reductions to the proposed spending level for technical operations could limit priorities to core functions and maintaining current tools, processes and systems; result in an inability to integrate or adapt to emerging initiatives and markets, including non-wires alternatives; affect compliance with NERC reliability and cyber requirements; increase reliability risks; and reduce benefits of significant investment in emerging technology (e.g., synchrophasors), if not maintained.

BPA helps meet fast-paced, evolving business needs and changing compliance standards through automation. Risks associated with reduced funding include reduced ability to respond to unforeseen compliance or changing business requirements.

Reduced funding for the power system dispatching sub-program would put BPA at a high risk for safety incidents, reliability events and/or compliance violations as this sub-program consists of real-time dispatchers and trainers necessary to operate the grid.

Reduced funding for the control center support sub-program or operations technology sub-program would compromise BPA's ability to operate and maintain control center assets or monitor and manage network systems (e.g., automatic generation control, SCADA, synchrophasors) and telecommunications system infrastructure (e.g., fiber, microwave system, remedial action schemes) used to control the interconnected transmission system. It will also limit tools, systems and processes needed to ensure backup capability between the control centers. Appropriate monitoring and management of control center assets requires tools and systems, including access to necessary spare parts and preservation of software licenses and maintenance requirements.

Reduced funding for the scheduling sub-program would create challenges in the implementation of reliability standards and other changes in commercial activities, including, but not limited to, flow gates, curtailments, tariff implementation, alternative resources, and rate case initiatives.

Reduced funding for the substation operations sub-program would affect substation operator apprenticeship, permitting and clearance certification programs; control of energized access; development of work standards; technical field operations support and procedures including inspections, switching and clearance; the ability to address emerging practices and standards, including integrating new initiatives and regulations; and could have an inadvertent effect on operations, including event awareness and prevention.

During the past two years, System Operations has undertaken a number of actions to manage costs, reevaluate work assignments, and find efficiencies throughout the department, including reducing service and supplemental labor contracts; absorbing new workload with existing staff; re-allocating workload when employees leave; prioritizing projects and business initiatives; and centralizing compliance responsibilities (which helped reduce non-compliance exposure).

## Work expected in 2020 and 2021

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The primary focus for System Operations will be to modernize the grid and its supporting technology and prepare for evolving markets. This will be a significant undertaking impacting all of System Operations.

Focused work initiatives will include implementing a metering review to ensure operational and business needs for future best practices are met; enhancing overall data availability, visualization, and situational awareness in all control centers; enacting physical and organizational operational changes; improving BPA's system modeling capabilities; implementing reservation and scheduling practice changes; and redesigning available transfer capability calculations and processes.

The program will also concentrate on implementing current and emerging NERC and federal cybersecurity requirements, along with required training. It will oversee ongoing and increased software licensing and maintenance requirements, including support for multiple security and cyber situational tools and systems installed in the control centers and in the field. It will address significant changes to systems, tools and processes used for system operations and reliability, which may include reliability coordinator changes. It will further enhance frequency response metrics and automated thermal and stability real-time assessment capabilities.

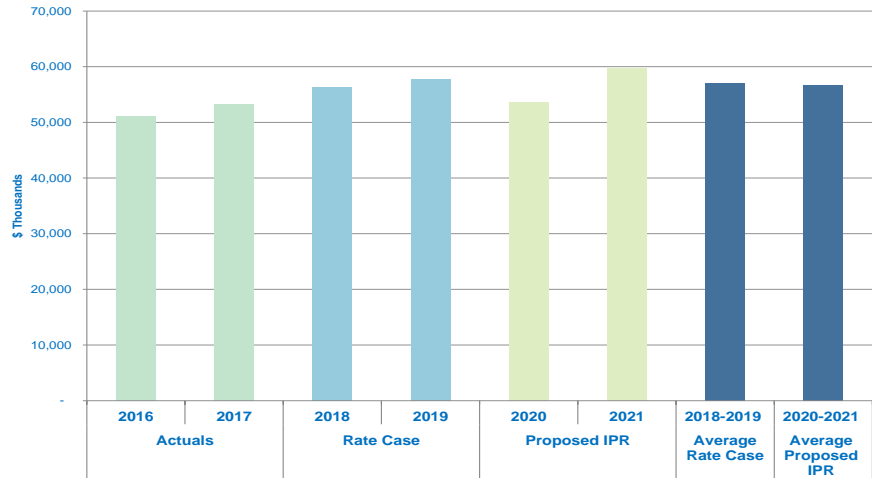
System Operations will perform significant updates to BPA's mission-critical IT processes and infrastructure to support grid modernization, including developing tools and services to be compatible with participation in emerging markets. This includes, for example, an upgrade to automatic generation control and remote communications capabilities. This upgrade would also allow the performance of multiple functions and data submissions to interact with potential developing marketing structures as well as develop the necessary functionality and interfaces to provide outage and derate capabilities to a potential market operator.

Improving substation operations continuity, field inspections, substation and equipment security, switching and clearance responsibilities, first response capability, inadvertent operations including event awareness and prevention; effective resolution of real-time system and safety issues, and integrating evolving policy, procedure and work standards support will remain a focus.



## 4.5 Engineering

11 percent of Transmission Services' IPR program costs



### Program cost details

| (\$Thousands)   | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---|---------------|---------------|---------------|---------------|---------------|---------------|
|   | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Research and Development                              | 7,458         | 8,576         | 7,129         | 7,298         | 3,850         | 3,870         |
| Transmission System Development Planning and Analysis | 18,059        | 21,601        | 21,292        | 21,752        | 27,946        | 33,946        |
| Capital to Expense Transfers                          | 8,951         | 6,896         | 4,285         | 4,285         | 3,328         | 3,328         |
| NERC/WECC Compliance                                  | 14,052        | 12,684        | 19,750        | 20,436        | 14,986        | 14,986        |
| Environmental Planning and Analysis                   | 1,251         | 1,192         | 1,695         | 1,747         | 1,639         | 1,668         |
| Engineering Line Rating                               | 1,399         | 2,291         | 2,200         | 2,200         | 1,934         | 1,934         |
| <b>Grand Total</b>                                    | <b>51,168</b> | <b>53,240</b> | <b>56,351</b> | <b>57,718</b> | <b>53,683</b> | <b>59,733</b> |

### Description

Transmission engineering includes work performed by multiple groups with a focus on safety and maintaining industry-leading assets. This work is accomplished through research and development; planning and analysis; and implementing and maintaining compliance standards to assure a reliable and resilient system. Engineering also ensures maintenance of line ratings, ensures all environmental analysis requirements are met and ways to manage project costs that cannot be capitalized are explored.

BPA's Technology Innovation program has an annual cycle of portfolio funding for research and development based on strategic needs identified in BPA's strategic plan objective 2b: modernize federal power and transmission system operations and supporting technology.

Transmission system development planning and analysis provides technical support and asset planning for the transmission infrastructure consistent with objective 2a: administer an industry-leading asset management program.

Capital-to-expense transfer program captures project costs that cannot be capitalized based on accounting practices. This sub-program assures that Transmission will improve cost-management discipline, which is objective 1a of BPA's strategic plan.

NERC and WECC compliance ensures compliance with NERC Orders 693 and 706 and addresses compliance with NERC and WECC mandatory standards; participates in the standards development process, implementing and maintaining compliance once standards are enacted; supports annual NERC/WECC self-certification; and provides staff support for audits.

Environmental planning and analysis ensures all BPA activities undergo appropriate environmental analysis and compliance review in accordance with environmental and cultural resource laws.

Engineering line rating verifies transmission line ratings to support system operating limits, transmission line performance and public and worker safety. This sub-program is consistent with objective 2a of BPA's strategic plan to administer an industry-leading asset management program.

### **Impacts of proposed spending level**

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The transmission engineering program will hold proposed spending levels flat and absorb the cost of inflation for the rate period. The program will continue to improve processes and expects to gain efficiencies to compensate for the cost of inflation. One example of process improvement efforts focused on asset management program delivery (AMPD) and was identified in the 2016 IPR. The AMPD initiative included goals to significantly improve annual program delivery levels, substantially advance asset management data quality and systems, and deliver robust project integration. Two specific areas of focus included implementing formal project scoping and stage-gate capital approval which improves investment decision-making and makes best use of capital dollars. The AMPD process improvements were completed at the end of FY 2017 and met the goals of clarifying roles and responsibilities, reducing duplication of efforts, and increasing capacity. Future efficiencies will be made through the capital investment approval (CIA) process improvements focusing on improving certainty and speed of project delivery.

### **Work expected in 2020 and 2021**

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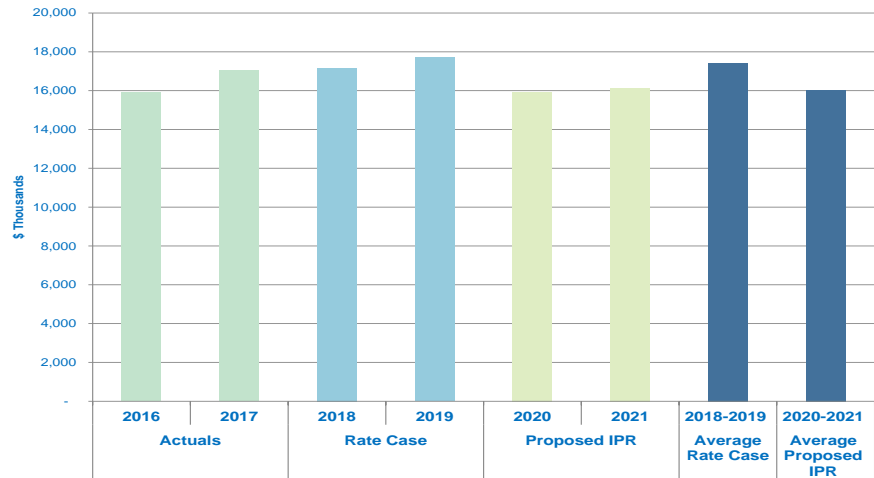
The transmission engineering program is aligned with BPA's strategic plan and is focused on achieving key business outcomes by the end of 2021 in several areas with an emphasis on meeting customer needs through enabling economic growth and providing access to federal and nonfederal resources. Transmission Planning will partner with the region to increase visibility of forecast loads, resources and customers' needs, and share planning information to facilitate customer load and resource siting decisions. An additional area of focus is improving our commercial planning practices, which will focus on probabilistic risk based commercial planning practices with the goal of establishing a consistent, timely and repeatable queue-management process and replacing long-term available transfer capability posting with more accurate system availability information.

The transmission engineering program expects improvements to the "maintain" area of the asset management lifecycle as well. Transmission will start optimizing maintenance intervals as well as our spares inventory with the use of a decision support tool that allows BPA to perform a probabilistic risk assessment.

Improvements to Transmission's asset management practices will continue. Transmission will continue to mature our risk management methodology with a focus on defining critical parts of the transmission system, integrating these needs into asset management, define enabling processes and establish organization and program risk thresholds and tolerances. Additionally, Transmission will continue to make improvements to our capital investment approval processes with a focus on improving portfolio management and making data-driven decisions.

## 4.6 Marketing

3 percent of  
Transmission  
Services' IPR  
program costs



### Program cost details

| (\$Thousands)                    | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                  | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Transmission Sales               | 2,299         | 2,524         | 3,491         | 3,600         | 2,887         | 2,887         |
| Contract Management              | 4,453         | 4,465         | 4,861         | 5,039         | 3,724         | 3,806         |
| Transmission Billing             | 2,318         | 2,093         | 2,518         | 2,611         | 2,895         | 2,992         |
| Business Strategy and Assessment | 6,836         | 7,948         | 6,285         | 6,457         | 6,419         | 6,438         |
| <b>Grand Total</b>               | <b>15,906</b> | <b>17,030</b> | <b>17,156</b> | <b>17,707</b> | <b>15,925</b> | <b>16,124</b> |

The transmission marketing program specifically addresses BPA's strategic goal to meet transmission customer needs efficiently and responsively. This program provides leadership and direction to standardize and streamline products, rules and strategies to satisfy BPA objectives and customer needs. This program provides open access to the federal transmission system, meets regulatory requirements, federal law and requirements of BPA's OATT. Responsibilities include developing and administering long-term and short-term transmission products and services and providing ratemaking support and margin management for transmission marketing and sales. Market intelligence, research and analysis contribute to product development and are used to set cost and revenue targets. This program manages nondiscriminatory reservation and sale of all transmission services associated with the transmission tariff and ensures commercial compliance, oversight and direction for all transmission commercial functions.

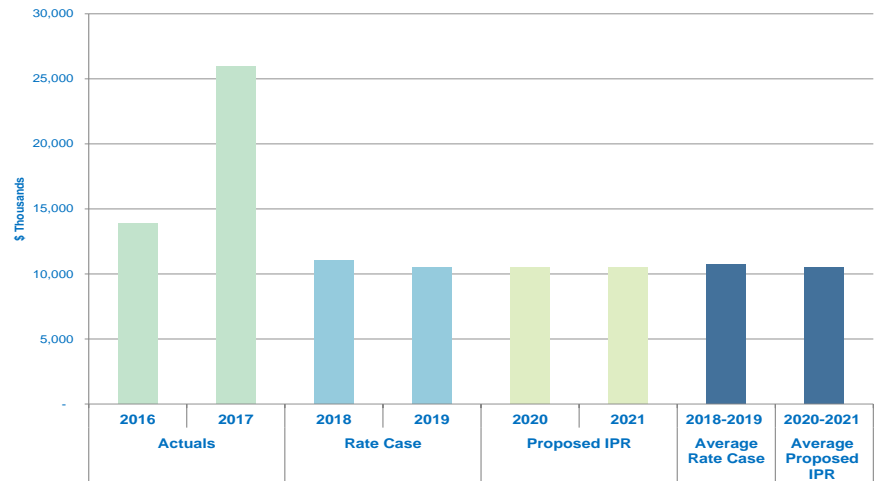
The transmission marketing program develops strategy, policies and implementation plans to enable customer participation in the energy imbalance market operated by CAISO that involve the use of BPA's transmission system. It continues to develop and implement grid modernization strategies, policies and implementation plans to address load service, congestion and new transmission service requests using flexible, scalable and cost-effective solutions, such as the commercial non-wires strategy. The program manages the internal decision process and external customer outreach and involvement to revise the BPA OATT and associated business practices. Mature market analysis capabilities help develop clear business practices and streamlined

processes that meet the current and future needs of network integration transmission service and point-to-point transmission service customers.

This program will continue evaluation of the roles and responsibilities between the marketing, system operations and planning programs that position BPA to most effectively develop and evaluate policies and practices for how BPA determines the most economical alternatives to meet regional load service.

## 4.7 Non-between business line transmission acquisition and ancillary services

2 percent of Transmission Services' IPR program costs



### Program cost details

| (\$Thousands)                                | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|--|---------------|---------------|---------------|---------------|---------------|---------------|
|  | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Leased Facilities                            | 7,533         | 6,128         | 5,746         | 5,179         | 5,220         | 5,220         |
| Settlement Agreements                        | 1,344         | 198           | 0             | 0             | 3             | 3             |
| Non-Between Business Line Ancillary Services | 4,932         | 11,850        | 97            | 97            | 97            | 97            |
| Oversupply Displacement Costs                | 0             | 2,239         | 0             | 0             | 0             | 0             |
| Reliability Demand Response/Redispatch       | 46            | 5,506         | 5,188         | 5,188         | 5,156         | 5,156         |
| <b>Grand Total</b>                           | <b>13,856</b> | <b>25,921</b> | <b>11,031</b> | <b>10,464</b> | <b>10,476</b> | <b>10,476</b> |

BPA provides open access to the federal transmission system, meeting BPA's OATT and regulatory requirements. The non-between business line (non-BBL) transmission acquisition and ancillary services program addresses BPA's strategic goal to meet transmission customer needs efficiently and responsively. This program provides leadership and direction for standardized and streamlined products. Responsibilities include creating agreements and services that ensure a reliable network, such as balancing services for load and renewable resources.

This organization develops strategy and policies in coordination with Transmission Marketing to enable other utilities' participation in the CAISO energy imbalance market through the use of BPA's transmission system. The program will continue to develop and implement grid modernization strategies, policies and plans to address load service, congestion and new transmission service requests using flexible, scalable and cost-effective solutions, such as self-supply initiatives and third party reserves. It will lease facilities in order to provide reliable services on the network and continue the evaluation of roles and responsibilities between the marketing, system operations and planning programs. This will position BPA to determine the most economical alternatives for balancing services and acquisition of services in order to provide reliable services to customers.

## 5. AGENCY SERVICES

Agency Services includes the Corporate and CAO organizations that provide support services and benefits to all of BPA. Its costs are ultimately recovered through power and transmission rates.

The majority of Agency Services costs are expense. To hold costs at or below the rate of inflation, Agency Services first determined whether the service is consistent with BPA's strategic plan and mission-critical business activities, and if so, how to provide the service at the lowest cost consistent with sound business principles.

### Agency Services Expense Overview

| (\$Thousands)                               | Actuals |         | Rate Case |         | Proposed IPR |         |
|---|---------|---------|-----------|---------|--------------|---------|
|   | 2016    | 2017    | 2018      | 2019    | 2020         | 2021    |
| <b>Administrator's Office Total</b>         | 1,095   | 1,003   | 1,200     | 1,240   | 967          | 991     |
| <b>Business Transformation Office Total</b> | 0       | 5,760   | 0         | 0       | 18,960       | 18,913  |
| Information Technology                      | 88,704  | 88,542  | 94,992    | 96,236  | 83,220       | 84,251  |
| Human Resources Service Center              | 16,809  | 16,347  | 17,550    | 17,898  | 16,647       | 16,955  |
| Internal Operations                         | 1,854   | 2,479   | 2,157     | 795     | 5,243        | 2,719   |
| Safety                                      | 6,163   | 6,433   | 9,291     | 9,473   | 6,712        | 6,836   |
| Security & Continuity of Operations (OSCO)  | 10,628  | 10,198  | 10,732    | 10,940  | 10,399       | 10,490  |
| Supply Chain                                | 36,703  | 35,903  | 36,065    | 36,938  | 37,706       | 38,490  |
| Workplace Services                          | 52,609  | 50,825  | 56,279    | 57,681  | 52,038       | 52,223  |
| <b>Chief Administrative Office Total</b>    | 213,469 | 210,726 | 227,065   | 229,962 | 211,964      | 211,964 |
| Chief Operating Officer                     | 2,252   | 2,627   | 10,728    | 15,757  | 4,915        | 4,984   |
| Customer Support Services                   | 9,639   | 8,994   | 10,048    | 10,405  | 9,377        | 9,722   |
| <b>Chief Operating Officer Total</b>        | 11,891  | 11,620  | 20,776    | 26,162  | 14,292       | 14,706  |
| <b>Compliance, Audit &amp; Risk Total</b>   | 16,348  | 15,840  | 17,148    | 18,043  | 17,225       | 17,816  |
| <b>Corporate Strategy Total</b>             | 20,828  | 15,488  | 19,830    | 20,691  | 8,201        | 8,267   |
| Communications                              | 4,696   | 4,620   | 4,938     | 5,096   | 4,599        | 4,772   |
| Deputy Administrator's Office               | 221     | 396     | 404       | 418     | 697          | 720     |
| Intergovernmental Affairs                   | 3,578   | 3,705   | 3,594     | 3,693   | 3,349        | 3,437   |
| <b>Deputy Administrator's Total</b>         | 8,495   | 8,722   | 8,936     | 9,206   | 8,646        | 8,929   |
| <b>Finance Total</b>                        | 17,502  | 16,056  | 18,750    | 19,225  | 16,072       | 16,596  |
| <b>General Counsel Total</b>                | 10,240  | 10,734  | 11,595    | 11,980  | 11,570       | 11,998  |
| <b>Grand Total</b>                          | 299,868 | 295,949 | 325,301   | 336,508 | 307,897      | 310,180 |

### Agency Services Capital Overview

| (\$Thousands)               | Proposed IPR |         |         |         |         |        |         |         |         |        |
|-----------------------------|--------------|---------|---------|---------|---------|--------|---------|---------|---------|--------|
|                             | 2020         | 2021    | 2022    | 2023    | 2024    | 2025   | 2026    | 2027    | 2028    | 2029   |
| Facilities                  | 29,646       | 23,254  | 17,224  | 41,678  | 51,667  | 4,344  | 27,400  | 27,900  | 28,500  | 29,000 |
| Security                    | 7,000        | 7,000   | 7,000   | 7,000   | 5,400   | 5,500  | 5,600   | 5,700   | 5,800   | 5,900  |
| Fleet                       | 6,700        | 7,200   | 8,200   | 8,200   | 8,500   | 9,000  | 9,200   | 9,800   | 9,800   | 10,000 |
| IT                          | 20,910       | 20,906  | 19,905  | 19,904  | 18,903  | 17,902 | 16,901  | 15,900  | 14,899  | 14,898 |
| Fish & Wildlife             | 47,266       | 47,266  | 43,000  | 43,000  | 40,000  | 40,000 | 40,000  | 40,000  | 39,923  | 15,000 |
| Environment                 | 5,557        | 5,557   | 5,580   | 5,590   | 5,600   | 5,610  | 5,620   | 5,630   | 5,640   | 5,650  |
| AFUDC                       | 380          | 257     | 331     | 256     | 427     | 573    | 593     | 593     | 593     | 593    |
| <b>Capital Direct Total</b> | 117,459      | 111,440 | 101,240 | 125,628 | 130,497 | 82,929 | 105,314 | 105,523 | 105,155 | 81,041 |

## 5.1 CORPORATE

### OVERVIEW

Corporate proposes to reduce costs by \$5 million a year compared to BP-18 spending levels.

- Reprioritization led to cutbacks or elimination of some work.
- Organizations across Corporate will be instrumental in supporting important processes and initiatives, including the Columbia River Systems Operations Environmental Impact Statement and Columbia River Treaty modernization.

Corporate's proposed spending levels for FY 2020-2021 support cost-effective services to internal clients, including Power Services and Transmission Services.

Corporate organizations fall under the direction of the administrator, deputy administrator or the chief operating officer. In addition to their direct offices, the organizations include Compliance, Audit and Risk Management; Business Transformation Office; Intergovernmental Affairs; Communications; Environment, Fish and Wildlife; Finance; Customer Support Services; General Counsel; and Corporate Strategy.

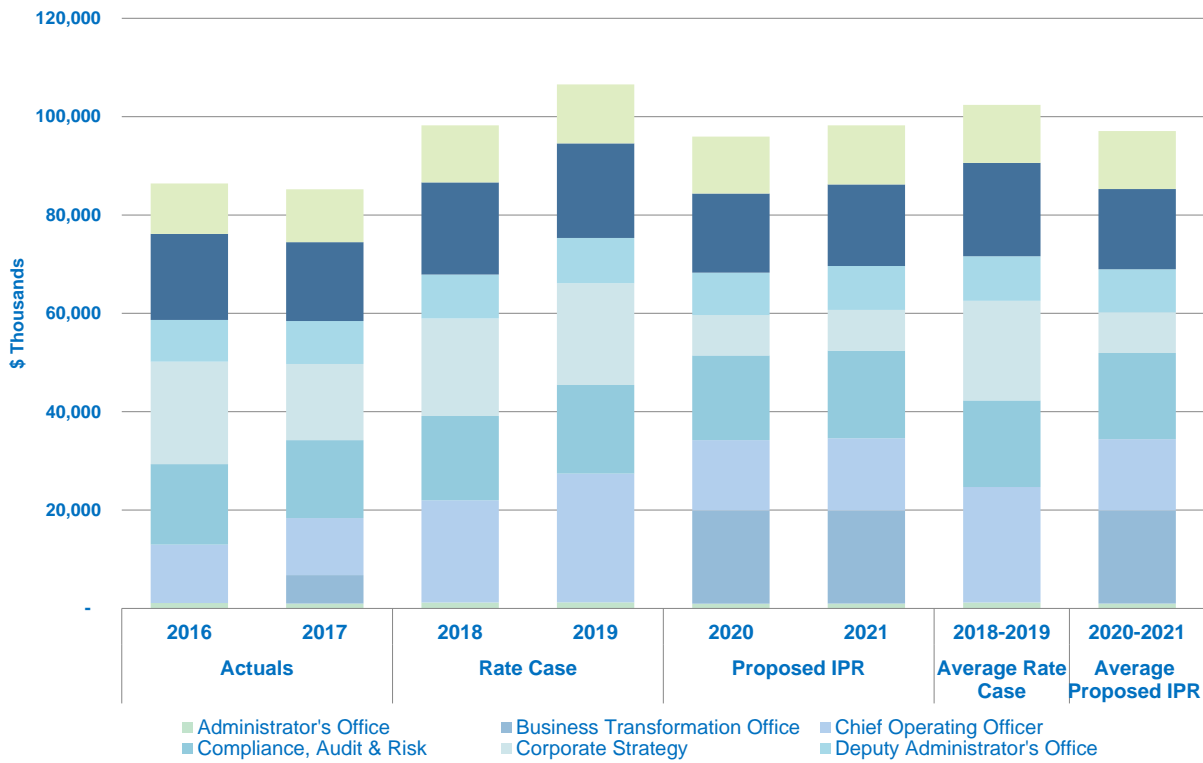
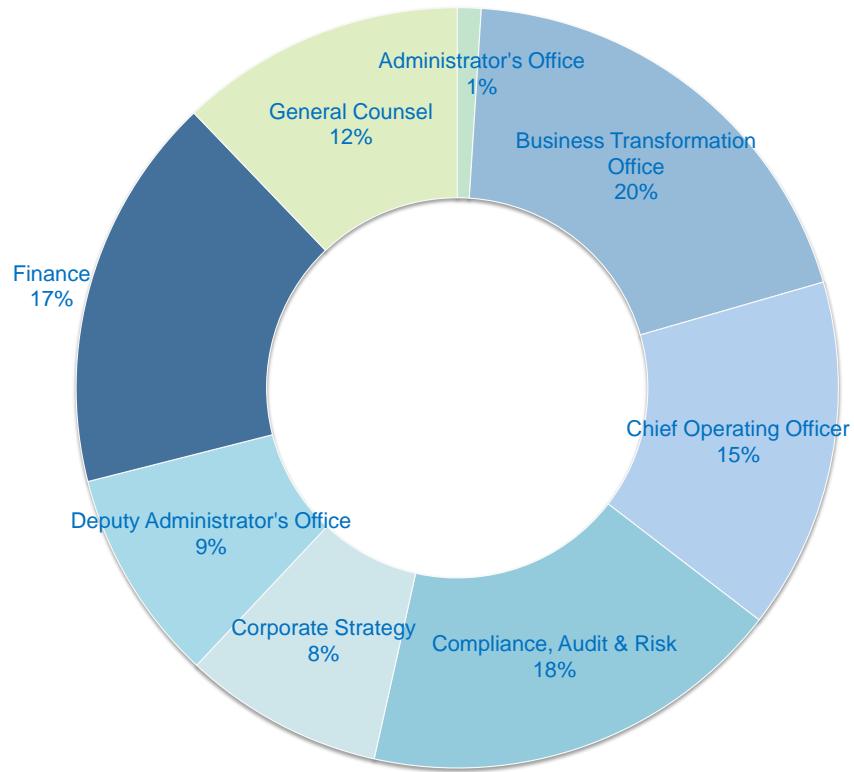
The tables for each organization include all costs that are allocated to Power and Transmission Services and a subset of costs that are direct charged to the business units. All corporate costs are included in the program view tables found in the Power and Transmission Services sections.

In aggregate, Corporate's proposed program costs for FY 2020 and 2021 workload is \$10.6 million below the BP-18 spending levels for the rate period. One notable driver for this reduction is refocusing the Technology Innovation office from a high-dollar program on a wide spectrum of technologies to a lower-dollar more focused program looking at technologies that help advance grid modernization and asset management efforts.

In the following sections, each of the Corporate organizations provides more information about what the workgroup or program does; how that work is connected to the strategic plan; and what work it expects to accomplish in FY 2020 and 2021.

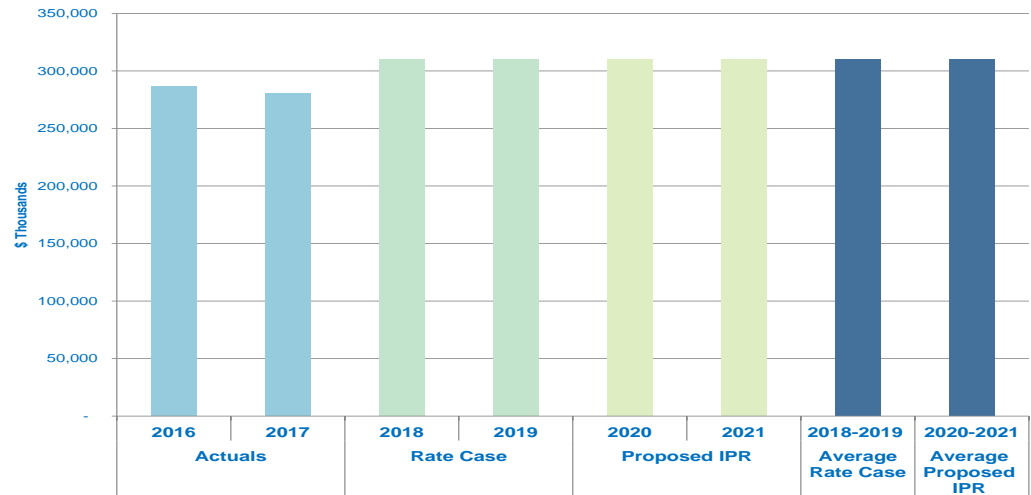


## Corporate Pool Expense Summary



| (\$Thousands)                               | Actuals |        | Rate Case |         | Proposed IPR |        |
|---|---------|--------|-----------|---------|--------------|--------|
|   | 2016    | 2017   | 2018      | 2019    | 2020         | 2021   |
| <b>Administrator's Office Total</b>         | 1,095   | 1,003  | 1,200     | 1,240   | 967          | 991    |
| <b>Business Transformation Office Total</b> | 0       | 5,760  | 0         | 0       | 18,960       | 18,913 |
| Chief Operating Officer                     | 2,252   | 2,627  | 10,728    | 15,757  | 4,915        | 4,984  |
| Customer Support Services                   | 9,639   | 8,994  | 10,048    | 10,405  | 9,377        | 9,722  |
| <b>Chief Operating Officer Total</b>        | 11,891  | 11,620 | 20,776    | 26,162  | 14,292       | 14,706 |
| <b>Compliance, Audit &amp; Risk Total</b>   | 16,348  | 15,840 | 17,148    | 18,043  | 17,225       | 17,816 |
| <b>Corporate Strategy Total</b>             | 20,828  | 15,488 | 19,830    | 20,691  | 8,201        | 8,267  |
| Communications                              | 4,696   | 4,620  | 4,938     | 5,096   | 4,599        | 4,772  |
| Deputy Administrator's Office               | 221     | 396    | 404       | 418     | 697          | 720    |
| Intergovernmental Affairs                   | 3,578   | 3,705  | 3,594     | 3,693   | 3,349        | 3,437  |
| <b>Deputy Administrator's Total</b>         | 8,495   | 8,722  | 8,936     | 9,206   | 8,646        | 8,929  |
| <b>Finance Total</b>                        | 17,502  | 16,056 | 18,750    | 19,225  | 16,072       | 16,596 |
| <b>General Counsel Total</b>                | 10,240  | 10,734 | 11,595    | 11,980  | 11,570       | 11,998 |
| <b>Grand Total</b>                          | 86,398  | 85,223 | 98,236    | 106,546 | 95,933       | 98,216 |

## 5.1.1 Environment, Fish and Wildlife



### Program cost details

#### Expense

| (\$Thousands)                   | Actuals        |                | Rate Case      |                | Proposed IPR   |                |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                                 | 2016           | 2017           | 2018           | 2019           | 2020           | 2021           |
| Agency Services G&A Allocations | 123            | 60             | 0              | 0              | 0              | 0              |
| Power Direct Support            | 287,095        | 283,372        | 314,894        | 314,830        | 315,293        | 315,753        |
| Transmission Direct Support     | 5,294          | 5,314          | 6,593          | 6,789          | 6,728          | 6,888          |
| <b>Grand Total</b>              | <b>292,512</b> | <b>288,747</b> | <b>321,486</b> | <b>321,618</b> | <b>322,020</b> | <b>322,642</b> |

*\*Note: Proposed FY 2020 and 2021 numbers do not reflect long-term cost reductions expected from discussions that are currently underway with BPA's partners in the region.*

#### Capital

| (\$Thousands)               | Proposed IPR  |               | Capital Outyears |               |               |               |               |               |               |               |
|-----------------------------|---------------|---------------|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                             | 2020          | 2021          | 2022             | 2023          | 2024          | 2025          | 2026          | 2027          | 2028          | 2029          |
| Fish & Wildlife             | 47,266        | 47,266        | 43,000           | 43,000        | 40,000        | 40,000        | 40,000        | 40,000        | 39,923        | 15,000        |
| Environment                 | 5,557         | 5,557         | 5,580            | 5,590         | 5,600         | 5,610         | 5,620         | 5,630         | 5,640         | 5,650         |
| <b>Capital Direct Total</b> | <b>52,823</b> | <b>52,823</b> | <b>48,580</b>    | <b>48,590</b> | <b>45,600</b> | <b>45,610</b> | <b>45,620</b> | <b>45,630</b> | <b>45,563</b> | <b>20,650</b> |

### Description

BPA's 2018-2023 Strategic Plan highlights how BPA has a unique role and responsibility to balance the economic and environmental benefits of the federal hydropower system. For more than 35 years, BPA has invested more than \$16 billion of ratepayer resources into one of the largest fish and wildlife programs in the world. The Environment, Fish and Wildlife division manages programs that mitigate for the effects of constructing and operating the Federal Columbia River Power System, as well as ensuring compliance with applicable environmental laws and regulations.

EFW provides support and compliance for the Power and Transmission business lines through three programs: Fish and Wildlife, Environmental Planning and Analysis, and Pollution, Prevention

and Abatement. Fish and Wildlife costs are primarily allocated to Power; Pollution Prevention and Abatement costs are primarily allocated to Transmission; and Environmental Planning and Analysis costs are allocated to both Transmission and Power depending on compliance needs.

BPA's Fish and Wildlife program implements hundreds of programs and projects across the Columbia River Basin each year and includes hydro actions and operations to improve fish passage and survival at the dams. Other key components of the F&W program include tributary and estuary habitat protection, habitat improvement monitoring, and researching critical uncertainties. Hatchery production of both anadromous and resident fish species helps mitigate hydro system impacts on fish species and may aid in conservation efforts.

These actions support compliance with applicable laws, including the Northwest Power Act and the Endangered Species Act, and help fulfill Bonneville's trust and treaty responsibilities to affected Native American tribes. BPA implements these actions through annual contracts with federal, state, tribal and local partners, in coordination with the Northwest Power and Conservation Council and independent science review.

Environmental Planning and Analysis ensures that all BPA activities undergo appropriate environmental analysis and compliance review in accordance with federal environmental and cultural resource laws. This organization also manages BPA's role in the FCRPS Cultural Resources Program, which is undertaken jointly with the Corps and the Bureau of Reclamation.

Pollution, Prevention and Abatement minimizes BPA's environmental liabilities. This organization develops, coordinates and manages environmental compliance programs for the operation, maintenance and construction of BPA's transmission system.

### **Impacts of proposed spending level**

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BPA's annual funding of the F&W program has produced major improvements and accomplishments in the protection, mitigation and enhancement of fish species through hydro system, habitat conservation and hatchery programs, with substantial improvements in Columbia River Basin fish and wildlife abundance and resilience.

Since 2008, BPA's annual spending for the F&W program has increased significantly. Fish and wildlife costs now make up nearly a third of the power revenue requirement and constitute another important variable in BPA's overall financial sustainability and cost competitiveness. As a result, like other programs throughout the agency, BPA intends to keep its fish and wildlife program costs (direct expense and capital costs)

flat, inclusive of any new obligations that have or may emerge from litigation or subsequent

The F&W program has:

- Protected almost 400,000 acre-feet of water.
- Opened up fish access to more than 3,764 miles of streams by removing barriers and small dams.
- Restored about 450 miles of stream habitat complexity.
- Protected or restored almost 9,000 acres of estuary floodplain by purchase or lease.
- Restored or enhanced more than 40 miles of estuarine tidal channels.

commitments in current or future biological opinions. To make the most of available funds, investments in fish and wildlife protection, mitigation and enhancement will be prioritized based on biological value and cost-effectiveness as well as their connection to mitigating for impacts of the FCRPS.

These initial IPR numbers do not reflect work that is currently underway with Northwest tribes, states and other partners to reduce costs by rebalancing the Fish and Wildlife portfolio. Bonneville has very significant but finite resources available to spend on the F&W program and these actions are consistent with spending reduction efforts being implemented across the agency. BPA will need the active support of its many partners and other stakeholders throughout the region to help sustain the Fish and Wildlife program at a level that is consistent with BPA's overall commercial viability. BPA anticipates that the actions taken in the short term will create sustainable savings that will roll into FYs 2020 and 2021. BPA will also continue to work with others in the region to attract additional fish and wildlife funding from regional and national governmental and nongovernmental sources, especially in the vital area of habitat restoration.

During FY 2020-2021, BPA expects that it will meet legal F&W compliance obligations under applicable laws, various BiOps, wildlife settlements and the Council program at the final proposed funding levels, to be determined over the course of this summer. BPA is considering short-term extensions of the Fish Accords as a means to meet compliance requirements and maintain strategic alignment with key tribal and state partners on hydro system operations and fish and wildlife mitigation actions. Fish Accords extensions will be considered within the framework of the funding limitations described above. Changes will require continued review and dialogue with our partners.

As part of the BPA cost-management effort, Fish and Wildlife continues to search for efficiencies. Spending and contracting decisions will be based on the biological priority and cost-effectiveness of a project in regards to the ESA, Northwest Power Act and other obligations and responsibilities – a biological investment portfolio approach. One example is the use of one-time stewardship agreements, rather than annual spending streams, to provide operation and maintenance costs associated with wildlife and fish land acquisitions purchased for mitigation.

The F&W program has put asset management plans in place for both land and water acquisitions. These asset plans are an integral part of the broader effort called for in the strategic plan to administer an industry-leading asset management program. In coordination with the Council, BPA is also evaluating and developing asset management plans for the hatcheries and fish screens it has funded over the last 25 years, as replacing/updating these investments will need to be managed to avoid significant cost increases or failures.

The primary impact of Environmental Planning and Analysis operating at its proposed budget level is delays in implementing projects. Such delays may increase implementation costs, the need for additional resources to finish construction on time, and/or the cost of additional or unanticipated mitigation.

For Pollution, Prevention and Abatement, the environmental capital programs focus on environmental compliance and liability within a long-term strategy to avoid unplanned expenses and maintenance that could postpone planned work. When failure of a transmission asset arises (i.e., a potential transformer fault), unplanned expense dollars must be found in the program to conduct environmental remediation, in addition to Transmission's emergency capital replacement of the failed electrical equipment. A potential risk this program faces is reduced transmission system reliability because aging high-voltage electrical equipment (40 to 65 years) that would have been replaced for polychlorinated biphenyl reduction remains in service. There could also be an increased likelihood of natural resource and property damage caused by off-site release of insulating oil from spills at BPA substations.

### **Work expected in 2020 and 2021**

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The F&W program will continue to implement actions in compliance with multiple National Oceanic and Atmospheric Administration and U.S. Fish and Wildlife Service BiOps, consistent with direction from court proceedings where applicable.

Emerging regulatory issues, adaptive management, and new commitments will be sequenced or reprogrammed from within existing F&W program spending to the extent possible. Ongoing and emerging fish and wildlife issues include blocked passage in tributaries, climate change, lamprey conservation, a sturgeon master plan, Columbia River Treaty recommendations, and providing litigation support, including significant input into legal strategy, court filings and status reports to the court. Fish and Wildlife will develop proposed actions and other materials and activities supporting consultation for a new, long-term FCRPS BiOp, including planning, regional communication, and outreach.

In addition, BPA, the U.S. Army Corps of Engineers and the Bureau of Reclamation have initiated a new, comprehensive CRSO EIS on the effects, alternatives and trade-offs associated with operations, maintenance and configuration of 14 federal dams. Through a robust public process and extensive analysis, the CRSO EIS will eventually select a long-term strategy for coordinated water management of these 14 dams. BPA will support development and analyses of action alternatives for the CRSO EIS as well as identification and eventual selection of a preferred alternative for long-term system operations. The draft EIS is due in March 2020, the final EIS is due March 2021, and the record of decision must be signed in September 2021. BPA will provide active litigation support, including significant input into legal strategy and status reports.

The final proposed spending levels for F&W will need to cover environmental compliance commitments under various laws and formal agreements. A number of these commitments are legally required elements of BPA's cost structure. The program must also strike a balance between listed species under the ESA and species that are not listed, between anadromous fish and resident fish and wildlife, and between wild and hatchery fish. With the exception of capital funding for hatchery construction and certain land acquisitions and stewardship funds, the F&W program spending is expense funded. The F&W organization has a tremendous number of issues to address and work to produce in the coming years. Efficient use of personnel resources will be essential to

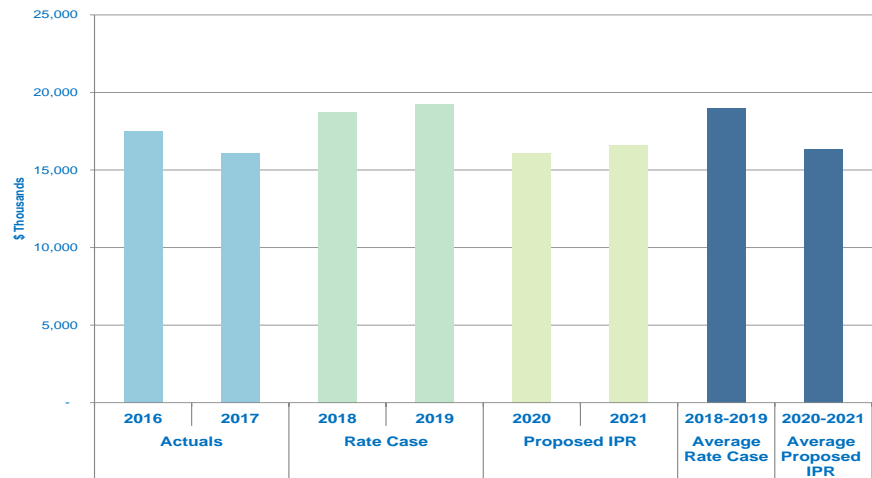
meeting these many objectives, and BPA may need to redeploy staff from other parts of the agency to support this critical work.

For Environmental Planning and Analysis, work includes continuing to identify the appropriate NEPA strategies and provide quality, timely and cost-effective environmental and cultural planning and analysis services to deliver key program milestones in partnership with Transmission, Power and Fish and Wildlife.

Pollution, Prevention and Abatement plans to replace 30 or more pieces of high-voltage equipment annually that are regulated for PCB content under the Toxic Substances Control Act; install or upgrade drainage treatment and containment systems at environmentally sensitive transmission facilities to maintain water resources protection and to prevent regulatory non-compliance; and install or upgrade oil storage at key transmission facilities to meet environmental regulatory standards and requirements.

## 5.1.2 Finance

17 percent of Corporate's IPR program costs



### Program cost details

| (\$Thousands)                   | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                 | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Agency Services G&A Allocations | 17,497        | 16,056        | 18,750        | 19,225        | 16,072        | 16,596        |
| Power Direct Support            | 5             | 0             | 0             | 0             | 0             | 0             |
| <b>Grand Total</b>              | <b>17,502</b> | <b>16,056</b> | <b>18,750</b> | <b>19,225</b> | <b>16,072</b> | <b>16,596</b> |

### Description

Finance provides leadership and services in financial planning and analysis, accounting and financial reporting, and financial strategy and operations for the FRCPS and BPA. This organization offers analytical insights and support for rate case and regulatory proceedings as well as public engagement processes. It oversees capital and expense budget development in alignment with strategic objectives, cash and debt management operations including meeting the annual U.S. Treasury payment and proactively addresses accounting matters to achieve a clean audit opinion.

Finance has primary responsibility for financial initiatives that are strategic and long-term in nature. It develops relationships with federal and nonfederal banking communities, ratings agencies, investors and others in the financial community. In addition, Finance provides leadership in developing proposals and policies on strategic issues that affect BPA's long-term financial integrity and competitiveness or that have an impact on customers, constituents and other stakeholders.



## **Impacts of proposed spending levels**

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Finance's proposed spending levels support BPA's strategic plan goal of strengthening BPA's financial health. Finance has reprioritized work and implemented cost efficiencies in order to meet this goal. For example, the development of the annual report represents a significant workload on an annual basis for Finance and Communications staff as well as others across BPA. As Finance looked at ways to streamline work, it was decided that the "Year in Review" section of the annual report was not required and will be eliminated going forward. This decision frees up staff to focus on other activities and eliminated a writing contract. Many of the reductions are due to efficiencies as well as expected reductions in federal workforce costs due to attrition. Finance will be taking on additional risk as a result of these reductions. Not hiring behind vacancies could increase the risk of errors and meeting timelines.

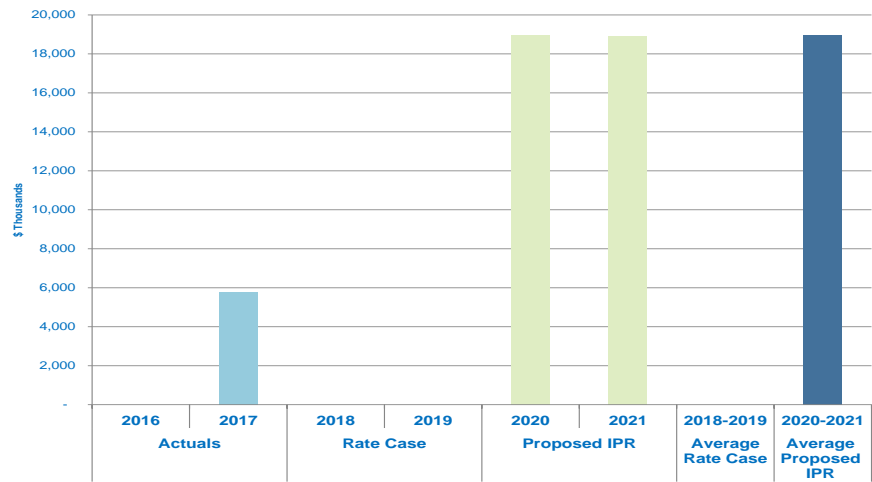
## **Work expected in 2020 and 2021**

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In FY 2020 and 2021, Finance will continue to lead the effort to meet the strategic goal of strengthening BPA's financial health. This includes leading cost-management initiatives and budget development in-line with the strategic goal to keep program costs at or below the rate of inflation; providing leadership in the efforts to increase financial resiliency with targets for how BPA uses debt, secures low cost debt, manages and maintains liquidity; and maintains high credit ratings.

### 5.1.3 Business Transformation Office

20 percent of Corporate's IPR program costs



#### Program cost details

| (\$Thousands)                   | Actuals  |              | Rate Case |          | Proposed IPR  |               |
|---------------------------------|----------|--------------|-----------|----------|---------------|---------------|
|                                 | 2016     | 2017         | 2018      | 2019     | 2020          | 2021          |
| Agency Services G&A Allocations | 0        | 4,207        | 0         | 0        | 6,460         | 6,413         |
| Power Direct Support            | 0        | 530          | 0         | 0        | 4,125         | 4,125         |
| Transmission Direct Support     | 0        | 1,023        | 0         | 0        | 8,375         | 8,375         |
| <b>Grand Total</b>              | <b>0</b> | <b>5,760</b> | <b>0</b>  | <b>0</b> | <b>18,960</b> | <b>18,913</b> |

#### Description

The Business Transformation Office is responsible for the successful development and execution of cross-agency initiatives designed to ensure BPA achieves the goals outlined in the BPA's strategic plan. The BTO embodies a structured approach to program design, management and execution within the portfolios of cross-agency initiatives.

The BTO's primary objective is to lead and facilitate implementation of assigned cross-agency initiatives working collaboratively with the business lines to help BPA achieve its strategic plan and fulfill its vision. The BTO provides resources, structure and standardization in the areas of program and project management, change management, business analysis and enterprise architecture.

#### Impacts of proposed spending level

The BTO spending levels are broken out into two main elements: Key Strategic Initiative and non-KSI. The KSI element funds the incremental costs for BPA's KSIs and the non-KSI element funds the BTO existing staff and capabilities.

The BTO was established in fiscal year 2017 and therefore was not included in the IPR 2016 spending levels. When the BTO was created, staff and the associated funding were transferred to the BTO from other organizations within BPA.

For FY 2020 and 2021, the four KSIs managed by the BTO have been replaced by one KSI: Grid Modernization. The Commercial Operations KSI work will be incorporated into this new KSI. The Asset Management KSI has been centralized under the agency asset manager where the program will continue to be implemented. The other two KSIs, Long-Term Finance and Rates and Business Information Systems, have been integrated into the normal workload of the benefiting organizations, Finance and IT.

### **Work expected in 2020 -2021**

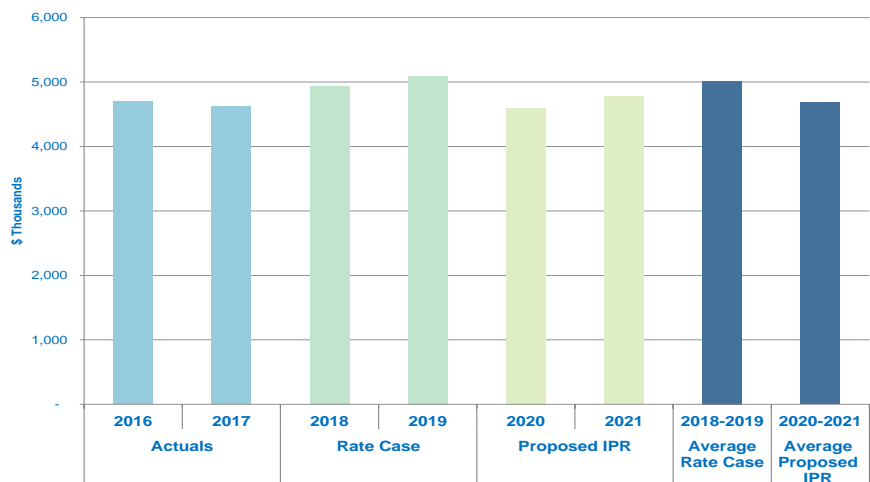
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The BTO spending levels have been right-sized to account for the organization's continued development. The BTO will continue to provide resources, structure and standardization to ensure BPA achieves the goals outlined in its strategic plan.

Since the number of KSIs has been reduced to one, the BTO's primary focus will be on grid modernization.

## 5.1.4 Communications

5 percent of Corporate's IPR program costs



### Program cost details

| (\$Thousands)                   | Actuals      |              | Rate Case    |              | Proposed IPR |              |
|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                                 | 2016         | 2017         | 2018         | 2019         | 2020         | 2021         |
| Agency Services G&A Allocations | 4,696        | 4,620        | 4,796        | 4,949        | 4,599        | 4,772        |
| Power Direct Support            | 0            | 0            | 142          | 147          | 0            | 0            |
| <b>Grand Total</b>              | <b>4,696</b> | <b>4,620</b> | <b>4,938</b> | <b>5,096</b> | <b>4,599</b> | <b>4,772</b> |

Communications is responsible for fostering support, knowledge, and awareness of BPA's activities, achievements, and value to the Northwest. In FY 2020 and 2021, the organization will support the implementation of the strategic plan and provide updates on its progress to the BPA workforce, electric utility customers, Northwest ratepayers, partners, the general public and other stakeholders.

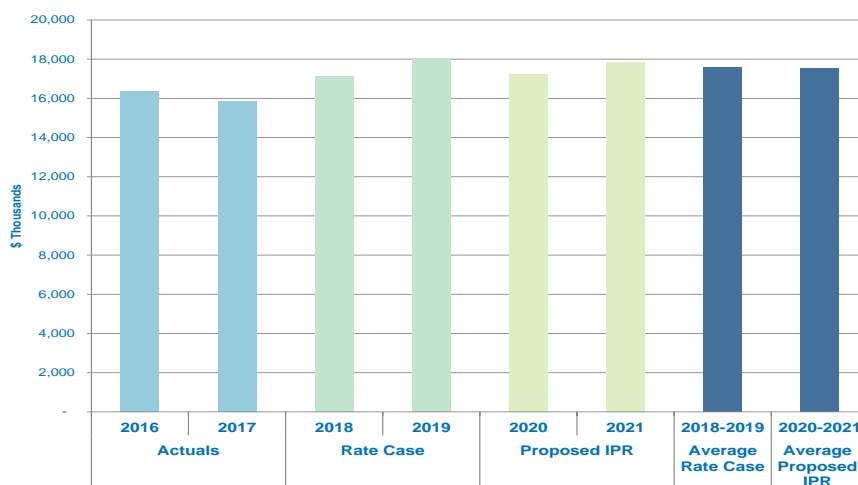
Communications is also responsible for ensuring that programs are in place to secure appropriate public input into BPA's decision-making processes. The staff promotes public engagement, education and awareness through public meetings, public comment processes, community events, web updates and engagement with media outlets. Communications is a partner with BPA leadership in providing public affairs counsel, developing clear and meaningful messages and implementing actions that best reinforce BPA's goals and direction. Communications also manages BPA's overall official external presence with visual branding and guidelines that help ensure standardization across the business.

The funding level challenges and constraints to Communications are similar to those of Intergovernmental Affairs in that there are many initiatives and processes that it supports. Communications is responsible for public engagement in the Columbia River Treaty process. This organization also supports preparation and coordination around the next FCRPS Biological Opinions and associated compliance with the National Environmental Policy Act. Communications supports BPA's long-term financial stability and its ability to meet its statutory obligations at sustainable rates, along with key BPA strategic initiatives such as grid modernization.

Communications provides extensive official BPA information to a variety of stakeholders, from fact sheets and forums such as BPA's Quarterly Business Review to public meetings and media forums, including responses to crises and safety incidents. Further spending reductions will compromise Communications' ability to provide these services in an efficient and effective manner.

## 5.1.5 Compliance, Audit and Risk Management

18 percent of Corporate's IPR program costs



### Program cost details

| (\$Thousands)                   | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                 | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Agency Services G&A Allocations | 10,482        | 9,829         | 10,224        | 10,781        | 11,119        | 11,487        |
| Power Direct Support            | 2,244         | 2,460         | 2,536         | 2,663         | 2,652         | 2,749         |
| Transmission Direct Support     | 3,622         | 3,551         | 4,388         | 4,599         | 3,454         | 3,580         |
| <b>Grand Total</b>              | <b>16,348</b> | <b>15,840</b> | <b>17,148</b> | <b>18,043</b> | <b>17,225</b> | <b>17,816</b> |

The Compliance, Audit and Risk Management organization is comprised of four organizations described below, headed by the executive vice-president of Compliance, Audit and Risk Management.

Agency compliance and governance oversees a broad array of compliance and governance functions at BPA, including agency level FERC compliance, policy management, Office of Management and Budget circular A-123 compliance, information governance, purchasing policy governance, and management of BPA's workplace concerns program/BPA Hotline.

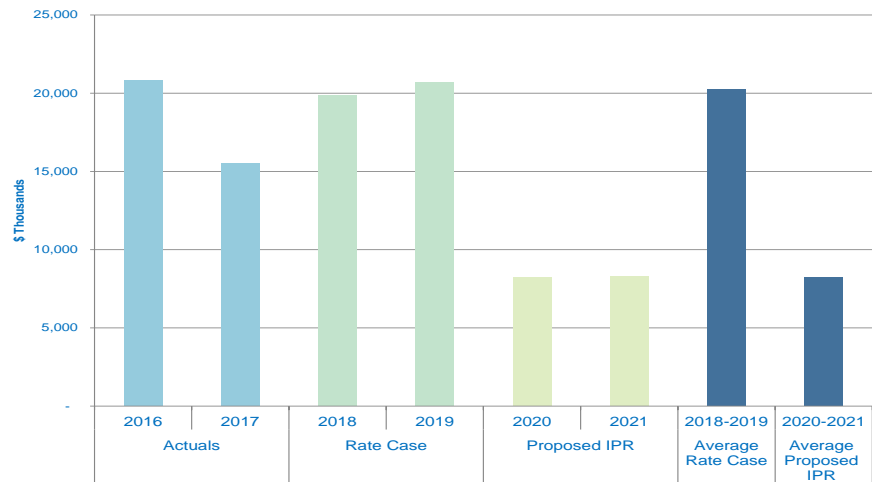
Audit provides independent, objective assurance and consulting services designed to evaluate and assist BPA by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of its internal control, risk management and BPA's governance processes. The overall objective is to provide reasonable assurance that BPA is compliant with laws and regulations, has efficient and effective operations, and has reliable financial reporting.

Risk management is comprised of the enterprise risk management and transacting, credit and insurance risk management functions. Risk management provides independent assurance that BPA business operations and planning and decision-making are risk informed and aligned with BPA's risk tolerance, improving the likelihood that BPA achieves its business objectives. The group provides consulting, facilitation and training for risk assessments, business cases, root cause analyses, and application of the agency decision framework.

Civil rights and equal employment opportunity is responsible for Equal Employment Opportunity Title VI and VII compliance and resolution programs.

## 5.1.6 Corporate Strategy

8 percent of  
Corporate's IPR  
program costs



### Program cost details

| (\$Thousands)                   | Actuals       |               | Rate Case     |               | Proposed IPR |              |
|---------------------------------|---------------|---------------|---------------|---------------|--------------|--------------|
|                                 | 2016          | 2017          | 2018          | 2019          | 2020         | 2021         |
| Agency Services G&A Allocations | 10,991        | 5,224         | 12,079        | 12,726        | 2,674        | 2,740        |
| Power Direct Support            | 5,548         | 4,702         | 4,153         | 4,260         | 3,527        | 3,527        |
| Transmission Direct Support     | 4,289         | 5,562         | 3,599         | 3,706         | 2,000        | 2,000        |
| <b>Grand Total</b>              | <b>20,828</b> | <b>15,488</b> | <b>19,830</b> | <b>20,691</b> | <b>8,201</b> | <b>8,267</b> |

Corporate Strategy positions BPA to deliver long-term regional value by providing strategic planning, technology research and development, strategic initiative implementation, operational excellence competency, and tracking and reporting on BPA's progress against strategic imperatives and performance indicators. BPA is making major changes in the Corporate Strategy organization. The Strategic Planning organization is being eliminated in lieu of a more distributed model of strategic planning involving the BTO, business lines and senior executives.

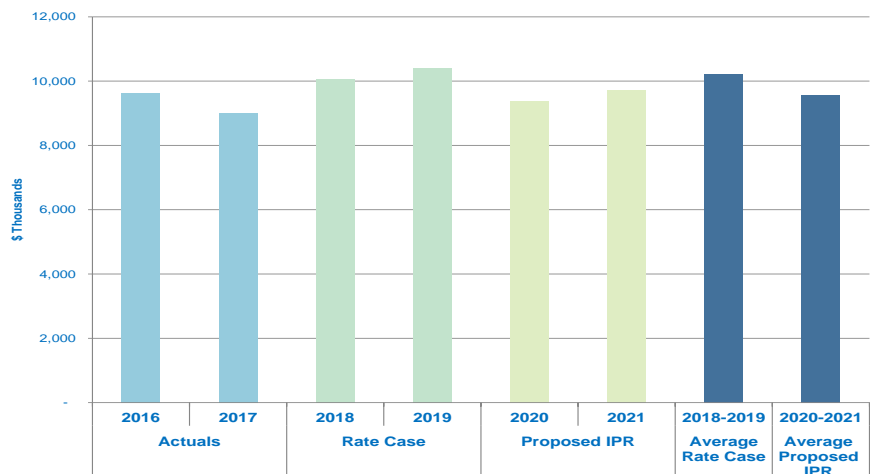
The Technology Innovation team delivers value through research, development and demonstration projects related to grid modernization and asset management. TI addresses BPA's future technology needs and mitigates risks by administering a disciplined research management program to identify, test, apply, refine, and introduce technology solutions across Power and Transmission business lines. BPA narrowed the focus of the Technology Innovation program, which led to significant program reductions. TI will concentrate on projects that support our grid modernization objectives and will work with the business lines to identify the types of projects needed to modernize assets and system operations.

BPA is considering additional changes or phase out of other Corporate Strategy organizations and will address these changes by the closeout report.



## 5.1.7 Customer Support Services

10 percent of Corporate's IPR program costs



### Program cost details

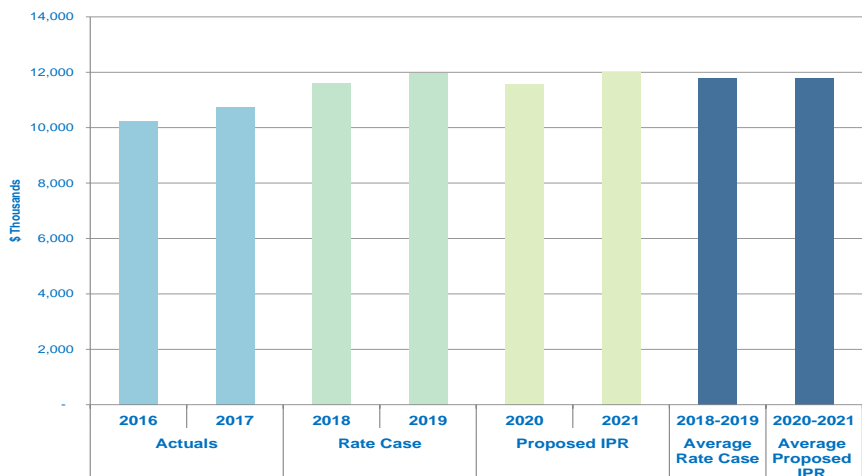
| (\$Thousands)                   | Actuals      |              | Rate Case     |               | Proposed IPR |              |
|---------------------------------|--------------|--------------|---------------|---------------|--------------|--------------|
|                                 | 2016         | 2017         | 2018          | 2019          | 2020         | 2021         |
| Agency Services G&A Allocations | 9,628        | 8,989        | 10,048        | 10,405        | 9,377        | 9,722        |
| Power Direct Support            | 11           | 0            | 0             | 0             | 0            | 0            |
| Transmission Direct Support     | 0            | 5            | 0             | 0             | 0            | 0            |
| <b>Grand Total</b>              | <b>9,639</b> | <b>8,994</b> | <b>10,048</b> | <b>10,405</b> | <b>9,377</b> | <b>9,722</b> |

Customer Support Services provides all load forecasts for BPA, produces all customer bills and oversees revenue metering services and contract administration. The organization provides these core business services central to the customer experience while meeting back office governance requirements. The group works closely with Power and Transmission front office business organizations. Customer Support Services uses 12 IT systems to perform work with two critical business systems; almost half of the systems are also used by other workgroups across BPA. Customer portal, one of the IT systems, provides a single source of metering, billing, contracts, forecasting and other BPA information to customers.

Customer Support Services' goals for FY 2020 and 2021 are aligned to help implement BPA's strategic plan. This organization will support Power and Transmission Services' efforts to standardize products and efficiently meet customer needs and share load and economic indicators for BPA to raise awareness, assess impacts and respond to the changing energy landscape. The group will ensure its systems keep pace with the changing needs of the utility industry by modernizing and automating processes to support the faster intra-hour system needs and will engage our customers in the replacement of the customer billing and customer portal systems. Customer Support Services will continue to promote process improvements while ensuring customer, contract, billing and metering data is accurate and timely, and will do all of this while fostering a safe, positive and inclusive culture where people are valued and empowered to deliver results.

## 5.1.8 General Counsel

12 percent of Corporate's IPR program costs



### Program cost details

| (\$Thousands)                   | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                 | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Agency Services G&A Allocations | 4,363         | 4,530         | 7,004         | 7,204         | 5,239         | 5,410         |
| Power Direct Support            | 3,018         | 3,260         | 2,875         | 2,983         | 3,166         | 3,294         |
| Transmission Direct Support     | 2,859         | 2,944         | 1,716         | 1,792         | 3,166         | 3,294         |
| <b>Grand Total</b>              | <b>10,240</b> | <b>10,734</b> | <b>11,595</b> | <b>11,980</b> | <b>11,570</b> | <b>11,998</b> |

The Office of General Counsel provides legal representation in connection with all BPA activities. It charges directly to Power and Transmission Services when supporting projects exclusively for the business line. It also has costs in support of general BPA initiatives which are allocated to the business units. Support includes legal advice and representation of BPA in all areas of claims, and administrative or judicial litigation. Areas covered include the Columbia River Treaty; corporate authority, governance and delegations; financial management; tribal issues; Fish and Wildlife program support; procurement of goods and services; tort claims; Freedom of Information Act/Privacy Act; employee claims; ethics, including conflicts of interests and financial disclosure; human capital issues, including labor issues, disciplinary actions, reasonable accommodations requests, and EEO claims; and security processes and procedures.

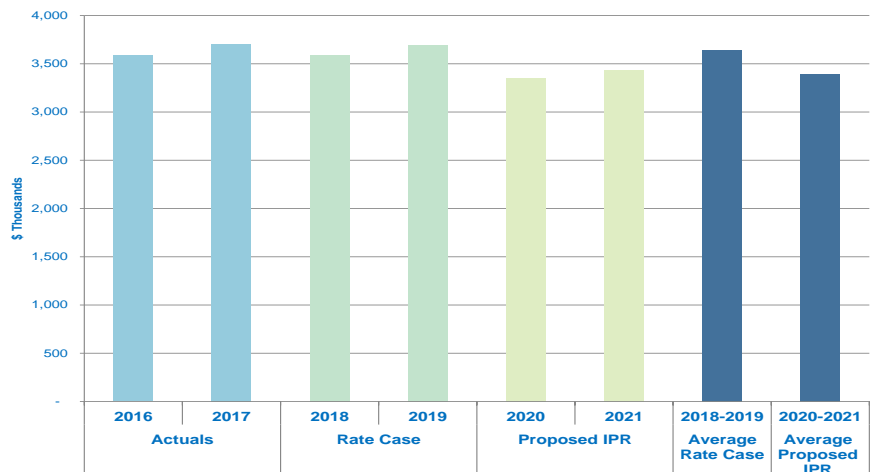
Insufficient funding of legal services may compromise BPA's ability to complete market transactions, including bond work and third party financing and also smaller transactions in support of customer contract needs. It may also jeopardize BPA's ability to participate in litigation, ranging from support of Department of Justice actions to actual representation in forums such as FERC. Significant delays to BPA initiatives may be felt by customers and BPA staff as legal resources are prioritized.

The Office of General Counsel's goals and priorities in FY 2020 and 2021 are to continue to provide advice related to, and defend actions associated with, the widely varying functional areas identified above. All issues are important, but more activity is expected with the Treaty negotiations; changing energy market environments; litigation and activities associated with the FCRPS Biological

Opinions; the pro forma tariff; and grid modernization. The Office of General Counsel is committed to BPA's cost-management goals. This additional work will be prioritized with existing workload and accomplished within the spending caps.

## 5.1.9 Intergovernmental Affairs and Northwest Power and Conservation Council

4 percent of Corporate's IPR program costs



### Program cost details

| (\$Thousands)                   | Actuals      |              | Rate Case    |              | Proposed IPR |              |
|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                                 | 2016         | 2017         | 2018         | 2019         | 2020         | 2021         |
| Agency Services G&A Allocations | 3,578        | 3,705        | 3,594        | 3,693        | 3,349        | 3,437        |
| Power Direct Support            | 9            | 0            | 0            | 0            | 0            | 0            |
| <b>Grand Total</b>              | <b>3,586</b> | <b>3,705</b> | <b>3,594</b> | <b>3,693</b> | <b>3,349</b> | <b>3,437</b> |

Intergovernmental Affairs is responsible for developing and managing BPA's outreach and coordination with national, state, local and tribal government entities and elected officials. Intergovernmental Affairs also supports engagement with public interest organizations on BPA decisions and coordinates BPA's relationship with the Northwest Power and Conservation Council. This function is responsible for fostering support, knowledge and effective involvement in and awareness of BPA's activities, including the regional engagement required by section 2.3 of the Northwest Power Act.

The primary duties of the Northwest Power and Conservation Council are (1) develop a regional power plan, (2) develop a fish and wildlife program as part of the power plan, and (3) provide for broad public participation in these processes. BPA provides funding for the Council under a formula specified by the Northwest Power Act. The Northwest Power and Conservation Council partnered with BPA to keep costs below the rate of inflation compared to BP-18 levels. These savings are due to efficiencies gained in areas that can be reduced without impacting the effectiveness of programs.

Intergovernmental Affairs anticipates the interests and concerns of regional elected officials, government agencies, tribes and public interest organizations as BPA contemplates and evaluates perspectives related to current and future programs and policies. These interactions are essential to fulfilling BPA's statutory obligations and objectives for commercial viability and meeting public obligations.

The current and near-term challenges and constraints to the Intergovernmental Affairs mission are many, including the ability to ensure mission-related goals are achieved. Intergovernmental Affairs supports tribal, state and constituent engagement for the Columbia River Treaty process. This organization also supports preparation and coordination around the next FCRPS Biological Opinions and associated compliance with the National Environmental Policy Act, including the extensive constituent and tribal contributions required. Intergovernmental Affairs supports BPA's long-term financial stability and its ability to meet its statutory obligations at sustainable rates. This organization supports key BPA strategic initiatives such as grid modernization to ensure successful engagement in evolving western electricity markets with state and federal regulators, elected officials and interested constituent groups. Intergovernmental Affairs continues to monitor federal and state policies related to carbon reduction, renewable energy development, electric system reliability, and other energy and environmental policies. Intergovernmental Affairs will also provide constituent coordination and outreach for revisions to the FCRPS BiOps and the extensive regional engagement expectations for the related NEPA process. In support of BPA's cost-management goals, this additional work will be prioritized with existing workload and accomplished within the spending caps.

## 5.2 CHIEF ADMINISTRATIVE OFFICE

### OVERVIEW

The CAO proposes to reduce costs by \$17 million a year compared to BP-18 spending levels.

- The CAO will meet its reductions through eliminating program expansions, reducing supplemental labor and reducing federal employees through attrition.
- A new IT strategy will bring long-term savings while improving service delivery.
- Capital investments are proposed to be flat or decline as CAO absorbs or reprioritizes existing work to meet emerging needs.

The CAO provides policy and strategic guidance concerning key BPA internal operations and provides executive-level leadership for strategic direction and policy for the high-performing organization that includes the following functions described below.

The business units that report directly to the CAO and that are supported by the CAO include: Information Technology, Human Resources, Safety, Security and Continuity of Operations, Supply Chain, and Workplace Services.

The program management office supports efficiency initiatives, reduces redundancies, improves focus on high priority programs, and improves strategic capabilities.

The Supply Chain cost-management initiative team is dedicated to managing the cross-BPA initiative to implement long-term efficiencies and cost savings in procurement and related areas.

The Diversity and Inclusion team develops, communicates and coordinates policies and initiatives that lead organizational change to foster a diverse workforce and an inclusive culture.

#### **Impacts of proposed spending level**

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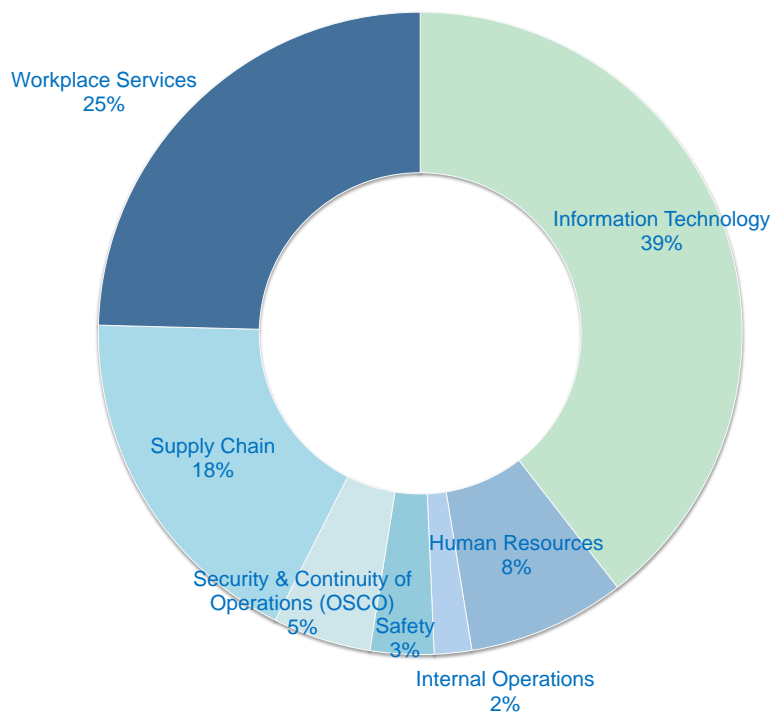
The CAO is reducing the proposed spending levels for FY 2020-2021 on average by \$16.6 million compared to BP-18. The majority of the cost reductions are due to anticipated reductions from Information Technology's Enterprise Technology Assessment (see page 90 for details). The remainder of the business units will achieve cost savings by eliminating planned spending increases and program expansion. Additionally, the CAO is reducing its federal workforce through attrition and reduced supplemental labor costs.

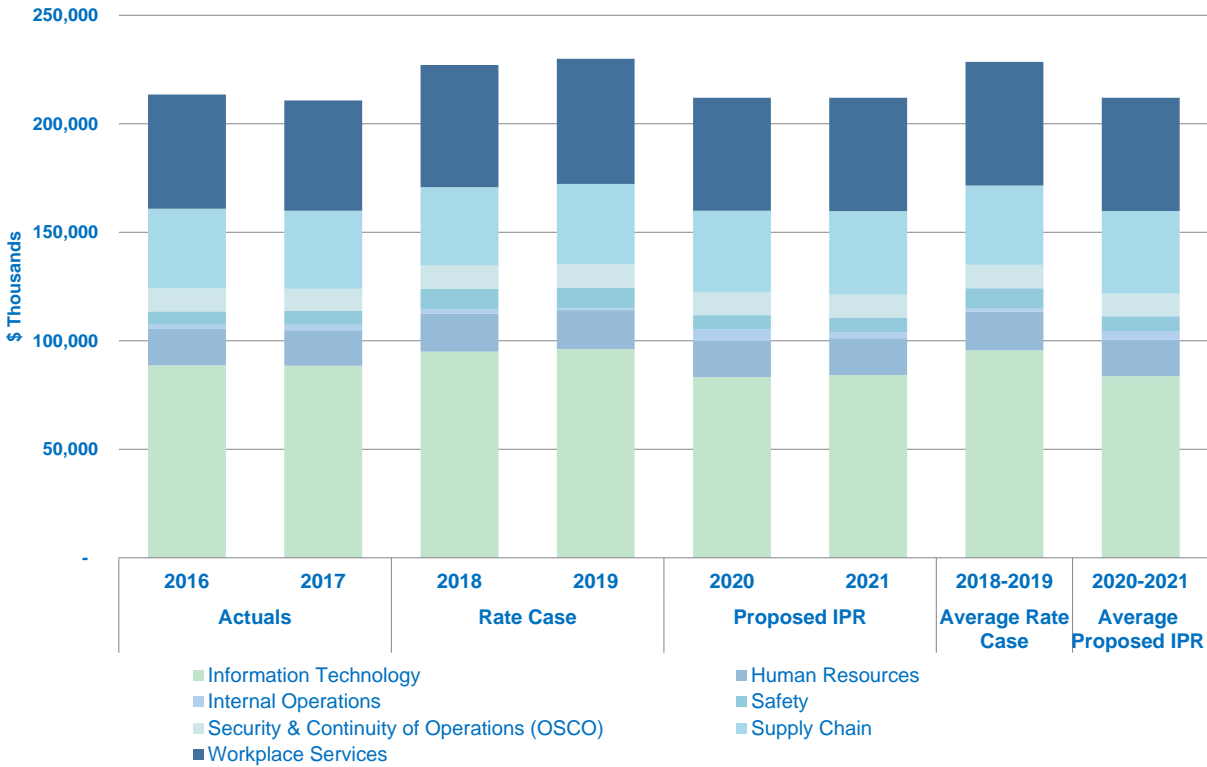
## Work expected in 2020 and 2021

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In FY 2020-2021, the CAO will continue major cost-management initiatives to find sustainable, long-term efficiency and cost savings, including initiatives in supply chain and IT. The CAO will support grid modernization strategic initiatives in Supply Chain and IT through efforts focused on improving the IT technical infrastructure and how it is supported, ensuring continuity of operations and the security of the grid, creating and supporting a safe, positive and inclusive work environment where people are valued and enabled to deliver results, and finally, developing a workforce strategy that provides an agile and adaptive response to grid modernization personnel requirements.

### Chief Administrative Office Pool Expense Summary



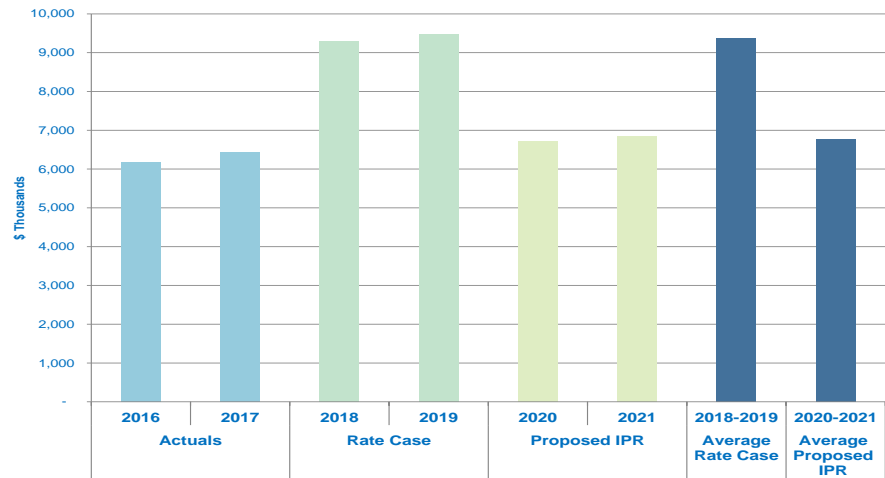


| (\$Thousands)                              | Actuals        |                | Rate Case      |                | Proposed IPR   |                |
|--|----------------|----------------|----------------|----------------|----------------|----------------|
|  | 2016           | 2017           | 2018           | 2019           | 2020           | 2021           |
| Safety                                     | 6,163          | 6,433          | 9,291          | 9,473          | 6,712          | 6,836          |
| Information Technology                     | 88,704         | 88,542         | 94,992         | 96,236         | 83,220         | 84,251         |
| Human Resources Service Center             | 16,809         | 16,347         | 17,550         | 17,898         | 16,647         | 16,955         |
| Internal Operations                        | 1,854          | 2,479          | 2,157          | 795            | 5,243          | 2,719          |
| Security & Continuity of Operations (OSCO) | 10,628         | 10,198         | 10,732         | 10,940         | 10,399         | 10,490         |
| Supply Chain                               | 36,703         | 35,903         | 36,065         | 36,938         | 37,706         | 38,490         |
| Workplace Services                         | 52,609         | 50,825         | 56,279         | 57,681         | 52,038         | 52,223         |
| <b>Chief Administrative Office Total</b>   | <b>213,469</b> | <b>210,726</b> | <b>227,065</b> | <b>229,962</b> | <b>211,964</b> | <b>211,964</b> |



## 5.2.1 Safety

3 percent of  
CAO's IPR  
program costs



### Program cost details

| (\$Thousands)                   | Actuals      |              | Rate Case    |              | Proposed IPR |              |
|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                                 | 2016         | 2017         | 2018         | 2019         | 2020         | 2021         |
| Agency Services G&A Allocations | 6,159        | 6,429        | 9,291        | 9,473        | 6,712        | 6,836        |
| Transmission Direct Support     | 4            | 4            | 0            | 0            | 0            | 0            |
| <b>Grand Total</b>              | <b>6,163</b> | <b>6,433</b> | <b>9,291</b> | <b>9,473</b> | <b>6,712</b> | <b>6,836</b> |

The Safety office supports BPA's mission and safety core value to provide a workplace that is free from all recognizable safety and health hazards through advice, information, and support to the BPA workforce. The safety office engages with executives, leaders, and the workforce to build a strong safety culture across BPA. Additionally, it implements a robust safety and health system by collecting industrial exposure data and monitoring industry improvements in the safety discipline.

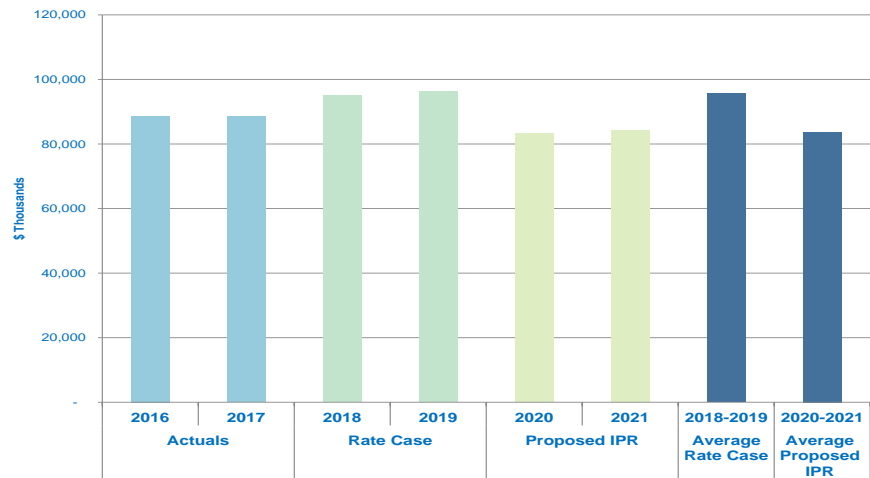
The program ensures compliance with the Department of Energy Federal Employee Occupational Safety and Health program by reviewing and updating programs and procedures. Safety also conducts inspections, investigations and appraisals, and recommends safe work practices and procedures. Safety reviews contractors site specific safety plans and performs worksite audits in compliance with host utility responsibilities.

The safety program collaborates with executive management and the workforce to effectively implement a robust safety and health program to ensure that accident and injury prevention remains a priority. These issues and strategies are managed through several BPA-wide safety committees, including the executive safety committee, office occupational safety & health committee, and the contractor safety committee as well as the safety steering team.

The Safety office supports BPA's cost-management goals through continuous improvement by benchmarking with industry peers, conducting workload studies and engaging in independent third-party program reviews.

## 5.2.2 Information Technology

39 percent of  
CAO's IPR  
program costs



### Program cost details

#### Expense

| (\$Thousands)                   | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                 | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Agency Services G&A Allocations | 88,704        | 88,542        | 94,992        | 96,236        | 83,220        | 84,251        |
| <b>Grand Total</b>              | <b>88,704</b> | <b>88,542</b> | <b>94,992</b> | <b>96,236</b> | <b>83,220</b> | <b>84,251</b> |

#### Capital

| (\$Thousands)               | Proposed IPR  |               | Capital Outyears |               |               |               |               |               |               |               |
|-----------------------------|---------------|---------------|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                             | 2020          | 2021          | 2022             | 2023          | 2024          | 2025          | 2026          | 2027          | 2028          | 2029          |
| IT                          | 20,910        | 20,906        | 19,905           | 19,904        | 18,903        | 17,902        | 16,901        | 15,900        | 14,899        | 14,898        |
| AFUDC                       | 380           | 257           | 331              | 256           | 427           | 573           | 593           | 593           | 593           | 593           |
| <b>Capital Direct Total</b> | <b>21,290</b> | <b>21,163</b> | <b>20,236</b>    | <b>20,160</b> | <b>19,330</b> | <b>18,475</b> | <b>17,494</b> | <b>16,493</b> | <b>15,492</b> | <b>15,491</b> |

### Description

Information Technology develops and supports agencywide business automation and provides governance, planning and standards for BPA's information technology activities.

IT has overall responsibility and accountability for all BPA information technology-related (non-grid operations) programs. This includes maintenance of assets covering telecommunications components, network circuits, servers, storage devices, desktop systems, printers, copiers, faxes, phone systems and software. Software assets are further categorized as critical business systems, enterprise business systems and task systems. Critical business systems must operate around the clock to enable power marketing and transmission scheduling functions. Enterprise business systems allow BPA to manage staff, finances, facilities, supply chain, transmission assets, and services such as managing circuits and work planning services. Task systems are small web-based applications that enable BPA staff to perform work more efficiently.

IT is responsible for meeting BPA's evolving and emerging business automation needs in a cost effective manner. To transform its 'business as usual' approach to IT business practices and associated steadily escalating funding levels, IT's chief information officer led and delivered a comprehensive Enterprise Technology Assessment in March 2018. The ETA identifies 10 breakthrough report strategies that align with BPA's goals of strengthening financial health and modernizing assets. When fully implemented, these BTR strategies will achieve cost reduction goals, create a new service model for IT to improve service delivery and enable IT to be a more effective strategic business partner.

### **Impacts of proposed spending level**

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The ETA has identified ten BTR strategies which achieve a cumulative \$25 million in savings by the end of FY 2020 and \$42.5 million by the end of FY 2023. IT anticipates the net result from the successful implementation of these 10 BTR strategies will be a proposed capital and expense funding profile that is significantly reduced from the profile included in the BP-18 spending levels.

Increases in IT expense spending are driven by inflation, additional operations costs from new systems and expense funding required to support capital expenditures. As a rule of thumb, IT requires 20 percent of the total capital investment in expense to develop the business case, perform requirement gathering and analysis, perform the analysis of alternatives and plan the project. Once the new system is delivered into production, the net new annual operation and maintenance costs associated with the investment is 8 percent of the investment. If all 10 of the BTR strategies identified in the ETA are successfully implemented over time, IT expenses will be driven down to increasing at the rate of inflation while absorbing the cost of the maintenance and enhancements for new systems.

The proposed capital levels are based on anticipated new systems and system replacements to meet business objectives. Due to the industry's shift to cloud-based services and the Office of Management and Budget directive to consider cloud-based services first, IT expects to see a significant increase in the adoption of cloud-based services in the out years. Although the impact on the combined IT spend, capital and expense will not change, IT will need less capital and an equal offsetting increase in IT expense requirements. This would be an increase added to the expense projections as capital is reduced and expense requirements for cloud-based services is increased.

The proposed spending levels support BPA's goals of strengthening financial health and modernizing IT assets. The proposed combined (expense and capital) spending levels represent a significant reduction from BP-18 spending levels due to resulting efficiencies and cost reductions from implementing the BTR strategies. To achieve these spending levels, IT will need to achieve sufficient efficiencies and cost savings to offset net new operations and maintenance associated with new systems being put into production as well as the impact of inflation.

Automation provides BPA the means to meet evolving business needs, evolving compliance requirements and to achieve efficiencies and cost savings. The IT spending proposal represents a shaping of capital and expense dollars that meet known requirements, maintain asset refresh rates and represent a significant cost reduction from BP-18 spending levels (as a result of implementing BTR strategies).

However, there are risks with the proposed levels. These risks may impact IT's ability to meet emerging business requirements and to fund software upgrades and infrastructure refreshes.

### **Work expected in 2020 and 2021**

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There are a number of projects in flight that are scheduled to be completed in FY 2020 and 2021, a number of projects queued up to begin in FY 2019 with completion scheduled in FY 2020 and 2021, and a number of BTR strategies that will be both completing and in flight in FY 2020 and 2021.

Projects currently in flight with an anticipated completion in FY 2020 and 2021 include: transmission forecast-to-complete, energy efficiency tracking and reporting, billing information system replacement and telecomm circuit information system replacement.

Major projects that have been approved and prioritized by the agency prioritization steering committee that will be in flight in FY 2020 include replacing the agency billing system, which will no longer be vendor supported in FY 2022, and upgrading Asset Suite. The current plan is to transition Asset Suite to the cloud to both reduce total cost of ownership and to leverage the inherent disaster recovery capability available through the cloud service provider.

The majority of the BTR strategies are expected to be fully implemented by the start of FY 2020. This includes implementing a new financial model for IT services which is scheduled to be rolled out in Q1 of FY 2020. The new financial model will create financial transparency of IT costs enabling business units to be directly involved when determining the amount of IT services they need and then funding those services.

The enterprise cloud based disaster recovery is scheduled to begin in FY 2020. Although critical assets are meeting continuity of operations requirements, BPA's non-critical business assets also have 'return to operation' requirements after a major event, commonly referred to as disaster recovery. The intent of the disaster recovery BTR strategy is to avoid building a brick-and-mortar disaster recovery datacenter for enterprise systems by leveraging cloud services for disaster recovery. Systems that are already deployed to the cloud will have geographical redundancies as part of the service. Legacy systems that have not been moved to the cloud will need to have disaster recovery capabilities developed and implemented. By using cloud services for disaster recovery, capital expenditures for redundant computational resources can be avoided as well as the cost of maintaining them.

There are supporting BTR strategies that support and will reduce the cost of establishing disaster recovery services. The main strategies include adopting cloud-based services for new systems, which align with OMB guidance to adopt cloud solutions, and the BTR strategy to host BPA's legacy PeopleSoft in the cloud (using a combination of software as a service and both infrastructure as a service and platform as a Service). Re-hosting PeopleSoft in the cloud is currently projected to save \$5 million to \$7 million by FY 2024 compared to maintaining PeopleSoft on premise. This effort is expected to be completed by FY 2021.

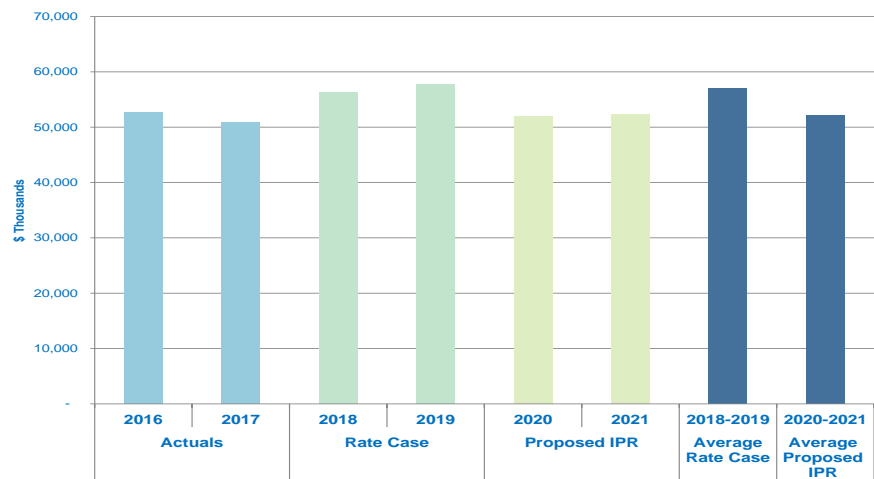
In FY 2020 and FY 2021, IT plans to work with the BTO to establish an enterprise architecture practice. The intent is to align IT’s technical and information architectures with BPA’s business architecture to optimize the use and value of the business systems that IT maintains, and to minimize the implementation of new systems with duplicative/redundant business capabilities.

| Uncertainty Driver  | Impact           |                  |
|---|------------------|------------------|
|   | Expense          | Capital          |
| <i>Faster adoption of cloud-based solutions than planned</i>  | <b>Increases</b> | <b>Decreases</b> |
| <i>Delay in implementing BTR strategies.</i>  | <b>Increases</b> | <b>Neutral</b>   |
| <i>Failure to achieve targeted BTR strategies efficiencies</i>  | <b>Increases</b> | <b>Neutral</b>   |
| <i>Inability to use capital flexibility (transition from capital to expense) to implement cloud-based solutions may result in inadequate resources to execute and implement cloud-based solutions</i> | <b>Defers</b>    | <b>Defers</b>    |
| <i>Higher cost in upgrading Asset Suite or delays that push more costs of upgrade into FY 2020 and FY 2021 than anticipated.</i>  | <b>Increase</b>  | <b>Neutral</b>   |
| <i>Higher cost to replace BPA Billing System than anticipated.</i>  | <b>Increases</b> | <b>Increases</b> |
| <i>Failure to adopt cloud-based implementation for Asset Suite upgrade and/or PeopleSoft re-host will drive up cost of disaster recovery to implement failover/recovery for these major systems.</i>  | <b>Increase</b>  | <b>Neutral</b>   |

**Table 1: Expense and Capital Uncertainty Drivers**

### 5.2.3 Workplace Services

25 percent of CAO’s IPR program costs level



#### Program cost details

| (\$Thousands)                   | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                 | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Agency Services G&A Allocations | 32,052        | 29,177        | 30,434        | 32,776        | 30,010        | 30,109        |
| Power Direct Support            | 2             | 0             | 0             | 0             | 16            | 16            |
| Transmission Direct Support     | 20,555        | 21,648        | 25,845        | 24,904        | 22,012        | 22,097        |
| <b>Grand Total</b>              | <b>52,609</b> | <b>50,825</b> | <b>56,279</b> | <b>57,681</b> | <b>52,038</b> | <b>52,223</b> |

## **Description**

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Workplace Services enables all BPA operations by providing office and other facilities assets, managing office floor space and furniture inventory, managing parking, mass transit and other commuter programs, and delivering essential services such as mail services, printing (including engineering drawings) and office supplies. These services are delivered throughout BPA mission areas and impact all BPA employees. The management of the facilities assets is over the full life cycle that includes acquisition, construction, operations and maintenance, and then disposal. This includes all leased facilities rents, utilities, and stormwater charges.

Workplace Services supports the implementation and execution of the BPA's strategic plan across all objectives. To meet objective 1a, Workplace Services is holding spending levels nominally flat and prioritizing projects that must be done now and deferring others to future years. It is also working with all business units to reduce demand for services that will allow Workplace Services to stay within proposed spending limits. The organization is implementing asset management processes and procedures that support objective 2a to administer an industry-leading asset management program. These efforts range from increasing asset management and technical competencies for staff to executing facility operations and maintenance activities that will provide BPA the longest service life possible. Workplace Services also enables the last two objectives by providing a robust and redundant control and duty scheduling center environment that will allow BPA to develop and participate in new markets and deliver services in a cost-effective manner.

## **Impacts of proposed spending level**

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The impacts of the proposed spending levels are manageable for FY 2020-2021. To maintain these levels, Workplace Services will defer lower priority facilities infrastructure projects, prioritize facilities work on control centers and high-priority control houses, and seek constant opportunities to lower costs of business services. This organization has several must-funds, such as utility bills, rents, and storm water service charges that will escalate based on contract obligations and inflationary pressures on utility providers. These increased charges will consume facility project dollars and will delay infrastructure maintenance work. This is manageable over the short term, but will result in degraded facilities assets and shortened facility life in the long term.

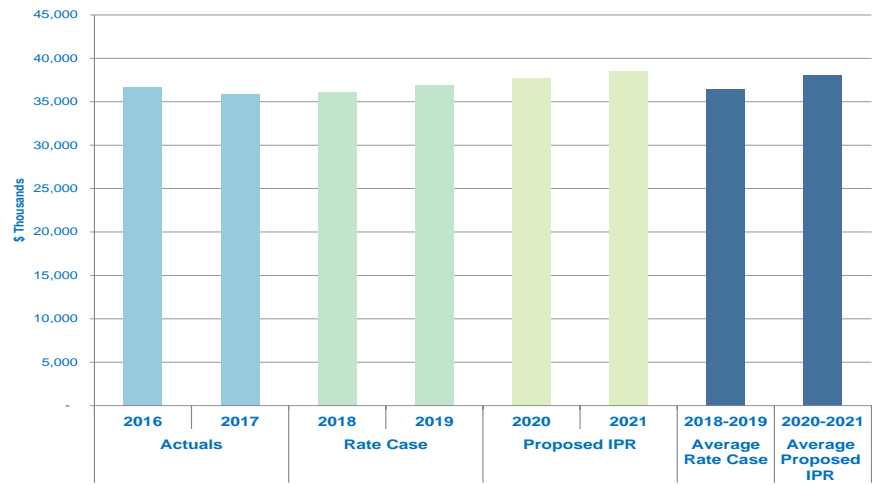
## **Work expected in 2020 and 2021**

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Significant work planned for FY 2021 includes facilities infrastructure investments on the Ross Complex, Covington Maintenance Regional Headquarters site, civil infrastructure at Celilo, and ongoing seismic improvements throughout the system. Workplace Services will continue to enhance internal asset management capabilities with peer BPA asset categories, and will also develop more consistencies in delivering facilities operations and maintenance work in all BPA facilities.

## 5.2.4 Supply Chain

18 percent of  
CAO's IPR  
program costs



### Program cost details

| (\$Thousands)                   | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                 | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Agency Services G&A Allocations | 5,729         | 6,015         | 4,426         | 4,437         | 6,746         | 6,953         |
| Transmission Direct Support     | 30,974        | 29,888        | 31,639        | 32,502        | 30,959        | 31,537        |
| <b>Grand Total</b>              | <b>36,703</b> | <b>35,903</b> | <b>36,065</b> | <b>36,938</b> | <b>37,706</b> | <b>38,490</b> |

### Description

Supply Chain is the enterprise provider of procurement, materials management, logistics services and fleet. The group develops and executes strategies to provide internal business partners managed solutions to secure equipment, materials and services. Supply Chain also ensures processes meet policy, ethics, risk and compliance requirements and monitors and manages all supply chain functions across BPA.

Specialized services offered by Supply Chain include: contracting for services; warehousing of inventory, inventory management and order fulfillment; handling transportation and fleet management, asset utilization and investment recovery; personal property management, purchase card administration, processing and disposal of hazardous materials; managing supplemental labor; and information systems management as it applies to supply chain, including management of material and equipment.

### Impacts of proposed spending level

Supply Chain will achieve cost savings by eliminating planned spending increases and program expansion. Additionally, Supply Chain is reducing its federal workforce through attrition and reducing supplemental labor costs.

## **Work expected in 2020 and 2021**

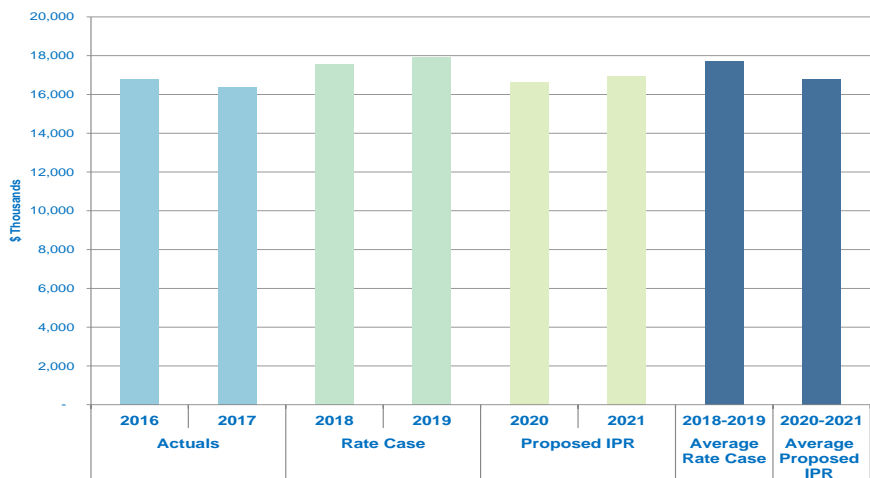
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Supply Chain will continue to deliver on the core business of procurement, materials management, logistics services and fleet management while implementing cost savings opportunities and working with internal customers to improve processes and procedures across BPA.



## 5.2.5 Human Resources Service Center

8 percent of  
CAO's IPR  
program costs  
spending level



### Program cost details

| (\$Thousands)                   | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                 | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Agency Services G&A Allocations | 13,901        | 13,410        | 14,350        | 14,698        | 13,447        | 13,755        |
| Transmission Direct Support     | 2,908         | 2,937         | 3,200         | 3,200         | 3,200         | 3,200         |
| <b>Grand Total</b>              | <b>16,809</b> | <b>16,347</b> | <b>17,550</b> | <b>17,898</b> | <b>16,647</b> | <b>16,955</b> |

### Description

Human Resources Service Center plans, directs, and manages a comprehensive Federal human capital management program positioned to meet BPA's mission and objectives. Delivery of business and objectives is accomplished and delivered through six major program areas: business unit strategic partnering; staffing and placement, position management and classification; learning and development; employee and labor relations; and information system management. HR is responsible for developing, communicating, and coordinating HR strategies, policies and initiatives with the business units in accordance with BPA's strategic plan.

### Impacts of proposed spending level

HR's proposed 2018 IPR spending levels are manageable for FY 2020 and 2021. There are no program reductions or cuts; rather, the proposed spending levels eliminate previously planned increases in HR's spending over time. Further, the spending levels reflect an overall reduction in the federal workforce costs through attrition and reductions in supplemental labor costs.

## **Work expected in 2020 and 2021**

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HR established several objectives to ensure that the workforce is the right size and composition, possesses the right skills and competencies and works in a positive environment.

The workforce modernization efforts for BPA will continue and align with BPA's strategic plan. Specifically, BPA will be reducing the size of the federal workforce through attrition while ensuring each new hire is prioritized and truly needed. Simultaneously, work will be needed to realign internal resources to focus on major initiatives such as grid modernization. The internal movement of employees to needed functions will be essential to executing the strategy. Similarly, HR will focus on establishing and updating workforce plans for BPA.

### 5.2.6 Facilities

#### Program cost details

| (\$Thousands)               | Proposed IPR  |               | Capital Outyears |               |               |              |               |               |               |               |
|-----------------------------|---------------|---------------|------------------|---------------|---------------|--------------|---------------|---------------|---------------|---------------|
|                             | 2020          | 2021          | 2022             | 2023          | 2024          | 2025         | 2026          | 2027          | 2028          | 2029          |
| Facilities                  | 29,646        | 23,254        | 17,224           | 41,678        | 51,667        | 4,344        | 27,400        | 27,900        | 28,500        | 29,000        |
| <b>Capital Direct Total</b> | <b>29,646</b> | <b>23,254</b> | <b>17,224</b>    | <b>41,678</b> | <b>51,667</b> | <b>4,344</b> | <b>27,400</b> | <b>27,900</b> | <b>28,500</b> | <b>29,000</b> |

Facilities provides full life cycle management of BPA’s building facilities assets; estimated at 2.7 million square feet across BPA’s service territory. This includes over 1,000 buildings and structures at more than 400 sites that include critical infrastructure, such as control centers, data centers, and the Celilo DC Converter Station. Facilities’ Asset Management Strategy enables BPA’s operations by providing quality support services and full life cycle management of assets in accordance with BPA strategic goals.

The scope of asset management activities includes replacements, renovation, system replacement, operations and maintenance, and disposal of assets. Excluded are investments defined as expansion of energized facilities such as new Transmission control houses or expansions of those facilities.

Facilities focuses on prioritized asset optimization by managing facilities assets and prioritizing work through disciplined and coordinated processes that optimize mission criticality, risk, resources, return on investment, and sustainability while maintaining agility to meet new requirements. Facilities initiatives and projects are comprehensively integrated and aligned with other asset categories to the extent practicable. Facility assets are managed with a life cycle perspective and processes are improved through a continuous plan–do–check–act cycle.

### 5.2.7 Fleet

#### Program cost details

| (\$Thousands)               | Proposed IPR |              | Capital Outyears |              |              |              |              |              |              |               |
|-----------------------------|--------------|--------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
|                             | 2020         | 2021         | 2022             | 2023         | 2024         | 2025         | 2026         | 2027         | 2028         | 2029          |
| Fleet                       | 6,700        | 7,200        | 8,200            | 8,200        | 8,500        | 9,000        | 9,200        | 9,800        | 9,800        | 10,000        |
| <b>Capital Direct Total</b> | <b>6,700</b> | <b>7,200</b> | <b>8,200</b>     | <b>8,200</b> | <b>8,500</b> | <b>9,000</b> | <b>9,200</b> | <b>9,800</b> | <b>9,800</b> | <b>10,000</b> |

BPA’s mobile equipment fleet is comprised of approximately 2,200 assets ranging from light to heavy duty vehicles, construction, mobile and material handling equipment. Approximately 1,300 assets are BPA owned, and approximately 900 are leased from the General Services Administration. The net value of these owned assets is approximately \$80 million.

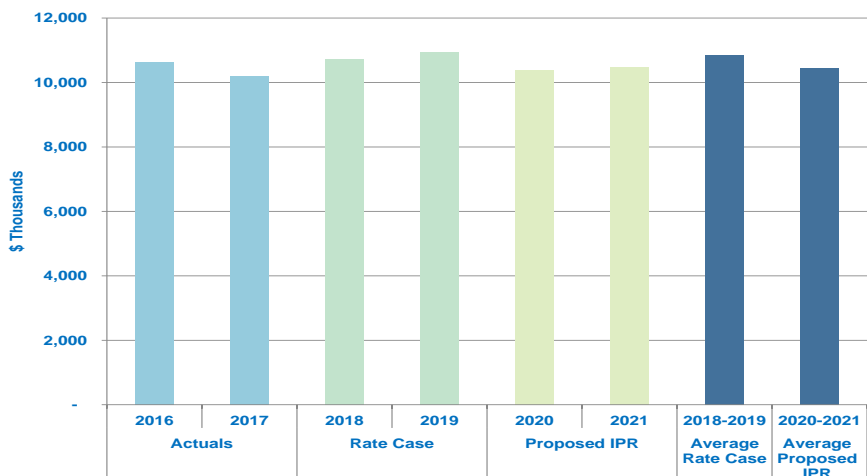
BPA’s fleet management function is organizationally under Supply Chain. It’s mission is to provide effective and efficient services to all its internal customers, mainly Transmission Services through: 1) developing a vehicle replacement cycle with a 15-year procurement plan; 2) right-sizing the fleet through a systematic analysis in conjunction with reducing fossil fuel consumption; 3) establishing policy on the types of equipment that should be BPA-owned versus locally rented; 4) focus on preventive and predictive maintenance; and 5) fostering business driven decisions using analytics and metrics, measured against risk and other operational improvement initiatives.

Fleet right-sizes BPA’s fleet assets and optimizes the life cycle of the various vehicles and equipment to ensure proper fleet management responsibilities. Replacing vehicles at the optimal time, planning proper maintenance, reducing downtime and unplanned repairs, disposing of assets that are under-utilized, reducing annual rental rates and ensuring proper fiscal management are paramount to providing effective fleet management. Additionally, Fleet works closely with its customers to understand their needs and assure effective, timely communication and service.

The approach for capital replacements for BPA’s fleet is aligned with utility industry standards, including evaluations of life cycles and costs. These efforts will lead to an anticipated reduction to annual capital expenditures for vehicle replacements.

## 5.2.8 Office of Security and Continuity of Operations

5 percent of  
CAO's IPR  
program costs



### Program cost details

#### Expense

| (\$Thousands)                   | Actuals       |               | Rate Case     |               | Proposed IPR  |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                 | 2016          | 2017          | 2018          | 2019          | 2020          | 2021          |
| Agency Services G&A Allocations | 9,897         | 9,722         | 10,088        | 10,283        | 9,834         | 9,925         |
| Transmission Direct Support     | 731           | 475           | 643           | 657           | 565           | 565           |
| <b>Grand Total</b>              | <b>10,628</b> | <b>10,198</b> | <b>10,732</b> | <b>10,940</b> | <b>10,399</b> | <b>10,490</b> |

#### Capital

| (\$Thousands)               | Proposed IPR |              | Capital Outyears |              |              |              |              |              |              |              |
|-----------------------------|--------------|--------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                             | 2020         | 2021         | 2022             | 2023         | 2024         | 2025         | 2026         | 2027         | 2028         | 2029         |
| Security                    | 7,000        | 7,000        | 7,000            | 7,000        | 5,400        | 5,500        | 5,600        | 5,700        | 5,800        | 5,900        |
| <b>Capital Direct Total</b> | <b>7,000</b> | <b>7,000</b> | <b>7,000</b>     | <b>7,000</b> | <b>5,400</b> | <b>5,500</b> | <b>5,600</b> | <b>5,700</b> | <b>5,800</b> | <b>5,900</b> |

The Office of Security and Continuity of Operation's objectives are protection, life-safety, disaster preparedness and compliance. These goals are directly tied to BPA's strategy. The organization works to implement a comprehensive approach to ensure personnel and critical infrastructure are protected in both the office environment and in the field. Continuity of operations is an important focus area and OSCO develops and executes BPA-wide continuity training and exercise programs for its staff.

Pursuant to NERC critical infrastructure protection standards, BPA's physical security program implements strategies to meet DOE's graded security protection policy requirements. The personnel and information security group is similarly charged with NERC CIP compliance and the mandatory compliance requirements from the OPM and NERC. Continuity of operations continues to identify new needs that ensure BPA can continue to perform its primary mission essential functions in the event of a catastrophic or disruptive event.

OSCO also provides security asset management through implementation of requirements for protection and compliance. BPA defines security assets as material, equipment, software or hardware that is used for the primary purpose of providing protection. Individual assets or components make up security systems that collectively provide various levels of physical security protection depending on the asset being protected.

## 6. GLOSSARY

|                |   |
|----------------|---|
| <b>AGC</b>     | Automatic Generation Control  |
| <b>AMPD</b>    | Asset Management Program Delivery   |
| <b>aMW</b>     | Average Megawatts - The unit of energy output over a year, equivalent to the energy produced by the continuous operation of one megawatt of capacity over a period of time; also an average of one million watts transferred over a period of time (often a year, thus average annual megawatts).   |
| <b>BiOp(s)</b> | <i>Biological Opinion</i> - Document resulting from formal consultation that states the opinion of the U.S. Fish and Wildlife Service, or National Marine Fisheries Service, as to whether a federal action is likely to jeopardize the continued existence of listed species or results in destruction or adverse modification of critical habitat.  |
| <b>BPA</b>     | <i>Bonneville Power Administration</i> - The Bonneville Power Administration, headquartered in Portland, Oregon, is a nonprofit federal power marketer that sells wholesale electricity from 31 federal dams and one nuclear plant to 142 Northwest electric utilities, serving millions of consumers and businesses in Washington, Oregon, Idaho, western Montana and parts of California, Nevada, Utah and Wyoming. BPA delivers power via more than 15,000 circuit miles of lines and 260 substations to 511 transmission customers. |
| <b>BTO</b>     | <i>Business Transformation Office</i>   |
| <b>BTR</b>     | <i>Breakthrough Report</i>  |
| <b>CAISO</b>   | <i>California Independent System Operator</i>   |
| <b>CAO</b>     | <i>Chief Administrative Office</i>  |
| <b>CGS</b>     | <i>Columbia Generating Station</i> - Nuclear power plant owned by Energy Northwest, for which BPA markets all power. Formerly known as WNP2.  |
| <b>CIP</b>     | <i>Critical Infrastructure Protection</i> - Coordinates all of NERC's efforts to improve physical and cyber security for the bulk power system of North America as it relates to reliability.   |
| <b>CRFM</b>    | <i>Columbia River Fish Mitigation Program</i>   |
| <b>CRSO</b>    | <i>Columbia River Spill Operation</i>   |
| <b>DC</b>      | <i>Direct Current</i>   |
| <b>DER</b>     | <i>Distributed Energy Resources</i>   |

|                |   |
|----------------|---|
| <b>DOE</b>     | <i>Department of Energy</i> - A department established in 1977 by the Department of Energy Organization Act to consolidate the major federal energy functions into one cabinet-level department that would formulate a comprehensive, balanced national energy policy. Responsible for regulatory, research and marketing programs related to energy production and use. BPA is an agency of the DOE. For more information: <a href="http://www.doe.gov">http://www.doe.gov</a>   |
| <b>EE</b>      | <i>Energy Efficiency</i>  |
| <b>EEO</b>     | <i>Equal Employment Opportunity</i>   |
| <b>EIM</b>     | <i>Energy Imbalance Market</i>  |
| <b>EIS</b>     | <i>Environmental Impact Statement</i> - The most intensive level of environmental analysis under the National Environmental Policy Act, public involvement and documentation, typically reserved for proposed actions that are expected to result in significant environmental impacts. The Environmental Impact Statement discloses the impacts of the action and alternatives on all applicable environmental resources. The Environmental Impact Statement process includes: public scoping; coordination with state, federal, and local agencies, and tribes; a draft Environmental Impact Statement sent to public for review and comment; a final Environmental Impact Statement; and a Record of Decision. |
| <b>ESA</b>     | <i>Endangered Species Act</i> - A 1973 Federal law, amended in 1978 and 1982, to protect troubled species from extinction. The National Marine Fisheries Service and U.S. Fish and Wildlife Service decide whether to list species as threatened or endangered. Federal agencies must avoid jeopardy to and aid the recovery of listed species. Similar responsibilities apply to non-Federal entities.   |
| <b>ETA</b>     | <i>Enterprise Technology Assessment</i>   |
| <b>F&amp;W</b> | <i>Fish &amp; Wildlife</i>  |
| <b>FCRPS</b>   | <i>Federal Columbia River Power System</i> - The transmission system constructed and operated by BPA and the hydro-electric dams constructed and operated by the U.S. Army Corps of Engineers and the Bureau of Reclamation in the Northwest. Each entity is separately managed and financed, but the facilities are operated as an integrated power system.  |
| <b>FERC</b>    | <i>Federal Energy Regulatory Commission</i> - The federal agency that reviews hydroelectric projects and applications for operating licenses, and regulates interstate aspects of electric power and natural gas industries. It is the agency to which BPA submits its proposed power rate adjustments for approval. Formerly Federal Energy Administration.  |
| <b>FY</b>      | <i>Fiscal year</i>  |
| <b>G&amp;A</b> | <i>General and Administrative</i>   |
| <b>HCM</b>     | <i>Human Capital Management</i>   |



|                |  |
|----------------|--|
| <b>HR</b>      | <i>Human Resources</i>   |
| <b>IPR</b>     | <i>Integrated Program Review – Financial public process occurring every two years, prior to the upcoming rate case.</i>  |
| <b>IT</b>      | <i>Information Technology</i>  |
| <b>KSI</b>     | <i>Key Strategic Initiative</i>  |
| <b>kV</b>      | <i>Kilovolt</i>  |
| <b>LRP</b>     | <i>Long Range Plan</i>   |
| <b>LSRCP</b>   | <i>The Lower Snake River Compensation Plan - A series of 13 fish hatcheries on the Lower Snake to mitigate the damage done to fish by the construction of Lower Monumental, Little Goose, Lower Granite, and Ice Harbor dams. Authorized by Congress in the mid-1970s, constructed by the U.S. Army Corps of Engineers, operated and maintained by the U.S. Fish and Wildlife Service. Expenses are repaid to the U.S. Treasury by BPA from power sales revenues, except one hatchery with shared funding.</i> |
| <b>MW</b>      | <i>Megawatts - The electrical unit of power which is equal to 1,000 kilowatts, or 1,000,000 watts.</i>   |
| <b>MWe</b>     | <i>Megawatt electric</i>   |
| <b>MWh</b>     | <i>Megawatt hour</i>   |
| <b>NEPA</b>    | <i>National Environmental Policy Act - A 1969 Federal law that requires evaluation of the environmental impacts of Federally funded projects and programs (action) and that the results of this evaluation be made available to the public. The type of NEPA document prepared varies by the significance of the impacts of the action and may be an environmental assessment or an environmental impact.</i>  |
| <b>NERC</b>    | <i>North American Reliability Corporation - A council consisting of nine Regional Reliability Councils/Corporations, encompassing virtually all of the power systems in the U.S. and Canada. Formed by the electric utility industry in 1968 and incorporated in 1975 to promote reliable and adequate supplies of bulk electric power.</i>  |
| <b>NOAA</b>    | <i>National Oceanographic &amp; Atmospheric Administration</i>   |
| <b>Non-BBL</b> | <i>Non-between business line</i>   |
| <b>NRC</b>     | <i>Nuclear Regulatory Commission - The federal agency that regulates, inspects, and oversees all activities involved with nuclear power plant generation to assure the safety of U.S. nuclear power plants. For more information: <a href="http://www.nrc.gov">http://www.nrc.gov</a></i>  |

|                 |  |
|-----------------|--|
| <b>O&amp;M</b>  | <i>Operations and maintenance</i>  |
| <b>OATT</b>     | <i>Open Access Transmission Tariff</i>   |
| <b>OGC</b>      | <i>Office of General Counsel</i>   |
| <b>OMB</b>      | <i>Office of Management and Budget</i>   |
| <b>OPM</b>      | <i>Office of Personnel Management</i>  |
| <b>OSCO</b>     | <i>Office of Security and Continuity of Operations</i>   |
| <b>PCB</b>      | <i>Polychlorinated Biphenyl</i> - Oily, persistent substance formerly manufactured for use in electrical equipment, primarily as a dielectric in capacitors. Banned from use in the manufacture of equipment in 1979 after research showed that PCBs cause skin disease and liver damage, and are a suspected carcinogen.  |
| <b>PFA</b>      | <i>Project Funded in Advance</i>   |
| <b>RM&amp;E</b> | <i>Research, Monitoring and Evaluation</i>   |
| <b>SCADA</b>    | <i>Supervisory Control and Data Acquisition</i> - The centralized computer system that includes transmission of numerical quantities and alarms from substations to a control center.  |
| <b>SPC</b>      | <i>System Protection &amp; Control</i>   |
| <b>TEC</b>      | <i>Total Economic Cost</i>   |
| <b>TI</b>       | <i>Technology Innovation</i>   |
| <b>TLM</b>      | <i>Transmission Line Maintenance</i>   |
| <b>USFWS</b>    | <i>U.S. Fish and Wildlife Service</i> - An agency within the Department of the Interior responsible for guiding conservation, development, and management of U.S. fish and wildlife resources. For more information: <a href="http://www.fws.gov">http://www.fws.gov</a>   |
| <b>WECC</b>     | <i>Western Electricity Coordinating Council</i> - 2002 successor to the Western Systems Coordinating Council as the organization responsible for coordinating and promoting bulk electric system reliability of transmission operators within the western interconnection. It was formed through the merger of the WSCC, the Western Regional Transmission Association and the Southwest Regional Transmission Association. It provides a forum for resolving transmission access disputes, and provides an environment for coordinating the operating and planning activities of its members. For more information: <a href="http://www.wecc.biz/About/Pages/default.aspx">http://www.wecc.biz/About/Pages/default.aspx</a> |