BONNEVILLE POWER ADMINISTRATION

2014 CAPITAL INVESTMENT REVIEW

INITIAL PUBLICATION

February 18, 2014

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1 INTRODUCTION

In 2006, Bonneville Power Administration (BPA) launched an asset management initiative as part of its Enterprise Process Improvement Project (EPIP). In 2007, the first asset management strategy was created to reform internal processes and guide BPA's investment planning. From there, asset strategies have been developed by BPA's asset categories and presented for public comment on a 2-year cycle. The asset management strategies set the direction for maintaining, replacing and adding capabilities to the power and transmission systems. Strategies have called for a ramp up in capital spending to manage the risks of an aging system, meet long-term capacity and flexibility needs, fulfill regional commitments in energy efficiency and fish and wildlife, and improve internal efficiency.

In 2012, BPA held its first Capital Investment Review (CIR). The 2012 CIR focused on updates and improvements to BPA's asset strategies and a plan for developing a process for prioritizing capital investments across the organization. BPA capital spending needs in excess of $1 billion per year over its 10-year planning horizon. Customers and other stakeholders strongly urged BPA to review capital spending through a rigorous prioritization process.

One of BPA's top strategic priorities is to preserve and enhance transmission and federal generation assets and the economic, environmental and operational value they create. In this 2014 CIR, BPA presents its next generation of long-term asset strategies and initial results from the new prioritization process. The 2014 draft asset strategies represent yet another leap forward in terms of quality and analytical sophistication. The strategies cover a planning horizon of ten years, FY 2014-23, and they are directed toward sustaining, or replacing and maintaining, an aging fleet of transmission, federal hydro, facilities, and information technology assets.

BPA designed and began implementing an organization-wide prioritization process in 2013, the goal of which is to optimize BPA's capital investment portfolio over time. During this first year of implementation, efforts have been directed at assessing, evaluating and prioritizing large expansion investments in transmission, facilities and information technology. BPA proposes to expand coverage of the prioritization process to additional investment types in the future. The process, including its analytical techniques, is based on time-tested, leading practices in capital intensive industries, including the electrical utility industry.

As a companion to the prioritization process, BPA is proposing a new concept called the "Affordability Cap". The Affordability Cap serves as a limit on capital expenditures that takes into account rate, long-term cost structure, financing and other objectives. The asset strategies, the investment prioritization process, and affordability are intended to work together, such that the value of BPA's capital investment portfolio is optimized over time.

The CIR presents stakeholders with an opportunity to advise and comment on BPA's draft asset strategies, prioritization process proposal, and spending proposals.

This Initial Publication includes an overview that summarizes BPA's strategic challenges in managing its investment program. The Initial Publication also includes executive summaries of the asset strategies. Full versions of draft asset strategies for Federal Hydropower, Transmission, Facilities, Information Technology, Energy Efficiency, Fish and Wildlife, Fleet and Security are available for review via links on BPA's CIR website.

The CIR takes place between February and April 2014, prior to the start of the Integrated Program Review (IPR) in May 2014. The IPR will conclude in September with a Close-Out Letter and Report on spending levels for FY 2015-17, which will be the basis for the BP-16 initial rate proposal this fall.

BPA welcomes your comments and thoughtful discussion during this process, which is designed, in part, to prepare for the upcoming IPR and debt management discussions.

1.1 Next Steps

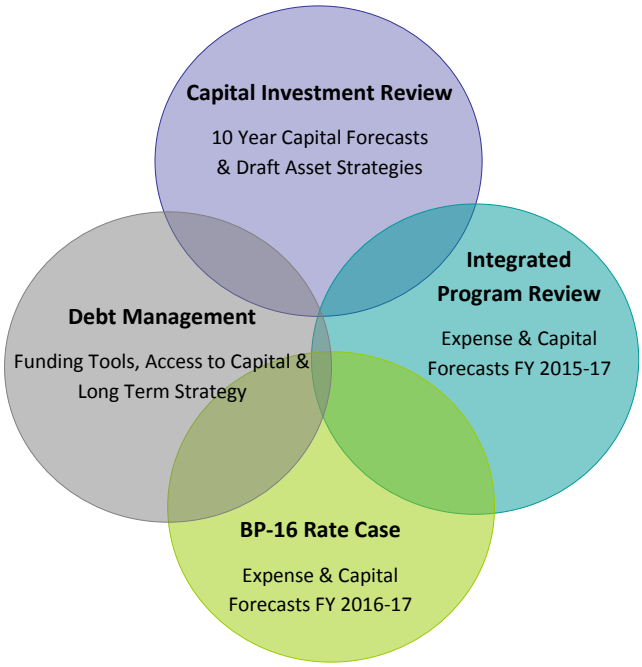
Upon conclusion of this CIR, BPA will consider the comments received, revise its capital spending levels as appropriate, and finalize its asset strategies. Changes to proposed capital spending levels will be rolled into the spending forecasts that are presented in the IPR and debt management workshops scheduled for this summer. After the IPR, BPA will apprise stakeholders of any significant changes, if any, to investment plans through the Quarterly Business Review (QBR), including planned changes to the investment portfolio that is optimized through the new prioritization process.

2 Finance Public Process

BPA currently offers three major public processes: the CIR, the IPR and ongoing discussions with the region on BPA's debt management and access to capital needs. These processes address interrelated financial issues such as capital planning and long-term asset strategies, future access to capital, debt management, alternative funding tools and near-term spending estimates. Topics addressed in these public processes help inform the upcoming rate case.

Each process offers interested parties an opportunity to review proposals, ask questions and provide comment on financial issues prior to decision making and inclusion of the decisions in the upcoming rate case.

Figure 1 – Finance Public Process



2.1 Capital Investment Review Process

The CIR process provides interested parties a chance to review, discuss and comment on BPA's draft asset strategies, 10-year capital forecast, and project prioritization process with the goal of achieving an optimized capital portfolio.

BPA will consider comments received during the CIR when finalizing the current draft asset strategies for final review and approval by BPA's Capital Allocation Board (CAB). In addition, feedback from the CIR will help inform debt management planning and proposed capital spending in the 2014 IPR for FY 2015-17 and associated capital-related costs in the upcoming rate case.

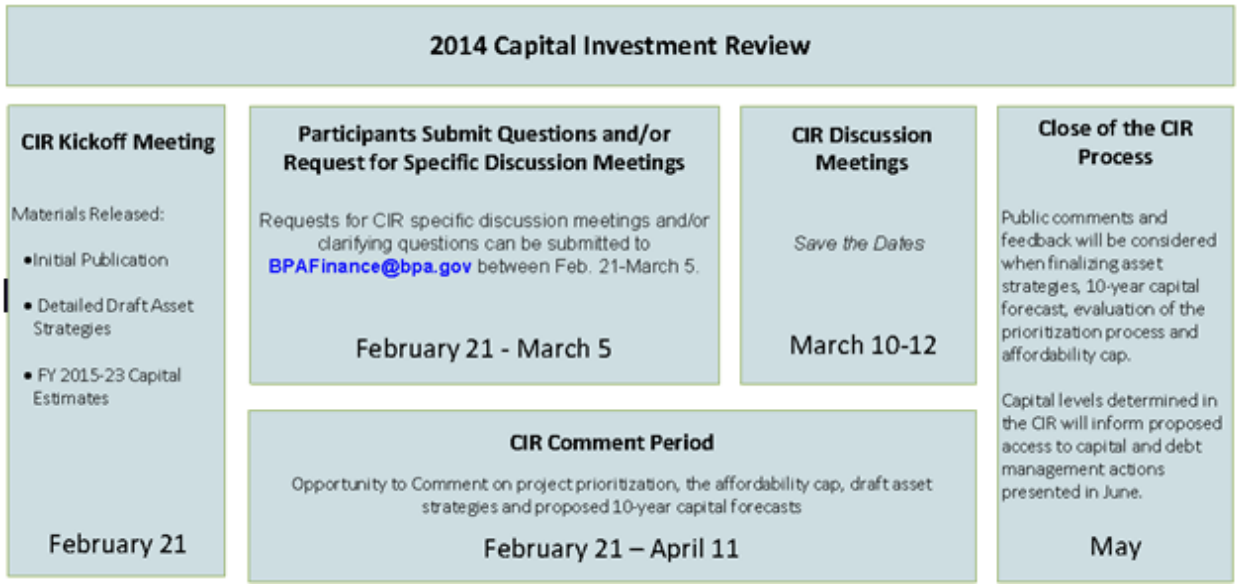
In addition to the information provided in this report, detailed draft asset strategies are available for review online. Participants have between February 21 and March 5, 2014 to request clarification on material and/or discussion meetings targeting specific CIR areas. Requests can be submitted online, by email, or by mail to BPA, P.O. Box 14428, Portland, OR 97293-4428. All requests for additional information or meetings will be viewable online.

To help BPA gauge the level of interest in meetings on specific asset strategies, please submit your request for a meeting regardless of requests already submitted by others. BPA currently anticipates holding meetings March 10-12, 2014. The region will be notified of specific times and meeting topics in early March; details will be made available on BPA's Public Calendar. Material posted in response to request for clarification on material will be accessible on BPA's CIR website.

Commenting on Draft Asset Strategies and Proposed Capital Levels

Participants have an opportunity to submit comments on BPA's draft asset strategies, prioritization process, Affordability Cap and proposed capital levels during an eight-week public comment period beginning February 21, 2014 and concluding April 11, 2014. Comments can be submitted online, by email, or by mail to BPA, P.O. Box 14428, Portland, OR 97293-4428.

Figure 2 – Capital Investment Review Public Process Map



2.2 Integrated Program Review Process

The IPR will offer interested parties an opportunity to review, discuss and comment on forecast expense spending levels for the upcoming three years. BPA anticipates the 2014 IPR process will begin May 2014 and last approximately eight weeks. Additional information pertaining to the upcoming IPR can be accessed online.

Figure 3 – Integrated Program Review Public Process Map

OVERVIEW

Aging Infrastructure

Increasing Demands on Assets

Technological Opportunities and Risks

Increasing Compliance Requirements

Optimizing the Investment Portfolio

3 OVERVIEW

3.1 INTRODUCTION

BPA's mission is to create and deliver the best value for our customers and constituents by:

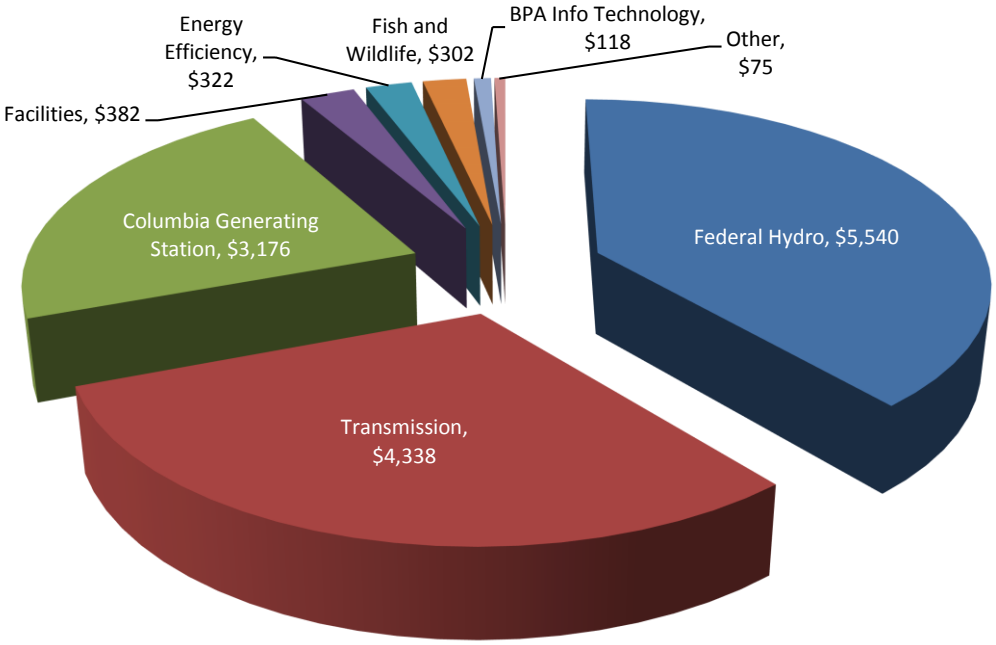
- Providing an adequate, efficient, economical and reliable power supply.
- Providing a transmission system that is adequate to the task of integrating and transmitting power from federal and nonfederal generating units, serving BPA's customers, providing interregional interconnections, and maintaining electrical reliability and stability.
- Mitigating the Federal Columbia River Power System's impacts on fish and wildlife.

The four pillars of BPA's vision to achieve this mission are system reliability, low rates consistent with sound business principles, responsible environmental stewardship, and regional accountability.

Physical assets – such as hydro-electric dams, transmission lines and substations, information systems, and investment in fish and wildlife mitigation – enable BPA and its FCRPS partners to deliver this mission and vision.

Figure 4

Federal Columbia River Power System and Columbia Generating Station
Historical investment costs after depreciation
As of September 30, 2013
$ Millions



Cumulative historical investment costs before depreciation: $20,449

Approximately 82 percent of BPA's firm power supply comes from 31 federal hydro-electric projects at costs among the most affordable in the nation. BPA's power portfolio is emission free and also includes nonfederal wind output and the Columbia Generating Station (CGS) nuclear plant.

BPA operates and maintains about 75 percent of the Pacific Northwest's high voltage transmission.

The transmission system includes 15,239 circuit miles of high-voltage power lines, a dependable network of transmission highways that deliver electricity to customers across the Pacific Northwest and into California, Canada and Montana. BPA manages the real-time operation of this system, and provides the maintenance, replacement, upgrade and expansion of infrastructure needed to meet a range of customer needs for transmission service and interconnection.

Energy efficiency accounts for BPA's largest resource addition since passage of the Northwest Power Act in 1980. More than 1,400 average megawatts (aMW) of energy efficiency savings have been acquired– more than twice the energy that Bonneville Dam produces in a year.

Federal hydro assets are comprised of 31 hydroelectric plants with over 200 generating units. Installed generating capacity is over 22,000 MW; in an average water year, 76 million megawatt-hours of electricity is generated. Twenty-one of the plants are owned and operated by the Corps of Engineers and 10 by the Bureau of Reclamation.

Transmission assets include 15,239 circuit miles of high-voltage transmission lines, 299 substations, 368 communications sites, and 195,600 acres of transmission line corridor rights of way. Transmission assets also include hardware and software applications for grid operations. Transmission assets are owned or leased by BPA.

Facilities assets include substation control houses, administrative offices, maintenance shops, warehouses and other non-electric plant. BPA owns over 1,000 buildings at over 400 sites in five states. Another 12 buildings are leased.

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.

Energy Efficiency assets include measures and projects in all end use categories – residential, commercial, industrial and agricultural. Examples include building measures to reduce heat loss/gain and infiltration, lighting measures that reduce energy consumption and HVAC systems and water heating equipment that are more energy efficient. These assets are owned and operated by end-use electric customers served by BPA's preference customers but serve to reduce BPA's power obligations.

Fish and Wildlife assets include habitat restoration 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 not covered by BPA asset strategies at this time. CGS is owned and operated by Energy Northwest.

3.2 STRATEGIC CHALLENGES

One of BPA's most important strategic objectives is to maximize the long-term operational and economic value of power and transmission system assets. This objective 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; and
- Total economic costs are minimized over the long-term. Total economic costs include not only BPA's costs to expand, replace, and maintain assets, but also the costs that customers and others may bear should the assets fail to perform (customer outages).

This strategic objective must be accomplished while considering rate, long-term cost structure, financing and other objectives.

Managing the risks of aging infrastructure

Preserving and enhancing federal generation assets and transmission and the economic, environmental and operational value they create is a strategic priority.

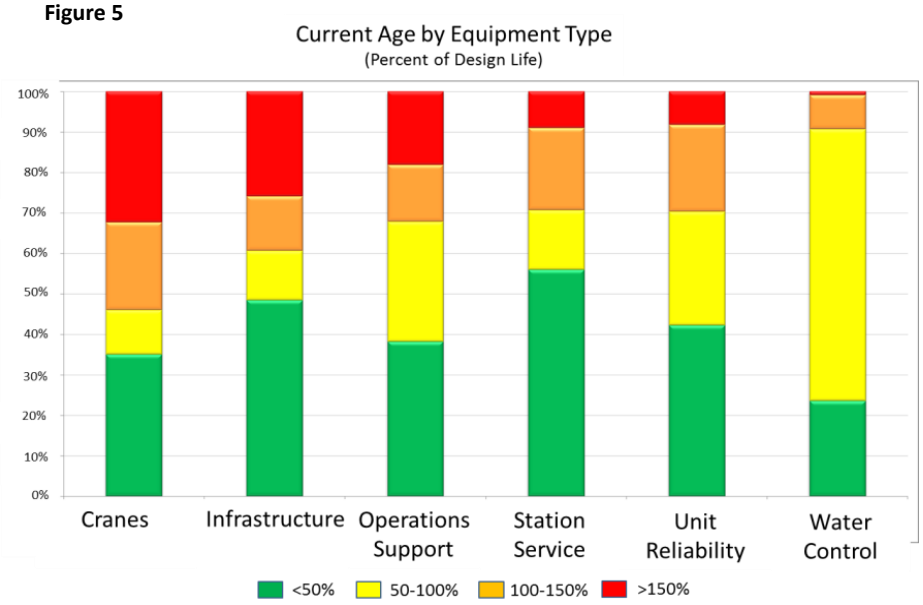
The majority of the transmission system and its high-voltage power lines and substations are more than 40 years old. Much of the critical infrastructure needs to be replaced or upgraded so that equipment continues to provide the reliable service and the capacity and capabilities that will be needed.

After years of under-investment, the aging, deteriorating state of non-electric facilities assets has become a serious issue. Most facilities were built before 1960 and, as a result, do not comply with current life safety, fire protection, and seismic event codes. Some facilities contain hazardous building materials, and many have exceeded their design life several times over. In other cases, maintenance has been deferred and made subject to break-fix maintenance only.

The average age of the federal hydroelectric plants is about 50 years, with some that exceed 60 years. In some cases, federal hydro assets are reaching and exceeding the end of their expected service lives. Figure 5 summarizes the age of federal hydroelectric assets. Large portions of hydro equipment have exceeded their design life, in particular, nearly 50 percent of cranes and infrastructure equipment.

Age alone is not an indicator of when an asset should be refurbished or replaced. The physical condition and performance and corrective maintenance history of equipment and facilities are often the bigger drivers for planning and prioritizing replacements.

Figure 5



BPA's Federal Hydro and Transmission Asset Categories are implementing economic value-based methods to determine the level of effort and the priorities that should be assigned when replacing equipment. These leading practice methods entail assessing the health condition of equipment, the likelihood of equipment failure or obsolescence, and the economic consequences if generation is lost or if transmission line de-rates or outages occur. The methods produce risk-informed, prioritized programs of replacements to minimize BPA costs and customer value losses over time.

To illustrate, Figure 6 is a risk "heat map" excerpted from the Federal Hydro Asset Strategy. The risk map shows the number of equipment units that are likely or not likely to fail based on asset health assessments (shown in rows). The risk map also shows the potential ranges of financial impact if equipment were to fail (columns). Hydro unit failures can lead to reduced levels of generation, which can in turn lead to reduced sales or increased purchases of replacement power. Failures can also lead to increased repair, replacement and other costs. This figure shows that a substantial number of critical hydro equipment units are in need of replacement if failures and related cost increases are to be avoided (the orange and yellow-orange zones on the map).

Figure 6

Likelihood	Insignificant < $ 10K	Minor $ 10K to $ 100K	Moderate $ 100K to $ 1 M	Major $ 1 M to $ 10 M	Extreme > $ 10 M
Almost Certain	3 Operations Support 1 Station Service	2 Cranes 25 Operations Support 13 Station Service 2 Unit Reliability 3 Water Control	17 Infrastructure 21 Operations Support 10 Station Service 16 Unit Reliability 4 Water Control	3 Infrastructure 1 Operations Support 15 Station Service 7 Unit Reliability 1 Water Control	1 Operations Support
Likely	13 Operations Support 7 Station Service	14 Operations Support 10 Station Service 35 Unit Reliability 1 Water Control	8 Cranes 10 Infrastructure 30 Operations Support 23 Station Service 25 Unit Reliability 14 Water Control	7 Cranes 7 Operations Support 51 Station Service 134 Unit Reliability 10 Water Control	1 Cranes 2 Station Service 16 Unit Reliability 2 Water Control
Possible	1 Infrastructure 19 Operations Support	1 Cranes 6 Infrastructure 20 Operations Support 6 Station Service 21 Unit Reliability 3 Water Control	42 Cranes 15 Infrastructure 31 Operations Support 24 Station Service 82 Unit Reliability 16 Water Control	26 Cranes 2 Infrastructure 4 Operations Support 47 Station Service 305 Unit Reliability 4 Water Control	4 Cranes 85 Unit Reliability 1 Water Control
Unlikely	3 Operations Support	4 Infrastructure 4 Station Service 4 Water Control	5 Cranes 8 Infrastructure 3 Station Service 44 Unit Reliability 35 Water Control	14 Cranes 1 Infrastructure 4 Station Service 166 Unit Reliability 3 Water Control	4 Station Service 45 Unit Reliability
Rare	5 Infrastructure 97 Operations Support 6 Station Service	1 Cranes 16 Infrastructure 62 Operations Support 115 Station Service 351 Unit Reliability 11 Water Control	50 Cranes 62 Infrastructure 52 Operations Support 124 Station Service 781 Unit Reliability 89 Water Control	56 Cranes 5 Infrastructure 4 Operations Support 162 Station Service 1329 Unit Reliability 20 Water Control	1 Operations Support 14 Station Service 310 Unit Reliability 3 Water Control

Consequence

Condition: 0 (Almost Certain) – 10 (Rare)

Risk Level	Low	Medium	High

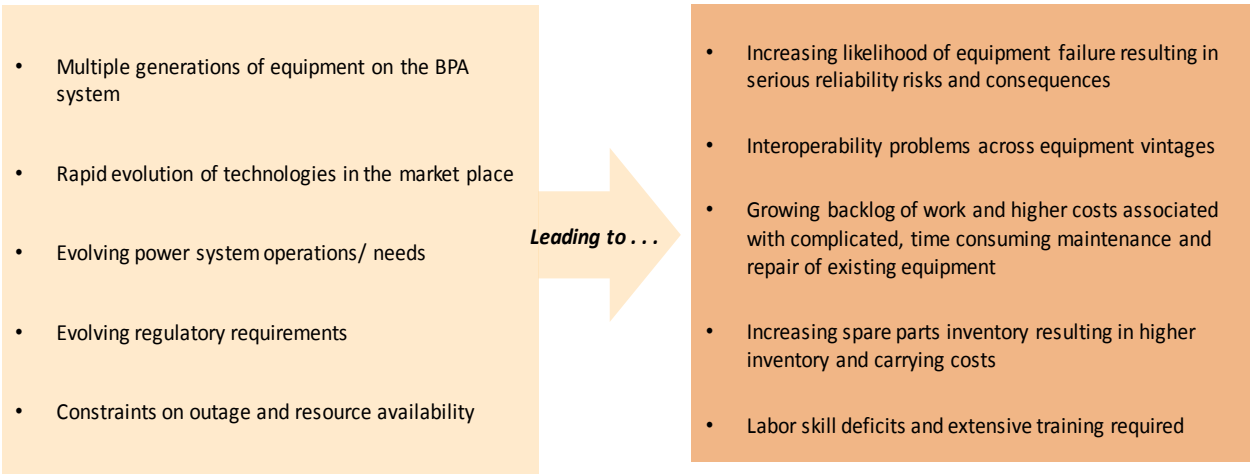
Comparable risk assessments are prepared for Transmission, Facilities and IT assets, and are found in the respective asset management strategies. The risk assessments play a key role in prioritizing refurbishment, replacement, and certain upgrade investments.

Managing technological risks and opportunities

For some classes of equipment, such as telecommunications and control systems equipment, technological obsolescence remains a major risk in meeting today's operational demands, maintaining long-term system reliability, and managing maintenance and repair costs. There are multiple generations of telecommunications and control systems equipment on BPA's system which has led to interoperability problems and increasing maintenance and repair costs. Meanwhile, the rapid evolution of telecommunications technologies could lead to shortages of spare parts and technical skills deficits for repairing older equipment.

Figure 7

Technological obsolescence risk



New technologies also present opportunities for greater efficiency and effectiveness. For example, evolving server technologies and industry trends toward cloud-based services enable growing information requirements to be met less expensively than otherwise.

As another example, synchronized phasor measurement units are being deployed by BPA and several other utilities in the Western Interconnection. The synchrophasors enhance real-time awareness of grid performance, which in turn helps reduce the risk of outages, enables faster restoration of the system should an outage occur, improves utilization of transmission assets, and enables better management of transmission congestion.

Technological advances are instrumental to the success of many industry-wide initiatives, to include: integrating variable energy resources, enhancing the reliability and efficiency of system operations, deploying demand response programs, and enabling energy storage devices.

Manage increasing demands on the power and transmission system

Renewable Portfolio Standards in the West have been driving wind energy growth. In the Pacific Northwest, 7,000 MW of wind energy were operating by the end of 2013. In the BPA balancing authority area, 38 wind and other renewable projects totaling 4,500 MW are operating. Currently, there are 4,915 MW interconnected to the BPA transmission grid, including nine substations and nine tap lines. Most wind projects are concentrated in the Columbia River Plateau where there is inexpensive access to BPA transmission lines and the interties to California. This concentration produces large swings in aggregate generation output, which requires BPA to provide significant balancing reserves to ensure reliability.

The growth of wind generation requires that BPA and the region jointly manage the costs and risks that come with increased variability in the region's resource portfolio, so that the reliability and cost-effectiveness of the system can be sustained. A strategic priority of BPA has been to expand balancing capabilities and resources. It is vital to broaden customer access to non-federal balancing resources while enhancing the operational tools of the BPA balancing authority and increasing coordination within and across the region's balancing authorities. To this end, the Northwest Power Pool Members' Market Assessment and Coordination Initiative (MC) is providing a venue for increased coordination among the region's utilities and balancing authorities that are together improving reliability, ensuring capacity adequacy and increasing efficiency. This group of public and investor-owned utilities is moving forward with a set of regional actions and investments to increase system visibility, foster a more robust bilateral capacity market and further evaluate design, cost and governance elements of potential future initiatives, including a security-constrained economic dispatch (SCED) within the Northwest Power Pool footprint.

Several transmission paths are at or near their capacity, which reduces flexibility in the operation of the transmission grid and limits BPA's ability to take line or substation assets out of service for needed maintenance, repairs, and replacements.

Demands are significant on the federal hydro system as well, including competing requirements to conduct fish operations, ensure flood control and provide balancing reserves for renewable energy.

In sum, existing capacity and flexibility will need to be utilized more efficiently. BPA will emphasize efficient deployment of non-federal resources on the supply and demand side to meet growing demands for balancing capacity. In addition, BPA will make necessary upgrades to the transmission system to meet load and interconnection requirements.

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 (NERC) reliability standards enforced by the Western Electricity Coordinating Council (WECC). The challenge that BPA and similar entities face is the amount and rate of change in reliability standards since their inception. Since 2007, new and revised reliability compliance standards have steadily increased and are expected to continue to increase over the next several years. These continued changes create capital and expense requirements for BPA and do not appear to be slowing. A large share of BPA's investment in transmission is driven by reliability and other regulatory requirements.

Growth in security and continuity of operations requirements to protect critical infrastructure has been rapid. The requirements are outlined in Presidential Decision Directives and issued by the North American Electric Reliability Corporation (NERC), Federal Energy Regulatory Commission (FERC), U.S. Department of Energy (DOE), and U.S. Department of Homeland Security (DHS).

BPA's information technology systems also must conform to federal and industry-mandated laws and regulations, including the Federal Information Security Management Act of 2002. BPA deems that 42 of its information technology systems support critical business processes involving power and transmission scheduling and marketing. Availability on a 24x7 basis is required for these systems.

Implement Endangered Species Act requirements

The FCRPS Biological Opinion (BiOp) is the federal plan for operating 13 main stem hydroelectric dams while protecting Endangered Species Act (ESA) listed salmon and steelhead on the Columbia and Snake Rivers. NOAA Fisheries on January 17 released its 2014 Supplemental Federal Columbia River Power System biological opinion for salmon and steelhead. Responses to the new plan have been across the board, with fish conservation parties continuing to call federal fish protection efforts inadequate while others dependent on river operations insist the planned fish protections are on track.

Implement NW Power Act energy efficiency requirements

The NW Power Act calls on BPA to achieve energy efficiency savings consistent with the NW Power and Conservation Council's power plan, which establishes five year and twenty year achievable potential for regional energy efficiency targets. BPA has established its share of current regional targets to be 42% (the portion of regional retail load served by utilities under Regional Dialogue contracts). The Power Plan targets roughly doubled between the Fifth Plan and the Sixth Plan, and the Seventh Plan targets have yet to be determined.

Optimize BPA's investment portfolio

In recent years, BPA ramped up its capital programs to manage the risks noted earlier, namely, managing an aging system, integrating new generating resources, relieving congestion constraints, meeting its energy efficiency and fish and wildlife commitments, and improving the efficiency of its internal operations. The impact of capital spending on power and transmission rates, long-term cost structure, financing and other objectives are very important and need to be closely examined.

3.3 THE AFFORDABILITY CAP

BPA is seeking to optimize its investment portfolio in order to provide a reliable, adequate, efficient and economical power and transmission system. This optimization must take into account not only investment needs but also rate, long-term cost structure, financing and other objectives. To that end, the Affordability Cap places a limit on planned cumulative capital expenditures and is integral to establishing an optimal investment portfolio. The Affordability Cap is designed to help:

- Manage long-term capital-related costs and associated rate impacts;
- Enable BPA to meet its long-term financing and debt management objectives; and
- Retain the long-term support of the financial community, including rating agencies.

BPA is proposing an Affordability Cap of $855 million to $940 million for BPA-wide capital spending per year over the FY 2014-23 period.

This Affordability Cap reflects a review of long-term capital-related costs and the implications of the costs for power and transmission rates. Additionally, BPA evaluated the cap range against its long-term debt management objectives to ensure capital financing needs were covered over a rolling ten year period. The cap range was also examined in light of internal constraints on BPA and its federal partners' ability to execute a large capital investment program, including labor, available outage time, and other constraints. Coincidentally, the cap range approximates the current capability of BPA and its partners' ability to successfully carry out a large investment program, as evidenced by the most recent 3 years of capital spending actuals (average $914 million per year versus the $855-$940 million cap range). Effectively, the Affordability Cap would constrain cumulative future capital spending to the recent rate of investment in nominal dollar terms. In real dollar terms, the Cap would require that BPA and its FCRPS partners find productivity and other savings to offset the effects of future inflation.

The Affordability Cap would apply to the investment portfolio for Transmission, Federal Hydro, Facilities, Information Technology, Fish and Wildlife, Energy Efficiency, Security, Environment, and Fleet. The Affordability Cap would not apply to CGS, Columbia River Fish Mitigation (CRFM), or transmission projects that are tariff-driven and funded in advance by a customer.

The Affordability Cap together with the capital prioritization process will enable BPA to optimize its capital portfolio of projects such that the funding demands of BPA's aging infrastructure, statutory and regulatory obligations, and other investment drivers are balanced with the region's capacity to absorb rate increases

3.4 Optimizing the Capital Investment Portfolio

The Affordability Cap works in conjunction with prioritizing investments to optimize the investment portfolio. While the Affordability Cap sets a ceiling on total planned capital spending, it does so without regard for the condition of assets nor capacity or other demands that are placed on the power and transmission system. That's where investment prioritization comes in. Here, the merits of potential investments are assessed and evaluated in order to select a portfolio of investments that maximizes value within the limits of the Affordability Cap.

At the conclusion of the 2012 CIR, BPA outlined a methodology and process for prioritizing capital investments. The results are being shown for the first time in this CIR.

The methodology calls for Sustain investments to be prioritized through asset management strategies while most other investments are prioritized through this new process.

Prioritization of Sustain investments

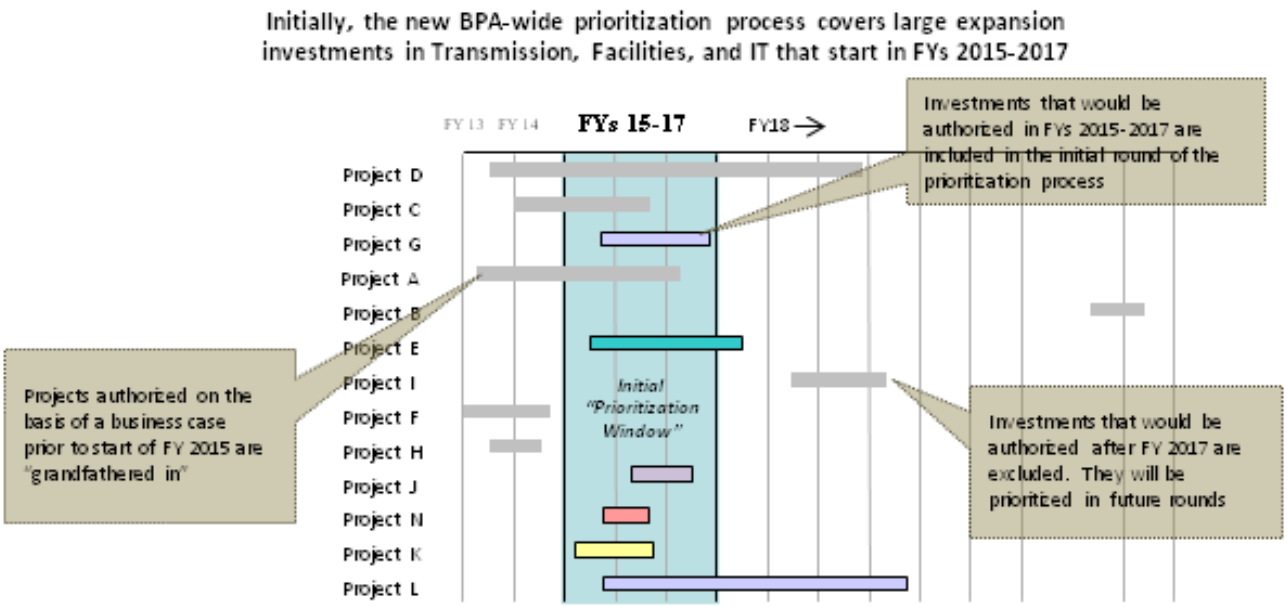
Sustain investments are directed at maintaining the performance and capability of existing equipment and facilities that are beyond design life, in poor condition, or obsolete. Sustain investments occur in BPA's Transmission, Federal Hydro, Facilities, Information Technology (IT), Security, Environment, and Fleet asset categories. These investments are prioritized by each asset category, taking into account the condition of their assets and assigning highest priority to the most important equipment and facilities at greatest risk. This prioritization is reflected in asset strategies, found here. BPA began developing asset strategies 6-7 years ago, and the strategies presented in this CIR represent another advance in terms of quality and analytical sophistication.

Prioritization of Expansion investments

Expansion investments include additions to capacity, such as new transmission line capacity; new functionality and capabilities, such as modernization of maintenance headquarters; and investments to increase operational output and productivity, such as business process automation projects.

To launch the new process, BPA chose to direct its efforts toward assessing, evaluating, and prioritizing major expansion investments in Transmission, Facilities and Information Technology that would start in FYs 2015-2017. BPA defines "major" investments as projects with an estimated investment cost of $3 million or more.

Figure 8



BPA chose to defer prioritizing some investments in this initial effort, and to exclude others. Small expansion investments (i.e., investments with an estimated investment cost of less than $3 million) were deferred, and they will be rolled into the process beginning with new project starts in FY 2018. Energy Efficiency and Fish and Wildlife were excluded because the prioritization of projects and program work is determined through processes outside BPA. Major expansion projects authorized by the end of FY 2014 were "grandfathered in", or put another way, the prioritization process was designed to take effect beginning with new starts in FY 2015.

What goals did BPA set for the new prioritization process?

A systematic BPA-wide process that:

- Optimizes the investment portfolio within available funding, labor, outage time, and other constraints;
- Furthers BPA's strategic priorities/objectives
- Provides a "level playing field" for diverse projects with different cost, benefit, and risk characteristics;
- Ensures decision-making is risk-informed and supported by thorough analysis;

- Provides transparency both internally and externally; and
- Enables efficient, timely decision making.

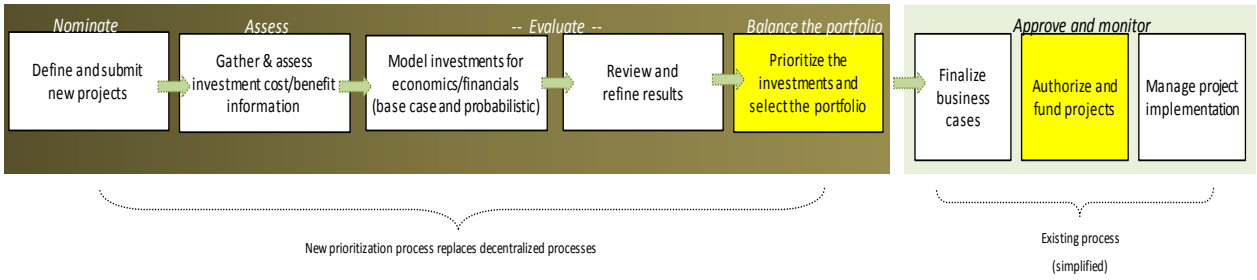
The methodology and process must be directed at maximizing the long-term operational and economic value of assets.

How does the process work?

The process begins with BPA asset categories submitting nominations for potential investments. Once nominated, cost and benefit information about the investments is collected and peer reviewed with subject matter experts. The investments are then evaluated (modeled) to determine their economic and financial implications. The modeling results are peer reviewed, and then consolidated at the corporate level, where the investments are rank-ordered. From there, BPA's Capital Allocation Board (CAB) reviews the findings and selects a preferred portfolio of investments.

The process that was started this past year will be a recurring process. Every 6 months, the CAB will review updates to investment nominations in order to "re-balance", or re-optimize, the portfolio in light of new information. BPA will present the results of this 6-month re-balancing cycle for public comment through the Quarterly Business Review process.

Figure 9



The new prioritization process represents a significant change in BPA's investment decision-making.

Figure 10

	Before	After
Prioritization of expansion investments	Prioritized within each asset category using a process and criteria unique to that asset category. The results of each asset category's prioritization are then added together to form an investment portfolio.	Expansion-type investments are prioritized using a single BPA-wide process. Each asset category nominates, assesses, and evaluates its proposed investments using a standardized value-based approach. The results are combined and then prioritized by the CAB to form the BPA investment portfolio.
Prioritization criteria for expansion investments	Criteria for prioritizing expansion-type investments are often situational, tactical in nature, and consensus-driven, often without robust economic analysis.	Metrics and modeling are based on leading practice economic and financial analysis. Metrics and modeling are standardized to provide efficiency, equitable treatment, and comparability of results.
Benefit assessments	Benefits are described qualitatively, with limited quantification. The benefits are often limited to those that impact BPA. Benefit assessments rarely capture uncertainty ranges.	All sources of value are captured quantitatively to the extent feasible, including benefits that are internal and external. Cost and benefit uncertainties are captured and modeled stochastically.
Rebalancing the portfolio	Portfolio is re-balanced within each asset category, generally in conjunction with the BPA spending level review processes, every two years.	Portfolio is re-balanced on a 6-month cycle by the CAB, with the results then entered into forecasts. The results of the re-balanced portfolio will be shared for public comment through the QBR process.
Cap on capital expenditures	No formal long-term cap. Limits on rate period spending are established through CIR/IPR public process.	Affordability Cap on capital expenditures is set by the CAB after customer comment in CIR. The cap applies to a 10-year planning horizon. Projected spending levels continue to be established through CIR/IPR process.
Prioritization of Sustain investments	Asset strategies are used to prioritize Sustain investments within each asset category.	Same, except that a portion of sustain investments will be subject to the new BPA-wide prioritization process beginning in FY 2018 (discussed later).
Governance	The Administrator consults with the CFO to approve the process. The Administrator and sponsoring VPs select the individual asset category portfolios. The portfolios are then aggregated up to the BPA level.	The CAB oversees the prioritization process and collectively recommends the BPA portfolio to the Administrator for final decision.

What criteria are used to prioritize expansion investments?

The analytical techniques that BPA has begun using are proven and consistent with leading practices in utility and other capital-intensive industries. Nominated investments are assessed and evaluated to illuminate the economic value they would create and the impact they would have on operations. Investments that are required to meet a compliance requirement, such as a regulatory standard or legal commitment, are given first priority. Remaining investments are rank ordered based on their net economic benefit ratio. The net economic benefit ratio compares the benefits of the investment to its costs to determine the investment's economic return, or "bang for the buck". Benefits to the region as well as to BPA are taken into account, with benefit and cost uncertainties quantified as well. For years, BPA has struggled to evaluate reliability features against financial features, and this net economic benefit ratio concept strikes a good balance.

Figure 11

$$\textbf{Net Economic Benefit Ratio} = \frac{\textbf{PV Economic Benefits} - \textbf{PV Investment Costs} - \textbf{PV Post-Project Costs}}{\textbf{PV Investment Costs}}$$

PV = present value

After the investments are rank-ordered by their net economic benefit ratios, the CAB may consider other factors before giving a green light to an investment. These other factors include the strategic importance of the investment, its cash flow impacts to BPA, its importance in balancing public responsibilities, the thoroughness of the alternatives that were considered, and the uncertainty of project costs and benefits.

What investment nominations were submitted in the 2013 process?

Fifty-one nominations were submitted, with 40 investments put in play. Of the 40 investments in play, 24 were for the transmission asset category, 12 for information technology, 3 for facilities and 1 for corporate. While covered by the new process, no expansion-type nominations were submitted for federal hydro at this time. Together, the 40 investments represent an investment cost range of $267 to $333 million, plus $550 to $660 million for the I-5 Corridor project. (These cost ranges include overhead costs, but exclude AFUDC.)

Figure 12

-- Investment classifications --

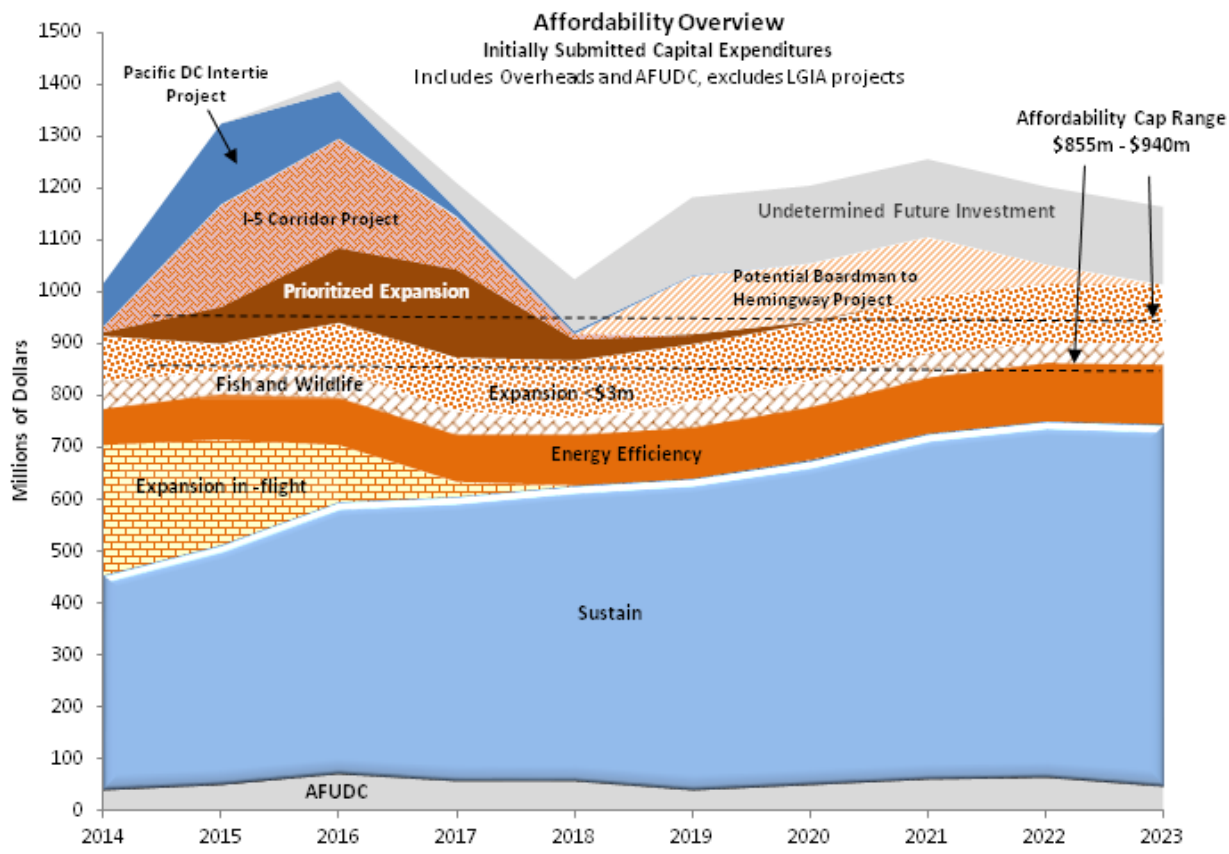
		Compliance	Policy Commitment	Discretionary	
Investments in play	Nominated, assessed and evaluated	4	0	21	Some are "green lighted" and others need additional assessment work with SMEs before ready for decision
	Nominated, but not assessed	0	6	9	Premature to assess costs/benefits at this point, submitted too late for this cycle, or treated separately
	Nominated, but removed from consideration	2	7	2	Cancelled, combined, deferred beyond 3-year window, moved to Core Sustain, or rescheduled to be authorized in 2014

3.5 Proposed Capital Spending

BPA's asset categories submitted requests for capital funding in late fall 2013. The requests for Sustain and Energy Efficiency and Fish and Wildlife funding were driven by asset management strategy submissions. Once received, the requests were consolidated and arrayed against the affordability range, and from there, a series of internal reviews led to a set of possible capital spending levels.

As submitted in late fall, the requested levels of funding totaled $4.9 billion over the 4-year, FY 2014-17 period, and $11.1 billion over the 10-year, FY 2014-23 period (see below). The 10-year total exceeds the upper range of the Affordability Cap by $1.7 billion and the lower range by $2.5 billion. Figure 13 reflects the initially submitted funding requests, including the expansion investments that were nominated in the new prioritization process.

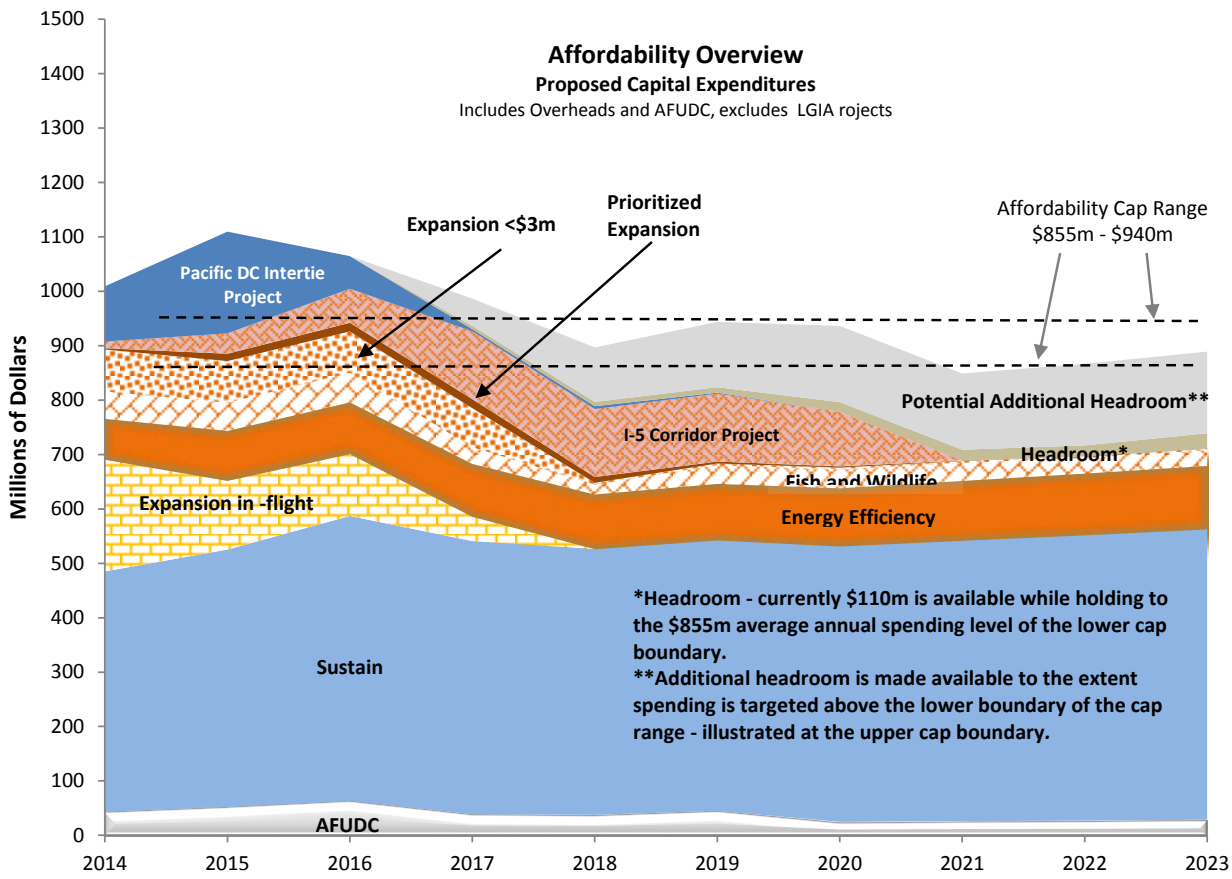
Figure 13



Given that the submitted levels of spending exceed the cap range by a wide margin, BPA conducted an intensive review. The review led to a proposal for this CIR that the submitted levels be reduced by $2.7 billion over the 10-year, FY 2014-23 period. As explained below, the proposed capital spending totals $4.1 billion over the 4-year, FY 2014-17 period and $8.4 billion over the 10-year, FY 2014-23 period. The potential reductions take several forms: permanent cuts to submitted spending levels; updates and corrections to the submitted levels; changes to investment schedules; and deferral of decisions to proceed or not proceed with particular investments. The reductions also call for the new prioritization process to be extended to a potential portion of sustain investment and to all small expansion projects.

Figure 14 shows the Affordability Overview chart after the potential reductions are made.

Figure 14



	FY 2011	FY 2012	FY 2013
Actual Spend	**$931**	**$927**	**$886**

Even with the potential reductions, BPA's proposed capital spending for the 4-year, FY 2014-17, period exceeds the lower end of the Affordability Cap range by $700 million and the upper end by $360 million; annual spending does start falling into the cap range in FY 2017. The higher spending levels in the early years are largely due to investments that are in-flight, meaning capital projects that were authorized and underway prior to introduction of the Affordability Cap. Major projects in-flight are summarized and their progress reported to stakeholders on a quarterly basis.

BPA's proposed capital spending appears below the lower end of the cap on a cumulative basis in Figure 14, but this would be a misinterpretation. This is because the chart collects only the expansion investments that have been prioritized and given a green light to date. It does not collect the investments that may be given a go-ahead in the future, including expansion investments that would start in FY 2018 and future years. Instead, the chart shows a calculation of "headroom", or the remaining capital available under the cap to fund future, not-yet-prioritized expansion investments. (Note: the "headroom" calculation assumes a continuing level of Sustain, Fish and Wildlife, and Energy Efficiency investments.)

3.6 Actions BPA Proposes to Optimize Portfolio

Clearly, the Affordability Cap poses a serious challenge that BPA would need to manage over time. Even with the potential reductions, there may be insufficient headroom to meet long-term expansion needs while also managing the risks of aging system assets. To continuously optimize the investment portfolio given BPA's constraints and also seek further capital spending reductions over time, BPA proposes several actions:

- Give the green light to expansion-type projects only if they are (1) needed to meet compliance requirements or (2) operationally essential and the economic pay-back is clear and compelling. As shown later, a relatively small number of newly nominated expansion investments are being given the green light at this time because this test is already being applied;
- More aggressively integrate non-wires alternatives into the transmission planning process. In some cases, non-wires alternatives, such as generation re-dispatch, energy efficiency, distributed generation, and demand response may help mitigate congestion constraints more economically than expansion alternatives. BPA is implementing a process to identify and develop feasible non-wires alternatives, and to ensure they are considered along side transmission expansion alternatives when appropriate;
- More aggressively bring workarounds and expense-based alternatives into the mix of alternatives that are considered before a decision is made to proceed with an investment. Examples of such alternatives include pursuing Software as a Service in lieu of developing or acquiring software solutions; reforming business processes in a manner that minimizes the need for automation; and leasing in lieu of building facilities. Such alternatives may reduce the need to expend capital while satisfying basic business needs;
- Reconsider BPA's willingness to make certain types of transmission investments, in whole or in part, especially when the beneficiary of the investment is limited/targeted;
- Extend the new prioritization process to additional investment types. BPA proposes to extend coverage of the prioritization process to sustain categories; to the extent such spending would exceed allocated spending levels in FY 2018 and future years. BPA proposes to also extend coverage to small expansion investments that would start in FY 2018 and later years. The prioritization process involves making trade-offs among competing investment proposals based on economics and other factors. As such, the extended process will better position BPA to more optimally deploy its limited resources;
- Fish and Wildlife (F&W) capital spending levels are proposed to be reduced beginning in FY 2018 by $10 million per year compared to initially submitted levels. The F&W program will work with regional stakeholders to establish expectations for capital spending after FY 2017;
- Continue to implement the total economic cost methodology for transmission Sustain investments. This methodology, which Transmission Services has already begun to apply to many assets, is key to prioritizing the replacement of equipment and facilities in a manner that minimizes long-term costs while meeting funding, labor, available outage time and other limitations;
- Better integrate maintenance planning and replacements planning to improve the economics of repair vs. replace trade-offs. While this year's asset management strategies show progress in optimizing maintenance planning, there remains much room for improvement. Optimized maintenance may enable a reduced need to expend capital; and
- Continue to deploy asset registers and reform associated practices. Asset registers are repositories of information on asset demographics, asset health data, and asset performance and cost history. Ready access to this information is the foundation for prioritizing work, managing equipment and facility failure and other risks, and minimizing replacement and maintenance costs over time. The

Transmission, Facilities, and IT asset categories have had the greatest need to bolster their asset register capabilities, and their progress and plans are covered in their asset management strategies.

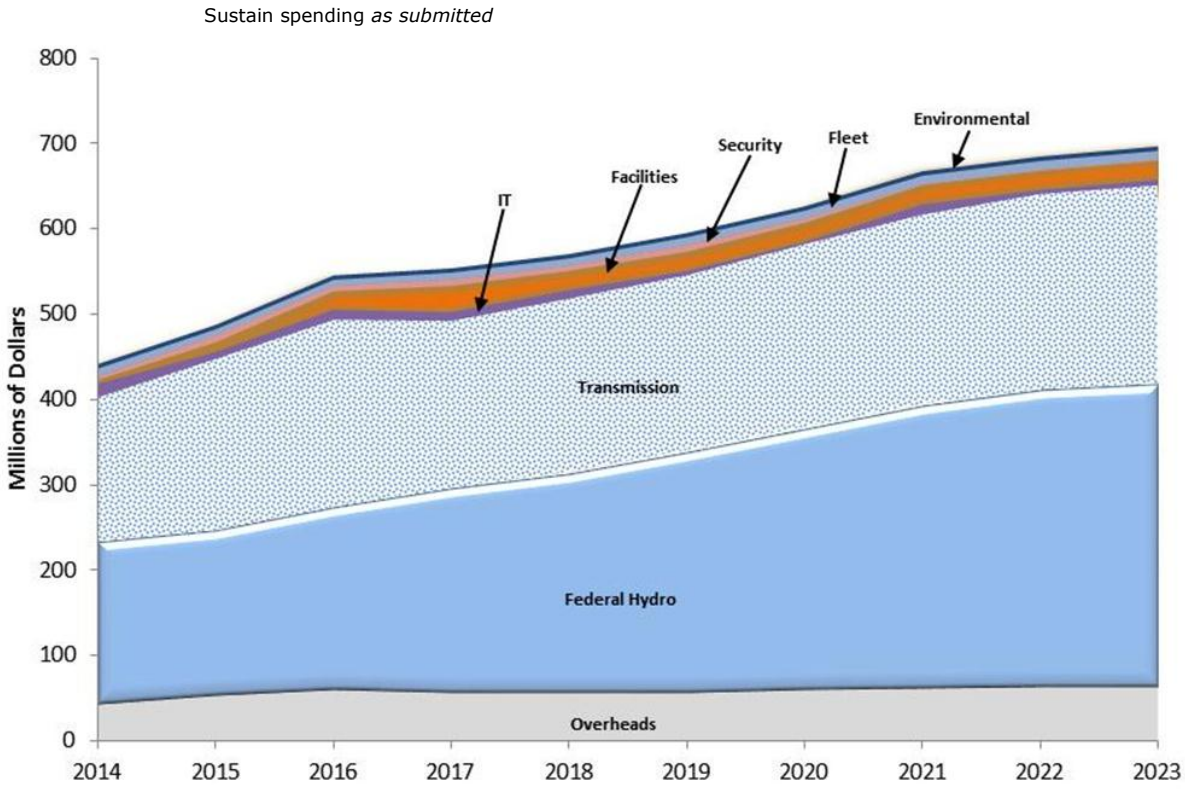
The following is a summary of proposed capital spending for Sustain investments, expansion investments that were excluded from the new BPA-wide prioritization process, and expansion investments covered by the prioritization process.

Sustain Investments

As noted earlier, Sustain investments include replacements when the primary purpose of the replacements is to manage the failure, obsolescence, health and safety, environmental and related risks of existing assets. These investments are prioritized through condition-based risk assessments, in which highest priority is assigned to the most critical equipment and facilities at greatest risk. Sustain investments are driven by asset management strategies for Transmission, Federal Hydro, Facilities, Information Technology, Security, Environmental, and Fleet. The asset strategies represent another leap forward in quality and sophistication of analytics since BPA began developing asset management strategies some 6 years ago.

The asset strategies call for a higher level of Sustain investment than BPA would be considering given the Affordability Cap. The strategies will be revised to be consistent with final decisions on spending reductions upon conclusion of the CIR and the IPR. Figure 15 below shows the spending levels that were initially submitted.

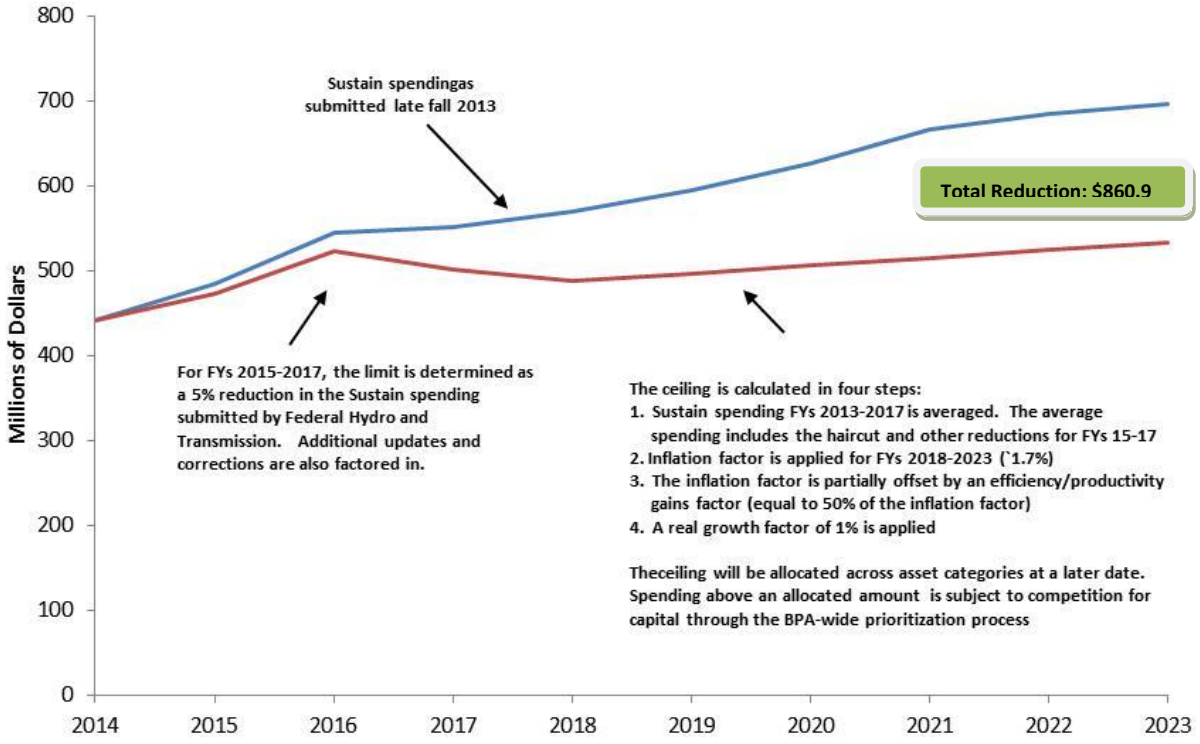
Figure 15 – Sustain Capital Summary



	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Total FY15-FY17	Total FY14-FY23
Environmental	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	15.6	52.0
Fleet	9.8	6.9	7.0	7.8	8.4	9.0	9.4	10.0	10.3	10.3	21.7	88.8
Security	3.5	8.4	6.4	7.6	6.0	7.8	4.6	1.0	1.0	1.0	22.4	47.3
Facilities	4.5	11.1	21.5	30.5	22.5	22.5	22.5	22.5	22.5	22.5	63.1	202.6
Information Technology	16.0	6.2	11.8	8.4	10.0	5.0	2.5	12.0	4.7	6.5	26.4	83.2
Transmission	169.8	201.1	219.3	196.0	204.5	206.4	215.6	223.3	229.0	232.3	616.4	2,097.3
Federal Hydro	189.4	193.7	214.1	239.6	257.0	282.0	307.0	332.0	349.0	355.0	647.3	2,718.7
Overheads	43.6	53.0	60.2	56.6	56.8	57.2	59.5	61.4	62.9	63.7	169.9	575.0
Total	441.6	485.6	545.5	551.7	570.4	595.2	626.4	667.4	684.6	696.5	1,582.7	5,864.9

Figure 16 below shows the reductions that BPA is applying to these submitted spending levels. For FYs 2015-2017, the reductions include updates and corrections to submitted spending levels and a 5% reduction to transmission and federal hydro Sustain spending. For FYs 2018-2023, an aggregate threshold ceiling is set based on the factors cited in the figure. The aggregate threshold ceiling would be allocated across asset categories at a later time based on asset health risks and the long-term economic/financial impact of alternative spending levels. The reductions would lead to a deferral of some needed replacements which means that asset failure, obsolescence and other risks would not decline or not decline as quickly as recommended by the asset strategies. The risks would add pressure to maintenance and unplanned outage costs. The probability of lost generation and transmission outages and de-rates would also be higher than if the reductions were not made. Recognizing this, asset categories would be provided the opportunity to augment their allocations for Sustain spending by competing for available headroom through BPA's prioritization process.

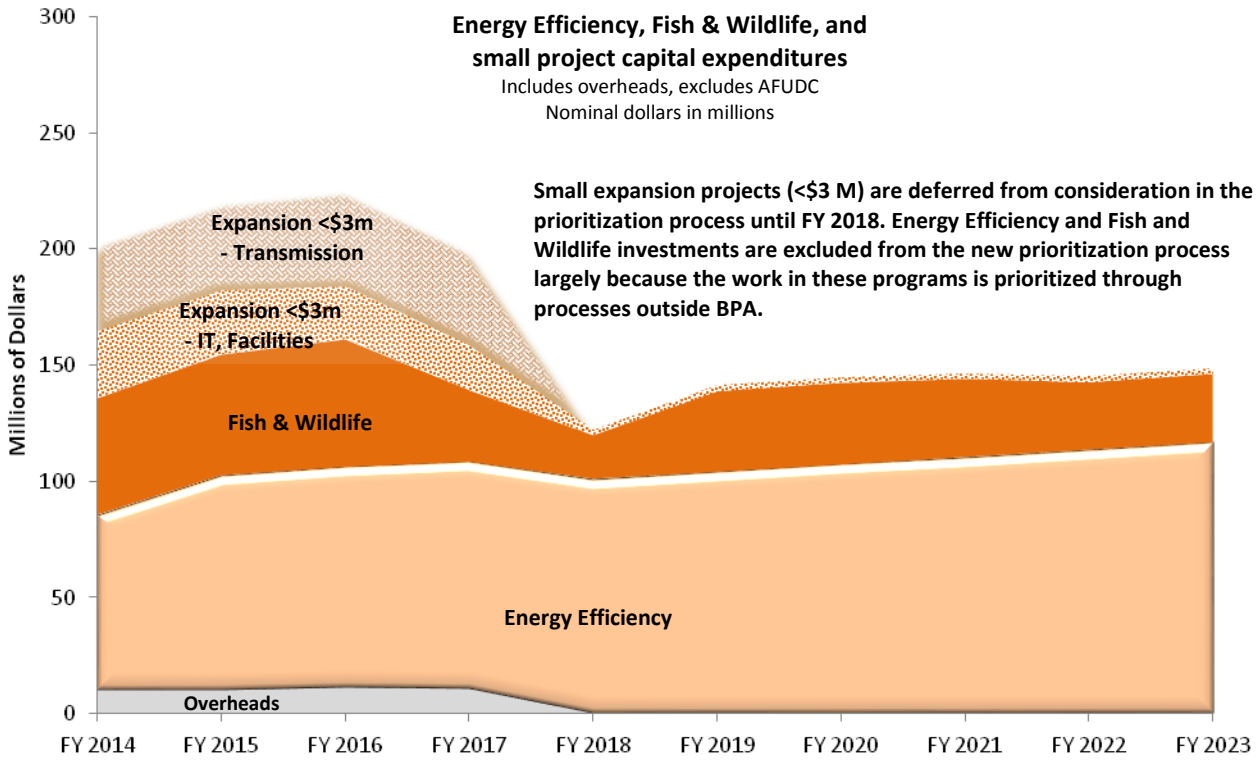
Figure 16 – Sustain capital levels, before and after proposed reductions
Includes overheads, excludes AFUDC, Nominal Dollars



Expansion investments

For purposes of prioritization, expansion investments are grouped into two categories: (1) expansion investments that are deferred or excluded from the prioritization process and (2) expansion investments that are covered.

Figure 17 – Expansion Investments Deferred or Excluded from BPA Prioritization Process



Expansion Investment Currently Excluded from New Prioritization Process

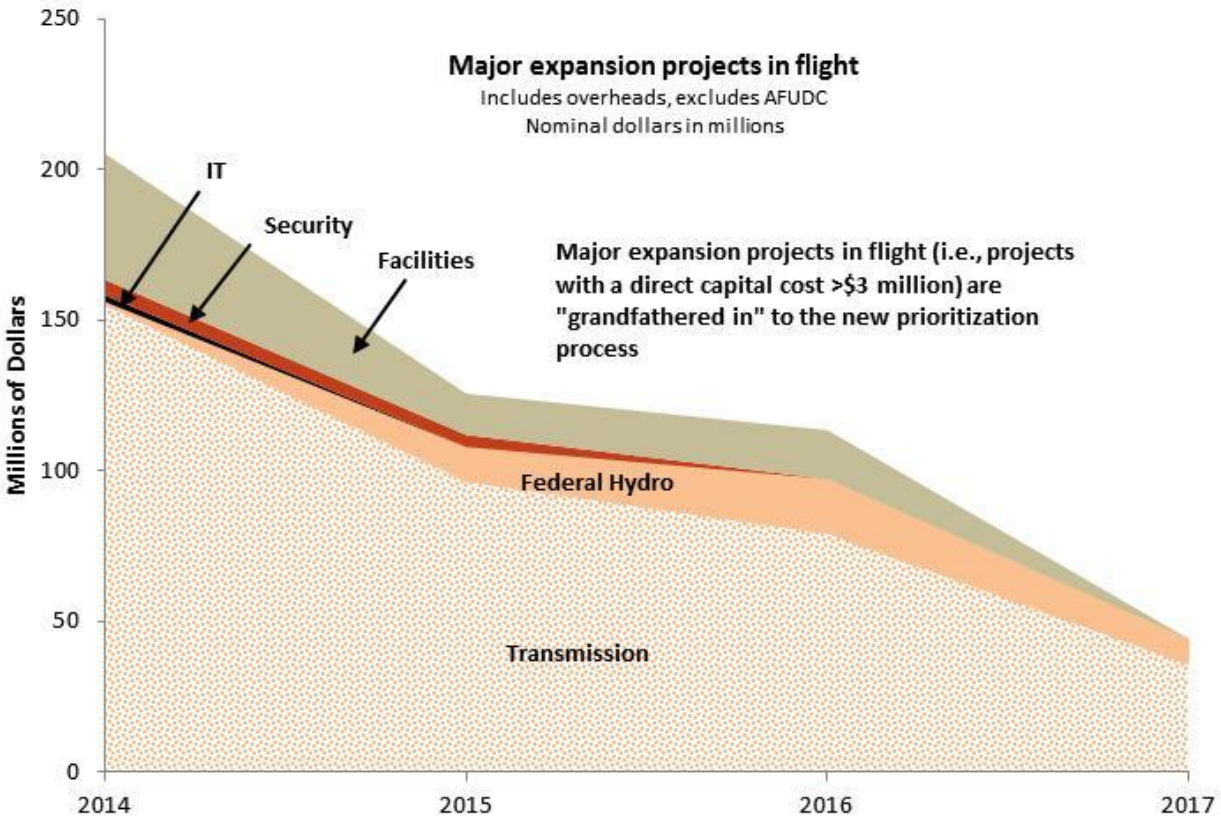
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Total
Expansion <$3m - Transmission	37.9	38.5	41.7	41.2	-	-	-	-	-	-	159.3
Expansion <$3m - IT/Facilities	29.1	27.7	22.9	19.5	2.5	2.5	2.5	2.5	2.5	2.5	114.2
Fish and Wildlife	50.0	51.8	54.8	30.8	28.6	44.8	45.0	43.6	39.0	39.3	427.8
Fish and Wildlife - Reduction	-	-	-	-	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(60.0)
Energy Efficiency - Incentive	52.6	64.4	66.3	68.3	70.4	72.5	74.7	76.9	79.2	81.4	706.6
Energy Efficiency - BPA Managed	22.6	27.6	28.4	29.3	30.2	31.1	32.0	33.0	33.9	34.9	303.0
Overheads	10.5	10.7	11.5	10.9	0.6	0.6	0.6	0.6	0.6	0.6	47.5
Total	202.8	220.7	225.6	200.0	122.3	141.5	144.9	146.6	145.3	148.7	1,698.4

In the case of Energy Efficiency investments, investment levels are driven by BPA's energy savings target as set forth by the Northwest Power and Conservation Council in their power plan as well as the mechanisms for achieving savings. In the case of Fish and Wildlife investments, the spending levels are driven by the Northwest Power and Conservation Council's fish and wildlife program, BiOp requirements, and long-term commitments with Tribes through the Fish Accords.

The Expansion investments that are excluded also include small expansion projects, defined as projects with an estimated capital cost of less than $3 million. These investments were deferred from being treated in the new prioritization process for practical reasons. The spending levels associated with small expansion projects that are shown above incorporate reductions. Small expansion projects that start beginning in FY 2018 will be rolled into the prioritization process.

Major expansion projects in flight, defined as projects with an estimated capital cost of $3 million or more that are authorized by the end of FY 2014 are "grandfathered" into the new process. The status of major expansion projects in-flight are reviewed and reported quarterly, and BPA proposes to proceed with these projects without change. Small expansion projects that begin in FY 2018 and future years will be incorporated into the new prioritization process.

Figure 18



Major Expansion Projects in Flight

	2014	2015	2016	2017	Total
Transmission	155.4	96.6	79.4	36.0	367.4
Federal Hydro	0.7	11.3	17.9	8.4	38.4
IT	2.2	-	-	-	2.2
Security	5.1	4.0	-	-	9.1
Facilities	41.8	13.8	16.3	-	71.8
Total	205.1	125.7	113.6	44.4	488.8

Expansion investments covered by the prioritization process

Figure 19 shows the 40 investments that were nominated and put in play during the 2013 process. This figure also shows the subset of investments for which BPA is giving a "green light" to proceed at this time. Summaries of the 40 nominated investments can be found on BPA's CIR website.

A large share of the investments that were nominated requires additional scoping of project alternatives and additional assessments of costs and benefits before a decision would be made to proceed or not proceed. The prioritization process is a continuous process, and such updates to costs and benefits will be considered on a 6-month cycle as the CAB "re-balances", or re-optimizes, the portfolio with the latest information. The 6-month cycle will lead to additional investments being given the green light and to additional investments being tabled, cancelled, or made subject to additional analysis before a decision is made.

Figure 19

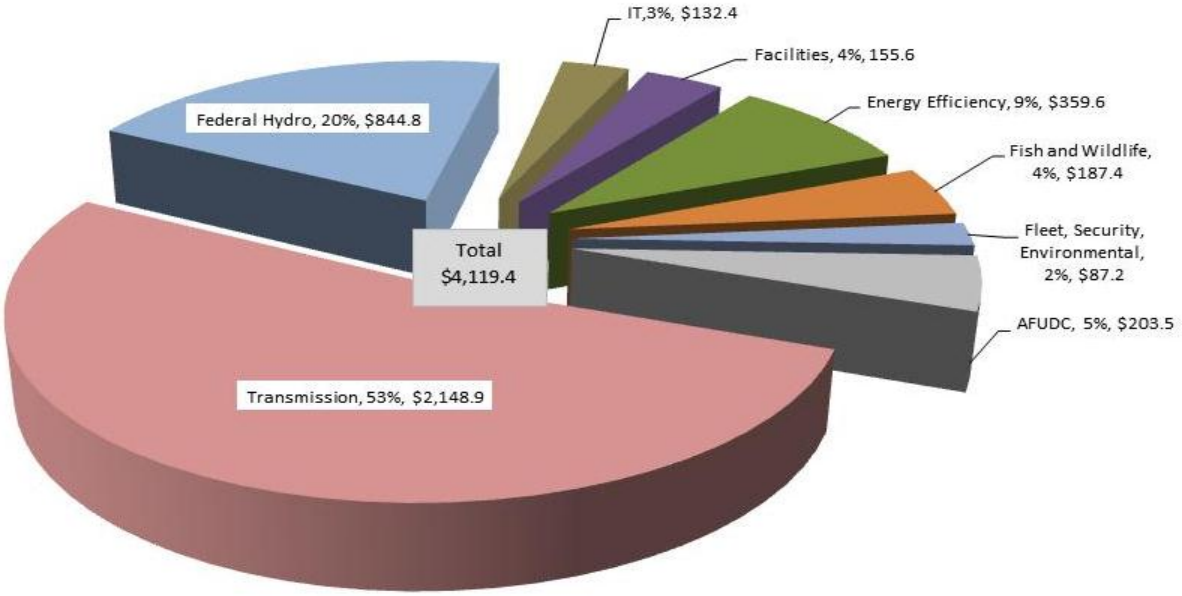
Prioritized Expansion Portfolio

Investment Name	Asset Category	Investment Classification	Net Economic Benefit Ratio	Capital spending (base amounts; without AFUDC) 2014	2015	2016	2017	Later Years	Total	Next Steps
Compliance Investments (Costs only assessed)										
Transmission Aggregated CC Compliance projects LT $3M.	Transmission	Compliance		0	794	0	0	0	794	Proceed with projects, update cost estimates
Transmission Aggregated Compliance Sub Upgrades LT $3M	Transmission	Compliance		0	0	0	589	589	1,178	Give green light at later date
FY15 - FY17 PMUs	Transmission	Compliance		0	337	3,032	1,819	1,550	6,738	Proceed to Business Case
DeMoss-Fossil Shunt Reactive Project	Transmission	Compliance		0	281	1,125	4,219	0	5,625	Proceed to Business Case
Subtotal				0	1,412	4,157	6,627	2,138	14,334	
Discretionary Investments (Costs & Benefits assessed)										
ITSM - CRM Project	IT	Discretionary	76.5	0	0	628	0	0	628	Proceed to Inception Stage
Walla Walla Reinforcement (Tucannon River-Hatwai 115kV)	Transmission	Discretionary	18.1	0	424	424	424	7,212	8,485	Proceed to Business Case
Spare Transformers at Wind Sites - Slatt Substation	Transmission	Discretionary	16.8	0	0	1,136	5,114	0	6,250	Proceed to Business Case
Spare Transformers at Wind Sites - Central Ferry Substation	Transmission	Discretionary	15.7	0	0	0	1,136	5,114	6,250	Proceed to Business Case
Spare Transformers at Wind Sites - Rock Creek Substation	Transmission	Discretionary	13.0	0	1,250	5,625	0	0	6,875	Proceed to Business Case
Spare Transformers at Wind Sites - John Day Substation	Transmission	Discretionary	12.8	1,250	5,625	0	0	0	6,875	Proceed to Business Case
ITSM - CMDB/AIM/ETS	IT	Discretionary	8.6	0	511	0	0	0	511	Proceed to Inception Stage
ITSM-CMS Project	IT	Discretionary	8.8	0	0	276	0	0	276	Proceed to Inception Stage
Monroe 500kV Line Retermination	Transmission	Discretionary	5.7	0	0	1,271	3,813	3,390	8,474	Proceed to Business Case
O&M Flex Project - Carlton Substation Sectionalization Project	Transmission	Discretionary	2.0	1,055	2,461	0	0	0	3,516	Proceed to Business Case
Montana-to-Washington Transmission System Upgrade Project	Transmission	Discretionary	1.6	0	18,250	82,125	82,125	0	182,500	Deferred
Power Constraint Management System (PCMS)	IT	Discretionary	0.5	0	1,854	955	0	0	2,809	Examine alternatives
Redmond MHQ Addition and Building Upgrade	Facilities	Discretionary	0.3	0	0	1,238	3,713	7,425	12,375	Examine alternatives
Snohomish MHQ Upgrade	Facilities	Discretionary	0.2	0	1,300	3,900	7,800	0	13,000	Examine alternatives
Southern Idaho Communication Upgrade	Transmission	Discretionary	(0.1)	0	0	1,400	4,900	700	7,000	Redefine scope of project
Lewiston MHQ Facility	Facilities	Discretionary	(0.5)	0	0	0	1,119	10,069	11,188	Examine alternatives
L0322 Klondike-Blalock Reinforcement Mobile Transformer	Transmission	Discretionary	(0.5)	0	0	0	1,663	0	1,663	Re-assess benefits
Sacajawea to Ice Harbor-Franklin 115kV #1 Line	Transmission	Discretionary	(1.0)	0	0	173	2,770	519	3,463	Cancelled
Structured Data Management (SDM)	IT	Discretionary	(1.1)	0	1,080	1,620	0	0	2,700	Proceed to Inception Stage
Business Systems Disaster Recovery	IT	Discretionary	(1.6)	0	5,502	8,254	0	0	13,756	Tabled
Business Systems Disaster Recovery (Alternative 2)	IT	Discretionary	(4.2)	0	1,259	1,888	0	0	3,147	
Subtotal				2,305	38,258	109,025	114,576	34,429	298,592	
Discretionary/Policy Commitment Investments (Costs only assessed at this point)										
Garrison East Transmission Project	Transmission	Discretionary		0	2,500	7,500	30,000	10,000	50,000	Deferred
Business Enterprise Services Strategy (BESS) initiatives	IT	Discretionary		0	0	2,490	520	2,790	5,800	Examine alternatives
Business Intelligence Competency Center	IT	Discretionary		0	0	0	2,100	0	2,100	Examine alternatives
Billing Information System Upgrade	IT	Discretionary		0	0	5,000	5,000	0	10,000	Examine alternatives
Boardman to Hemingway	Transmission	Discretionary		0	0	0	0	375,000	375,000	Assess benefits, examine alternatives
Capability Upgrades for Planning and Operations in Power Servi	IT	Discretionary		0	1,540	4,616	4,616	9,232	20,004	Examine alternatives
EIM Potential Technology Enhancements	IT	Discretionary		0	0	850	850	6,800	8,500	Assess benefits, revise cost estimates
Transmission Asset Portfolio Management System	IT	Discretionary		0	2,500	2,500	0	0	5,000	Define scope, assess costs and benefits
G0314 Interconnection of Thompson Falls Hydroelectric Project a	Transmission	Policy Commitment		0	0	1,781	7,719	2,375	11,875	Tabled
G0105/G0432 enXco's Desert Claim Wind Project	Transmission	Policy Commitment		0	0	0	563	10,688	11,250	Tabled
Transmission Aggregated PFIA Projects LT $3M	Transmission	Policy Commitment		0	2,287	2,287	2,287	2,287	9,146	Proceed with projects, update cost estimates
G0361 Invenergy's Heppner Wind Stanfield	Transmission	Policy Commitment		0	0	0	3,750	21,250	25,000	Tabled
Transmission Aggregated A & CS projects LT $3M	Transmission	Policy Commitment		0	625	625	0	0	1,250	Proceed with projects, update cost estimates
Monroe 500kV Reactor	Transmission	Policy Commitment		0	1,502	1,502	6,009	1,002	10,015	Assess benefits
ETC Scenario Analysis	IT	Discretionary		0	0	500	500	0	1,000	Examine alternatives
Subtotal				0	10,954	29,651	63,913	441,423	545,940	
Projects "Green Lighted" and in Prioritized Portfolio				2,305	15,675	18,049	18,812	19,552	74,392	
Projects deferred, excluded until further assessment				0	34,949	124,784	166,304	458,438	784,474	
Total Prioritized Portfolio				2,305	50,623	142,833	185,116	477,990	858,866	

Summary of proposed capital spending

Figure 20 summarizes BPA's proposed capital spending, including Sustain and all Expansion components, for the FY 2014-17 period.

Figure 20 – Capital Comparison Summary



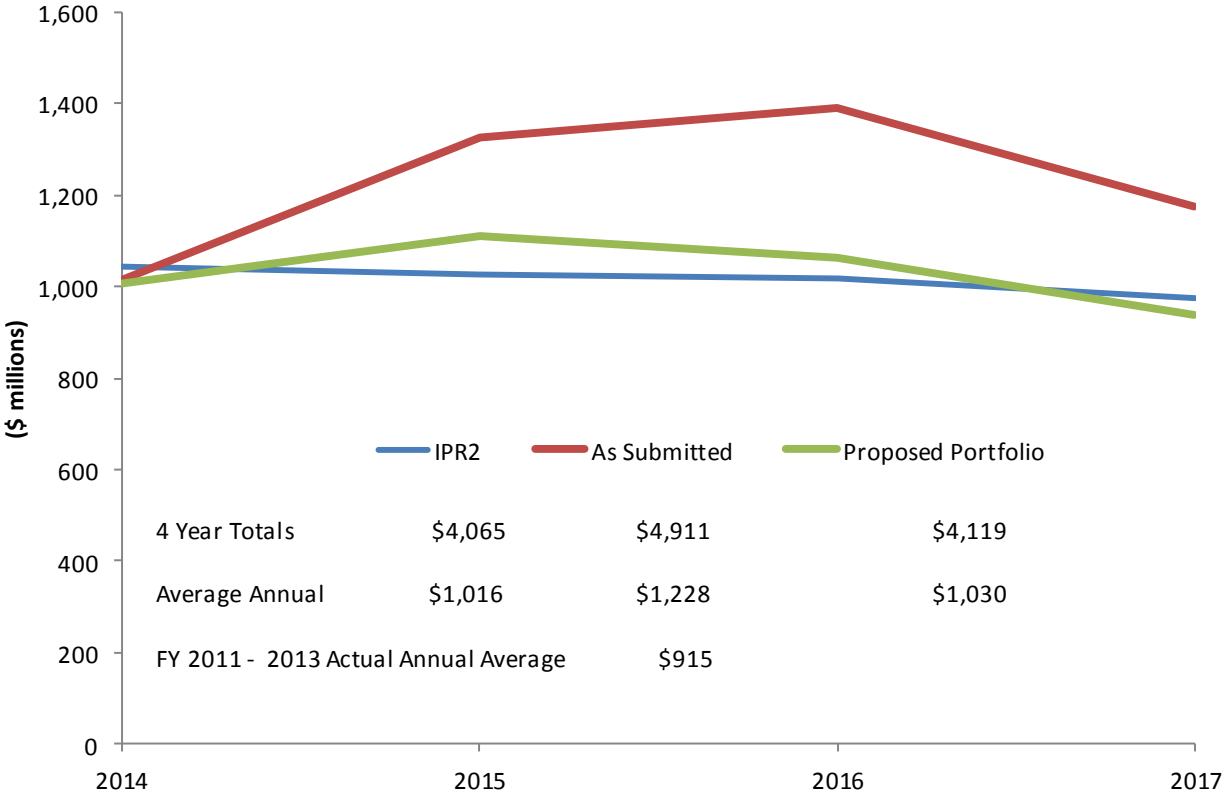


Figure 21

Capital Comparison Summary

Nominal Dollars in Millions (Includes overheads, AFUDC and LGIA projects)

As Initially Submitted (Late Fall 2013)	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Total
Transmission											
Sustain	295.3	406.9	365.6	259.0	260.6	259.6	269.3	278.9	286.1	290.2	2,971.4
Expansion	253.3	431.5	445.1	357.9	137.8	224.1	211.7	209.5	130.9	94.0	2,495.8
Federal Hydro											
Sustain	160.5	174.0	196.5	235.1	257.0	282.0	307.0	332.0	349.0	355.0	2,648.1
Expansion	29.5	31.0	35.5	12.9	-	-	-	-	-	-	108.9
Information Technology											
Sustain	16.0	6.2	11.8	8.4	10.0	5.0	2.5	12.0	4.7	6.5	83.2
Expansion	20.8	39.6	51.8	30.1	23.7	25.9	17.4	17.0	17.0	17.0	260.2
Facilities											
Sustain	5.6	10.1	23.1	38.1	28.1	28.1	28.1	28.1	28.1	28.1	245.8
Expansion	46.5	19.9	26.2	15.2	13.4	9.3	2.5	2.5	2.5	2.5	140.5
Security/Environmental/Fleet											
Sustain	18.5	20.5	18.6	20.6	19.6	22.0	19.2	16.2	16.5	16.5	188.2
Expansion	5.1	4.0	-	-	-	-	-	-	-	-	9.1
Energy Efficiency	75.2	92.0	94.8	97.6	100.5	103.6	106.7	109.9	113.1	116.3	1,009.6
Fish and Wildlife	50.0	40.0	50.0	40.0	28.6	44.8	45.0	43.6	39.0	39.3	420.4
AFUDC	40.6	51.7	72.8	60.1	58.2	45.9	50.4	60.4	66.4	49.0	555.4
Total	1,016.8	1,327.3	1,391.8	1,175.0	937.6	1,050.3	1,060.0	1,110.1	1,053.4	1,014.4	11,136.7
Proposed reductions											
5% sustain reduction FY15-17*	-	(12.6)	(21.5)	(30.0)	-	-	-	-	-	-	(64.1)
Cap sustain spending FY18-23	-	-	-	-	(82.4)	(98.2)	(120.4)	(152.3)	(160.4)	(163.0)	(776.8)
Fish and Wildlife reduction FY 18-23	-	-	-	-	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(60.0)
Move additional expansion into prioritization	-	-	-	-	(134.2)	(133.6)	(134.2)	(134.8)	(135.4)	(136.0)	(808.1)
Prioritized expansion portfolio**	-	(46.3)	(138.1)	(170.5)	(47.0)	(159.5)	(132.1)	(115.9)	(37.5)	-	(846.9)
I-5 Corridor schedule and cost adjustment	1.5	(159.4)	(146.7)	23.1	114.8	125.0	100.0	-	-	-	58.3
Other changes	(9.2)	2.8	(18.6)	(64.7)	(12.5)	14.6	(10.1)	(33.3)	(38.5)	(19.3)	(188.9)
Total reductions	(7.7)	(215.5)	(325.0)	(242.1)	(171.3)	(261.7)	(306.8)	(446.3)	(381.7)	(328.4)	(2,686.5)
Proposed spending levels (Jan 2014)											
Transmission											
Sustain	313.6	430.4	320.5	236.5	260.8	259.8	269.5	279.1	286.3	290.4	2,946.8
Expansion	217.6	196.3	209.5	231.3	137.8	128.4	102.5	0.8	-	-	1,224.3
Federal Hydro											
Sustain	189.4	189.0	206.2	221.8	257.0	282.0	307.0	332.0	349.0	355.0	2,688.4
Expansion	0.7	11.3	17.9	8.4	-	-	-	-	-	-	38.4
Information Technology											
Sustain	16.0	6.2	11.8	8.4	10.0	5.0	2.5	12.0	4.7	6.5	83.2
Expansion	27.0	25.0	21.0	17.0	-	-	-	-	-	-	90.0
Facilities											
Sustain	5.6	13.9	26.9	18.1	28.1	28.1	28.1	28.1	28.1	28.1	233.3
Expansion	47.1	19.2	21.7	3.1	3.1	3.1	3.1	3.1	3.1	3.1	109.9
Security/Environmental/Fleet											
Sustain	18.5	20.5	18.6	20.6	19.6	22.0	19.2	16.2	16.5	16.5	188.2
Expansion	5.1	4.0	-	-	-	-	-	-	-	-	9.1
Sustain and other undistributed reductions	-	-	-	-	(107.4)	(123.2)	(145.4)	(177.3)	(185.4)	(188.0)	(926.8)
Energy Efficiency	75.2	92.0	94.8	97.6	100.5	103.6	106.7	109.9	113.1	116.3	1,009.6
Fish and Wildlife	50.0	51.8	54.8	30.8	18.6	34.8	35.0	33.6	29.0	29.3	367.8
AFUDC	43.4	52.2	63.2	39.2	38.1	45.0	24.8	26.3	27.1	28.8	388.0
Total	1,009.1	1,111.9	1,066.9	932.9	766.3	788.6	753.2	663.8	671.6	686.0	8,450.2
Headroom - lower end of cap range	-	-	-	6.0	8.0	10.0	18.0	20.0	20.0	28.0	110.0
Headroom - upper end of cap range	-	-	-	56.0	108.0	130.0	158.0	160.0	170.0	178.0	960.0

* Applied to Transmission and Federal Hydro excluding PDCI and other forecast adjustments

** 16 of 40 nominated investments are given the green light at this time

FEDERAL HYDRO

ASSET STRATEGY SUMMARY

4 FEDERAL HYDRO

This asset strategy was prepared before BPA's proposal to reduce costs. Spending levels in this document do not tie to proposed reductions. The strategy will be revised upon conclusion of the CIR and the IPR

4.1 PROFILE OF ASSETS

The Federal Columbia River Power System (FCRPS) includes 31 hydroelectric plants – 21 operated by the U.S. Army Corps of Engineers (Corps) and 10 by the U.S. Bureau of Reclamation (Reclamation). With an installed capacity of over 22,000 megawatts, the FCRPS is the largest hydropower system in the United States and second largest in North America. In an average water year, it produces 76 million megawatt-hours of electricity, displacing fossil-fired generation that would otherwise emit in excess of 40 million tons of carbon dioxide.

The FCRPS is a multi-purpose system producing products and services for power, flood damage reduction, navigation, irrigation, municipal and industrial water supply, and fish and wildlife. Power generation value is estimated at $4.4 billion annually with an additional avoided carbon dioxide emission value of $1.4 billion per year.

The 31 plants are grouped into four strategic classes:

- **Main Stem Columbia:** plants that provide the majority of power, ancillary services, and non-power benefits to the Pacific Northwest.
- **Headwater/Lower Snake:** plants that support services provided by Main Stem Columbia plants.
- **Area Support:** plants that do not support the region as a whole, but provide key power and non-power benefits to a sub-basin, primarily in the Willamette Valley I5 corridor.
- **Local Support:** plants that provide services locally, primarily in Southern Idaho.

The 13 Main Stem Columbia and Headwater/Lower Snake plants produce 96 percent of the energy and capacity for the system.

The plants are further grouped within strategic classes according to their criticality, based largely on the quantity of energy produced; particularly during peak periods, and by the relative cost of unavailability, i.e., the financial consequence of the loss of generation at the margin. Five plants – Grand Coulee, McNary, Chief Joseph, John Day and Dworshak – are considered particularly critical to the power system based on the significant financial impact of generating unit outages at these facilities. The program outlined in this strategy targets a significant portion of investments at these five plants to improve condition and reliability.

Figure 22 – Criticality of Assets

Relative Cost of Unavailability	FCRPS Hydro Plants			
Severe >$40 million/year				Grand Coulee Chief Joseph McNary
Extreme $10-$40 million/year			Dworshak	John Day
Major <$10 m/year	Anderson Ranch, Minidoka Black Canyon, Chandler Boise Diversion, Roza Green Springs	Big Cliff, Dexter, Hills Creek Lost Creek, Detroit, Palisades Foster, Albeni Falls, Cougar Green Peter, Lookout Point	Libby, Hungry Horse Ice Harbor, Little Goose Lower Monumental Lower Granite	Bonneville The Dalles
	Local Support	**Area Support**	**Headwater/ Lower Snake**	**Main Stem Columbia**

4.2 Objectives of this Strategy

The objective of the hydro strategy is to invest in equipment refurbishments and replacements to manage risk within funding constraints established by BPA's Access to Capital Strategy.

The strategy is implemented through a set of Direct Funding Agreements to:

- Ensure that life safety and environmental requirements are met;
- Meet FCRPS commitments for fish and wildlife and cultural resource programs;
- Meet BPA's business continuity needs for a reliable supply of low-cost generation by ensuring power generating assets are properly operated, inspected, and maintained;
- Mitigate the risk of power generation component failures by replacing or refurbishing equipment and purchasing spares when warranted;
- Increase the efficiency and/or capability of power facilities where economically feasible; and
- Fund a portion of high priority multi-purpose projects, in accordance with BPA's direct funding agreements with the Corps and Reclamation.

With this in mind, the 2016 strategy includes the direct funded O&M program, direct funded capital program, and appropriations for joint cost features reimbursed by BPA. The strategy excludes costs that are specific to other project purposes.

The scope of the hydro strategy covers two major program areas:

- The Capital Program is comprised primarily of large, discrete investment needs for equipment

replacement or refurbishment, largely driven by condition and risk.
- The O&M Program reflects core funding for maintenance, operations, and minor equipment replacements, and is largely driven by the staffing needs of each facility.

The Capital Program funding proposals presented within this strategy focus on the 10-year period, FY 2014-23, with an additional 10-year horizon to outline a 20-year view of risk forecasts resulting from alternative investment levels. Investments target electrical and mechanical systems, less on civil features for dam safety, which are typically funded through appropriations, a share of which is reimbursed by BPA.

Reinvestment costs for civil features have been relatively low for the history of the FCRPS. Civil features are long-lived and refurbishment and replacement needs are typically negligible for the first 50 years of plant life. However, at some point significant reinvestment in civil features is needed to assure public safety and extend asset life.

The following issues are considered exclusions in the development of this asset strategy:

- For the focus period of this strategy, a limited amount of civil features have been identified, primarily gates, in the analysis of risk and investment needs. The exclusion of costs for other dam safety civil features likely underestimates the total funding need forecast. As the hydro system continues to age, anticipating funding needs for all civil features will require more explicit attention in future strategies.
- The use of an Enterprise Asset Management (EAM) system is a key element in providing data for evaluating historical and future maintenance activities. The Corps and Reclamation both have implemented EAM solutions for tracking of work orders and management of their preventive maintenance programs. However, the use of these systems is still evolving, particularly for the Corps which has recently completed a major upgrade of its system and processes. As a result, gaps remain in the FCRPS' ability to perform detailed analysis of the O&M Program.
- The plan does not yet consider program management and implementation issues such as succession planning, skill gaps, automation, or mechanisms for planning and executing major projects.
- The plan does not include a risk assessment of changes in fuel supply based on factors such as changes in weather patterns or fish operations. Additional capital projects could be mandated to address fisheries concerns, and any change in fuel supply could affect the economic value of generating assets and, therefore, the selection of projects.

4.3 STRATEGIC CHALLENGES

Aging Infrastructure

The hydro system infrastructure is aging, with an average age of over 50 years. The oldest plant in the system is Minidoka, with an in-service date of 1911. Bonneville Dam is the oldest Main Stem Columbia plant, with an in-service date of 1938. While many more years of valuable production can be expected from the hydro system, it faces significant challenges associated with maintenance and replacements demands to preserve this value.

Funding Constraints

In the 2012 IPR, BPA limited capital funding to the hydropower program as part of its Access to Capital Strategy for debt management. The resulting hydro capital program declines by 10 percent in real

dollars over the next ten years. The analyses included in this 2014 CIR Hydro Asset Strategy suggest that higher levels of capital funding are needed to improve equipment condition and manage performance risk effectively.

Aging Workforce

The power industry as a whole is now in a retirement bubble that poses significant risk to maintaining the workforce needed to operate and maintain facilities effectively. A large percentage of personnel working on-site at FCRPS hydro plants are eligible for retirement within five years. The workforce of accountants, engineers and project managers who support the hydropower facilities are also nearing or at retirement age.

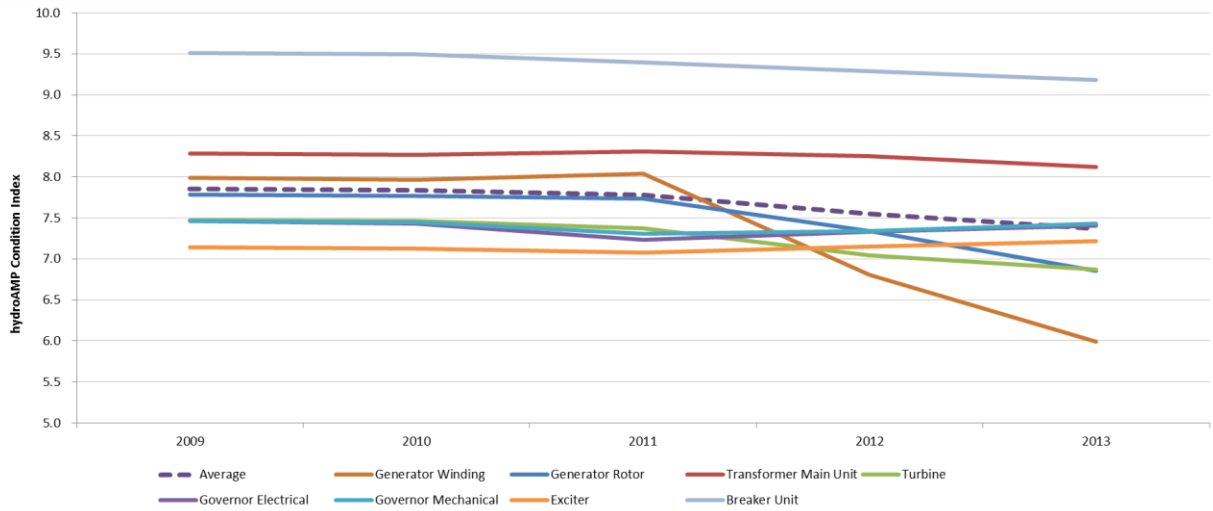
4.4 Major Elements of the Strategy

The strategy is focused on an understanding of equipment condition, an assessment of how condition affects generation, safety and environmental risk, and the actions necessary to reduce risk within resource limitations and available funding.

There are few redundant or spare equipment components in hydroelectric generating facilities and, as such, it is important that the condition of major components be understood and managed. Along with nearly two dozen utilities in North America, the FCRPS uses hydroAMP to assess the condition of its hydro assets. Since 2009, the average FCRPS hydro power train equipment condition index has declined from 7.8 to 7.3, on a scale of zero to 10.0. A similar decline of condition has occurred for plant auxiliary equipment. The decline is largely attributable to a reinvestment level that is below what would be expected from benchmark averages and suggested by asset planning analyses. The historical level of reinvestment equates to an average equipment replacement cycle in excess of 75 years.

Equipment condition varies across the 31 FCRPS hydro plants, with four of the five most critical plants having 30 percent or more of their equipment in marginal or poor condition.

Figure 23 - Risk Map Based on Current Condition and Financial Consequence of Failure



HydroAMP is a common element used to identify equipment risk. The FCRPS hydro program correlates equipment condition with the likelihood of equipment failing to perform as expected. Using hydroAMP as a risk map input provides a quantitative view of risks by mapping the likelihood of failure for specific

equipment components against the consequence of that failure causing a loss of generation availability. Without intervention, condition declines over time and equipment tends to move up on the risk map below. The number preceding each equipment type listed on the map corresponds to the number of equipment items in that category. Similar maps are generated for safety and environmental risk.

Figure 24 - Risk Map Based on Current Condition and Financial Consequence of Failure

Likelihood	Insignificant < $ 10K	Minor $ 10K to $ 100K	Moderate $ 100K to $ 1 M	Major $ 1 M to $ 10 M	Extreme > $ 10 M
Almost Certain	3 Operations Support 1 Station Service	2 Cranes 25 Operations Support 13 Station Service 2 Unit Reliability 3 Water Control	17 Infrastructure 21 Operations Support 10 Station Service 16 Unit Reliability 4 Water Control	3 Infrastructure 1 Operations Support 15 Station Service 7 Unit Reliability 1 Water Control	1 Operations Support
Likely	13 Operations Support 7 Station Service	14 Operations Support 10 Station Service 35 Unit Reliability 1 Water Control	8 Cranes 10 Infrastructure 30 Operations Support 23 Station Service 25 Unit Reliability 14 Water Control	7 Cranes 7 Operations Support 51 Station Service 134 Unit Reliability 10 Water Control	1 Cranes 2 Station Service 16 Unit Reliability 2 Water Control
Possible	1 Infrastructure 19 Operations Support	1 Cranes 6 Infrastructure 20 Operations Support 6 Station Service 21 Unit Reliability 3 Water Control	42 Cranes 15 Infrastructure 31 Operations Support 24 Station Service 82 Unit Reliability 16 Water Control	26 Cranes 2 Infrastructure 4 Operations Support 47 Station Service 305 Unit Reliability 4 Water Control	4 Cranes 85 Unit Reliability 1 Water Control
Unlikely	3 Operations Support	4 Infrastructure 4 Station Service 4 Water Control	5 Cranes 8 Infrastructure 3 Station Service 44 Unit Reliability 35 Water Control	14 Cranes 1 Infrastructure 4 Station Service 166 Unit Reliability 3 Water Control	4 Station Service 45 Unit Reliability
Rare	5 Infrastructure 97 Operations Support 6 Station Service	1 Cranes 16 Infrastructure 62 Operations Support 115 Station Service 351 Unit Reliability 11 Water Control	50 Cranes 62 Infrastructure 52 Operations Support 124 Station Service 781 Unit Reliability 89 Water Control	56 Cranes 5 Infrastructure 4 Operations Support 162 Station Service 1329 Unit Reliability 20 Water Control	1 Operations Support 14 Station Service 310 Unit Reliability 3 Water Control

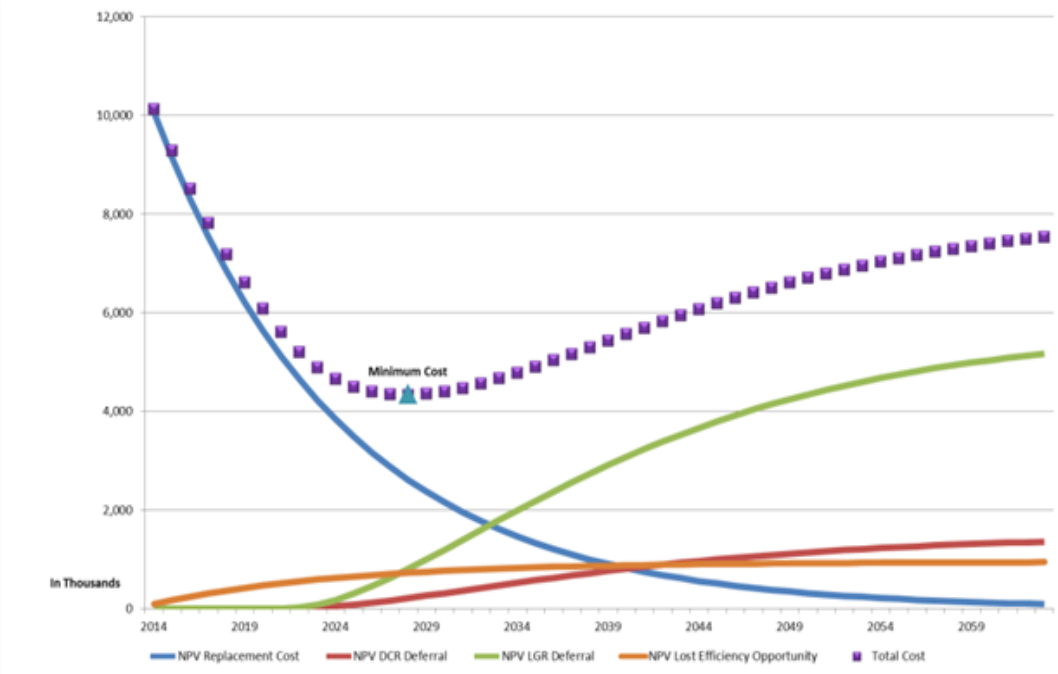
Consequence

Condition: 0 (top) – 10 (bottom)

Risk Level	Low	Medium	High

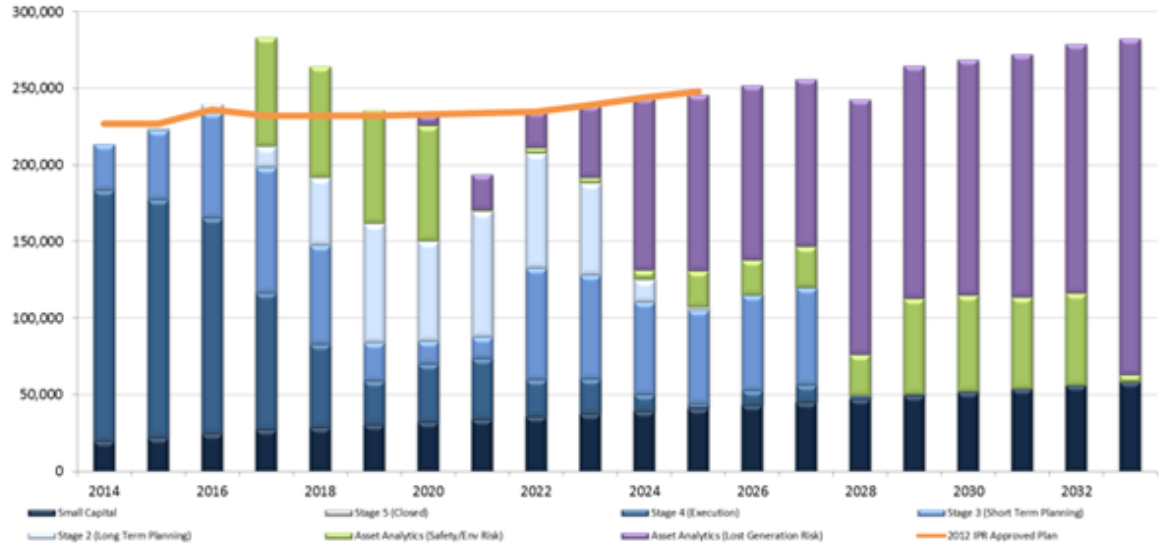
Investments to maintain reliability are less about “if” than “when” to make equipment repairs or replacements. The strategy uses a risk-based approach of asset analytics to forecast the optimum time for making these investments. To determine the optimum timing for replacement, each equipment component is evaluated in yearly time steps over 50 years. In each year, the present value of accumulated financial risk cost is added to the present value cost of replacing the equipment in that year. The sum of these present value costs is the total cost related to a decision to delay equipment replacement until that year. The optimum time to plan on equipment replacement is at the low point (cost minimum) of the total cost curve, i.e., the point at which financial risk costs begin growing faster than the benefit of deferring the investment.

Figure 25 - Optimum Timing for Equipment Replacement



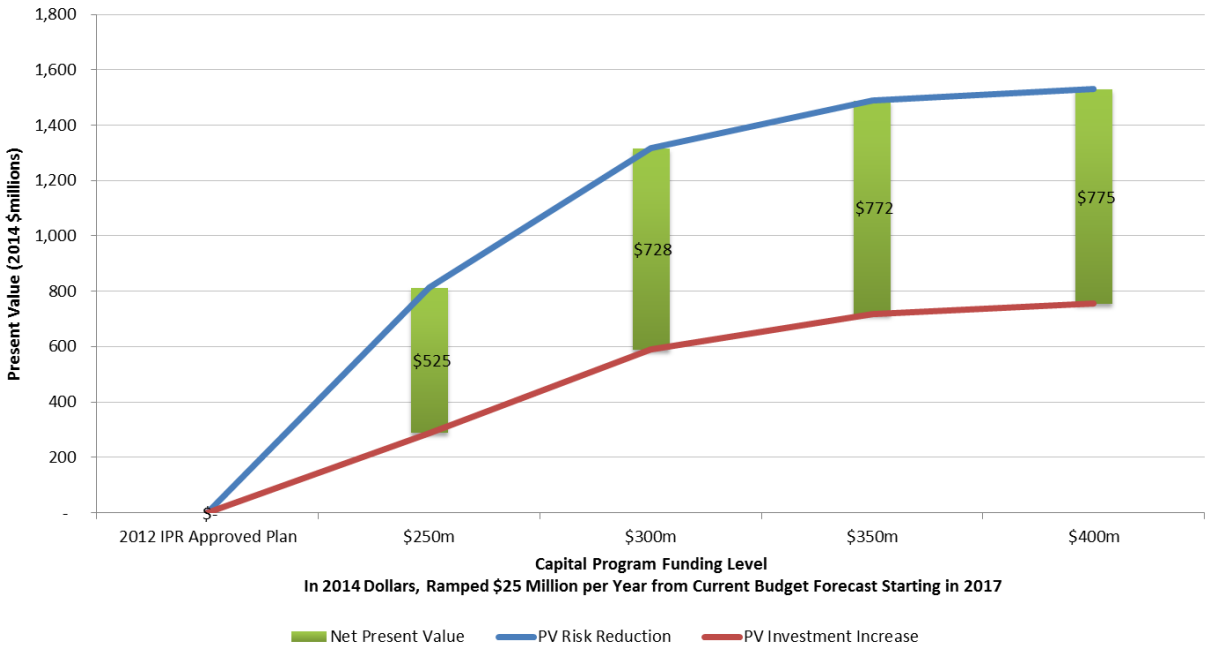
The IPR2 capital forecast (June 2013) averages $235 million per year through 2025, declining by 10 percent in real dollars over the period 2014-2025. Through 2025, nearly $2.2 billion is programmed, focused primarily on unit reliability improvements on Main Stem Columbia and Headwater/Lower Snake plants. About $800 million of the program is in an execution stage, with an additional $1.0 billion in short and long term planning stages, and $400 million reserved for small capital projects (minor equipment replacements). Asset analytics are applied to the remaining $650 million available to inform the next set of investments to be selected by the capital program.

Figure 26 – Capital Forecast (2014 – 2033)



Funding constraints require that some investments are delayed beyond their cost minimum, resulting in higher risk and total cost for the system. For the strategy, the impact of various higher funding levels were considered and their associated reduction in risk. Several sensitivities were run with consistent funding levels through 2017, then ramping up at $25 million per year until a trigger funding level was reached, after which it was held constant in real dollars for the remainder of the 50-year study period. BPA found that the plan's net present value (NPV) increased dramatically as capital funding was increased to $300 million per year, with NPV increasing more slowly at higher funding levels.

Figure 27 - Net Present Value of Various Program Funding Levels (12% Discount Rate)



Under the 2012 IPR capital forecast, average equipment condition is projected to decline for the foreseeable future. Lost generation risk is forecasted to increase through 2022, after which it is expected to decline to current levels by 2027. Key drivers behind this trend is the need to rewind generators and address turbine reliability problems at the five critical priority plants – Grand Coulee, Chief Joseph, John Day, McNary and Dworshak – which will have significant impacts on system availability for the next decade or more.

4.5 Results to be Achieved

The hydro program's strategic priority is focused on one measure: Hydro system availability performance compared to a system availability forecast.

The availability forecast incorporates known routine maintenance needs, capital program and extraordinary expense related outages associated with implementing the strategy, and a component for forced outages reflecting equipment condition and operational risks.

NERC Generating Availability Data System (GADS) defines Availability Factor (AF) as ((Available Hours / Period Hours) * 100%). System availability is the MW-weighted average of AF for the 31 plants in the FCRPS. The 4-year forecast for FCRPS hydro system availability is shown in Figure 28.

Figure 28 – FCRPS Hydro System Availability Forecast

	FY 2014	FY 2015	FY 2016	FY 2017
Forecast	77.4%	77.5%	79.0%	80.8%

The forecast increases 3.4 percent over the 4-year horizon, in part an artifact of capital and non-routine expense programs that are not fully defined in later years. The next availability forecast will improve that definition, with a trend that is likely flatter.

4.6 Proposed Spending Levels

The total capital program spending level was defined by BPA's Access to Capital Strategy and confirmed during the 2012 IPR. Allocations between small and large capital are made within the capital program.

This 2014 CIR Hydro Asset Strategy identifies long term benefits associated with higher capital program levels, but the status quo for available funding is not expected to change due to debt management considerations and efforts to keep immediate rate increases to a minimum. As a result, the expected range of capital spending is forecast to be within plus or minus 5 percent of the proposed capital spending for the 10-year period, with annual fluctuations that could exceed that amount.

Capital Program ($ millions)

Figure 29 – 2012 IPR2 Capital Forecast

($ millions)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Large Cap	207	204	211	204	203	201	200	200	199	201	2,030
Small Cap	20	23	25	28	29	31	33	34	36	38	297
Total	**227**	**227**	**236**	**232**	**232**	**232**	**233**	**234**	**235**	**239**	**2,327**

Figure 30 – 2014 CIR Proposed Capital Levels Based on Strategy Analytics ($300 million)

($ millions)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Large Cap	170	182	207	220	228	251	274	298	313	317	2,460
Small Cap	20	23	25	28	29	31	33	34	36	38	297
Total	**190**	**205**	**232**	**248**	**257**	**282**	**307**	**332**	**349**	**355**	**2,757**

*This is from the Fed Hydro strategy

TRANSMISSION

ASSET STRATEGY SUMMARY

5 TRANSMISSION

This asset strategy was prepared before BPA's proposal to reduce costs. Spending levels in this document do not tie to proposed capital reductions. The strategy will be revised upon conclusion of the CIR and the IPR.

5.1 INTRODUCTION

BPA owns and manages about three-fourths of the Northwest region's high voltage transmission assets. This system spans approximately 300,000 square miles and includes more than 15,000 circuit miles of transmission lines and 299 substations. These assets deliver electric power, directly or indirectly, to a population of more than 12 million through four product categories.

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

Assets Covered by this Strategy

Alternating Current Substations: 298 Substations and ~32,000 major equipment categories

Power Transformers and Reactors, Power Circuit Breakers, Circuit Switchers, DC Control Batteries and Chargers. Shunt Capacitors, Current Limiting Reactors, Instrument Transformers, Engine Generators, Surge Arrestors, Fuses, Disconnect Switches, Rigid Riser Replacement, Substation Grounding, Substation Bus and Structures, Low Voltage Station Auxiliary, Control Houses

Direct Current Substations: Celilo Converter Station

HVDC Converter Station, Static Var Compensators, Fixed Series Capacitor Banks, Thyristor Controlled Series Capacitor Bank

Control Center: 2 Control Centers with 85 plus automation systems

Real-time Grid control and management systems; Grid and data center monitoring, protection, and alarm systems; CC critical power infrastructure; Non-real-time operations analysis and support systems; Commercial Business Systems/facilities integration and support

Power System Control / Telecommunications: 732 sites and ~ 11,000 pieces of equipment, 3,000 miles of fiber optic cable

RAS, Transfer Trip, SCADA remote terminal units, Fiber cable, Comm batteries/chargers, SONET/MW Radios, VHF/mobile/portable radios, UHF, DATS, Multiplex, Power Line Carrier, Telemetering, Operational Networks and their management, Engine Generators, Supervisory Control Systems, UPS, Telephone systems, Telephone protection, Field Information Network, Misc support systems

System Protection and Control: 956 locations, ~28,000 pieces of equipment, 33 equipment types

Transformer relays, Bus relays, Line relays, Breaker relays, RAS, Reactive relays, Revenue metering and Control, SER, DFR, Control equip, Load shedding relay, Indicating Meter Transducers, Relay Communications

Rights of Way: 195,600 acres of BPA maintained ROW corridors, 319 corridors, 423 transmission lines, 368 communication sites, approx. 11,860 miles of access roads, approx. 80,000 tracts of easement

Access roads, Roads, Bridges, Culverts, Trails and gates, Tracts of easement

Wood Lines: Approx. 4,800 miles, 336 separate transmission lines with 73,500 wood poles

Poles, Conductors, Insulator assemblies, Guy assemblies, Fiber optic cable, Line disconnect switches, Ground wire, Counterpoise

Steel Lines: 10,300 circuit miles with 43,500 lattice steel and engineered steel pole transmission lines and all associated towers, hardware and components

Towers, Connectors, Conductors, Insulator assemblies, Footings, Dampers, Counterpoise

5.2 Objectives

The Transmission Asset Management Strategy provides the roadmap for managing the health, performance, costs and risks of transmission assets owned or leased by BPA. This is achieved through ensuring the *sustainment* of critical existing assets, including transmission lines, substations, control center equipment and other facilities and equipment to meet reliability and availability requirements; and that *expansion* of the system provides the needed transmission capacity and flexibility into the future. Through an assessment of the current state of BPA's transmission asset management program, this strategy represents the course of action needed to ensure achieving the end-state goals.

Figure 31

Vision for managing transmission assets:

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.

Long-term goals

For improving asset management practices:

- Transmission asset management practices conform to leading practices
- Expansion, replacements, and maintenance are integrated, prioritized in terms of asset criticality and risk, and directed at meeting reliability and other standards at lowest total economic cost
- Asset management plans deliver on the transmission asset management strategy through an optimized funding and resourcing plan. Projects are completed within scope, on schedule and within budget.

For expanding transmission:

- Load service obligations and customer service request projects meet standards and tariff requirements
- An integrated regional expansion planning process is implemented
- A robust grid that effectively and efficiently integrates diverse energy resources
- Inter-regional transfer capacity meets reliability standards and market requirements
- Fuller, more optimal use is made of existing transmission capacity through technological, policy and process change

For sustaining assets:

- Information on asset attributes (condition, performance, and costs) is complete, accurate, and readily accessible
- Assets are proactively maintained and replaced
  - Maintenance, replacements and sparing integrated
  - Priority given to critical assets at greatest risk
  - Reliability, availability, and other standards met at lowest total economic cost
- Maintenance is reliability-centered (condition-based)

5.3 Strategic Challenges

Over the past few years much has changed in the utility industry that has placed additional demands on how BPA's transmission assets are managed. From regulatory requirements on how critical cyber assets are classified and managed to market changes that drive differences in how the transmission system is operated, pressures such as these present challenges in ensuring objectives are defined, prioritized, integrated, and achieved, all while minimizing impacts to customer rates. Meeting strategic objectives on all fronts depends on having a healthy and well planned system infrastructure. The strategy to reach the ideal state for the system infrastructure must mitigate and manage several challenges:

- Taking advantage of new technology that will provide valuable efficiencies
- Staying on top of technology changes to ensure reliability and interoperability of equipment, and avoid obsolescence
- Having adequate data to inform the prioritization of work and once identified, securing adequate funding levels and committed resources to address backlogs in capital replacement and deferred maintenance
- Balancing the customer demand for system availability with the necessary outages to facilitate maintenance and replacement projects
- Responding to evolving and increasing regulatory requirements
- Addressing the increasing physical and cyber hazards that put the transmission system at risk
- Meeting the demands of an evolving market and the increased reliance on critical real time data. Together customer needs, system constraints, and system operating limits will require transmission operators to have greater system visibility, accuracy of models and automated controls in order to maintain reliability.

5.4 Major Elements of the Strategy

BPA's transmission asset management strategy is focused on the efforts necessary to achieve the long term goals of sustaining its existing infrastructure at desired performance levels while addressing the challenges listed above. The Transmission Asset Management strategy document describes the specific approaches to be taken and places particular focus on overarching initiatives and the set of actions and prioritized investments to be implemented in the sustain programs. Expansion investments, driven by capacity and customer requirements, are prioritized through the BPA Capital Investment Prioritization process and are identified in the overview section of BPA's CIR publication.

Highlights from the sustain asset strategies are included below to provide context to the capital investment levels forecasted for FY 2014-2023. Detailed strategies and supporting asset information are contained in the full Transmission Asset Management Strategy document.

Overarching strategy for program and process improvements

A recent evaluation of the current state of BPA's transmission program resulted in the development of strategic priorities for Transmission Services in the areas of *System Infrastructure, System Operations,* and *Commercial Success.* These three priorities must be addressed in the context of achieving the fourth priority, *System Reliability Compliance.* The System Infrastructure strategic priority forms the basis for this asset strategy with outcomes expected to deliver on the following picture of success:

> Significantly improved annual program delivery levels of 90% for Sustain and 80% for Expand; substantially advanced asset management quality and systems; robust project integration; and implemented technology strategy and governance; together preserve and enhance the reliability and availability of the existing and future transmission system infrastructure.

Specific process improvements identified in the strategy to facilitate reaching this objective are:

- Greater accessibility of higher quality asset data
- Development and integration of sustain program asset strategies using a standardized approach for identifying risks through an evaluation of total economic cost metrics.
- Implementing portfolio management tools for greater visibility into asset program information
- Building project management capabilities
- Addressing hurdles in project execution
- Creating a critical spares strategy

5.5 SUSTAIN PROGRAM STRATEGIES:

The Transmission sustain programs are structured by groups of assets. Each sustain program has an asset specific strategy and corresponding implementation plan of prioritized investments determined to best meet BPA's strategic objectives for its transmission system. Sustain investments are defined as investments the primary purpose of which is to replace existing assets in order to maintain system performance and capability. In an effort to better prioritize investments towards mitigating the most critical risks, Transmission Services adopted an approach for evaluating risks based on reducing *total economic cost*s. This approach has currently been applied to the AC Substations, Power System Control, and System Protection and Control programs with the remainder of the sustain programs to be evaluated by the end of FY 2015.

AC substations

The AC Substations program has recently undergone a re-examination of strategic approaches using the total economic cost evaluation metrics. The preferred strategic alternative contains the following elements:

- Replacement plans to address the backlog of deferred capital replacements based on an economic lifecycle
- Predictive analysis using information from relays, sensors and camera
- Improving work related processes
- Addition of on-site transformer and reactor spares

Development of the high-level implementation plan to implement selected strategic changes is expected to be complete by FY 2014 Q2. In the meantime, the AC Subs program has already begun prioritizing replacements based on the newly developed strategy with a goal of minimizing total economic costs over time.

Control centers

The strategies to improve control center asset performance are focused on:

- Addressing critical asset risks first, as well as high risk asset issues before they reach critical stage
- Migrating Open Virtual Memory System technology systems such as major control systems to a Windows platform to improve manageability and maintain sufficient software vendor support
- Ensuring that critical systems meet their established availability targets by taking appropriate maintenance, support and replacement actions
- Complete Lifecycle Plans with risk assessments for each asset and update them at least annually
  - Incorporates established server and workstation equipment lifecycle standards
  - Includes refinement of additional performance standards

- Develop a control center Data Management Program and Strategy
- Develop enterprise architecture and strategic "line of sight" to control center assets
- Develop visibility, tools, and processes to support more complete and proactive Demand & Capacity Management in the control centers
- Strategically plan for control center asset information management improvements meeting a wide range of program stakeholder needs
- Establish dedicated control center technology and architecture planning functions or roles, and better integrate with the Power System Control (PSC) and System Protection and Control (SPC) Technology Evaluation and Testing Council and test team processes
- Develop a cyber-security and risk management strategy towards evolving the current practices for system visibility, risk assessment, decision making and compliance response

Power system control (PSC) and system telecommunication

The strategy is aimed at aggressively minimizing total economic cost by reducing the risks of:

- Asset failure through surmounting large backlogs resulting from years of underinvestment
- Interoperability issues by designing and conducting a comprehensive, integrated testing program
- Technological obsolescence by developing and implementing a long-term strategy for moving off SONET and other equipment

PSC and system telecommunication equipment is upgraded and replaced to support BPA's delivery on its strategic objectives, including possible energy imbalance market formation, greater use of dynamic transfer capacity and demand response resources, and changes in scheduling. PSC replacement plans are integrated with SPC and associated control center assets. Process improvements in documentation accuracy and enhanced training enable achievement of objectives to address backlogs and reduce rework.

System protection and control (SPC)

Over the next 10 years, replace specific populations of equipment groups that are at highest risk of failure or technological obsolescence and contribute the most to total economic cost. Targeting these replacements will mitigate the risks associated with:

- The documented poor health of aged equipment
- The lack of manufacturer support for older equipment
- The increased corrective maintenance on aged asset population
- The challenge of retaining the skill set necessary to work on older equipment models

Improvements in the SPC program include better coordination with the PSC program for replacements and integrated testing, which will also incorporate innovative technology.

Rights-of-way

Vegetation management

- Implement an integrated vegetation management approach – a system of managing plant communities whereby managers set objectives, identify compatible and incompatible vegetation, consider action thresholds and evaluate, select and implement the most appropriate control methods to achieve set objectives. The choice of control methods should be based on the environmental impact and anticipated effectiveness along with site characteristics, security, economics, current land use and other factors.

- Assure the highest level of regulatory compliance by adopting the integrated vegetation management approach, which is considered an industry best practice.

Access roads

- Implement a systematic long-term method for upgrading and maintaining BPA access to and through rights-of-way corridors. This allows a corridor approach for planning work in support of the wood pole and steel lines sustain programs. It also considers bundling projects to allow greater implementation through the owner's engineer contract.
- Ensure that safe access in compliance with environmental regulations is provided throughout the entire transmission system.

Land rights

- Develop a long-term plan to meet program objectives/targets, including reducing backlogs and supporting asset plans for access roads, vegetation, and lines. This strategy prioritizes the needs for rights (alternative routes, risk of complaints/litigation/trespass violations, criticality of the line, tribal renewals) in a comprehensive view.

Wood lines

The strategy is an asset life cycle strategy which is a combination of life extension and systematic replacement of the worst performing and highest consequence of failure assets.

- The life extension strategy replaces all of the aged components on a priority pole replacement structure
- The systematic replacement strategy addresses rebuilding approximately 100 miles of aged, poorly performing wood pole lines each year
- Projects are implemented on a three-year program schedule to allow adequate time for gaining road rights, acquiring land and materials, and performing NEPA activities
- Old de-energized lines are removed to mitigate safety and liability risks and reduce maintenance responsibility

Steel lines

The strategy includes a proactive plan to replace vital overhead system components nearing end of life by:

- Setting standard metrics for collecting and retaining asset condition data with enough granularity to identify condition trends, target and pace replacement efforts, manage components over time and better predict remaining service life
- Standardizing the process for sampling and testing retired components
- Developing a long-term strategy for evaluating and mitigating a continuously aging asset
- Incorporating standardized components and technology innovations into replacement efforts

5.6 Results to be Achieved

Transmission Services has adopted key transmission targets and system performance measures, or metrics, and to monitor the overall reliability, adequacy and availability of BPA's transmission system (shown in the figure below). These system performance measures and targets are supplemented with asset program-specific metrics and targets contained in the sustain program strategies.

Figure 32

	Performance Measures	End Stage Targets
Reliability	**System Average Interruption Duration Index (SAIDI) - Average duration of automatic outage minutes by BPA line category.** Provides an indication of BPA's success at minimizing the duration of unplanned transmission line outages.	No control chart violations per year for line importance categories 1-2. No more than 1 control chart violation per year for line importance categories 3-4.
	System Average Interruption Frequency Index (SAIFI) - Average number of automatic outages by BPA line category. Provides an indication of BPA's success at minimizing the number of unplanned transmission line outages.	No control violations per year for line importance categories 1-2. No more than 1 control chart violation per year for line importance categories 3-4.
	Report of number of outages to transmission lines of all voltage levels caused by vegetation growing into the conductor or within flashover distance to the conductor. (Relates to vegetation growing from either inside or outside the BPA right-of-way)	No outages to transmission lines of all voltage levels caused by vegetation growth.
Adequacy	**Flowgate Performance** Number of excursion minutes that actual path flows are greater than the System Operating Limits (SOL). Indicates congested areas for which capacity expansion may merit consideration. Included in Transmission Services FY 2014 balanced scorecard.	Flowgate annual excursion minutes for all of FY 2014 are at or below the calculated control limit (110 minutes/flowgate) system-wide.
Availability	**Availability for service of BPA's most important transmission lines (Category 1 and 2)** Included in Transmission Services FY 2014 balanced scorecard.	BPA's most important transmission lines (Category 1 and 2) are available for service at least 97.39% of the time.
Process Improvements	**Asset Management Key Transmission Target** Included in Transmission Service FY 2014 balanced scorecard.	Per the approved Asset Management Roadmap, processes, tools, and policies in support of asset register improvements; asset strategy development; and more successful project, portfolio and program delivery will be integrated and operationalized in the business organizations to enable effective Asset Management and planning.

5.7 Proposed Spending Levels

The Transmission sustain capital program execution level has increased from approximately $70 million in FY 2008 to $177 million in FY 2013. An average of $200 million is planned for FY 2014-17 with a slight ramp up in the out years. The annual level of investment is expected to increase and the determination of the optimal level needed to adequately address the backlog will continue to be analyzed.

Figure 33

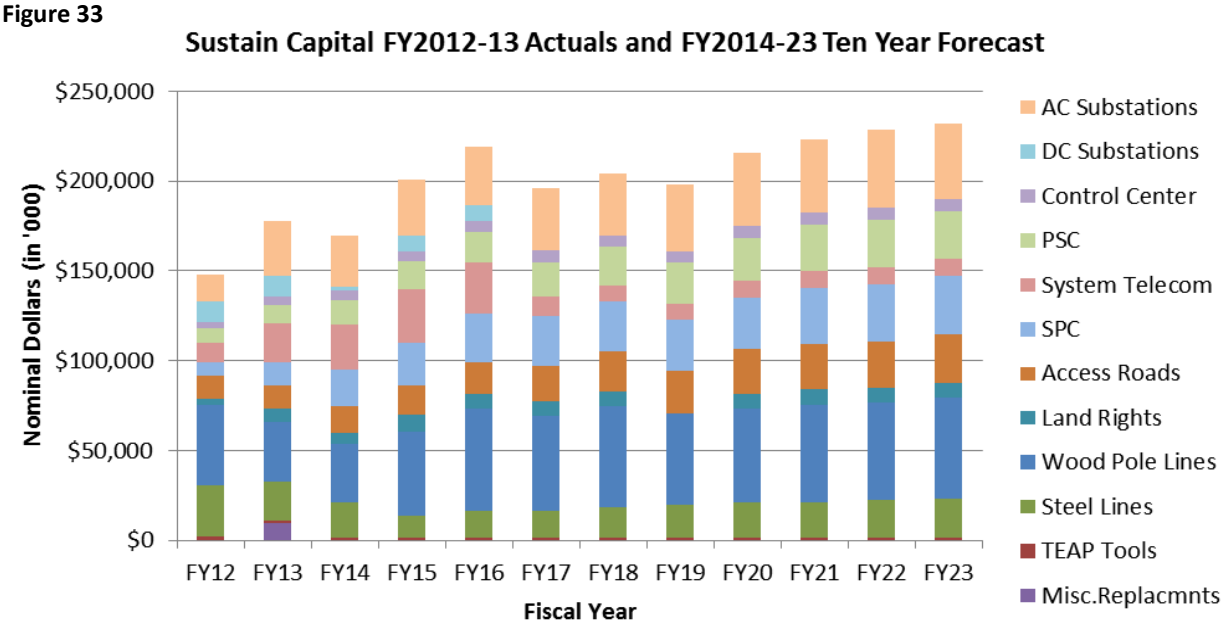


Figure 34 - Capital FY2012-13 Actuals and FY 2014-23 CIR Proposed Capital Spending Levels

	Actuals		Proposed Capital Spending Levels										
($ thousands, nominal)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
AC Substations	15,007	30,219	28,367	31,508	32,870	34,331	34,703	37,157	40,728	40,861	44,012	42,082	411,845
DC Substations	11,813	11,826	1,907	8,500	8,300	400	-	-	-	-	-	-	42,746
Control Center	3,228	4,701	5,811	5,827	6,104	6,206	6,437	6,516	6,597	6,677	6,760	6,837	71,701
PSC	7,793	9,795	13,500	15,500	17,500	19,500	21,500	22,850	23,798	25,975	26,204	26,437	230,352
System Telecom	10,986	22,152	24,845	29,559	28,000	10,750	8,750	8,899	9,050	9,204	9,360	9,519	181,074
SPC	7,280	12,877	20,350	23,898	27,284	27,420	27,814	28,252	28,897	31,036	31,946	32,310	299,364
Access Roads	13,422	12,491	15,000	16,000	18,000	20,000	22,500	23,500	25,000	25,425	25,857	27,297	244,492
Land Rights	3,134	7,551	6,042	9,790	7,778	7,910	8,045	8,181	8,321	8,462	8,043	8,180	91,437
Wood Pole Lines	44,516	33,282	33,020	46,520	57,270	52,850	55,900	51,000	52,000	54,100	54,100	56,000	590,558
Steel lines	28,407	21,881	19,603	12,625	14,865	15,276	17,449	18,623	19,741	20,024	21,200	22,074	231,768
TEAP Tools	2,410	1,369	1,176	1,200	1,224	1,248	1,273	1,299	1,325	1,351	1,378	1,406	16,659
Misc.Replacments	-	9,349	-	-	-	-	-	-	-	-	-	-	9,349
Sustain Total	**147,995**	**177,493**	**169,622**	**200,927**	**219,195**	**195,892**	**204,371**	**206,277**	**215,455**	**223,115**	**228,862**	**232,143**	**2,421,347**

*This is from the Transmission strategy

INFORMATION TECHNOLOGY

ASSET STRATEGY SUMMARY

6 INFORMATION TECHNOLOGY

This asset strategy was prepared before BPA's proposal to reduce costs. Spending levels in this document do not tie to proposed capital reductions. The strategy will be revised upon conclusion of the CIR and the IPR.

6.1 PROFILE OF ASSETS

The Information Technology Asset Strategy covers the technology assets hosted in the Bonneville User Domain (BUD). These assets comprise approximately,

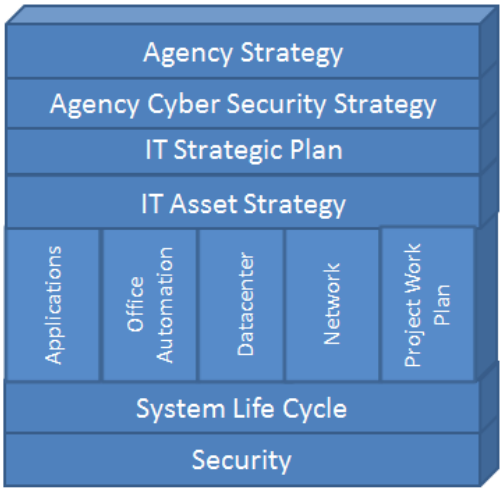
- 1% of the BPA's Plant In Service total capital assets
- 4% of the BPA's planned FY 2014 capital spend
- 2% of the BPA's planned FY 2014 expense spend

These assets include circuits, servers, storage devices, desktop systems, printers, copiers, faxes, phone systems, and software, including Software as a Service (SaaS). The software systems covered by this strategy include critical business systems, general business systems, web applications, and task systems. Critical business systems must operate and be available around the clock (24x7). There are approximately 20 critical business systems. These systems enable power and transmission marketing and scheduling functions, hydro operations, and load forecasting. General business systems enable BPA to manage its staff, finances, facilities, supply chain, transmission assets, and services such as managing circuits and work planning. Task systems are small web based applications that enable BPA staff to more efficiently perform their work. A small sampling of examples include: Absentee Tracking System, the Tribal Matrix website, and the NW Sub-basin Geographic Data browser.

This strategy does not cover technology assets residing on the operational grid network, as they are not currently under IT governance. Grid network systems monitor and manage the status of the electric grid. These management systems include BPA's SCADA (supervisory control and data acquisition) and AGC (Automatic Generation Control) systems.

The IT Asset Portfolio is divided into four major asset portfolios and the Project Work Plan as shown in Figure 35. The Project Work Plan contains the projects, which create assets (software system, networks, datacenter, etc.) that are placed into production under one of the four asset portfolios. Each asset portfolio has its own asset plan. BPA uses these individual asset plans to create its overall IT Asset Strategy.

Figure 35 - Strategy and Asset Management Stack



The Office Automation, Network, and Data Center Portfolios collectively form the information technology infrastructure that supports both users and systems. Infrastructure will be used throughout this strategy to refer collectively to these three portfolios.

Figure 36

	Office Automation	Data Center	Network
Assets	Desktops, laptops, printers, and desktop software	Servers (infrastructure servers, application servers, database, etc.) operating systems, database management systems, and management tools	Data, voice, and video networks
Asset Category Activities	• Refresh of network printers and desktops/laptops • Upgrading workstation software • Adoption of new technologies • Bringing or maintaining systems in compliance with architectural standards	• Refresh of servers and storage • Migrating to new server operating systems • Adopting new technologies (hierarchical storage management, virtualization, etc.) • Enhancement of data center (improving bandwidth between servers and SAN, improving backup and recovery, server consolidation, etc.) • Bringing or maintaining systems in compliance with architectural standards	• Refresh of network infrastructure (routers, switches, hubs, firewalls, cabling, etc.) • Enhancement of network infrastructure (remote access, wireless access, etc.). • Adoption of new technologies (tele-presence, messaging convergence, IPV6, etc.) • Bringing or maintaining systems in compliance with architectural standards

Infrastructure Portfolios

Application Portfolio

Includes the sub-portfolios for Critical Business Systems, Business Systems, General Purpose Systems, and General Tasks Systems. These sub-portfolios cover:

- Implementing minor or major software upgrades
- Managing systems implemented as Software as a Service (SaaS)
- Applying system or security patches
- Implementing planned new features to meet business needs
- Addressing user requested changes to meet emerging business needs
- Correcting bugs or erroneous computing conditions
- Implementing annual changes such as tax code changes
- Implementing expense Projects for major system changes
- Implementing potential Capital Projects for delivering new functionality
- Maintaining systems in to compliance with the enterprise architecture
- Retirement and/or disposition of systems

Critical Assets

Critical IT assets are defined by the functions they support and/or their availability requirements. A critical system supports one or more of the following functions:

- Real time or preschedule transmission or power scheduling
- Hydro operations
- Marketing (deal capture, day ahead trading)
- Short term forecasting, planning and loads

The critical IT services include network, email, telephone, and DNS services. A critical IT service has a 24x7-availability requirement and supports the above functions on an hourly basis. Using these criteria for critical business services, there are 20 critical business systems and 4 critical IT services.

The critical business systems are contained in the Applications Portfolio's Critical Business System sub-Portfolio. The Network Portfolio contains the network, telephone, and DNS services. Email is in the Application Portfolio's General Business sub-portfolio

6.2 Objectives of this Strategy

The goal of BPA's Asset Strategy is to maximize the long-term operational and economic value of BPA's assets. This goal is accomplished by ensuring assets operate efficiently and effectively and provide the capacity and capabilities needed to meet health and safety, reliability, availability, adequacy, environmental, security and other standards; striving to minimize total economic costs over the long-term. The Information Technology Asset Strategy has developed four goals covering IT assets that align with BPA's asset strategy and span the four IT asset plans.

Information Technology Asset Goals:

- Enable BPA to reliably and securely, in accordance with Federal and Industry regulations and laws, use IT resources to effectively and efficiently perform work while maximizing utilization of IT resources. (ITAG 1)
- Optimize total cost of ownership by balancing the costs of new investments for upgrades and replacements with ongoing operations and maintenance costs. (ITAG 2)
- Strike a balance between individual business unit's immediate requirements and overall BPA strategic objectives by delivering flexible and extensible assets that meet current objectives and can be leveraged to meet future strategic business objectives, resulting in reduced future delivery times and a least total cost of ownership. (ITAG 3)
- Institutionalize Operational Excellence through the adoption of maturity models to drive continuous improvement processes, practices, and service delivery to; maximize the value of BPA's IT assets and to reduce the cost of operations and maintenance. (ITAG 4)

These goals are mapped, in each of the IT's sub portfolio category chapters, to the sub portfolio strategies.

Asset Sustain Rates

Infrastructure assets are refreshed based on a combination of industry best practices and BPA's desire to optimize value in its investment. As a rule, BPA maintains hardware one to two years beyond industry best practices. Although this approach does increase the risk of failure in the latter year of operations, historically this has not had an adverse impact on BPA's environment. Critical systems are redundant by

design, reducing the risk of operational disruptions. The increases in replacement costs from hardware failure in the year leading up to a refresh cycle are offset by lower operating costs provided by maintaining environmental stability, allowing BPA to optimize the value of its investments, keeping the overall total cost of ownership lower than adhering strictly to industry recommendations.

There is not a standardized refresh schedule for IT application systems. IT applications are maintained while the systems continue to meet business needs and are cost effective. Upgrades and replacements are considered discretionary and are either expense or capital projects. Delivering and supporting automated business systems accounts for approximately 40%[1] of annual IT capital and 40% of the IT expense spending. New automated business systems result in new support contracts, new operation & maintenance costs, and on-going enhancement costs.

6.3 Strategic Challenges

IT at BPA faces a number of challenges, which can be grouped into the following bins: Compliance, Rate of Change in IT, and Strategic Partnership:

Figure 37

Compliance	Rate of Change in IT	Strategic Partnership

• Increasing NERC-CIP Regulation
• Raising bar for Security
  ○ Implementing SCOAC
  ○ Implementing SANS Top 20
  ○ Evolving threats – especially awareness to grid operations
• Federal Guidance
  ○ Implementing ICAM/HSPD-12
  ○ Implementing IPv6
  ○ Transitioning to Trusted Internet Connections (TIC)
• COOP and Disaster Recovery
	• Rate of change in IT, changing roles/skills
	• Rise of Cloud based solutions
	• Hardware core sustain transitioning from capital to expense
	• Transitioning to workload storage
	• Consumerization of IT (managing smart phones, tablets, and other consumer products)
		• Aligning IT and business objectives
		• Developing Strategies to address aging applications/business Systems
		• Adoption of Software as a Service (SaaS) solutions
		• Evolving use of capital and expense to provision solutions (new assets)
		• Prioritizing development and deployment of new assets (business solutions) based on value
		• Establishing business boards to prioritize enhancements

It is important to note that two areas, hardware core sustain and SaaS, will prove to be challenges in out-year forecasting for capital and expense. Hardware costs have been dropping with many items (such as servers, individual blades, and most network switches) approaching or falling below the threshold for capitalization, putting additional pressure on expense spending. The details of drivers and impact on capital and expense programs are discussed in each of the infrastructure chapters. In a different vein, it

[1] With the completion of major infrastructure projects in FY2014/FY2015, capital requirements are expected to drop substantially with business systems accounting for 75% or more of capital expenditures

is not always known in advance whether SaaS will provide the optimum business solution for a given project when programming out-year capital and expense requirements. Since SaaS solutions cannot be capitalized (no tangible BPA owned asset) capital may have been programmed when the project may instead need expense funding. These challenges could introduce up to a 10% uncertainty level in a capital and expense requirements in a given year. This uncertainty is not in the combined yearly capital and expense forecast. As a result BPA will work to identify strategies that will allow it to handle annual uncertainty in capital versus expense requirements.

6.4 Major Elements of this Strategy

We are shifting the emphasis of our asset strategy from being heavily tilted toward achieving efficiencies to the combination of becoming a more effective strategic business partner and leveraging technology to achieve both business efficiencies and cost efficiencies. We have been able to contain expense expenditures well below the rate of inflation and the cost of new contracts from FY 2005 to FY 2013. This came at the cost of delaying improvements and innovations, with some criticism that IT was not the effective strategic partner BPA needed – a partner whose fundamental purpose is to provide and maintain automated business solutions. In FY 2011, BPA began to change its focus to strengthen leveraging technology to drive efficiencies. By leveraging industry trends, BPA is projecting to control its growth through FY 2017 (leveraging technology will help BPA control operations costs as is explained in detail in the chapters covering infrastructure assets); however, these innovations are primarily on the infrastructure side of assets. An area BPA needs to develop is leveraging and delivering a greater degree of innovation to business clients.

BPA is now working to become a more effective strategic partner, which entails working with the various business units to understand their future needs, transitioning from a reactive order taker to proactively shaping BPA's future business automation environment.

Since the last strategy, three high level risks (R1, R5, and R6 from the FY 2012 Asset Strategy) have been either mitigated to acceptable levels or to the point they are no longer risks. R8 addresses changing regulatory requirements associated with proactively protecting the IT environment from the challenges of emerging and evolving security threats. R3-R4 refer to a combination of pressures IT faces that include the need to link the operation and enhancement costs of automated business assets with the value they are providing the business. Today, there is a disconnect in the sense that business units are realizing the benefits without a direct connection to the ongoing IT cost of supporting these systems.

COOP and Disaster Recovery

Critical assets must meet Continuity of Operations (COOP) requirements. BPA's non-critical business assets also must return to operation requirements after a major event commonly referred to as Disaster Recovery (DR), which range from hours to up to a month. Each of the four major asset portfolios contains availability improvement initiatives that can be and are being weaved into a combined strategy to achieve and meet both COOP and DR business requirements. Many of the assets currently in, and planned to be delivered, into the four major asset portfolio are contributing to BPA's overall COOP and DR capabilities. Examples include providing voice over IP services to the Munro Scheduling Center, providing virtual desktop recovery capabilities at BPA's Alternate Data Center (ADC), and leveraging myPC to provide remote access to network services during major events. BPA's System Life Cycle (SLC) requires new projects to identify and address COOP and/or DR requirements to ensure BPA is delivering assets that meet business availability and recovery requirements. To bridge the gap between BPA's current business systems' disaster recovery capabilities and future capabilities baked into the SLC, BPA

will be undertaking a Business System Disaster Recovery (BSDR) project in the FY 2015-FY 2017 time frame to deliver unified and comprehensive capabilities for legacy systems.

6.5 RESULTS TO BE ACHIEVED

BPA is in the preliminary steps of implementing a dual strategy of leveraging technology to achieve efficiencies and becoming a proactive strategic partner to the business lines. Major infrastructure milestones expected to be hit in FY 2014 and FY 2015 include completing the migration to virtual desktop infrastructure (myPC project) and migration of general business systems to a consolidated and virtualized datacenter (IVC project). In addition to aiding in the control of Office Automation costs, BPA will be able to leverage myPC to expand its telework capabilities. BPA's myPC environment will enable staff to use their own mobile devices to access network resources - enabling Bring Your Own Device (BYOD). The myPC project will also move BPA to a current desktop operating system (Windows 7), current office suite, and current browser (see the chapter on Office Automation for more details). The IVC project will move BPA to current operating systems and database versions on consolidated and virtualized servers. Both myPC and IVC are intended to leverage innovation to deliver an agile and elastic environment, with lower overall operational costs.

BPA has begun to strengthen the partnership between business lines and IT to help develop longer-term strategies and roadmaps for its business systems. The Business Enterprise Services Strategy team is developing a strategy and roadmap for major Human Capital, Finance, Contracts, Billing, Transmission Asset Maintenance, Project Planning, and Supply Chain systems (see chapter on Application Portfolio for details). The roadmap is expected to be completed by first quarter in FY 2015 and will address when to replace or refresh major systems. For example, the roadmap will address when to replace BPA's billing system (system will be out of support in FY 2018) and future direction for BPA's ERP system which is approaching 15 years in service. In addition to identifying refresh and replacement dates, the strategy will also examine how to leverage and use unused or underused capabilities in existing enterprise systems prior to implementing new systems.

Since FY 2010, the Work Plan portfolio's capital has been averaging about $40 annually with approximately 40% of the capital program being used to modernize and expand BPA's infrastructure capabilities. The majority of the program is used to deliver new business capabilities or to improve business capabilities.

BPA's major IT infrastructure modernization projects are expected to be completed in FY 2015 (although BPA will start smaller modernization projects like strengthening Backup Services). With the completion of the major components of infrastructure modernization, coupled with applying IT capitalization rules, a shift is expected to be seen from capital to expense to maintain infrastructure in the out years. However, it is uncertain how much capital or expense will be required for hardware refreshes. At the same time, several key and large systems will either need to be upgraded or replaced. IT is working to establish and implement Asset Plans for each IT asset category to support the IT Asset Strategy. BPA's commitment to the continued maturing and use of Asset Plans can be seen in the integration and use of Asset Plans to drive planned work for system enhancements.

To support Asset Plans, and the management of assets, BPA is in the beginning stages of rolling out metrics that will inform managers of the state of BPA assets as well of their level of performance, both in terms of meeting customers' needs and economic targets. A major component of BPA's IT metric plan includes participation in UNITE. UNITE is a consortium of twenty utilities from across the nation engaged in benchmarking the performance of IT operations and practices with the intent of aiding members in

understanding their performance against their peers and to identify areas that can be improved.

BPA completed its initial benchmarking cycle with UNITE early 2012 utilizing FY 2011 data. BPA intends to leverage its benchmarking work with UNITE to formalize BPA's IT metric collection program and in doing so incorporate key UNITE metrics and methodologies. BPA will use this past cycle to establish FY 2011 as a baseline for several key metrics. This adoption of UNITE metrics and methodology is reflected in changes it is making in its IT Asset Strategy Performance Indicators. This is the ideal time to make these changes as BPA is in the initial stage of implementing these metrics. BPA is beginning another benchmarking year with UNITE, starting 2nd Quarter FY 2014, and will start to collect and report metrics to UNITE. BPA expects to see results from the consortium members for FY 2013 by the end of the 3rd Quarter FY 2014.

Summary of IT Performance Indicators (ITPI)

This is IT's second reporting period after establishing baselines for selected indicators. Although the status of each indicator is informative, the true value for IT comes in the analysis of the trend of these indicators over time. The trend will allow BPA to determine how its strategies toward its assets is or is not meeting objectives and will provide insight in to where resources need to be concentrated or strategy rethought.

These performance indicators show that in the second reporting period our strategies to contain operations and maintenance costs below inflation (and new contract costs from moving new systems into production) are working, as shown by ITPI-1, ITPI-3, ITPI -10. However, ITPI-7 slipped to red due to project delay in implementation of IVC – our project to consolidate and virtualize our non-critical business systems. We will not realize all our expected cost efficiencies for Data Center Maintenance and Operations until we complete our system migration as part of IVC. We do have some voice network components - private branch exchanges (PBX) and the voicemail system - that are beyond their end of life which is driving ITPI-5 to red for this reporting period. The voicemail system is scheduled to be replaced in the second quarter of FY 2014 by leveraging Exchange 2010. The PBXs are scheduled to be replaced as part of the network modernization in FY 2015-16. This indicator will remain red until the PBXs are replaced. Software utilization collection was suspended during the roll-out of myPC (our virtual desktop infrastructure), in light of not having the appropriate tools and available staff (staff resources are focused on deploying thin clients and refreshing laptops and desktops) to collect and report on this measure. It will continue to report red until myPC is fully deployed by FY 2014 Q2.

Figure 38 - Summary Performance Indicator

Indicator		FY 2012 Status	FY 2013 Status
ITPI-1	Average Personal Computing Device Cost	GREEN	GREEN
ITPI-2	Software Utilization	GREEN	RED
ITPI-3	Enterprise Printing Costs	GREEN	GREEN
ITPI-4	Network Utilization	GREEN	GREEN
ITPI-5	Network & Voice Operations and Maintenance Status	RED	RED
ITPI-6	Physical Windows Server Consolidation	GREEN	GREEN
ITPI-7	Data Center Maintenance Operations and Maintenance Growth	GREEN	RED
ITPI-8	Server Operating System Configuration Monitoring	GREEN	RED
ITPI-9	Ability to Enhance Systems	GREEN	GREEN
ITPI-10	Operations and Maintenance Growth	GREEN	GREEN

6.6 Proposed Spending Levels

BPA has reshaped the expense and capital spending levels to accommodate infrastructure refreshes with the anticipated shift in the use of expense for infrastructure sustain projects and system upgrades. We are also anticipating more SaaS solutions in the out-years which will require expense instead of capital funding.

When compared to the 2012 IPR spending profile, the combined capital and expense FY 2014-23 funding profile is lower and includes a drop in the capital profile and a rise in expense spending. The current funding profile for FY 2014-17 is $38.6 million lower than the funding profile proposed in the 2012 IPR. The capital profile also reflects that IT projects with total investments greater than $3 million will need to compete at the agency level beginning in FY 2015 and all non-sustain IT projects will need to complete at the Agency level beginning in FY 2018. Given the rapid rate of change in IT, coupled with emerging business and compliance requirements, there is uncertainty associated with the proposed funding profile.

Figure 39 – 2014 CIR Proposed Capital and Expense Levels

	Proposed Spending Levels										
($ millions)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Expense 1/	79.0	85.8	87.3	87.6	89.4	91.6	92.5	93.9	97.3	99.3	903.7
Capital	43.0	31.2	32.8	25.4	10.0	5.0	2.5	12.0	4.7	6.5	173.1
Total	**122.0**	**117.0**	**120.1**	**113.0**	**99.5**	**96.5**	**95.0**	**105.9**	**102.0**	**105.8**	**1,076.8**

*1/ Draft expense spending levels, further discussion will occur during the 2014 IPR

**This is from the IT strategy

Figure 40 – 2012 IPR Proposed Capital Spending

	Proposed Spending Levels								
($ millions)	2014	2015	2016	2017	2018	2019	2020	2021	Total
Expense 1/	79.0	83.2	85.0	86.6	88.3	84.0	84.0	84.0	674.1
Capital	43.0	42.0	43.0	44.0	45.1	45.3	45.3	45.3	353.0
Total	**122.0**	**125.2**	**128.0**	**130.6**	**131.7**	**127.6**	**129.3**	**129.3**	**1,023.7**

FACILITIES

ASSET STRATEGY SUMMARY

7 FACILITIES

This asset strategy was prepared before BPA's proposal to reduce costs. Spending levels in this document do not tie to proposed capital reductions. The strategy will be revised upon conclusion of the CIR and the IPR.

Workplace Services provides strategic planning, management and governance of facilities asset management, facilities maintenance and operations, space management, printing services, mail services, and office services for BPA. The Facilities Management Officer (FMO) is responsible for office facilities strategic planning and for overseeing and managing BPA's facilities asset management programs. This includes establishing the asset performance objectives, targets and standards in alignment with BPA's asset management, policies, strategic objectives, including asset management objectives and guidelines

This Workplace Services Facilities Asset Management Strategy defines how BPA systematically and comprehensively meets these responsibilities through an optimized approach that balances risks, needs, opportunities and constraints and is also aligned with BPA's strategic objectives and policies. It addresses requirements from FY 2014-23 and replaces the Facilities Asset Management Strategy published in FY 2012.

7.1 PROFILE OF ASSETS

BPA owns and operates an estimated 2.7 million square feet of facilities valued at over $1.1 billion across Oregon, Washington, Idaho, Montana, and California. This includes over 1,000 buildings at more than 400 sites that include critical infrastructure, such as control centers and substation control houses, in addition to maintenance shops, administrative offices and warehouses. Workplace Services is also responsible for the GSA-owned BPA Headquarters building, corporate commercially leased spaces, and the various non-building assets at each site such as sewer systems, fences, and roads.

The average age of BPA owned facilities and supporting infrastructure is 38 years old with 60% of facilities assets beyond their estimated useful life (EUL) and in need of either major renovation or capital replacement. Prioritizing this work within available funding and project delivery resource limits is a primary strategic challenge. Other strategic challenges include emerging operational and regulatory requirements that result in out of cycle requests and immature or non-existent facilities planning and maintenance management systems.

The Facilities Asset Management (FAM) organization provides planning and programmatic oversight of BPA facilities and associated infrastructure that supports the breadth of BPA operations. For the purpose of clarifying the scope of this, Facilities Asset Management Strategy, the following definition shall apply:

Facilities are all site buildings, their associated mechanical, structural, and utility systems, surrounding grounds, and other fixed improvements upon the land within the sites controlled by BPA. Components that directly generate, transmit, or control marketed/high voltage power or station service are excluded as are electrical support systems for the control centers, and the initial funding and construction of new facilities/upgrades driven by transmission system needs. Assets also excluded from the scope of this strategy are cyber security systems, IT equipment and personal property.

Figure 41 – Asset Grouped by Criticality

Importance Level	Asset Grouping	Asset Type		
1	Utility 1	Control Center Data Center	Control House Microwave	
2	Utility 2	Control House Control/Maintenance Relay House	Microwave Engine Generator Buildings	
3	Office, Maintenance and Special Purpose	Office - Guard Station Storage - Fuel and Haz Mat Maintenance HQ Office - Business Critical	Storage - Special Maintenance Shop Administration Meter Houses	
4	Storage	Other - Pump House Office - Classroom / Training Site Utility Storage General	Material & Equipment Vehicle Transportation Research	
5	Other	Oil House Other Rental	Untanking Tower Abandoned	

7.2 Strategic Facilities Objectives

Workplace Services will meet BPA's strategic goals of integrated asset management by achieving the following objectives:

Prioritized Asset Optimization

Manage facilities assets and prioritize work through disciplined and coordinated processes that optimizes mission criticality, risk, resources, return on investment, and sustainability, while also maintaining sufficient agility to meet emerging requirements.

Operational Alignment

Comprehensively integrate Facilities initiatives and projects with other asset categories to the maximum extent practicable.

Asset Life Cycle Management

Manage facilities assets with a life cycle perspective and improve facilities and processes through a continuous Plan – Do – Check – Act cycle.

7.3 Strategic Challenges

There are several external and internal issues which could impact Workplace Services investment decisions for this Facilities Asset Management Strategy. Some issues can be resolved and are subjects of the Strategic Initiatives that follow, while others are best viewed as drivers or constraints and simply must be dealt with:

- Backlogs of facilities maintenance and replacement

- Emerging operational requirements
- Evolving regulatory requirements
- Immature or non-existent facilities planning and maintenance management systems

BACKLOG OF FACILITIES MAINTENANCE AND REPAIR (BMAR) OR REPLACEMENT

The average age of BPA facilities and supporting infrastructure is 38 years old, and 60% of facilities assets are beyond their estimated useful life (EUL) and in need of substantial repair, renewal, or capital replacement. This work represents a substantial challenge to prioritizing work within BPA's available funding and staffing limits.

EMERGING OPERATIONAL REQUIREMENTS

BPA's expansion investment program consists of capital projects required to increase capacity and improve reliability to meet load growth, generation interconnections, customer service requests, and provide congestion relief. Similarly, BPA continues to strengthen the resiliency of operations which may prompt replacements, systems monitoring capabilities and/or installation of redundancy to existing facilities in the future. These out of cycle requirements may drive changes to forecasted asset repair and maintenance plans.

EVOLVING REGULATORY COMPLIANCE

SECURITY

BPA's implementation of security requirements from the Department of Energy's Graded Security Policy, the North American Electric Reliability Corporation Critical Infrastructure Protection Standards (NERC-CIP) and the Department of Homeland Security Presidential Directive (HSPD) 12 results in time-sensitive projects to install and maintain high cost/high tech security equipment in facilities and to control personnel access in some areas. Such projects challenge BPA with rapid coordination and amended space planning to support requirements.

FEDERAL LAWS/GUIDELINES

Federal laws, such as the National Energy Conservation Policy Act of 1978, the Energy Policy Act of 2005, Energy Independence and Security Act of 2007, and the guidance of Executive Orders 13423 and 13514 call for improved building performance for new and renovated federal facilities as well as improved tracking of facilities performance.

BUILDING CODES (LIFE SAFETY)

Many aged BPA facilities were constructed prior to the advent of modern life safety, fire protection and seismic event codes. In many cases, this represents an unacceptable risk to personnel, assets and to BPA operations. While existing buildings are not mandated to comply with modern codes unless they undergo a major renovation, BPA is challenged to address these concerns while prioritizing and analyzing elements of risk-to-value and cost-to-benefit.

HAZARDOUS MATERIALS (LIFE SAFETY)

Asbestos, lead, mercury and polychlorinated biphenyls (PCB) are just a few of the known or suspected hazardous materials that may exist in BPA facilities and represent potential hazards to personnel. Abatement of hazardous materials often adds significant cost and time to routine repairs and may limit the extent of repairs.

IMMATURE FACILITIES PLANNING AND MAINTENANCE MANAGEMENT SYSTEMS

LIMITED WORKFORCE FORECAST

Emerging operational requirements often requires dynamic staffing support. While staffing levels for federal employees (BFTE) may be reasonably forecasted, the absence of annual supplemental labor contract employee (CFTE) forecasts poses a significant challenge to Workplace Services in providing the right type of work/support space in the proper quantities when required. Unforeseen changes in CFTE staffing lead to sub-optimization of the facilities inventory and reactionary facilities planning with lasting impacts.

OFFICE SPACE CONSTRAINTS

Workplace Services enables BPA operations by providing employees and contract staff adequate space to perform their work. BPA space standards ensure consistency across the organization in the quality and quantity of space provided to employees. In addition to the application of this standard, BPA needs to maintain an appropriate amount of swing space to allow for employee/organizational moves and changes in staffing levels. Currently, BPA has a deficit of swing space in the Portland/Vancouver metropolitan area to meet forecasted staffing requirements.

ASSET INFORMATION

Workplace Services requires readily available access to current and accurate information for facilities and infrastructure for which BPA is responsible in order to optimize maintenance, operations and replacement activities. BPA's current information systems for asset ownership, leases, sales, condition, portfolio and systems composition, performance, cost of ownership, etc., are either maintained and/or owned by various BPA organizations with differing priorities and accuracies or, non-existent (e.g., an Enterprise Asset Management (EAM) Computerized Maintenance Management System (CMMS). The absence of a singular enterprise system of record for facilities information inhibits the ability to consistently make informed business decisions.

CONSTRAINED LABOR RESOURCES

Workplace Service relies upon BPA's recently restructured facilities project delivery method via Transmission's Project Management Office for facilities project management and Sourcing Services for procurement. The volume of projects being administered by BPA has the potential to constrain resources and impact the amount of facilities work which may be performed.

Figure 42

7.4 STRATEGIC INITIATIVES

In order to manage the operations, planning, and execution risks of the Strategic Challenges above, Workplace Services identified the following actions necessary to achieve its long-term objectives:

PRIORITIZED ASSET OPTIMIZATION

ESTABLISH STANDARDS

Key business partners were consulted and core lines of service were assessed in the development of Version 1 Service Standards with an initial deployment made within the Critical Facilities portfolio at BPA's Dittmer Control Center and Munro Control Center. This implementation will serve as the basis for future efforts to integrate client business unit service level requirements to asset life cycle, capital investments, operations and maintenance (O&M) procedures, and expenditures. This effort will extend to other areas of the assets life cycle such as design, maintenance and code standards.

IMPROVE TRACKING OF INFRASTRUCTURE INVESTMENT

With the establishment of these enhanced Service Levels, Workplace Services is adding several new service, maintenance, repair and performance metrics to track capital and expense expenditures required to maintain the agreed upon service levels for BPA facilities. This will enable Workplace Services to understand the true cost for providing consistent service levels to facility occupants, and identify investment opportunities for more efficient facility/systems replacement for ongoing cost avoidance.

DEVELOP ASSET MANAGEMENT SERVICES

PEOPLE

As reported in the BPA Asset Management Enterprise Process Improvement Plan (EPIP), Facilities Asset Management was formed in 2006 and is responsible for planning and oversight of BPA facilities. Much progress has been made across the BPA in developing asset management skills and capacity. Asset managers across the BPA come from many professions including engineers, architects, and facilities specialists. For these reasons, there remains an opportunity to develop a generalized standard of practice and competencies for asset management practitioners. Facilities Asset Management will initiate work on developing staff in accordance with a competency framework set forth in the Federal Buildings Personnel Training Act (FBPTA) of 2010. As part of continuing to enable the practice of asset management, Facilities Asset Management will continue to monitor needs, provide tools, and provide support in the areas of succession management, knowledge management and skills development, change management and communication.

TOOLS AND DATA

An important area for ongoing development is implementation of standardized tools supporting asset management processes. By integrating the various systems together Workplace Services will be able to make more informed infrastructure decisions on behalf of the BPA. To facilitate this, the following tools are being developed and/or implemented:

ASSET REGISTRY

The majority of BPA facilities assets are captured in an asset registry and Facilities Asset Management is in the process of conducting a review of the existing data and any gaps to support asset management planning.

LIFE CYCLE COST ANALYSIS AND CAPITAL PLANNING

Standardized tools for calculating the Total Cost of Ownership (TCO) for assets.

REPORT AUTOMATION

Work is under way to automate reporting of standardized facilities asset, maintenance and proposed spending levels status reports for broad dissemination within BPA.

DATA STANDARDIZATION

It is important that BPA facilities data standards are established. These standardized values are required for asset reporting and prioritization.

STANDARDIZED COMPUTER MAINTENANCE MANAGEMENT SYSTEM (CMMS)

Facilities Asset Management created and implemented an interim Computerized Maintenance Management Systems (iCMMS) to bridge the gap until BPA decides upon the implementation of an enterprise CMMS. This system will be populated in FY 2014.

ENABLE INTEGRATED INFRASTRUCTURE DECISION MAKING

Development of staff and asset management tools will allow Workplace Services to undertake life cycle valuations and quantitative sustainability assessments associated with facilities projects. This will require sufficient resources and training to ensure that life cycle costing for projects and maintenance tasks is achieved.

Ongoing staff development along with the maturation of the facility data and systems, will represent a huge advance in the development and execution of the facilities program. However, additional efficiencies can and should be realized via close coordination with other facilities strategic partners.

The establishment of a joint working group between Facilities Asset Management, other Category Asset Managers, Subject Matter Experts (SME) and others as appropriate, will enable the sharing of potential and planned work with a proper context of operational and life cycle renewal costs.

ESTABLISH PARTNERSHIP AGREEMENTS

In 2013 Facilities Asset Management established Partnership Agreements with Transmission Engineering partner organizations in order to clarify roles and responsibilities and promote efficient workflow. This represents a major milestone towards maturing the BPA structure for facilities planning and project execution. Further Partnership Agreements will be pursued with Transmission Field Services to clarify roles and responsibilities for field operations and maintenance activities beyond the Portland-Vancouver metropolitan area.

ESTABLISH ASSET MANAGEMENT PLANS

Facilities Asset Management established an Asset Management Plan (AMP) for critical assets at the Dittmer Control Center. This model will serve as a basis for further implementation within the Critical

Facilities portfolio. Additional AMP will be developed for the facilities portfolio as appropriate. In some cases, asset specific AMP's are appropriate, in other cases, complex-wide or portfolio-wide AMP's will be developed.

ASSET LIFE CYCLE MANAGEMENT

UPDATE THE ASSET MANAGEMENT STRATEGY

The Workplace Services Facilities Asset Management Strategy is intended to act as the reference asset management strategy (AMS) for all BPA facilities infrastructure. Practice and performance expectations, as well as responsibilities, of the Facilities Asset Management program continue to evolve. As such, this strategy and its sub-components will require regular updates to align and respond to emerging operational needs.

CONTINUALLY IMPROVE THE ASSET MANAGEMENT SYSTEM

BPA's Asset Management Policy (BPAM Chapter 660) states that leading industry practices, such as the British Standards Institute, Publically Available Specification 55, will become the basis for asset management practices and use a Plan-Do-Check-Act cycle. Included in the standard are areas not necessarily addressed in previous asset management strategies. These include:

- Training and awareness programs for staff.
- Performance tracking and corrective action mechanisms or tools.
- Documentation and records for asset management.
- Asset management plans.
- Asset management practice performance measurement, internal review and checking.
- Benchmarking infrastructure investment, service provision and risk management to other industry organizations and federal agencies.

7.5 RESULTS TO BE ACHIEVED

BPA and its stakeholders can expect that the general health and reliability of critical and mission essential facilities assets will improve through informed and conscientious repair and replacement efforts. BPA will further develop and implement facilities asset management capabilities with leading industry practices in order to ensure:

- Performance standards for critical assets are established and met
- Investments are prioritized to meet mission requirements and strategic intent
- Return on investments are predictable
- Assets are managed to maintain reliability and safety

Maturation of the BPA facilities asset management systems will be guided by the Strategic Facilities Objectives and seen through developments in the areas below.

Figure 43

PRIORITIZED ASSET OPTIMIZATION

- Infrastructure investment, service provision and risk management will be benchmarked to industry and

other federal agencies.

- Facilities asset registry information will be validated, associated facilities information will be mapped, and policy issued to clarify roles and responsibilities for data ownership and maintenance. Personnel performing building operations and maintenance, energy management, sustainability, water efficiency, safety (including electrical safety), building performance measures and design functions will receive core competency training appropriate for their positions, per the FBPTA of 2010.

OPERATIONAL ALIGNMENT

- Forums with other asset category partners, Transmission Planning and other SMEs to coordinate efforts will convene regularly. Processes and tools may be developed to support these efforts.
- Facilities service, maintenance, design, performance and quality management standards will be formally established.
- Asset Management Plans will be proactively developed for core business portfolios.

ASSET LIFE CYCLE MANAGEMENT

- Facilities performance and corrective action mechanisms will be tracked and reviewed in order to update the AMS appropriately.
- Asset management performance measurement and internal reviews will be performed.
- Facilities asset management decisions will be archived to maintain documentation and records for asset management.

This focused strategy will inform managers of the state of BPA assets as well of their level of performance, both in terms of meeting customers' needs and economic targets while identifying areas of the asset management systems that can be improved.

7.6 PROPOSED SPENDING LEVELS

The proposed level of spending represents a comprehensive forecast to maintain reliability and operation of BPA facilities.

Figure 44

	Actuals		Proposed Capital Spending Levels										
($ millions)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
In-Flight / Expand Projects													
Maintenance HQ's	0.4	3.6	18.4	6.0	8.0	-	-	-	-	-	-	-	36.4
Business Continuity	0.5	4.3	15.0	-	-	-	-	-	-	-	-	-	19.8
Station Service Upgrade	-	-	-	5.0	5.0	-	-	-	-	-	-	-	10.0
In-Flight / Expand Sub-Total	**1.0**	**7.9**	**33.4**	**11.0**	**13.0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**66.3**
Core / Sustain Projects													-
Small Captial Projects	0.8	1.2	-	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	15.5
HazMat Abatement	0.3	0.1	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.9
Asset Decommission	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.5
Maintenance HQ's	-	-	0.6	0.6	16.0	12.0	-	-	-	-	-	-	29.2
Comm Bldg Replace	1.0	3.3	3.9	1.0	-	-	-	-	-	-	-	-	9.2
Ross Bldg Replace	-	-	-	3.0	3.0	16.0	20.0	20.0	20.0	20.0	20.0	20.0	142.0
Critical Facilities	-	1.1	1.9	1.9	1.9	0.3	0.3	0.3	-	-	-	-	7.7
Station Service Upgrade	-	-	-	4.0	-	-	-	-	-	-	-	-	4.0
Core / Sustain Sub-Total	**2.2**	**5.7**	**6.4**	**13.0**	**23.4**	**30.8**	**22.8**	**22.8**	**22.5**	**22.5**	**22.5**	**22.5**	**217.1**
Non-Core Sustain Projects (<$3M)													-
HQ Capital Projects	0.4	2.3	2.4	2.4	2.5	2.2	2.2	2.2	2.5	2.5	2.5	2.5	26.6
Non-Core Sustain Sub-Total	**0.4**	**2.3**	**2.4**	**2.4**	**2.5**	**2.2**	**2.2**	**2.2**	**2.5**	**2.5**	**2.5**	**2.5**	**26.6**
Total Sustain Capital (Lines 5+15+18)	**3.5**	**16.0**	**42.2**	**26.4**	**38.9**	**33.0**	**25.0**	**25.0**	**25.0**	**25.0**	**25.0**	**25.0**	**310.0**
Low (P10)			37.9	23.8	35.0	29.7	22.5	22.5	22.5	22.5	22.5	22.5	261.4
High (P90)			50.6	31.7	47.0	39.6	30.0	30.0	30.0	30.0	30.0	30.0	348.9
Total Sustain (FY 2014-17)						**140.5**							
Non-Core Sustain/Expand (CPP)													-
Maintenance HQ's	-	-	-	0.4	0.8	14.8	8.8	14.4	14.0	6.0	-	-	59.2
New Facility Projects	-	-	-	-	6.0	6.0	-	-	-	-	10.0	10.0	32.0
Total Expand Capital	**-**	**-**	**-**	**0.4**	**6.8**	**20.8**	**8.8**	**14.4**	**14.0**	**6.0**	**10.0**	**10.0**	**91.2**
Low (P10)			37.9	24.1	41.1	48.4	30.4	35.5	35.1	27.9	31.5	31.5	343.4
High (P90)			50.6	32.1	54.8	64.6	40.6	47.3	46.8	37.2	42.0	42.0	458.0
Total Expand (FY 2014-17)						**168.5**							
Total Capital Forecat (Lines 19+26)	**3.5**	**16.0**	**42.2**	**26.8**	**45.7**	**53.8**	**33.8**	**39.4**	**39.0**	**31.0**	**35.0**	**35.0**	**401.2**

*Non-Core Sustain (Compliance) program to shift security upgrades from Security to Facilities in FY 2015. Proposed capital levels included in Security Strategy

**This is from the Facilities strategy

Figure 45

	Actuals		O&M Spending Estimates 1/										
($ millions)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
FAM Program Requirements	16.4	2.5	3.6	3.6	3.7	3.8	3.9	3.9	4	4.1	4.2	4.3	58
Facilities Assets Upgrade/Replace/Renovate/Repair		13.3	12.4	16.1	12.9	13.2	13.5	13.7	14	14.3	14.6	14.9	152.9
Ross Facilities Base O&M	2.8	2.8	2.7	2.7	2.8	2.8	2.9	3	3	3.1	3.1	3.2	34.9
Field Facilities Base O&M	5.5	5.6	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.1	6.2	67.8
Critical Facilities O&M/Upgrade/Replace/Repair	N/A	1.8	3.3	3.4	3.4	2.6	2.6	2.7	0.6	0.6	0.6	0.6	22.2
HQ O&M/Upgrade/Replace	20.4	20.6	5.6	5.7	5.9	6	6.1	6.2	6.3	6.5	6.6	6.7	102.6
Renovate/Repair													0
Lease Costs	0	0	15.2	15.4	15.3	15.6	15.8	16	16.3	16.6	16.8	17.1	160.1
Total Expense Estimate (Lines 1-8)	**45.1**	**46.5**	**48**	**52.3**	**49.4**	**49.4**	**50.3**	**51.3**	**50.1**	**51**	**52**	**52.9**	**598.3**
Expense Alternatives for Capital Replacement Work	0	0	0	0	5	5	5	5	5	5	5	5	40
Total Expense Estimate with alternatives (Lines 9+10)	**45.1**	**46.5**	**48**	**52.3**	**54.4**	**54.4**	**55.3**	**56.3**	**55.1**	**56**	**57**	**57.9**	**638.3**

*1/ Draft expense spending levels, further discussion will occur during the 2014 IPR

SECURITY

ASSET STRATEGY SUMMARY

8 SECURITY

This asset strategy was prepared before BPA's proposal to reduce costs. Spending levels in this document do not tie to proposed capital reductions. The strategy will be revised upon conclusion of the CIR and the IPR.

The Office of Security and Continuity of Operation (OSCO) is accountable for supporting BPA's mission and stakeholder interests by protecting BPA's people, facilities critical systems and information. The program scope covers more than 300 facilities, over 5,000 employees and contractors, as well as thousands of visitors each year. Security system designs and standards ensure BPA is compliant with regulatory requirements, guidelines, provisions and principles prescribed by the North American Electric Reliability Corporation (NERC), Federal Energy Regulatory Commission (FERC), U.S. Department of Energy (DOE), and U.S. Department of Homeland Security (DHS) as outlined in Presidential Decision Directives.

There are two fundamental changes from the previous strategy pertaining to:

- the order of implementing security upgrades at critical sites, and
- the strategy for managing failing and obsolete security infrastructure.

Due to the unpredictable nature of threat activity and resulting security conditions, the prioritization scheme must allow for flexibility to maneuver in an environment where security conditions can change with little advanced warning, while also ensuring an adequate baseline level of security commensurate with criticality.

BPA's previous method for prioritizing work simply based on relative criticality of the site may not be the best approach under all circumstances because security risk is influenced by several other factors including threat information and security system or mitigating strategies. For example, while a given site may have a greater consequence resulting from malevolent acts, another potentially less critical site that is experiencing a high level of criminal activity may be at a greater "risk" of loss, thereby warranting an earlier or greater investment in security infrastructure.

The former strategy of actively replacing obsolete system components on a scheduled basis is not practical or feasible in the long term because the supporting infrastructure will need to be upgraded to support new technology. BPA is proposing a new way forward to address this challenge by developing a protection design standard which leverages new technology and can be sustained over the long term.

8.1 PROFILE OF ASSETS

The purpose of security assets is to implement BPA requirements for protection and compliance. BPA defines a security asset 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. Figure 46 outlines the systems, their purpose, and provides examples of the types of components included in each system.

Figure 46 – System and Component Overview

Systems	Purpose	Asset Types Include	
Protective Barrier	Provide a physical barrier between adversary and target. Protective barriers delay an adversary's attempts to gain entry or cause damage to critical components.	• Fence • Gate • Padlock • Bollards	• Chains • Barbed wire • Door • Reinforced glass
Intrusion Detection	Provide warning of pending intrusion and notification of an intrusion by unauthorized people.	• Motion detectors • Fence detection systems • Glass break sensors	• Motion sensing cameras
Surveillance	Video surveillance systems allow for the real-time viewing of activity as well as the ability to review activity in the past. Used in support of detection systems in order to asses alarm annunciations.	• Fixed cameras • PTZ cameras • DVR/NVR • Thermal imaging devices	• Mounting structures, hardware, wiring, and circuitry
Lighting	Lighting used specifically to address a security need, whether to support low light camera operation or to illuminate an area of security concern, would be considered security lighting.	• Entrance or gates • Camera lights • Perimeter lights	• Special area lights
Early Intrusion Detection	Provide the capability to detect activity outside the perimeter of the facility and provide early warning of potentially malevolent activity.	• Motion/Thermal detection surveillance devices	
Screening	Ensure that contraband, such as weapons, firearms, and controlled substances, are not brought into BPA facilities.	• X-ray machines	• Metal detectors

8.2 Objectives of This Strategy

This strategy leverages security assets to meet BPA goals of *Compliance* and *Protection* by achieving the following objectives:

- Prioritize and fund security gaps in protection standards set by BPA's Critical Asset Security Plan (CASP). The CASP integrates risk-based protection strategies in accordance with DOE's Graded Security Policy (GSP) and compliance driven security standards for NERC CIP and Homeland Security Presidential Directive (HSPD) compliance, into a comprehensive protection approach. Protection standards are defined and grouped by each facility's criticality level, or tier, where Tier 1 is considered "most critical."
- Forecast, prioritize and fund security system maintenance activities which are economical,

sustainable, risk informed and ensure reliable system performance. In accordance with DOE Order 473.3, the maintenance standards are informed by System Performance Assurance, Component Testing and Preventative Maintenance Program (SPAP). The SPAP requires that BPA security systems are tested and maintained on a regular basis, with corrective maintenance performed at a level consistent with the criticality and location of the system.

- Outside the scope of this strategy are:
- Cyber security systems
- IT infrastructure (networks, servers, etc.) used to operate the digital security components
- Administration, maintenance, and cyber security of the software solution used to carry the video and alarm data feed
- Ongoing security fence maintenance is supported by Facilities Asset Management

OSCO coordinates with Information Technology and Facilities to ensure that these, and related requirements, are addressed in the appropriate asset management plans.

8.3 Strategic Challenges

There are two strategic challenges which are actively being addressed starting in FY 2014.

Rapidly evolving regulatory requirements

Critical Infrastructure Protection (CIP) requirements issued by NERC CIP have had a major impact on BPA's security program, both in terms of resourcing as well as developing processes for successful implementation. NERC requirements emerge every one to two years requiring implementation within 12 to 18 months. It is difficult to anticipate the scope and spending needed for NERC projects in advance. Standard BPA processes for capital projects require a least a two to three year planning window which does not accommodate NERC timelines. Furthermore, NERC CIP impacts several BPA organizations with complex interdependencies and upstream/downstream impacts.

To address these challenges, BPA is developing an all stakeholder inclusive process for managing NERC CIP related and other security project work. BPA is looking to transition security capital program management to the appropriate organizational structure within BPA. This allows physical security resources to focus on NERC and other physical security activities related to assessment, standards development, implementation, training, performance testing and security threat management.

Aging and technologically obsolete systems

A large number of systems (primarily cameras) are projected to fail in the next few years due to exceeding manufacturer recommended Mean Time to Failure (MTTF). If not managed, this may impact security system effectiveness, cause a spike in maintenance fees and drain on limited resources.

The former strategy of actively replacing obsolete system components on a scheduled basis is not practical or feasible in the long term because the supporting infrastructure will need to be upgraded to support new technologies. Additionally, BPA security subject matter experts believe that the large number of cameras currently deployed is not providing a security risk reduction benefit commensurate to the level of investment and long term costs associated with reliable sustainability. BPA's OSCO is proposing a protection design standards which leverages new technology that can be sustained over the long term. The benefits to this approach are:

- Immediate reduction in costs associated with video surveillance maintenance
- Reduction in information technology band width and licensing costs

- Ability to redirect resources to more sustainable security system's development and implementation
- Maintaining "security in depth" and multi-layered alarm assessment capability

BPA implements a layered security approach that includes all aspects of the physical security, personnel security, information security and operations security disciplines. Video surveillance is almost exclusivly used to assess alarm activity after the fact. This has traditionally been one of two primary assessment tools to determine the nature of an alarm. The draft strategy uses other less costly more sustainable technology to provide assessment capability in depth. Therefore the decommissioning of significant video surveillance assets at substations is expected to have very minimal to no impact of security sysem effectiveness or assessment capability.

8.4 Major Elements of the Strategy

Prioritization

When prioritizing, several factors are considered:

- Real-time security threat information, including increased rates of incidents
- Regulatory mandates
- The criticality of the facility as measured by the impact of its loss on BPA's ability to achieve its mission
- Criticality of a system or components based on its failure on maintaining security compliance and security system effectiveness
- Efficiencies to be gained by coupling the project with other work at the site

Figure 47 shows the priority matrix used to resource and schedule investments during initial enhancements as well as future maintenance

Figure 47 – Priority Matrix

Priority Level	Description
Priority 1	Immediate threat mitigation in response to an event or change in threat conditions which may or may not be based on tier designation
Priority 2	Tier 1, 2, and 3 protection according to regulatory compliance requirements and by a graded security approach
Priority 3	Protection of both energy and non-energy facilities based on improving or enhancing security conditions using federal facility protection guidelines and standards provided by DOE, General Services Administration (GSA) etc. and risk informed protection strategies to address security threats and gain efficiencies.

Strategic initiatives

Five initiatives have been identified for meeting the strategic objectives and reducing variety of security and operational risks. Figure 48 summarizes each initiative and provides the risk exposure from foregoing or delaying implementation.

Figure 48 – Strategic Initiatives, Risks and Costs ($ millions)

Drivers	Initiatives	Risks of Foregoing Implementation	10 Year Cost Capital / Expense	
BPA Critical Asset Security Plan (CASP)	1. Compliance Ensure compliance with security regulation by applying mandatory security enhancements as required by NERC, DHS, DOE, etc.	**Financial and Reputational Risk Due to Regulatory Non-Compliance:** Findings by regulatory entities within one year leading to; a) possible financial sanctions, b) mandated policy changes and, c) public criticism.	$8.7	
	2. Critical Infrastructure Protection in Support of GSP Installation of security systems designed to provide the appropriate level of protection for critical infrastructure with a Tier 1, Tier 2 or Tier 3 criticality level designation.	**Financial and Operational Risk Due to Terrorist/Criminal Activity:** Continual exposure to "medium risk" of terrorist attack or collateral damage from criminal activity which could result in the loss of critical transmission facilities with; a) an extreme consequence to the bulk electric system, b) major economic impact to regional customers and economy and, c) severe observable impact and orders for substantial corrective action, including some mandatory changes in BPA operation or administration.	$37.1	
	3. Essential Infrastructure Protection Improving or enhancing security systems at essential sites using federal facility protection guidelines and standards provided by DOE, GSA etc. and risk informed protection strategies to address security threats and gain efficiencies.	**Financial and Operational Risk Due to Criminal Activity:** a) Increased exposure to criminal activity and potential collateral damage impacting Bulk Electrical System (BES), b) inability to replace or update obsolete security systems compromising protection of essential facilities such as the headquarter building, c) using more costly guard force contract labor to protect facilities as opposed to automated systems which cost less over time and provide equal or greater level of protection.	$1.5	
BPA System Performance Assurance, Testing and Preventative Maintenance Program (SPAP)	4. Performance Testing & Preventative Maintenance Bi-annual assessment of security systems through performance tests leading to repair or replacement of components that may impact security system reliability or compliance.	**Financial and Reputational Risk Due to Inadequate Maintenance:** Lack of awareness of failing or faulty security systems and equipment leading to; a) compromised protection of critical infrastructure, b) strain on limited resources to support urgent vendor callouts, c) non-compliance with DOE order 473.3 and, d) criticism by regulatory entities due to unplanned outages of critical security systems.		$0.5
	5. Replacement & Renewal Program Timely replacement of failed components commensurate with criticality of system to maintain compliance and provide protection. Strategic phase-out of components no longer technological viable.	**Operational and Reputational Risk Due to Inadequate Maintenance:** Failing or faulty security systems and equipment leading to; a) compromised protection of critical infrastructure, b) strain on limited resources to support O&M activity and, c) criticism by regulatory entities due to unplanned outages of critical security systems.		$6.0
		TOTAL	$47.3	$6.9

8.5 Results to be Achieved

BPA and its stakeholders can expect ongoing compliance with requirements, improved critical site protection, and reliable security system performance.

Compliance

Success in maintaining security compliance will be measured by BPA having zero violations of a NERC requirement as a result of lacking security systems or underperformance of existing systems. Violations count only when not previously self-reported and assigned a low to moderate Violation Risk Factor (VRF) and Violation Security Level (VSL) as identified by a regulatory audit or investigation.

Protection

By the end of 2017 five additional Tier 2 critical substations will have security enhancements installed, which will result in a notable reduction in risk. Figure 49 shows the estimated risk reduction to be gained as a result of the proposed implementation.

Figure 49 – Estimated Security Risk Impact Tier 2 Protection

	Before Tier 2 Treatment		After Tier 2 Treatment		
Threat	Risk Numerical	Risk Range	Risk Numerical	Risk Range	% Risk Reduction
International Terrorist	0.49	Medium	0.42	Medium	7%
Eco Terrorist / Special Interest	0.45	Medium	0.36	Medium	9%
Criminal Activity	0.45	Medium	0.2	Low	25%
Vandal	0.4	Medium	0.18	Low	22%
Insider	0.13	Low	0.13	Low	0%

(Note: The "Before" state assumes Level 1 and NERC CIP systems up to CIP 006 Version 3.)

Additionally, three Tier 3 critical substations will be protected with required security measures with notable reduction in security incidents.

Security system reliability

New design standards will be defined and incorporated into a long-range implementation plan. It is believed that a large number of outdated cameras can be decommissioned with minimal to no impact to security system effectiveness and reduce maintenance overhead in the long run. Furthermore, efficiencies may be gained by coupling security work with Facilities Asset Management (FAM) projects.

8.6 PROPOSED SPENDING LEVELS

Proposed capital levels for FY 2014-23

When compared to the prior proposal, the current plan may require an additional $5.1 million in the out-years to cover $3.1 million for addition of three Tier 3 site protection and $2.0 million for NERC CIP placeholder costs. BPA's OSCO is proposing a capital model which funds:

- NERC CIP required protection with placeholder funding beyond the current NERC CIP version at $500K per year starting in FY 2016
- Graded security and critical infrastructure protection at Tier 1, 2 and 3 sites
- Anticipated work in the future for essential infrastructure protection such as the headquarter building

Figure 50 – 2014 CIR Proposed Capital Levels - Projects reprioritized within base funding

	Actuals		Proposed Capital Spending Levels										
($ thousands)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Regulatory Compliance	482	2,290	3,197	1,500	500	500	500	500	500	500	500	500	11,469
Tier 1 Critical Site	-	351	304	-	-	-	-	-	-	-	-	-	655
Tier 2 Critical Site	2,923	133	-	6,661	3,033	7,070	5,517	7,307	4,131	-	-	-	36775
Tier 3 Critical Site	-	-	-	250	2,850	-	-	-	-	-	-	-	3100
Essential Facilities	-	534	-	-	-	-	-	-	-	500	500	500	2034
Total Capital	**3,405**	**3,309**	**3,501**	**8,411**	**6,383**	**7,570**	**6,017**	**7,807**	**4,631**	**1,000**	**1,000**	**1,000**	**54,034**
2012 IPR Forecast	4,190	8,802	3,501	8,407	6,387	7,570	6,210	4,645	2,000	1,500	1,000	1,000	55212
Delta From 2012 IPR	(785)	(5,493)	-	4	(4)	-	(193)	3,162	2,631	(500)	-	-	-1178

*This is from the Security strategy

Proposed expense spending for FY 2014-23

BPA's security maintenance strategy has shifted from individual component maintenance and upgrade to a more holistic approach of upgrading the entire security infrastructure at a site based on a new standard. The maintenance and update activities are funded from two sources. Security systems at transmission sites are funded by Transmission Field, while systems installed at headquarter building are paid for out of the corporate cost center. BPA's OSCO believes that the proposed maintenance strategy can be achieved within the base funding levels as indicated in Figure 51. Some reshaping is required in FY 2016 and FY 2017 to allow for more sites to be upgraded to new standard, with less maintenance resources anticipated in FY 2020 and FY 2021 as a result of efficiency gains.

Figure 51 – Proposed Expense Spending for Security System Maintenance

	O&M Spending Estimates 1/										
($ thousands)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Transmission Funds											
2012 IPR Trans. Maintenance Forecast	554	680	542	740	402	589	690	690	690	690	6,267
Performance Testing and Maintenance	40	41	42	44	45	46	48	49	51	52	458
Replacement Upon Failure	216	218	220	223	225	227	229	232	234	236	2,260
New Standard Deployment	285	476	407	323	337	321	248	238	145	112	2,892
Tier 2 Maintenance	-	5	10	40	80	95	195	205	220	250	1,100
Trans. Sub-Total	**541**	**740**	**680**	**630**	**687**	**689**	**720**	**723**	**650**	**650**	**6,710**
Delta from 2012 IPR	-	-	(278)	(41)	-	-	147	172	-	-	-
Corporate Funds											
2012 IPR Corp. Maintenance Forecast	18	18	19	20	20	21	192	23	23	24	378
Performance Testing and Maintenance	7	7	7	8	8	8	8	9	9	9	80
Replacement Upon Failure	11	11	12	12	13	13	14	15	15	15	131
Corp. Sub-Total	**18**	**18**	**19**	**20**	**21**	**21**	**22**	**24**	**24**	**24**	**211**
Delta from 2012 IPR	-	-	-	-	(1)	-	170	(1)	(1)	-	167
Total Expense Estimate	**559**	**758**	**699**	**649**	**708**	**711**	**743**	**747**	**674**	**674**	**6,922**

1/ Draft expense spending levels, further discussion will occur during the 2014 IPR

8.7 SUMMARY

The security asset management strategy seeks to balance compliance and graded protection initiatives to provide BPA with the most risk appropriate security, applying sound asset management principles and efficiencies to minimize costs and maximize the use of rate payer dollars. Process improvements and new design standards are the highlights of the current approach and will set the direction for the next decade.

ENERGY EFFICIENCY

ASSET STRATEGY SUMMARY

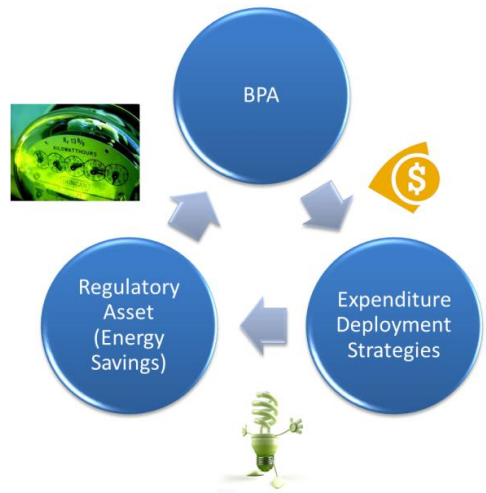
9 ENERGY EFFICIENCY

9.1 PROFILE OF ASSETS

BPA's asset strategies generally concern physical assets owned by BPA and its federal partners (e.g., hydroelectric dams, transmission facilities, Information Technology equipment). The energy efficiency asset is different than other BPA assets because the physical assets are acquired, owned, operated, and maintained by residential, industrial, commercial or other end-users. From BPA's perspective as a funding entity, the asset acquired is the energy efficiency resource, i.e., the electric energy savings produced by physical assets not owned by BPA, but by end-users. Since neither BPA nor BPA's customer utilities own the asset, BPA treats energy efficiency as a "regulatory asset." However, BPA is required to acquire the asset, which it does through a variety of expenditure deployment strategies, as explained in this asset strategy. BPA has extensive processes to ensure expenditures result in the achievement of real reductions in electric power consumption as a result of increases in efficiency of energy use, production, or distribution.

Below is a figure that demonstrates the relationship between BPA, expenditures, and the acquisition of a regulatory asset:

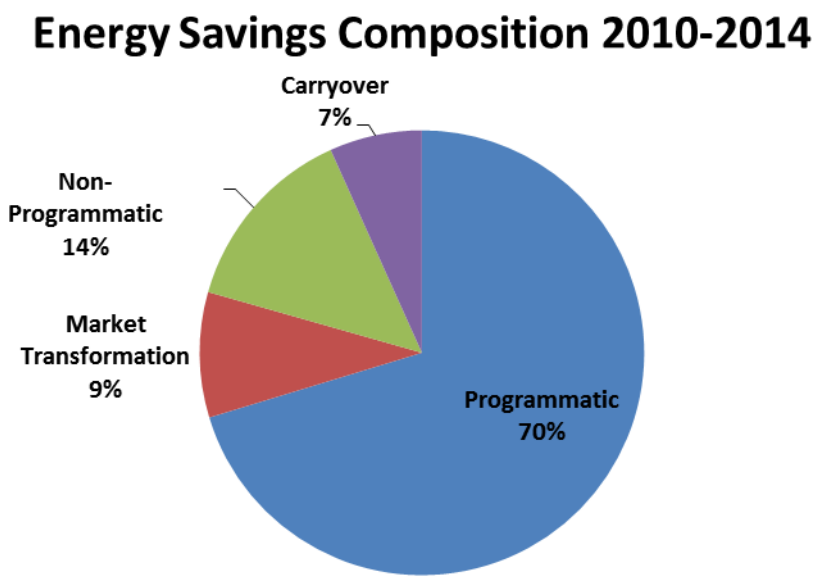
Figure 52



The energy efficiency asset serves the purpose of reducing the administrator's obligation to serve load as articulated in the 1980 Pacific Northwest Power Planning and Conservation Act (Power Act), which directs BPA to acquire cost-effective conservation.

Energy efficiency also differs from other BPA assets in that products and services produce the asset rather than the other way around. For example, the installation of energy efficient appliances (products) produces the energy savings (the regulatory asset). In this way, there are no energy efficiency asset groups as a kilowatt hour saved is a kilowatt hour not produced. The variation comes in how a kilowatt hour saved is captured by BPA. Generally, there are three types of energy savings: 1) programmatic savings, 2) market transformation savings, and 3) non-programmatic savings. Below is a graph that demonstrates the relative size, on a planning basis, of each of these savings types over the course of FY 2010-14.

Figure 53



9.2 Objectives of this Strategy

BPA's Long-Term Regional Dialogue Policy sets the BPA's overarching energy efficiency goal to "pursue conservation equivalent to all cost-effective conservation in the service territories of those public utilities served by BPA." These savings are to be achieved in partnership with public utilities at the lowest possible cost to BPA. Pursuing this objective allows BPA to meet its load obligations at low cost, maximize the value of the hydro system by "stretching the river," and minimize long-term economic costs by investing in the region's lowest cost resource.

To determine the amount of energy savings that constitutes "all cost-effective conservation," BPA looks to the power plans of the Northwest Power and Conservation Council (Council). Each power plan spans twenty years and sets a five-year regional target for cost-effective conservation with a portion of the target attributable to public power. The scope, therefore, of the asset strategy is the amount of energy savings defined in each power plan and attributed to public power. The planning horizon for this asset strategy, spanning 2014 through 2023, will cover the Council's Sixth, Seventh, and Eighth Power Plans.

Capital funds are essential for Energy Efficiency, working in collaboration with public power customers, to achieve its organizational objective and, perhaps more important, for BPA to meet its energy savings commitment. To facilitate savings acquisition, Energy Efficiency capital is split between covering the costs for 1) payments to utility customers for savings achieved and 2) the costs relating to BPA-managed program implementation. Covering program implementation costs with capital funds allows the region to reach implementation economies of scale across a wide variety of service territories, which lowers the overall regional cost of acquiring savings. An example of capital funds paying for program implementation is the Energy Smart Grocer program that allows utilities to use one regional implementer to acquire energy savings at grocery stores rather than having each utility run its own program or contract individually with an implementer.

9.3 STRATEGIC CHALLENGES

According to the Council's Sixth Power Plan, the population of the Pacific Northwest will increase from about 13 million in 2010 to about 16.7 million by 2030. Load is projected to increase from 21,000 average megawatts (aMW) to 28,000 aMW, a growth of 7,000 aMW. The implication is that the region will invest in energy efficiency rather than new generation facilities for at least 85 percent, or 5,900 aMW, of the expected load growth.

As one of six strategic priorities, BPA is pursuing energy efficiency to meet 85 percent of the load growth of regional public utilities through energy efficiency and conservation over 20 years.

Energy efficiency, therefore, is BPA's priority resource for meeting its customers' load growth. Energy efficiency is the lowest cost and least risk resource in the Pacific Northwest. It also:

- Reduces customer utilities' load and load growth and eliminates or defers the need for new generation and transmission infrastructure;
- Supports U.S. energy independence by reducing the need for imported fuel sources; and
- Contributes to climate change mitigation and adaptation efforts because it has a negligible carbon footprint.

A foundation for accomplishing the 85 percent load growth target was established through BPA's new tiered rate design now in effect through the Long-Term Regional Dialogue contracts. Preference customers can extend the value of their allocation of low-cost Tier 1 power from BPA by investing in energy efficiency, which reduces their load and defers their need to purchase more costly Tier 2 power or make other resource acquisitions.

The ambitious target in the Council's Sixth Power Plan required BPA and its customers to expand on existing methods as well as identify and develop new ways to acquire energy efficiency. The portfolio of programs, offerings and activities outlined in the 2012 Action Plan for Energy Efficiency (Action Plan), covering FY 2010-14, are designed to facilitate meeting public power's share of the Council's target. The Action Plan helps guide BPA's program decisions and its evaluation of progress toward the target.

Drivers

A host of drivers influence BPA's energy efficiency capital investments. First and foremost, the Power Act considers energy efficiency a priority resource. The Power Act specifically calls for the Council to create power plans and for BPA to act consistently with those plans. As mentioned above, the most recent power plan, the Sixth Power Plan, calls for the region to cover 85 percent of load growth with energy efficiency savings and, therefore, BPA's strategic objective is to act consistently with the Plan and ensure public power's share of the regional target is met. BPA and public power customers are committed to capturing energy efficiency benefits for the Pacific Northwest as set out in BPA's long-term strategic objective for energy efficiency: *"BPA and public power cooperatively accomplish public power's share of regionally cost-effective energy efficiency and demand management."*

Energy efficiency is expected to play a critical role in meeting future load growth because it is the lowest-cost resource available to the region. In addition to being the region's lowest-cost resource, energy efficiency allows BPA to meet its load obligations and plays a critical role in BPA's resource program. Other drivers for BPA's acquisition of energy efficiency include:

- Reducing BPA utility customers' exposure to higher costs for serving above high water mark loads;
- Reducing overall regional electricity consumption, which helps reduce the need for, and costs of,

acquiring power and further reduces the need for new transmission and distribution investments; and

- Reducing the amount of carbon emissions that would be emitted by some generation of electricity to serve load growth not otherwise reduced because of energy efficiency savings.

Challenges

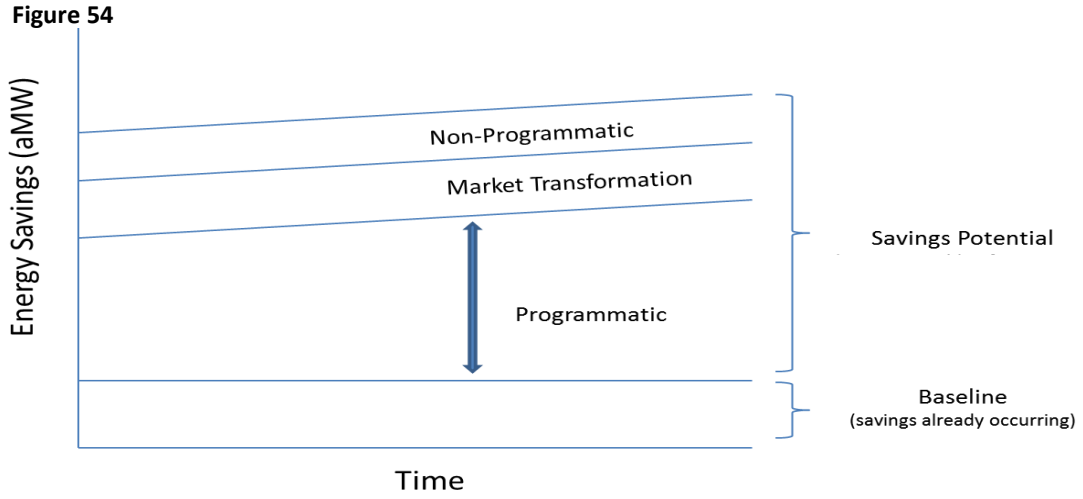
BPA faces two primary challenges to achieve its goal of meeting 85 percent of load growth with energy efficiency. The first concerns technology. After years of successfully acquiring energy savings from relatively inexpensive technologies (e.g., lighting from compact florescent lights), the region is transitioning from an era of "low hanging fruit" – low cost savings – to an era of more expensive cost-effective energy efficiency measures and, therefore, higher overall acquisition costs. The consequence of such an increase in overall cost is a failure to meet BPA's targets if spending levels do not keep pace with potentially escalating costs.

The second challenge concerns the mismatch between Washington State's Initiative 937 (I-937), which requires utilities with at least 25,000 customers to acquire energy efficiency, and the Council's power plan conservation targets. In effect, the mismatch results from target setting using different approaches: the Council's target is based on regional achievable potential and utility targets under I-937 are based on utility-specific conservation potential assessments. When the I-937 individual utility targets are added together, they do not add to the amount of conservation the power plan assumes those utilities will acquire. Thus, BPA's ability to achieve the regional target could be jeopardized since many of its largest public utilities will be acquiring savings at lower levels than the Council's plan assumes. BPA is aware of current legislation in Washington State that may minimize this concern.

9.4 Major Elements of the Strategy

To meet the ambitious goal of meeting 85 percent of load growth with conservation, Energy Efficiency pursues energy saving strategies in the following three areas, as the diagram illustrates below: 1) Programmatic; 2) Market Transformation; and 3) Non-Programmatic. At any given point in time, there is a certain amount of savings that have already been accounted for and comprise the baseline. Any savings above the baseline are eligible to be reported against BPA's targets. Programmatic savings are achieved with the use of capital funding, whereas market transformation and non-programmatic savings are achieved with expense funding.

Figure 54



Programmatic savings

Programmatic savings are achieved in two ways: through BPA's customer utilities and BPA regional programs. Customer utilities offer programs to incent end-users to save energy. Those energy savings are then reported to BPA, which pays the utilities for acquiring the savings. Utility programs achieve savings in each market sector (commercial, industrial, residential, agricultural) through a mix of Unit Energy Savings (i.e., savings on a per-unit basis), calculators (e.g., lighting), and custom projects and programs.

At least 70% of the capital funding made available to Energy Efficiency for acquiring energy efficiency savings is allocated to utility customers via Energy Conservation Agreements and the Energy Efficiency Incentive (EEI). Therefore, customers, not BPA, have direct control over the timing and specific use of these funds. EEI funds must be spent in a particular rate period on cost-effective energy efficiency savings that count toward public power's share of the regional target. Utilities must follow the Energy Efficiency Implementation Manual (IM) (http://www.bpa.gov/Energy/N/implementation.cfm) in order to be reimbursed. Energy Efficiency Contracts Administration provides receipt and acceptance as well as oversight on the savings acquisition and spending. Detailed information on measures and projects that are claimed toward the target are retained in the Energy Efficiency Database, an internal resource used for reference and future program design.

Energy Efficiency uses the portion of its capital spending not allocated to customers via the EEI mechanism to cover the costs of delivering regional programs. This includes the costs associated with managing regional programs, such as Energy Smart Grocer and Energy Smart Industrial. Energy Efficiency prioritizes the portion of the capital spending over which it retains control by directing it to regional programs that meet a market need or offer a program opportunity. Energy Smart Grocer is an example of a program that fills a niche need and has proven to be a successful delivery mechanism across BPA's service territory while meeting the diverse needs within BPA's customer base. Energy Smart Industrial is an example of a successful program that captured available energy efficiency that was not being fully tapped. With increased resources and focus, this potential has been successfully reached.

Market transformation savings

Market transformation savings leverage the regional market's power to accelerate innovation and adopt energy-efficient products, services and practices. Examples include collaborating with manufacturers to integrate energy efficiency into their product designs and with architects and builders to promote early adoption of energy efficient designs and practices. BPA partners with and is the major funder of the Northwest Energy Efficiency Alliance (NEEA), which promotes market transformation.

Non-programmatic savings

Non-programmatic savings are:

- Cost-effective; Above the assumed baseline for determining conservation potentials in the Council Plan;
- Not incented through utility-sponsored energy-efficiency programs; *and*
- Not part of net-market effects claimed by NEEA.

For instance, thousands of compact fluorescent light bulbs are purchased and installed in the region without the use of utility financial incentives. BPA tracks and accounts for these savings through data

collection to inexpensively capture the savings that count toward public power's target.

Key execution risks

BPA faces several risks that may jeopardize achieving BPA's energy efficiency strategic objective of meeting public power's share of the regional savings target.

- ***The costs for acquiring energy efficiency end up being more than what BPA has planned.*** Energy Efficiency estimates the cost of acquiring savings for each of the five years of a power plan. If actual costs are more than projected costs, there might not be enough funding to reach annual savings targets, which would increase the possibility of missing the five-year savings target. To mitigate this risk, the costs are managed at both the measure and portfolio levels. BPA sets reimbursement rates at levels that represent the value to the system as well as help move the market for a particular measure or technology. This allows some control on the uptake of a measure, although that is ultimately controlled by customer utility programs.
- ***Utility customers do not deliver 25 percent of the programmatic savings.*** BPA has planned to achieve 75 percent of public power's programmatic savings targets via the Energy Efficiency Incentive, i.e., payments paid by BPA to utilities. Utility customers are expected to achieve the remaining 25 percent without payment from BPA. This achievement split provides customers with a degree of local control and lowers BPA's wholesale power rate. Although this achievement split was agreed to during the original Post-2011 Public Process, it poses a risk to BPA's energy efficiency objective if customers do not deliver enough programmatic savings to reach the 25 percent target. For the FY 2012-13 rate period, utilities surpassed the target by delivering more than the projected 30 aMW. The risk, however, remains for FY 2014 and beyond, especially considering the mismatch between Washington State I-937 utility targets and the Council's power plans. This is being considered in the Post-2011 Review, that is currently taking place.
- ***The timing of BPA's setting of proposed spending and the setting of regional savings targets do not easily align.*** BPA's CIR, IPR and rate setting necessitate that Energy Efficiency's proposed spending is set before regional savings targets stipulated by the Council are known. For example, the FY 2014-15 IPR and rate case schedules have resulted in Energy Efficiency spending levels being set before the Seventh Power Plan conservation targets are known, which is now estimated to be late 2015. As was the case with the release of the Sixth Power Plan, BPA can revise out-year spending levels appropriately to meet the targets.

9.5 Results to be Achieved

By the end of the 2016-17 rate period, public power will be two years into the Council's Seventh Power Plan. Success, therefore, will be measured by whether public power is on track to meet the five year conservation target in the Seventh Power Plan. Because the Seventh Power Plan will not be final until the end of calendar year 2015, it is impossible to say at this point what "on track" looks like in terms of savings achievements as the overall five year target is not yet known.

9.6 Proposed Spending Levels

Without knowing the conservation targets in the Seventh Power Plan, it is difficult to confidently estimate the capital level of funding for Energy Efficiency over a ten year planning horizon. However, the five year savings target in the Sixth Power Plan is based on a twenty year power plan and it is the twenty year plan that envisions 85% of load growth being met through conservation. Therefore, it is likely a safe assumption that the savings target in the Seventh Power Plan will not be significantly lower than the

target in the Sixth Power Plan. In fact, the twenty year plan assumes an upward trend of targets over time, so it is more likely the Seventh Power Plan target will be larger than the one in the Sixth Power Plan. At this point, however, such an increase is speculative. Therefore, as the regional power planning and post 2011 review processes evolve, the 10-year planning horizon for Energy Efficiency capital funding only assumes annual proposed spending levels are increased by the rate of inflation beginning in FY 2015 (as was also done in the last CIR).

Figure 55

	Proposed Capital Spending Levels										
($ millions)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
EE Incentive (EEI)	52.6	64.4	66.3	68.3	70.4	72.5	74.7	76.9	79.2	81.4	706.7
BPA-Managed	22.6	27.6	28.4	29.3	30.2	31.1	32.0	33.0	33.9	34.9	303.0
Total	**75.2**	**92.0**	**94.8**	**97.6**	**100.5**	**103.6**	**106.7**	**109.9**	**113.1**	**116.3**	**1,009.7**

*This is from the Energy Efficiency strategy

FISH AND WILDLIFE

ASSET STRATEGY SUMMARY

10 FISH AND WILDLIFE

This asset strategy was prepared before BPA's proposal to reduce costs. Spending levels in this document do not tie to proposed capital reductions. The strategy will be revised upon conclusion of the CIR and the IPR.

10.1 PURPOSE AND SCOPE

BPA is responsible for the protection, mitigation and enhancement of fish and wildlife affected by the construction and inundation impacts of the Federal Columbia River Power System (FCRPS). BPA is guided in its program implementation by the Northwest Power and Conservation Council's (Council) Fish and Wildlife Program (Program) and the associated biological opinions that regulate the operation of the FCRPS (i.e. 2009 FCRPS BiOp). The Council provides project selection and funding recommendations for the construction of fish facilities and acquisition of land under the Program informed by their public and scientific review procedures. Subsequently, through BPA's spending level review processes; the CIR and IPR, proposed capital and expense spending levels are developed for program implementation. Once BPA receives Council recommendations projects are selected for funding. This funding activity supports Program purposes, such as mitigation for construction and inundation, providing habitat for wildlife, securing riparian buffers to protect streams for fish, and providing land for construction of fish hatcheries.

Funding the construction of a facility or acquisition of land under the proposed capital spending level portion of the Program does not result in BPA taking title or owning the facility or land (reflects current program policy). The funded entity or sponsor (usually a Tribe, state or other federal agency) takes title on a permanent basis together with ownership responsibilities (i.e. payment of property taxes). BPA's asset value in a property is secured through the use of a required conservation easement that is placed on the property. The conservation easement gives BPA enforcement rights on the property in perpetuity to ensure the natural resource values (wildlife benefits) are for ever protected. The main thrust is to maximize asset value consistent with sound business practices, while optimizing the use of limited capital and staff resources.

10.2 BACKGROUND

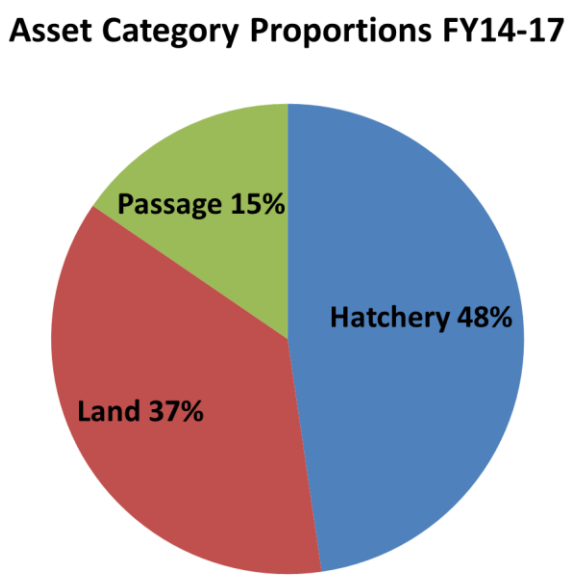
Performance objectives for wildlife mitigation and land acquisition were determined by Council driven loss assessments conducted in the 1980's and formalized in the Council's Fish and Wildlife Program, most recently updated in 2009, however, the Council is currently involved in a new public updating process to prepare an amended program in 2014. For critical assets, asset owners and operators develop asset management plans that identify how the asset is being maintained to ensure the value is sustained year after year. Hatchery strategies have resulted in increased juvenile and adult returns. Within the Columbia River Basin, all hatchery programs are under review. The Hatchery Scientific Review Group (HSRG) has reviewed hatchery and wild stocks to improve management practices to meet conservation goals while providing for sustainable fisheries. The review process encompasses all anadromous hatchery programs in the Columbia River Basin and addresses changes and reforms in hatchery practices.

Wildlife mitigation targets are nearing completion. The acquisition of wildlife land, and subsequent conservation easements, ensures the long-term conservation value of the asset. A management plan is prepared for each property that identifies the activities to sustain, restore, and enhance the value and benefit of the original investment. The value has been increased for these properties as determined by the recent Council Wildlife Crediting Forum.

10.3 Profile of Assets

The Fish and Wildlife organization has three major asset categories. The three categories are land acquisitions for wildlife credit, major hatchery construction and tributary passage improvements. Land acquisitions for wildlife credit are a requirement to mitigate for the flooding and inundation of the dams. Each hydro project has a wildlife loss assessment that BPA is responsible to fund and pay for O&M to fulfill the obligation. Current major hatchery construction projects are mainly driven by the Columbia Basin Fish Accords. Hatcheries are being built across the NW States to supplement and reintroduce extirpated species such as Salmon and Steelhead back into the Columbia River Basin. Hatcheries range in production from a few hundred thousand to several million juveniles that are released annually into rivers, streams and reservoirs. Tributary Passage improvements aid in the survival and extend the habitat reach in rivers and streams for both anadromous and resident species. Improvements consist of culvert installations or removal, blocking or screening drainage ditches from river canals and improvements such as small dam removal that open additional miles of stream habitat.

Figure 56



10.4 Asset Management Objectives

The collaborative and shared responsibility characteristics of the BPA Fish and Wildlife program performance objectives are set by Biological Opinions, court orders, and Council recommendations. BPA does not own, operate or maintain fish and wildlife facilities or land. BPA does provide sources of funding to deliver on recommendations for hatchery and fish facility additions, upgrades and replacements and the acquisition of conservation land parcels and easements.

Hatchery and Fish Facility Assets

BPA Fish and Wildlife Management receives from the Council decision letters that make recommendations on projects to fund. The Council enacts a rigorous process to approve facilities that entails environmental compliance, biological benefit and scientific review. BPA's objective is to make funding decisions based on capital availability and annual constraints to deliver on these Council recommendations. Once hatcheries or other fish facilities are constructed BPA turns over ownership to the sponsor who owns the asset but continues to fund operations and maintenance of the facility.

Land Assets

Over the history of the BPA Fish and Wildlife Program various agreements have been reached with acquisition sponsors based on the Council Fish and Wildlife Program and Loss Assessments. In these agreements BPA commits to providing "pre-acquisition" funding to allow the sponsor to find potential parcels and obtain and prepare various acquisition documents; appraisals, titles, maps, sales agreements, etc. As the sponsor nears completion of this pre-acquisition work they propose a level of mitigation credit they will extend to BPA in exchange for funding. BPA then negotiates a conservation easement to establish how the properties are to be maintained, what activities are prohibited, and BPA's enforcement right.

Tributary Passage

Management objectives surrounding passage improvements are part of the overall strategy to rebuild rivers and streams for fish survival and reproduction. The strategy around passage improvements is to locate areas that need improvement that will provide the largest benefit comparatively. To date the program has opened up hundreds of miles of river habitat that had been blocked by primarily man made structures providing increased access to spawning grounds. Fish screens in heavily irrigated areas around the region have been a major focus of the Program to provide safe passage for both anadromous and resident fish from destructive irrigation channels.

10.5 Key Drivers

The following are key drivers in determining level of funding of the Fish & Wildlife program:

- Need to increase habitat for wildlife and resident fish
- Need to increase adult fish returns and mitigate impacts of hydro projects
- Need to improve out-migration of juvenile fish and increase adult spawning habitat

BPA and the region benefit from these investments through the mitigation of effects of hydro operations and enable continued operation of the Federal Hydro projects in the Columbia River system.

10.6 Strategic Challenges

There are many uncertainties and risks that impact the fish and wildlife program and salmon recovery and wildlife mitigation.

- For wildlife land acquisitions, willing sellers in priority locations (associated with FCRPS dams) are at times difficult to identify. Political pressures affect land acquisitions due to concern over property value and taxes (i.e. the affect of lands moving into a "trust" status)
- The risks associated with meeting hatchery objectives are complex and involve, for example, an entities ability to identify a location that has adequate water supplies, secure environmental

permits, broodstock availability, acclimation facilities, etc.

- Risks to filling gaps for fish passage include local government and private landowner practices, meeting permit requirements, and road development that create barriers to potential healthy habitat.

In addition, risks include everything from operational failures, to natural events, like fire and weather, to court ordered harvest rules and ocean conditions.

10.7 Strategy Direction

The Fish and Wildlife asset category will enhance its asset strategy by conforming as closely as possible to BPA's policy on developing asset management strategies (BPAM 661). This enhanced strategy will focus on investments for which BPA retains discretion to influence the relative prioritization, selection, implementation, and on-going support of investments and land acquisitions.

Wildlife objectives are being met with current program strategies of funding land acquisitions that provide significant wildlife benefit toward achieving completion of BPA's mitigation obligation. The program is moving toward settlement agreements to define the obligation and establish a dollar amount and habitat units to extinguish the obligation. Also included in these settlement agreements are O&M stewardship payments for the long-term maintenance of the properties. By defining the dollars, O&M funds and habitat units remaining to extinguish the obligation the Program and sponsors have gained certainty of future funding to plan operations while also extinguishing the need for funding after all required purchases are made.

In general, hatchery production is used to increase juvenile out-migration and thus an increase in adult returns, but for some fish populations needing additional support, it has been determined that additional hatcheries are required. For hatcheries, the need is to supplement fish populations of concern under ESA as guided by the various BiOp's. BPA's strategy is to continue working with sponsors through the Northwest Power and Conservation Council's Three Step program to fund hatchery projects.

Access to available habitat needed to increase spawning continues to be limited by various obstacles. For passage improvements, the need is to ensure BPA's ability to increase the amount of smolt out-migration and as returning adult numbers increase the need is to ensure access to available high-quality habitat.

Additionally, BPA has reached settlement agreements in many forms, including Land Use Agreements (LUAs), Accords, Memorandum of Agreements (MOA's) and settlement agreements that guide BPA's future direction.

10.8 Results to be Achieved

Results to be achieved for each of the asset categories are unique to that category. Hatchery success will be measured first based on if the hatchery was built on schedule and within the forecast. It will then be measured by its productivity (i.e., healthy juvenile fish released annually). Over the long-term the hatchery will be evaluated to determine that its meeting its objective of supplementing and/or reintroducing species into critical areas determined by the BiOp.

Tributary Passage results will be measured primarily by the safety provided to the rivers and streams, but also in determining that the reopened habitat is being utilized for reproduction. The Program monitors these improvements and reports when increased habitat is being utilized.

Land acquisitions for wildlife credit will be measured over two objectives. The acquisitions under a settlement agreement will be reviewed to determine that progress is being made each year to extinguish the obligation within the timeframe set within the agreement. A major achievement being realized is not only the extinguishment of the obligation but the extinguishment of the O&M costs associated with the purchases thru the establishment of long term stewardship funding that is for the life of the property. These stewardship funds extinguish future obligations from BPA and is a long-term saving to the rate payers. For purchases that are outside a settlement agreement, the program will be measured on its ability to enter into settlement agreements or to better define the outstanding obligation and come to agreement with the States to ultimately move toward completion of the mandated purchases.

10.9 Proposed Spending Levels

There is a growing O&M responsibility due to past investments. However, that O&M responsibility is met through expense spending, of approximately $15 million per year for the wildlife program. For land acquisition in FY 2012 the program spent $26 million. For hatcheries the program spent $23.6 million and for passage/other $7.9 million was spent in FY 2012. The total FY 2012 capital spending was $57.5 million.

For land acquisition in FY 2013 the program spent $19.1 million. For hatcheries the program spent $21.3 million and for passage/other $11.7 million was spent in FY 2013. The total FY 2013 capital spending was $52.1 million.

For land acquisition in FY 2014 the capital forecast is $22.3 million. The hatchery capital forecast is $20.1 million and for passage/other the forecast is $7.6 million. The total FY 2014 capital forecast is $50 million.

Figure 57 - Annual proposed capital spending for FY 2014-23

	Proposed Capital Spending Levels										
($ millions)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Hatchery	20.1	28.7	33.1	7.3	0.0	9.0	9.0	7.3	2.5	2.5	119.7
Land	22.3	16.5	15.1	15.3	12.0	19.2	19.4	19.7	19.9	20.1	179.5
Passage	7.6	6.6	6.6	8.2	6.6	6.6	6.6	6.6	6.6	6.6	68.7
Total	**50.0**	**51.8**	**54.8**	**30.8**	**18.6**	**34.8**	**35.0**	**33.6**	**29.0**	**29.3**	**367.8**

*This is from the Fish and Wildlife strategy

11 Other Investment Programs

11.1 Columbia Generating Station

The Columbia Generating Station forecast provided represents investment levels consistent with Energy Northwest's Long-Range Plan and the BP-14 Final Proposal. The Long-Range Plan will be refreshed including updated capital and expense forecasts in the Spring of 2014 and will be shared during the 2014 IPR process.

Figure 58 – CGS Capital Forecast

	Proposed Capital Spending Levels										
($ thousands)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
CGS	222,773	126,908	147,744	114,967	121,636	65,126	73,938	57,891	90,762	-	1,021,745

11.2 Columbia River Fish Mitigation

The Columbia River Fish Mitigation Program (CRFM) was established by Congress in the early 1990's to fund anadromous fish passage facilities at eight Corps of Engineer dams on the Columbia and Snake Rivers. The program has expanded to include work in the Columbia River estuary as well as at Corps of Engineer dams on the Willamette River. This program is funded through annual Congressional appropriations to the Corps of Engineers. BPA is responsible for the repayment of the power portion of the spending, approximately 80% of the total. The current expectation is that program will end in 2023.

Figure 59 – CRFM Capital Forecast

	Actuals	Proposed Capital Spending Levels										
($ thousands)	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
CRFM	~	78,577	137,096	95,220	61,932	38,907	50,646	4,467	38,436	-	-	505,280
Cumulative Investment	1,323,152	1,401,729	1,538,825	1,634,045	1,695,978	1,734,884	1,785,530	1,789,997	1,828,432	1,828,432	1,828,432	18,389,436

12 CONCLUSION

The complete draft asset strategies are located online. BPA requests your comments by April 11, 2014 in order to inform the Debt Management Workshops soft close out for the 2014 CIR. In addition, BPA will offer workshops the week of March 10 to follow up on any requests for additional information or questions pertaining to this report or draft asset strategies. Please submit any requests for information or questions online or via email to comments@bpa.gov by March 5, 2014.

13 FINANCIAL DISCLOSURE

This information has been made publicly available by BPA on February 18, 2014, and contains information not reported in BPA financial statements.

14 ACRONYM GLOSSARY

AC	Alternating Current
AF	Availability Factor
AGC	Automatic Generating Control
ALF	Albeni Falls
AMP	Asset Management Plan
AMS	Asset Management Strategy
aMH	Average Megawatt
AND	Anderson Ranch
BCD	Black Canyon
BCL	Big Cliff Dam
BDD	Boise Diversion Dam
BiOp	Biological Opinion
BFTE	Bonneville Full Time Equivalency
BON	Bonneville Dam
BPA	Bonneville Power Administration
BSDR	Business System Disaster Recovery
BUD	Bonneville User Domain
CAB	Capital Allocation Board
CASP	Critical Asset Security Plan

CDR	Chandler
CIR	Capital Investment Review
CFTE	Contractor Full-Time Equivalent
CGL	Grand Coulee
CGS	Columbia Generating Station
CGR	Cougar
CHJ	Chief Joseph
CIP	Critical Infrastructure Protection
CMMS	Computerized Maintenance Management System
COOP	Continuous Operation
Corps	United States Army Corps of Engineers
Council	Northwest Power and Conservation Council
CRFM	Columbia River Fish Mitigation
DHS	Department of Homeland Security
DET	Detroit
DEX	Dexter
DNS	Domain Name System
DR	Disaster Recovery
DVR	Digital Video Recorder
DWR	Dworshak

EAM	Enterprise Asset Management
EPIP	Enterprise Process Improvement Project
ESA	Endangered Species Act
EUL	Estimated Useful Life
FBPTA	Federal Buildings Personnel Training Act
FAM	Facilities Asset Management
FCRPS	Federal Columbia River Power System
FERC	Federal Energy Regulatory Commission
FMO	Facilities Management Officer
FOS	Foster
GADS	Generating Availability Data System
GPR	Green Peter
GSP	Green Springs Project
GSP	Graded Security Policy
GSA	General Services Administration
HCR	Hills Creek
HGH	Hungry Horse
HSPD	Homeland Security Presidential Directive
IHR	Ice Harbor
ICAM	Identity, Credentials, and Access Management

iCMMS	Interim Computerized Maintenance Management System
IPR	Integrated Program Review
IPv6	Internet Protocol version 6
IT	Information Technology
ITPI	Information Technology Performance Indicators
IVC	IT Virtualization and Consolidation
JDA	John Day
LGS	Little Goose
LIB	Libby
LMN	Lower Monumental
LOP	Lookout Point
LOS	Lost Creek
LWG	Lower Granite
MCN	McNary
MIN	Minidoka
MTTF	Mean Time To Failure
MWH	Megawatt Hour
NERC	North American Electric Reliability Corporation
NPV	Net Present Value
NSS	Facilities project management Sourcing Services

NVR	Network Video Recorder
NW	Workplace Services
O&M	Operations and Maintenance
OSCO	Office of Security and Continuity of Operation
PAL	Palisades
PCB	Polychlorinated Biphenyls
PSC	Power System Control
PTZ	Pan Tilt Zoom
QBR	Quarterly Business Review
Reclamation	United States Bureau of Reclamation
ROZ	Roza
SaaS	Software as a Service
SANS	System Admin, Audit, Networking, and Security
SCADA	Supervisory Control and Data Acquisition
SCOAC	Security Operations Analysis Center
SPAP	System Performance Assurance, Component Testing and Preventative Maintenance Program
SME	Subject Matter Expert
SONET	Synchronous Optical Network
SPC	System Protection and Control
TCO	Total Cost of Ownership

TDA	The Dalles
TEP	Transmission Project Management Office
UNITE	Utility Information Technology Benchmark
VRF	Violation Risk Factor
VSL	Violation Security Level
WECC	Western Electricity Coordinating Council